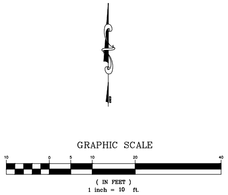
SITE PLAN

36 Pinewood Lane
Situated in the City of Hudson,
County of Summit and State of Ohio
PPN: 3202736

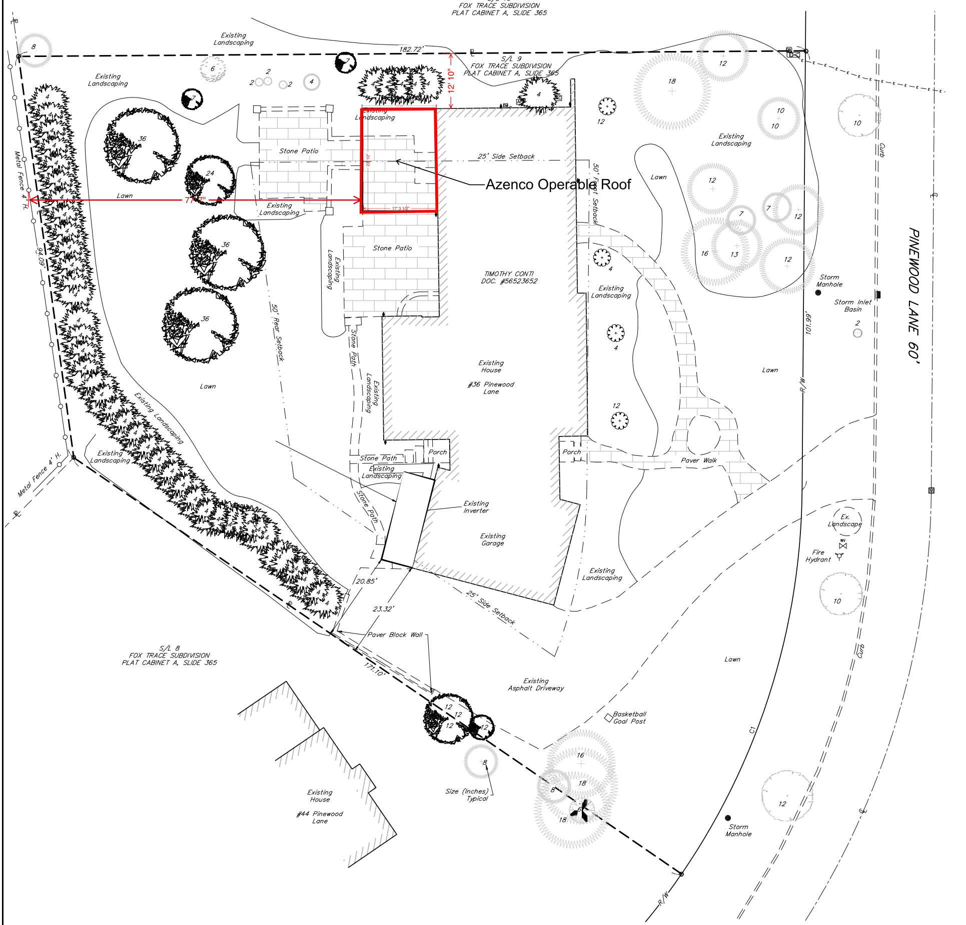


GRAPHIC SCALE

(IN FEET)
1 inch = 10 ft.

Curve Table					
Curve #	Length	Radius	Delta	Chord Direction	Chord Length
C1	94.97'	160.00'	34°00'30"	N17°25'58"E	93.58'

***NO EXISTING TREES ARE TO BE DISTURBED OR REMOVED FOR THE DURATION OF THE PROJECT.



TOPOGRAPHIC LEGEND

- Hydrant
- Water Valve
- Water Shutoff
- Water Meter Pit
- Well
- Roof Drain
- Storm Manhole
- Inlet Basin
- Catch Basin
- Yard Drain
- Light Pole
- Flood Light
- Sign
- Telephone Manhole
- Guy Wire
- Traffic Signal
- Utility Pole
- Signal Pole
- Soil Test Point
- Signal Box
- Sanitary Manhole
- Cleanout
- Gas Line Marker
- Gas Valve
- Gas Meter
- Gas Shutoff
- Gas Test Station
- Bollard
- Bench Mark
- Air Conditioning Unit
- Telephone Pedestal
- Transformer
- Cable Pedestal
- Electric Meter
- Electric Pull Box
- Mail Box
- Deciduous Tree
- Coniferous Tree
- Bush
- Traffic Pull Box
- Overhead Lines
- Underground Gas
- Underground Electric
- Underground Cable
- Underground Telephone
- Underground Fiber

TREE TYPE LEGEND

- ARBORVITAE
- SWEET GUM
- PINE
- MAPLE
- CHERRY
- CEDAR
- ORNAMENTAL

Dimensions to property lines are shown to foundation wall only and do not include overhangs or footer locations.

Foundation dimensions shown are for rough field layout only, see Architectural House Plans for all dimensions.

TWO WORKING DAYS BEFORE YOU DIG
Call 1-800-362-2764
TOLL FREE
Outside Ohio 216-744-5191
OHIO UTILITIES PROTECTION SERVICE

DATE:	DESCRIPTION:	BY:
10/07/22	SITE PLAN	RJP

Lewis Land Professionals, Inc.
Civil Engineering & Surveying
8691 Wadsworth Rd. Suite 100 Wadsworth, Ohio 44281
Phone: (330) 335-8232
www.landprosinc.com

DATE OF SURVEY: OCTOBER 4, 2022

PROJ. No. 22-287 DRAWING NAME 22-287.dwg

GOVERNING CODES & STANDARDS

BUILDING CODE:	OBC 2024	OHIO BUILDING CODE
	IBC 2021	INTERNATIONAL BUILDING CODE
STANDARDS:	ASCE 7-16	AMERICAN SOCIETY OF CIVIL ENGINEERS: MINIMUM DESIGN LOADS FOR BUILDINGS AND OTHER STRUCTURES
	ADM	THE ALUMINUM ASSOCIATION: SPECIFICATION FOR ALUMINUM STRUCTURES
	ACI 318	AMERICAN CONCRETE INSTITUTE: BUILDING CODE REQUIREMENTS FOR STRUCTURAL CONCRETE
	TMS 402	THE MASONRY SOCIETY: BUILDING CODE REQUIREMENTS FOR MASONRY STRUCTURES
	ASC 360	AMERICAN INSTITUTE OF STEEL CONSTRUCTION: SPECIFICATION FOR STRUCTURAL STEEL BUILDINGS
	AISC 341	AMERICAN INSTITUTE OF STEEL CONSTRUCTION: SEISMIC PROVISIONS FOR STRUCTURAL STEEL BUILDINGS
	AWS D1.1	AMERICAN WELDING SOCIETY: STRUCTURAL WELDING CODE - STEEL
	AWS D1.3	AMERICAN WELDING SOCIETY: STRUCTURAL WELDING CODE - SHEET STEEL
	AWS D1.4	AMERICAN WELDING SOCIETY: STRUCTURAL WELDING CODE - REINFORCING STEEL
	AISI S100	AMERICAN IRON AND STEEL INSTITUTE: NORTH AMERICAN SPECIFICATION FOR THE DESIGN OF COLD-FORMED STEEL STRUCTURAL MEMBERS
	AWC NDS	AMERICAN WOOD COUNCIL: NATIONAL DESIGN SPECIFICATION FOR WOOD CONSTRUCTION
	AWC SPDWS	AMERICAN WOOD COUNCIL: SPECIAL DESIGN PROVISIONS FOR WIND AND SEISMIC
	ASTM	AMERICAN SOCIETY FOR TESTING AND MATERIALS

DESIGN CRITERIA

1. DEAD LOADING
   A. SUPERIMPOSED DEAD LOAD — 5 PSF (IN ADDITION TO THE STRUCTURE SELF WEIGHT)
2. LIVE LOADING
   A. ROOF LIVE LOAD — 20 PSF (REDUCIBLE)
3. RAIN LOADING
   A. DESIGN RAINFALL: 4.5"/HOUR (100-YEAR, 1-HOUR RAINFALL)
      a. RAINWATER AT LOWEST POINT OF ROOF SHALL NOT POND DURING DESIGN RAINFALL
   B. DESIGN RAIN LOAD, R: — 20 PSF
4. SNOW LOADING
   A. GROUND SNOW LOAD — 25 PSF
   B. MIN ROOF LOAD — 25 PSF
   C. SNOW EXPOSURE FACTOR — 1.0
   D. SNOW LOAD IMPORTANCE FACTOR — 1.0
   E. THERMAL FACTOR — 1.2
5. WIND LOADING INPUTS
   A. RISK CATEGORY — II
   B. ULTIMATE WIND SPEED — 115 MPH (ASD=SQRT(0.6)*Vult)
   C. WIND EXPOSURE FACTOR — C
   D. DIRECTIONALITY/OTHER FACTORS — Kd=0.85, G=0.85, Kz=0.85, Kzt=1.0
   E. METHODOLOGY — OPEN HOST ATTACHED CANOPY
   F. MEAN ROOF HEIGHT — 8' - 6"
   G. SYSTEM MOUNTING HEIGHT — 0' - 0"
6. SEISMIC LOADS
   A. RISK CATEGORY — II
   B. SITE CLASS — D
   C. S_S — 0.134
   D. S_{DS} — 0.143
   E. S_1 — 0.049
   F. S_{D1} — 0.078
   G. SEISMIC DESIGN CATEGORY (SDC) — B
   H. LONG TRANSITION PERIOD (T_L) — 12
   I. LATERAL RESISTING SYSTEM — NONSTRUCTURAL COMPONENTS (APPENDAGES & ORNAMENTATIONS)
   J. REDUNDANCY FACTOR, ρ: — 1.0
   K. OVERSTRENGTH FACTOR, Ωo: — 2.0
   L. RESPONSE MODIFICATION FACTOR, R: — 2.5
   M. AMPLIFICATION FACTOR: — 2.5
7. SERVICEABILITY:
   a. TOTAL LOAD DEFLECTION: — L/120
   b. LIVE LOAD DEFLECTION: — L/180

EARTHWORK & FOUNDATIONS

A. THE INFORMATION HEREIN MAY BE USED BY THE CONTRACTOR FOR HIS GENERAL REFERENCE ONLY. A GEOTECHNICAL REPORT AND RECOMMENDATIONS SHALL SUPERSEDE THE MINIMUM CRITERIA STATED IN THE STRUCTURAL GENERAL NOTES.
B. PILE/GROUND SCREW FOUNDATION SYSTEM ARE DESIGNED BASED ON THE FOLLOWING DESIGN CRITERIA PER THE ICC REPORT ESR-4226:
   A. PILE TYPE: GROUND SCREWS
   B. PILE SIZE: 4 1/2" INCH DIAMETER
   C. PILE SERVICE COMPRESSION CAPACITY: 38.7 KIPS
   D. PILE SERVICE TENSION CAPACITY: 9 KIPS
   E. PILE SERVICE SHEAR CAPACITY: 11.5 KIPS
   F. PILE SERVICE MOMENT CAPACITY: 4.36 KIPS
   G. PILE APPROXIMATE DEPTH: 6' - 6" BELOW EXISTING GROUND LEVEL
   H. DESIGN SERVICE COMPRESSION: 2.0 KIPS
   I. DESIGN SERVICE TENSION: 0.2 KIPS
   J. DESIGN SERVICE SHEAR: 0.4 KIP
   K. DESIGN SERVICE MOMENT: 1.98 KIP-FT
C. ASSUMED PILE DEPTH SHALL BE VERIFIED IN FIELD BY QUALIFIED GEOTECHNICAL ENGINEER RETAINED BY THE OWNER.
D. CENTER ALL POSTS UNDER THEIR RESPECTIVE PILES.
E. THE CONTRACTOR IS SOLELY RESPONSIBLE FOR ALL EXCAVATION PROCEDURES INCLUDING, BUT NOT LIMITED TO: LAGGING, SHORING, AND PROTECTION OF ADJACENT PROPERTY, STRUCTURES, STREETS, AND UTILITIES IN ACCORDANCE WITH THE REQUIREMENTS OF THE LOCAL BUILDING DEPARTMENT AND OSHA REGULATIONS.
F. EXCAVATION SHALL NOT OCCUR WITHIN ONE FOOT OF THE ANGLE OF REPOSE OF ANY SOIL BEARING FOUNDATION UNLESS THE FOUNDATION IS PROTECTED AGAINST SETTLEMENT.
G. CONTRACTOR SHALL DETERMINE THE EXTENT OF THE CONSTRUCTION DEWATERING SYSTEMS REQUIRED FOR THE EXCAVATION. AT A MINIMUM, CONTRACTOR SHALL PROVIDE POSITIVE DRAINAGE AWAY FROM THE BUILDING SITE.

EXISTING CONDITIONS & DEMOLITION

1. EXISTING CONDITIONS
   A. THE CONTRACTOR SHALL VERIFY ALL DIMENSIONS AND CONDITIONS OF EXISTING BUILDINGS AT THE CONSTRUCTION SITE AND REPORT ANY DISCREPANCIES FROM THE ASSUMED CONDITIONS SHOWN ON THE DRAWINGS TO THE ARCHITECT/STRUCTURAL ENGINEER OF RECORD PRIOR TO FABRICATION OR ERECTION OF ANY STRUCTURAL MEMBER.
   B. EXISTING CONDITIONS SHALL BE SHOWN HALFTONE ON THE CONTRACT DRAWINGS UNLESS NOTED OTHERWISE.
   C. EXISTING CONDITIONS SHOWN ON THE CONTRACT DRAWINGS WERE OBTAINED FROM EXISTING CONSTRUCTION DOCUMENTS AND LIMITED SITE OBSERVATION. DRAWINGS OF EXISTING CONSTRUCTION ARE AVAILABLE TO THE CONTRACTOR UPON REQUEST TO THE OWNER. HOWEVER, THE AVAILABLE DRAWINGS OF THE EXISTING CONDITIONS ARE NOT NECESSARILY COMPLETE. THE CONTRACTOR SHALL FIELD VERIFY ALL APPLICABLE INFORMATION.
   D. THE CONTRACTOR SHALL VERIFY THE LOCATION OF EXISTING UTILITIES PRIOR TO START OF CONSTRUCTION AND ENSURE PROTECTION OF EXISTING UTILITIES THAT REMAIN IN SERVICE.

STRUCTURAL ALUMINUM & ALUMINUM WELDING:

1. ALL COMPONENTS SHALL BE STRUCTURAL ALUMINUM (U.N.O.) AND SHALL BE FABRICATED AND ERECTED ACCORDING TO THE GOVERNING BUILDING CODE AND MATERIAL STANDARDS REFERENCED ON THIS SHEET.
2. ALL STRUCTURAL ALUMINUM SHALL BE MIN 1/8" THICK U.N.O. AND BE OF THE FOLLOWING ALLOY AND TEMPER:
   A. BEAMS, PURLINS, COLUMNS — 6063-T6
   B. ALL OTHER EXTRUSIONS — 6063-T6
   C. FASTENERS — SS 316
3. STRUCTURAL ALUMINUM SHALL BE FRAMED PLUMB AND TRUE AND ADEQUATELY BRACED DURING CONSTRUCTION.
4. WHERE ALUMINUM IS IN CONTACT WITH OTHER METALS EXCEPT 300 SERIES STAINLESS STEEL, ZINC OR CADMIUM AND THE FAYING SURFACES ARE EXPOSED TO MOISTURE, THE OTHER METALS SHALL BE PAINTED OR COATED WITH ZINC, CADMIUM, OR ALUMINUM.
5. UNCOATED ALUMINUM SHALL NOT BE EXPOSED TO MOISTURE OR RUNOFF THAT HAS COME IN CONTACT WITH OTHER UNCOATED METALS EXCEPT 300 SERIES STAINLESS STEEL, ZINC, OR CADMIUM. ALUMINUM SURFACES TO BE PLACED IN CONTACT WITH MASONRY, CONCRETE, WOOD, FIBERBOARD, OR OTHER POROUS MATERIAL THAT ABSORBS WATER SHALL BE PAINTED.
6. FOR ALUMINUM IN CONTACT WITH CONCRETE: ACCEPTABLE PAINTS: PRIMING PAINT (ONE COAT), SUCH AS ZINC MOLYBDATE PRIMER IN ACCORDANCE WITH FEDERAL SPECIFICATION TT-P-645B ("GOOD QUALITY", NO LEAD CONTENT). ALT: HEAVY COATING OF ALKALI-RESISTANT BITUMINOUS PAINT. ALT: WRAP ALUMINUM WITH A SUITABLE PLASTIC TAPE APPLIED IN SUCH A MANNER AS TO PROVIDE ADEQUATE PROTECTION AT THE OVERLAPS.
7. ALUMINUM SHALL NOT BE EMBEDDED IN CONCRETE TO WHICH CORROSIVE COMPONENTS SUCH AS CHLORIDES HAVE BEEN ADDED IF THE ALUMINUM WILL BE ELECTRICALLY CONNECTED TO STEEL. EMBEDDED ALUMINUM ELEMENTS WILL BE COVERED WITH PLASTIC TAPE OR OTHERWISE PROTECTED AS PER 2020 ADM M.7.3.
8. BOLT HOLES SHALL BE DRILLED IN THE SAME NOMINAL DIAMETER AS THE BOLT + 1/16".
9. ALUMINUM WELDING SHALL BE PERFORMED IN ACCORDANCE WITH WELD FILLER ALLOYS MEETING ANSI/AWS A5.10 STANDARDS TO ACHIEVE ULTIMATE DESIGN STRENGTH IN ACCORDANCE WITH THE ALUMINUM DESIGN MANUAL PART I-A, TABLE 7.3.1. ALL ALUMINUM CONSTRUCTION SHALL BE IN CONFORMANCE WITH THE TOLERANCES, QUALITY, AND METHODS OF CONSTRUCTION AS SET FORTH IN THE AMERICAN WELDING SOCIETY'S STRUCTURAL WELDING CODE ALUMINUM (D1.2). MINIMUM WELD IS 1/8" THROAT FULL PERIMETER FILLET WELD UNLESS OTHERWISE NOTED.
10. STAINLESS STEEL FASTENERS SHALL BE ASTM F593 316 SS COLD WORKED CONDITION. PROVIDE (5) PITCHES MINIMUM PAST THE THREAD PLANE FOR ALL SCREW CONNECTIONS. ALL FASTENER CONNECTIONS TO METAL SHALL PROVIDE 2xDIAMETER EDGE DISTANCE AND 3xDIAMETER SPACING.
11. SELF-DRILLING SCREWS SHALL BE TEK BRAND / ALL POINTS FASTENERS OF SIZE #14, STAINLESS STEEL 300 SERIES, WITH MINIMUM 1/2" THREAD ENGAGEMENT BEYOND THE CONNECTED PART, UNLESS OTHERWISE NOTED.
12. THE CONTRACTOR IS RESPONSIBLE TO INSULATE ALL MEMBERS FROM DISSIMILAR MATERIALS TO PREVENT ELECTROLYSIS.

STRUCTURAL WOOD

1. ALL DIMENSION LUMBER SHALL BE STRUCTURAL GRADE #2 SOUTHERN YELLOW PINE OR BETTER MEETING APPLICABLE REQUIREMENTS OF THE SOUTHERN PINE INSPECTION BUREAU (SPIB) AND PRESSURE-IMPREGNATED (PT) BY AN APPROVED PROCESS (ACQ 0.4 PRESSURE TREATED) PRESERVATIVE IN ACCORDANCE WITH THE APPLICABLE PROVISIONS OF THE BUILDING CODE AND AMERICAN WOOD PRESERVERS ASSN (AWPA) "BOOK OF STANDARDS" OR 0.55 SPECIFIC GRAVITY MIN.
2. MEMBER SIZES SHOWN ARE NOMINAL UNLESS NOTED OTHERWISE.
3. ALL METAL CONNECTORS IN CONTACT WITH WOOD USED IN LOCATIONS EXPOSED TO WEATHER SHALL BE GALVANIZED.
4. NAILS SHALL PENETRATE THE SECOND MEMBER A DISTANCE EQUAL TO THE THICKNESS OF THE MEMBER BEING NAILED THERETO. THERE SHALL BE NOT LESS THAN 2 NAILS IN ANY CONNECTION.
5. MEMBERS SHALL BE FREE OF CRACKS AND KNOTS. MOISTURE CONTENT SHALL BE 19% OR LESS. DRY WOOD MAY SPLIT MORE EASILY. IF WOOD TENDS TO SPLIT, PRE-BORING HOLES SHALL BE USED WITH DIAMETERS NOT EXCEEDING 3/4" OF THE NAIL DIAMETER OR USE A 5/32" BIT FOR SDS SCREWS. A FASTENER THAT SPLITS THE WOOD SHALL BE REEVALUATED PRIOR LOADING THE CONNECTION.
6. WOOD THAT IS IN CONTACT WITH CONCRETE OR MASONRY, AND AT OTHER LOCATIONS AS SHOWN ON STRUCTURAL DRAWINGS, SHALL BE PROTECTED WITH 30 # FELT OR PRESSURE TREATED IN ACCORDANCE WITH AITC-109. MEMBER SIZE SHOWN ARE NOMINAL.

LOUVERED PERGOLA DESIGN & OPERATION:

1. THE LOUVERED ROOFING SYSTEM SHALL BE INSTALLED WITH THE **AZENCO R-BLADE** PRODUCT.
2. LOUVERS SHALL BE SPACED SUCH THAT THEY ALLOW 50% SYSTEM POROSITY WHEN FULLY OPENED.
3. LOUVERS SHALL BE ROTATED TO A 90 DEGREE 'OPEN' POSITION DURING ANY NAMED STORM OR WEATHER DESIGN EVENT TO PREVENT EXCESSIVE FORCE TO THIS STRUCTURE. THE OWNER SHALL BE NOTIFIED IN WRITING OF THIS AND THAT CARE SHALL BE TAKEN TO AVOID BUILDUP OF SNOW, DEBRIS, CONSTRUCTION LOADS, & ANY OTHER FORCES THAT CAN AFFECT THE INTEGRITY OF THIS DESIGN.
4. THE STRUCTURE SHALL BE POSTED WITH A LEGIBLE AND READILY VISIBLE DECAL OR PAINTED INSTRUCTIONS TO THE OWNER OR TENANT STATING TO REPOSITION THE LOUVERS AND WINDSCREENS DURING WIND OR SNOW ADVISORIES. THE CANOPY OWNER SHALL BE NOTIFIED OF THESE CONDITIONS BY THE PERMIT HOLDER AT THE TIME OF SALE.
5. SYSTEM SHALL BE EQUIPPED AND TELECO CERTIFIED TO OPERATE PROPERLY WITH SENSORS WHICH WILL PROMPT THE LOUVER BLADES TO ROTATE TO THE OPEN (VERTICAL) POSITION WHENEVER THE WIND SPEED REACHES 45 MPH MINIMUM, OR TEMPERATURE DROPS TO 32° FAHRENHEIT OR LOWER, AND/OR INCLUDE THE ABILITY FOR MANUAL OPENING AND LOCKING BY THE USER.
6. LOUVERED ROOF SYSTEM SHALL BE PER MANUFACTURER MAXIMUM SPANS OR BY OTHERS.
7. NO CERTIFICATION IS OFFERED FOR WATERPROOFING, SIZING, OR OPERATION OF GUTTERS. SYSTEM NOT DESIGNED FOR WATERSHED OF RAINFALL FROM ADJACENT ROOFS UNLESS SPECIFICALLY SHOWN HEREIN, TYP.

GENERAL NOTES

1. ALLOWABLE DESIGN PRESSURES UTILIZED IN THIS DOCUMENT HAVE BEEN CALCULATED PER THE REQUIREMENTS OF THE CODES AND STANDARDS STATED HEREIN USING ASCE 7-16 ALLOWABLE STRESS DESIGN METHODOLOGY WITH THE CRITERIA AS OUTLINED HEREIN. THE CONTRACTOR SHALL CONTACT THE AUTHORITY HAVING JURISDICTION TO ENSURE APPROPRIATE CRITERIA TO BE USED BEFORE CONSTRUCTION BEGINS.
2. DIMENSIONS ARE SHOWN TO ILLUSTRATE DESIGN FORCES AND OTHER DESIGN CRITERIA. IN SOME CASES, DETAILS MAY BE INTENTIONALLY ALTERED FOR PRESENTATION PURPOSES. DO NOT SCALE DIMENSIONS ELECTRONICALLY OR OTHERWISE. FIELD INSTALLATION MAY VARY SLIGHTLY BUT MUST REMAIN WITHIN 5% OF THE INTENDED DESIGN. THE CONTRACTOR IS TO VERIFY ALL DIMENSIONS PRIOR TO INSTALLATION.
3. THE INTEGRITY OF ANY EXISTING STRUCTURE HAS NOT BEEN VERIFIED BY THIS ENGINEER. THESE PLANS ARE NOT TO BE USED FOR CONSTRUCTION UNTIL A DESIGN PROFESSIONAL APPROVES THE HOST STRUCTURE AS BEING ABLE TO ACCOMMODATE THE NEW DESIGN.
4. APPROVAL OF THE HOST STRUCTURE FOR USE SHALL BE AT THE DISCRETION OF THE BUILDING OFFICIAL AND/OR SEPARATE ENGINEERING CERTIFICATION.
5. THIS STRUCTURE HAS BEEN DESIGNED AND SHALL BE FABRICATED IN ACCORDANCE WITH THE STRUCTURAL PROVISIONS OF THE ABOVE-REFERENCED BUILDING CODE. STRUCTURE SHALL BE FABRICATED IN ACCORDANCE WITH ALL GOVERNING CODES. THE CONTRACTOR SHALL INVESTIGATE AND CONFORM TO ALL LOCAL BUILDING CODE AMENDMENTS WHICH MAY APPLY AND GOVERN. DESIGN CRITERIA OR SPANS BEYOND STATED HEREIN MAY REQUIRE ADDITIONAL SITE-SPECIFIC SEALED ENGINEERING.
6. THE EXISTING HOST STRUCTURE MUST BE CAPABLE OF SUPPORTING THE LOADED SYSTEM AS VERIFIED BY THE ENGINEER & OR ARCHITECT OF RECORD, et.al. THE HOST STRUCTURE WHICH IS DESIGNED, CERTIFIED, AND INSPECTED BY OTHERS MUST PROVIDE SUFFICIENT, CAPACITY FOR THIS SPECIFIED DECK SYSTEM. NO WARRANTY OR GUARANTEE TO THESE CONDITIONS, EITHER EXPRESSED OR IMPLIED, IS OFFERED WITH THIS CERTIFICATION.
7. THE CONTRACTOR SHALL CAREFULLY CONSIDER POSSIBLE IMPOSING LOADS ON ROOF, INCLUDING BUT NOT LIMITED TO ANY CONCENTRATED LOADS WHICH MAY JUSTIFY GREATER DESIGN CRITERIA. ALL STRUCTURAL MEMBERS AS SHOWN HAVE BEEN DESIGNED TO CARRY IN PLACE DESIGN LOADS ONLY; THE CONTRACTOR SHALL BE RESPONSIBLE FOR THE SUPPORT OF ANY ADDITIONAL LOADS AND FORCES IMPOSED DURING MANUFACTURING, TRUCKING, ERECTING, AND HANDLING. SYSTEM NOT DESIGNED TO HANDLE CONCENTRATED LOADS FROM HUMAN ACTIVITY.
8. SPECIAL INSPECTIONS MAY BE REQUESTED OR REQUIRED AT THE DISCRETION OF THE AUTHORITY HAVING JURISDICTION.
9. GENERAL STRUCTURAL NOTES ARE APPLICABLE TO THE DESIGN AND CONSTRUCTION OF THE ENTIRE PROJECT AND THUS ARE APPLICABLE TO EVERY SHEET WITHIN THIS SET.
10. SHOULD THE CONTRACTOR ENCOUNTER A CONFLICT BETWEEN THESE DRAWINGS AND ANY OTHER CONTRACT DOCUMENT OR APPLICABLE CODE OR STANDARD OF PRACTICE DURING BIDDING, THE PROVISION RESULTING IN THE GREATER COST APPLIES. SHOULD THE CONTRACTOR ENCOUNTER A CONFLICT DURING CONSTRUCTION, THE CONTRACTOR SHALL SUBMIT A WRITTEN REQUEST FOR CLARIFICATION TO THE DESIGN TEAM, WHO WILL PROVIDE A WRITTEN RESPONSE IN RETURN.
11. THE CONTRACTOR SHALL SUPERVISE AND DIRECT ALL WORK AND SHALL BE RESPONSIBLE FOR CONSTRUCTION MEANS, METHODS, PROCEDURES, TECHNIQUES, AND SEQUENCE. THE CONTRACTOR HAS SOLE RESPONSIBILITY FOR THE QUALITY AND CORRECTNESS OF THE WORK.
12. THE CONTRACTOR SHALL BE SOLELY RESPONSIBLE FOR COORDINATION OF THE STRUCTURAL WORK WITH OTHER TRADES INCLUDING, BUT NOT LIMITED TO: ARCHITECTURAL, CIVIL, AND MEP FOR FLOOR SLAB STEPS, SLOPES AND CURBS, FLOOR SLAB FINISH, OPENINGS IN STRUCTURAL FLOORS, ROOFS AND WALLS, ETC.
13. THE BUILDING HAS BEEN DESIGNED BY THE STRUCTURAL ENGINEER OF RECORD TO RESIST THE CODE REQUIRED VERTICAL AND LATERAL FORCES IN ITS FULLY COMPLETED CONDITION. THE CONTRACTOR SHALL PROVIDE ALL REQUIRED BRACING, SHORING, AND OTHER CONSTRUCTION SUPPORTS NECESSARY TO ENSURE THE BUILDING'S STABILITY AND SAFETY THROUGHOUT THE DURATION OF CONSTRUCTION. FURTHER, THE CONTRACTOR SHALL NOT OVERLOAD THE STRUCTURE DURING CONSTRUCTION. THE CONTRACTOR SHALL RETAIN A LICENSED PROFESSIONAL ENGINEER TO PROVIDE THE ANALYSIS AND DESIGN NECESSARY TO DETERMINE POTENTIALLY OVERLOADED, UNSTABLE, OR HAZARDOUS CONDITIONS THAT MAY OCCUR AT ANY STAGE DURING CONSTRUCTION.
14. THE CONTRACTOR SHALL VERIFY ALL EXISTING DIMENSIONS AND CONDITIONS AND COORDINATE WITH THE CONTRACT DOCUMENTS AND SHOP DRAWINGS.
15. THE CONTRACTOR SHALL NOT EMPLOY CONSTRUCTION MEANS OR METHODS THAT MAY DAMAGE UTILITIES, ADJACENT BUILDINGS, OR PROPERTY. DOCUMENTATION OF ADJACENT CONDITIONS PRIOR TO CONSTRUCTION IS RECOMMENDED. FURTHER, THE CONTRACTOR SHALL EITHER ADEQUATELY CONFINE THE SITE OR PROTECT ADJACENT PROPERTY FROM DAMAGE.
16. THE CONTRACTOR SHALL BE SOLELY RESPONSIBLE FOR PROJECT SAFETY AND OSHA REQUIREMENTS. SHOULD THE STRUCTURAL ENGINEER OF RECORD NOTIFY THE CONTRACTOR OF A POTENTIALLY UNSAFE CONDITION, IT IS SOLELY AS A COURTESY FROM ONE PROFESSIONAL TO ANOTHER. IT SHOULD NOT BE INTERPRETED AS THE STRUCTURAL ENGINEER OF RECORD ASSUMING ANY RESPONSIBILITY FOR PROJECT SAFETY.
17. ALL STRUCTURES REQUIRE PERIODIC MAINTENANCE TO EXTEND LIFE SPAN AND ENSURE STRUCTURAL INTEGRITY FROM EXPOSURE TO THE ENVIRONMENT. A PLANNED PROGRAM OF MAINTENANCE SHALL BE ESTABLISHED BY THE BUILDING OWNER. THIS PROGRAM SHALL INCLUDE, BUT NOT BE LIMITED TO: PAINTING OF STRUCTURAL STEEL, PROTECTIVE COATINGS FOR CONCRETE, SEALANTS, CAULKED JOINTS, EXPANSION JOINTS, CONTROL JOINTS, SPALLS AND CRACKS IN CONCRETE, AND PRESSURE WASHING OF EXPOSED STRUCTURAL ELEMENTS EXPOSED TO A SALINE OR OTHER HARSH CHEMICAL ENVIRONMENT.
18. THE BUILDING OWNER SHALL NOT ALTER OR MODIFY ANY STRUCTURAL ELEMENT WITHOUT CONSULTING A LICENSED PROFESSIONAL ENGINEER. FURTHER, BUILDING OWNER SHALL NOT RENOVATE, REPURPOSE, ADD-ON TO, OR OTHERWISE MODIFY THE EXISTING STRUCTURAL SYSTEMS WITHOUT CONSULTING A LICENSED PROFESSIONAL ENGINEER.

ELECTRONIC DATA/REPRODUCTION

1. ALL INFORMATION CONTAINED IN THE ELECTRONIC FILES OF THE CONTRACT DOCUMENTS ARE INSTRUMENTS OF SERVICE OF THE ARCHITECT/STRUCTURAL ENGINEER OF RECORD AND SHALL NOT BE USED FOR OTHER PROJECTS, ADDITIONS TO THE PROJECT, OR THE COMPLETION OF THE PROJECT BY OTHERS. ELECTRONIC FILES OF THE STRUCTURAL DOCUMENTS REMAIN THE PROPERTY OF AM STRUCTURES AND IN NO CASE SHALL THEIR TRANSFER BE CONSIDERED A SALE.
2. THE USE OF ELECTRONIC FILES OR REPRODUCTIONS OF THESE CONTRACT DOCUMENTS BY ANY CONTRACTOR, SUBCONTRACTOR, ERECTOR, FABRICATOR, OR MATERIAL SUPPLIER IN LIEU OF PREPARATION OF SHOP DRAWINGS SIGNIFIES THEIR ACCEPTANCE OF ALL INFORMATION SHOWN HEREIN AS CORRECT AND OBLIGATES THEMSELVES TO ANY JOB EXPENSE, REAL OR IMPLIED, ARISING DUE TO ANY ERRORS OR OMISSIONS THAT MAY OCCUR HEREIN. THE USE OF ELECTRONIC FILES DOES NOT RELIEVE THE CONTRACTOR'S RESPONSIBILITY FOR PROPER CHECKING AND COORDINATION OF DIMENSIONS, DETAILS, SIZE, AND QUANTITIES.
3. DIMENSIONS AND ELEMENT SIZES AND LOCATIONS IN THE ELECTRONIC FILES MAY NOT BE PRECISE AND, IN SOME CASES, HAVE BEEN INTENTIONALLY ALTERED FOR PRESENTATION PURPOSES. DO NOT SCALE DIMENSIONS ELECTRONICALLY OR OTHERWISE.
4. WHEN USED FOR THE PREPARATION OF SHOP DRAWINGS, ALL INFORMATION NOT APPLICABLE TO THE SUBCONTRACT SHALL BE REMOVED FROM THE DRAWINGS, INCLUDING, BUT NOT LIMITED TO: SHEET NUMBERS, SECTION MARKS, TITLE BLOCKS, AND REFERENCES TO THE CONTRACT DOCUMENTS.

STRUCTURAL DRAWING LIST

SHEET NUMBER	SHEET NAME
S1	GENERAL NOTES
S2	GENERAL NOTES
S3	POST LAYOUT PLAN
S4	ROOF FRAMING PLAN
S5	REFLECTED CEILING PLAN
S6	ELEVATIONS
S7.0	DETAILS
S7.1	DETAILS CONT

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ENGINEER'S SEAL

STATE OF OHIO
ANDREW McCANN
E-87255
REGISTERED
PROFESSIONAL ENGINEER
Seal Exp: 12/31/25
COA#: 6511
COA Exp: 06/30/26

THIS ITEM HAS BEEN DIGITALLY SIGNED AND SEALED BY ANDREW MCCANN, PE, ON THE DATE ADJACENT TO THE SEAL. PRINTED COPIES OF THIS DOCUMENT ARE NOT CONSIDERED SIGNED AND SEALED AND THE SIGNATURE MUST BE VERIFIED ON ANY ELECTRONIC COPIES.

TIMAN CUSTOM WINDOW SHUTTERS
CONTI
36 Pinewood Ln, Hudson, Ohio, 44236

ISSUANCE SCHEDULE

NO.	DESCRIPTION	DATE
0.	INITIAL ISSUANCE	03/18/2025

GENERAL NOTES

PROJECT #	250270
DATE	03/18/2025
DWN	MHR
CHK	AEM

S1

SCALE: AS INDICATED

ANCHORS & FASTENERS

1. ALL BOLTS SHALL BE HOT DIPPED GALVANIZED, OR STAINLESS STEEL & MEET THE REQUIREMENTS OF ASTM A307 GRADE A. WASHERS SHALL BE USED BETWEEN WOOD & BOLT HEAD & BETWEEN WOOD & NUT CONFORMING TO FEDERAL SPECIFICATION FF-W-92 FOR WASHERS. NUTS SHALL BE INSTALLED SUCH THAT THE END OF THE THREADED ROD OR BOLT IS AT LEAST FLUSH WITH THE TOP OF NUT.
2. BOLT HOLES SHALL BE AT LEAST A MINIMUM OF 1/32" AND NO MORE THAN A MAXIMUM OF 1/16" LARGER THAN THE BOLT DIAMETER.
3. NAILS SHALL PENETRATE THE SECOND MEMBER A DISTANCE EQUAL TO THE THICKNESS OF THE MEMBER BEING NAILED THERETO. THERE SHALL BE NOT LESS THAN 2 NAILS IN ANY CONNECTION.
4. DRY WOOD MAY SPLIT MORE EASILY. IF WOOD TENDS TO SPLIT, PRE-BORING HOLES SHALL BE USED WITH DIAMETERS NOT EXCEEDING 3/4" OF THE NAIL DIAMETER OR USE A 5/32" BIT FOR SDS SCREWS. A FASTENER THAT SPLITS THE WOOD SHALL BE REEVALUATED PRIOR LOADING THE CONNECTION.
5. ANCHORS SHALL BE INSTALLED IN ACCORDANCE WITH MANUFACTURERS' RECOMMENDATIONS. MINIMUM EMBEDMENT SHALL BE AS NOTED HEREIN. MINIMUM EMBEDMENT AND EDGE DISTANCE ARE DEPTHS INTO SOLID SUBSTRATE AND DO NOT INCLUDE THICKNESS OF STUCCO, FOAM, BRICK, AND OTHER WALL FINISHES.
6. ANCHOR QUANTITIES INDICATED IN DETAILS ARE FOR GRAPHICAL PURPOSES ONLY. DO NOT SCALE DIAMETER, LENGTH, OR PENETRATION(S). HEAD STYLE(S) ARE FREELY INTERCHANGEABLE.
7. MECHANICAL ANCHORS (EXPANSION ANCHORS/EXPANSION BOLTS) INTO EXISTING CONCRETE AS SHOWN ON THE STRUCTURAL DRAWINGS SHALL BE ONE OF THE FOLLOWING PRODUCTS:
   A. KWIK BOLT TZ ANCHORS MANUFACTURED BY HILTI FASTENING SYSTEMS
   B. STRONG-BOLT 2 ANCHORS MANUFACTURED BY SIMPSON STRONGTIE COMPANY
   C. POWER-STUD+ SD2 ANCHORS MANUFACTURED BY DEWALT
8. MECHANICAL ANCHORS (EXPANSION ANCHORS/EXPANSION BOLTS) INTO EXISTING CONCRETE MASONRY AS SHOWN ON THE STRUCTURAL DRAWINGS SHALL BE ONE OF THE FOLLOWING PRODUCTS:
   A. KWIK BOLT 3 ANCHORS MANUFACTURED BY HILTI FASTENING SYSTEMS
   B. WEDGE-ALL ANCHORS MANUFACTURED BY SIMPSON STRONGTIE COMPANY
   C. POWER-STUD+ SD1 ANCHORS MANUFACTURED BY DEWALT
9. SCREW ANCHORS INTO EXISTING CONCRETE AND CONCRETE MASONRY AS SHOWN ON THE STRUCTURAL DRAWINGS SHALL BE ONE OF THE FOLLOWING PRODUCTS:
   A. KWIK HUS EZ ANCHORS MANUFACTURED BY HILTI FASTENING SYSTEMS
   B. TITEN HD ANCHORS MANUFACTURED BY SIMPSON STRONGTIE COMPANY
   C. SCREW-BOLT+ ANCHORS MANUFACTURED BY DEWALT
10. ADHESIVE ANCHORS (EPOXY ANCHORS/DRILL & EPOXY) INTO EXISTING CONCRETE AS SHOWN ON THE STRUCTURAL DRAWINGS SHALL BE ONE OF THE FOLLOWING ADHESIVE PRODUCTS:
   A. HIT-HY200 EPOXY ADHESIVE WITH HAS ROD MANUFACTURED BY HILTI FASTENING SYSTEMS
   B. AT-XP ADHESIVE MANUFACTURED BY SIMPSON STRONGTIE COMPANY WITH AN ALL-THREAD F1554 GRADE 36 STEEL ROD
   C. PURE110+ EPOXY ADHESIVE MANUFACTURED BY DEWALT WITH AN ALL-THREAD F1554 GRADE 36 STEEL ROD
11. ADHESIVE ANCHORS (EPOXY ANCHORS/DRILL & EPOXY) INTO EXISTING CONCRETE MASONRY AS SHOWN ON THE STRUCTURAL DRAWINGS SHALL BE ONE OF THE FOLLOWING ADHESIVE PRODUCTS:
   A. HIT-HY70 INJECTION ADHESIVE WITH HAS ROD MANUFACTURED BY HILTI FASTENING SYSTEMS
   B. AT-XP ADHESIVE MANUFACTURED BY SIMPSON STRONGTIE COMPANY WITH AN ALL-THREAD F1554 GRADE 36 STEEL ROD
   C. AC100+ GOLD MANUFACTURED BY DEWALT WITH AN ALL-THREAD F1554 GRADE 36 STEEL ROD
12. ADHESIVE FOR ANCHORING REINFORCING BARS (REBAR) INTO EXISTING CONCRETE AS SHOWN ON THE STRUCTURAL DRAWINGS SHALL BE ONE OF THE FOLLOWING ADHESIVE PRODUCTS:
   A. HIT-HY200 EPOXY ADHESIVE MANUFACTURED BY HILTI FASTENING SYSTEMS
   B. AT-XP ADHESIVE MANUFACTURED BY SIMPSON STRONGTIE COMPANY
   C. PURE110+ EPOXY ADHESIVE MANUFACTURED BY DEWALT
13. THE GENERAL CONTRACTOR SHALL OBTAIN APPROVAL FROM THE STRUCTURAL ENGINEER OF RECORD PRIOR TO USING POST-INSTALLED ANCHORS FOR MISSING OR MISPLACED CAST-IN-PLACE ANCHORS.
14. SUBSTITUTION REQUESTS FOR ALTERNATIVE PRODUCTS SHALL BE SUBMITTED TO THE STRUCTURAL ENGINEER OF RECORD WITH CALCULATIONS THAT ARE PREPARED AND SEALED BY A LICENSED PROFESSIONAL ENGINEER. CALCULATIONS SHALL SHOW THAT THE SUBSTITUTED PRODUCT WILL ACHIEVE AN EQUIVALENT CAPACITY USING THE APPROPRIATE DESIGN PROCEDURE REQUIRED BY THE REFERENCED BUILDING CODE.
15. LOCATE, BY NON-DESTRUCTIVE MEANS, ALL EXISTING REINFORCEMENT, AND AVOID DURING INSTALLATION OF ANCHORS. IF EXISTING REINFORCEMENT LAYOUT PROHIBITS THE INSTALLATION OF ANCHORS AS INDICATED ON THE STRUCTURAL DRAWINGS, THE CONTRACTOR SHALL NOTIFY THE STRUCTURAL ENGINEER OF RECORD IMMEDIATELY.
16. HOLES SHALL BE DRILLED AND CLEANED, AND ANCHORS SHALL BE INSTALLED PER THE MANUFACTURER'S PUBLISHED INSTALLATION INSTRUCTIONS. DEFECTIVE OR ABANDONED HOLES SHALL BE FILLED WITH NON-SHRINK GROUT OR AN INJECTABLE ADHESIVE MATCHING THE ADJACENT CONCRETE COMPRESSIVE STRENGTH.
17. MASONRY ANCHORS SHALL NOT BE INSTALLED IN HOLLOW CORE MASONRY. IF INSTALLATION INTO HOLLOW CORE MASONRY IS DESIRED, SUBMIT ALTERNATIVE PRODUCT FOR REVIEW AND APPROVAL BY THE STRUCTURAL ENGINEER OF RECORD.
18. MASONRY ANCHORS SHALL NOT BE INSTALLED IN HEAD JOINTS.
19. IN ADDITION TO THE MANUFACTURER'S PRINTED INSTALLATION INSTRUCTIONS, THE FOLLOWING GUIDELINES SHALL BE FOLLOWED FOR INSTALLATION OF ADHESIVE ANCHORS:
    1. ADHESIVE ANCHORS SHALL BE INSTALLED IN CONCRETE HAVING A MINIMUM AGE OF 21 DAYS AT TIME OF ANCHOR INSTALLATION. CONCRETE SHALL HAVE A MINIMUM COMPRESSIVE STRENGTH OF 2,500 PSI AT THE TIME OF INSTALLATION UNLESS HIGHER STRENGTH IS REQUIRED PER THE MANUFACTURER'S PRINTED INSTALLATION INSTRUCTIONS.
    2. ADHESIVE ANCHORS SHALL BE INSTALLED IN DRY CONCRETE, AND DURING DRY CONDITIONS.
    3. ADHESIVE ANCHORS SHALL BE INSTALLED IN HOLES PREDRILLED WITH A CARBIDE TIPPED DRILL BIT.
    4. ADHESIVE ANCHORS SHALL BE INSTALLED WITHIN THE TEMPERATURE RANGE SPECIFIED IN THE MANUFACTURER'S PRINTED INSTALLATION INSTRUCTIONS, BUT NOT OUTSIDE OF THE DESIGN TEMPERATURE RANGE. LOADS SHALL NOT BE APPLIED TO ADHESIVE ANCHORS UNTIL THE FULL CURING TIME ASSOCIATED WITH THE INSTALLATION TEMPERATURE HAS ELAPSED.
20. INSTALLATION OF ADHESIVE ANCHORS SHALL BE PERFORMED BY PERSONNEL CERTIFIED BY AN APPLICABLE CERTIFICATION PROGRAM. CERTIFICATION SHALL INCLUDE WRITTEN AND PERFORMANCE TESTS IN ACCORDANCE WITH THE ACI/CRSI ADHESIVE ANCHOR INSTALLER CERTIFICATION PROGRAM, OR EQUIVALENT.
21. SPECIAL INSPECTIONS SHALL BE PROVIDED FOR POST-INSTALLED ANCHORS IN ACCORDANCE WITH THE ANCHOR MANUFACTURER'S PRINTED INSTALLATION INSTRUCTIONS AND/OR EVALUATION REPORTS, UNLESS MORE SPECIFIC REQUIREMENTS ARE SPECIFIED IN THE CONSTRUCTION DOCUMENTS.
22. CONTINUOUS INSPECTION SHALL BE PROVIDED FOR ADHESIVE ANCHORS INSTALLED IN HORIZONTAL OR UPWARDLY INCLINED ORIENTATIONS TO RESIST SUSTAINED TENSILE LOADS.
23. HOLE DRILLING AND INSTALLATION OF ADHESIVE ANCHORS SHALL BE IN ACCORDANCE WITH MANUFACTURER'S PRINTED INSTALLATION INSTRUCTIONS. ANCHORS SHALL BE INSTALLED IN CONCRETE DRY CONDITION.

ABBREVIATIONS

ADDL	ADDITIONAL
ADJ	ADJACENT
AFF	ABOVE FINISHED FLOOR
ALT	ALTERNATE
APPROX	APPROXIMATE
ARCH	ARCHITECT OR ARCHITECTURAL
ASD	ALLOWABLE STRESS DESIGN
B/	BOTTOM OF
BLDG	BUILDING
BLKG	BLOCKING
BP	BASE PLATE
BOT	BOTTOM
BTWN	BETWEEN
C	COMPRESSION
CFS	COLD-FORMED STEEL
CIP	CAST-IN-PLACE
CL	CENTER LINE
CLR	CLEAR OR CLEARANCE
CMU	CONCRETE MASONRY UNIT
COL	COLUMN
CONC	CONCRETE
CONN(S)	CONNECTION(S)
CONST	CONSTRUCTION
CONT	CONTINUOUS
COORD	COORDINATE
D&E	DRILL & EPOXY
db	REINFORCING BAR DIAMETER
°	DEGREE(S)
Ø	DIAMETER
DIAG	DIAGONAL
DIM(S)	DIMENSION(S)
DL	DEAD LOAD
DWG(S)	DRAWING(S)

ABBREVIATIONS

EA	EACH
EF	EACH FACE
EJ	EXPANSION JOINT
EL	ELEVATION
EMB	EMBED
EOS	EDGE-OF-SLAB
EQ	EQUAL
EW	EACH WAY
EXIST	EXISTING
EXP	EXPANSION
EXT	EXTERIOR
F/F	FACE-TO-FACE
FF	FINISH FLOOR
FND	FOUNDATION
FS	FAR SIDE
FT	FEET
FTG	FOOTING
GA	GAGE, GAUGE
GALV	GALVANIZED
GB	GRADE BEAM
GC	GENERAL CONTRACTOR
HCA	HEADED CONCRETE ANCHORS
HORIZ	HORIZONTAL
HSS	HOLLOW STRUCTURAL SECTION
ID	INSIDE DIAMETER
IF	INSIDE FACE
IN	INCH
INFO	INFORMATION
INT	INTERIOR
JST(S)	JOIST(S)

ABBREVIATIONS

K	KIPS (1,000 POUNDS)
KLF	KIP PER LINEAR FOOT
KSF	KIP PER SQUARE FOOT
KSI	KIPS PER SQUARE INCH
L	LENGTH
LB(S)	POUND(S)
LL	LIVE LOAD
LLH	LONG LEG HORIZONTAL
LLV	LONG LEG VERTICAL
LRFD	LOAD RESISTANCE FACTORED DESIGN
LSH	LONG SIDE HORIZONTAL
LSV	LONG SIDE VERTICAL
LTS	LAP TENSION SPLICE
LWC	LIGHT WEIGHT CONCRETE
M	MOMENT
MAX	MAXIMUM
MC	MOMENT CONNECTION(S)
MEP	MECHANICAL, ELECTRICAL, PLUMBING, FIRE PROTECTION
MFR	MANUFACTURER
MID	MIDDLE
MIN	MINIMUM
NIC	NOT IN CONTRACT
NS	NEAR SIDE
NTS	NOT TO SCALE
NWC	NORMAL WEIGHT CONCRETE
OC	ON CENTER
OD	OUTSIDE DIAMETER
OF	OUTSIDE FACE
OPNG(S)	OPENING(S)
OPP	OPPOSITE

ABBREVIATIONS

PAF	POWDER ACTUATED FASTENER
PERP	PERPENDICULAR
PL	PLATE
PLF	POUNDS PER LINEAL FOOT
PREFAB	PRE-FABRICATED
PSF	POUNDS PER SQUARE FOOT
PSI	POUNDS PER SQUARE INCH
PT	POST-TENSIONED
REF	REFERENCE
REINF	REINFORCE(D) (ING) OR (MENT)
REQ(D)	REQUIRE(D)
REV	REVISION
RTU	ROOF TOP UNIT
SCHED	SCHEDULE(D)
SF	SQUARE FOOT (FEET)
SIM	SIMILAR
SMS	SHEET METAL SCREW
SOG	SLAB-ON-GROUND
SPEC(S)	SPECIFICATION(S)
SS	STAINLESS STEEL
STD	STANDARD
STIFF	STIFFENER
SYM	SYMMETRICAL
T	TENSION
T&B	TOP AND BOTTOM
T/	TOP OF
TYP	TYPICAL
UNO	UNLESS NOTED OTHERWISE
V	SHEAR
VERT	VERTICAL
VIF	VERIFY IN FIELD
W/	WITH
W/O	WITHOUT
WWR	WELDED WIRE REINFORCEMENT

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ENGINEER'S SEAL

STATE OF OHIO
ANDREW McCANN
E-87255
REGISTERED
PROFESSIONAL ENGINEER
Seal Exp: 12/31/25
COA#: 6511
COA Exp: 06/30/26

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TIMAN CUSTOM WINDOW SHUTTERS
CONTI
36 Pinewood Ln, Hudson, Ohio, 44236

ISSUANCE SCHEDULE

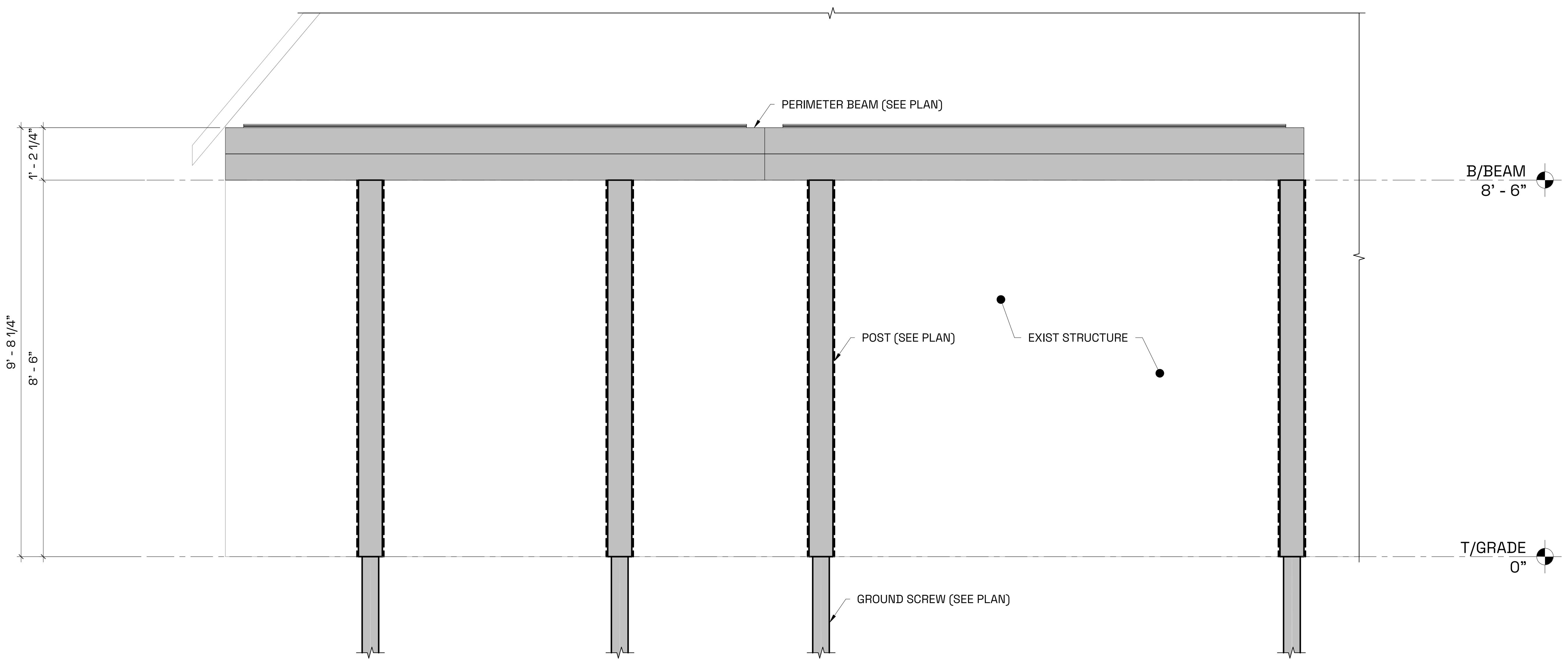
NO.	DESCRIPTION	DATE
0.	INITIAL ISSUANCE	03/18/2025

GENERAL NOTES

PROJECT #	250270
DATE	03/18/2025
DWN	MHR
CHK	AEM

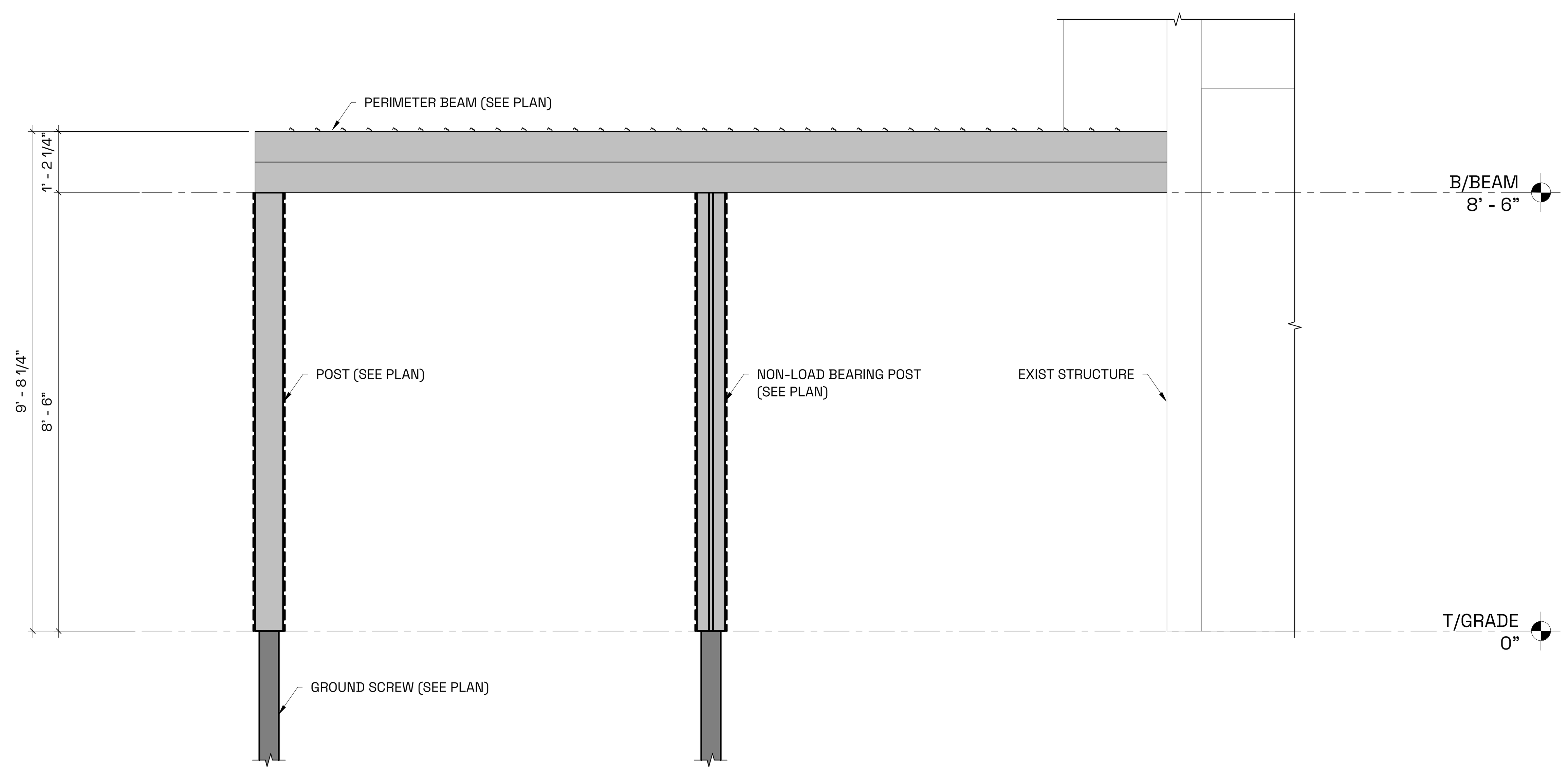
S2

SCALE: AS INDICATED



1 FRONT ELEVATION

1/2" = 1'-0"



2 SIDE ELEVATION

1/2" = 1'-0"

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ISSUANCE SCHEDULE

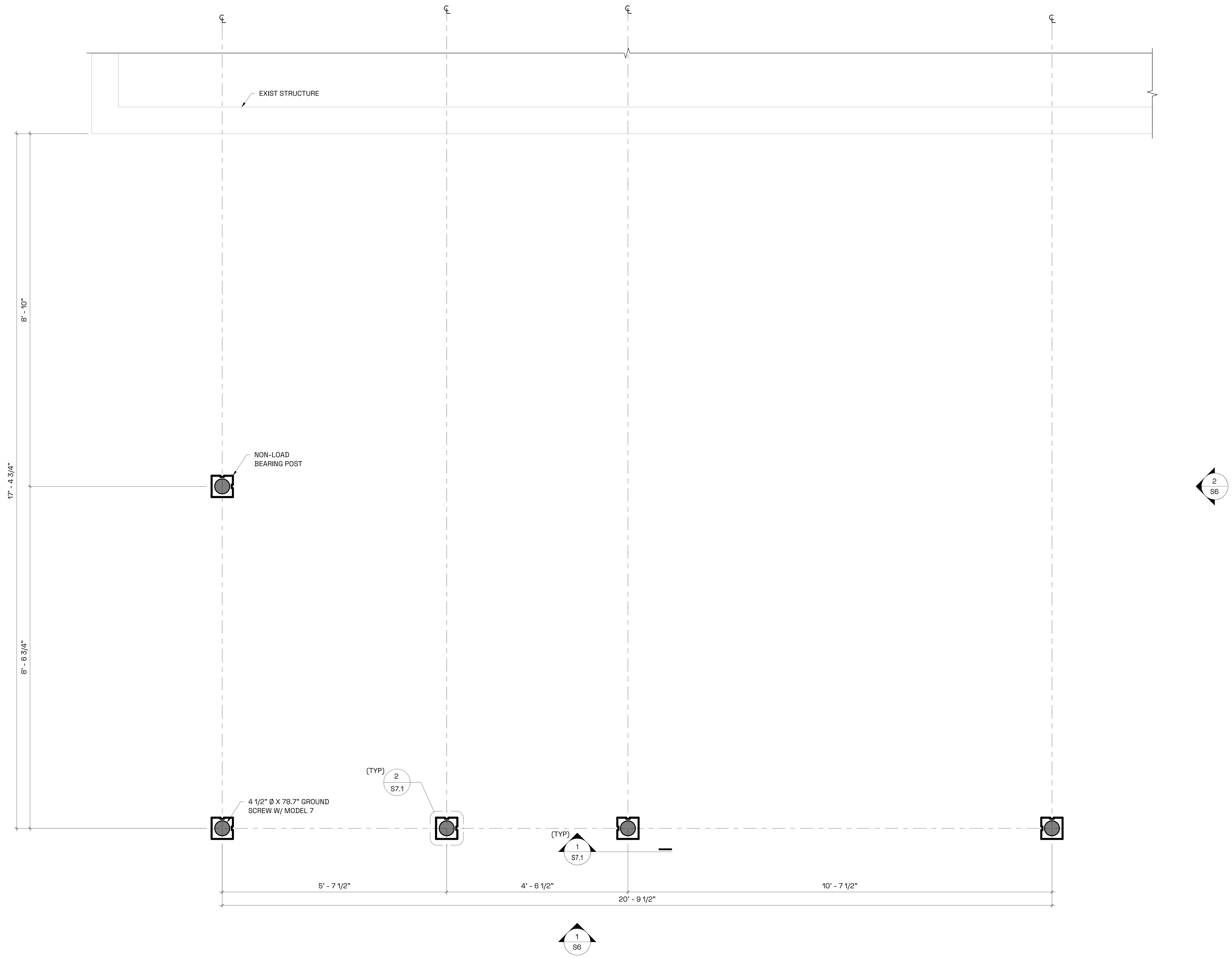
NO.	DESCRIPTION	DATE
0.	INITIAL ISSUANCE	03/18/2025

ELEVATIONS

PROJECT #	250270
DATE	03/18/2025
DWN	MHR
CHK	AEM

S6

SCALE: AS INDICATED



1 POST LAYOUT PLAN

3/4" = 1'-0"

NOTES:

1. CONTRACTOR SHALL FIELD VERIFY ALL DIMENSIONS.

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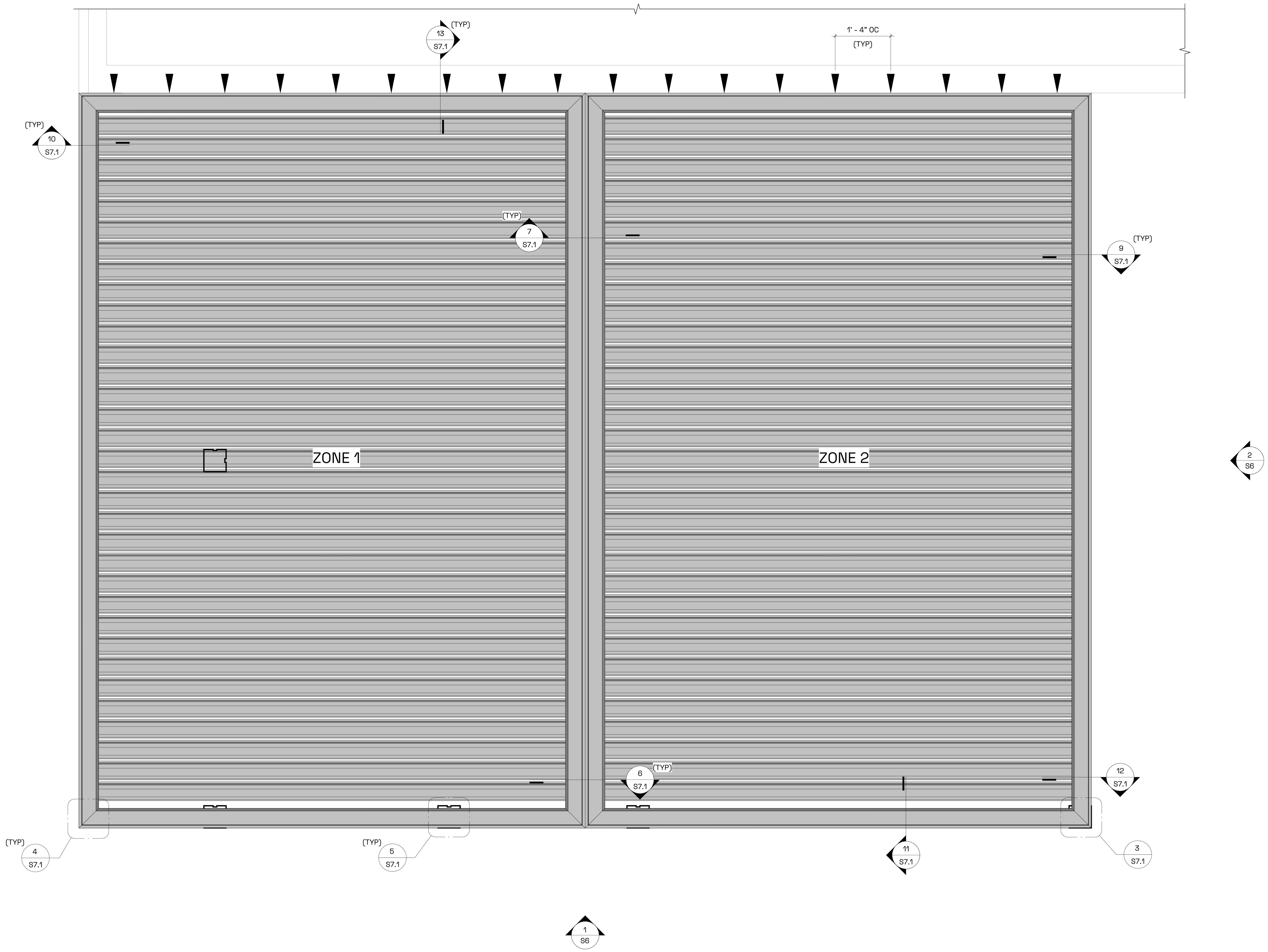
POST LAYOUT PLAN

PROJECT #	250270
DATE	03/18/2025
DWN	MHR
CHK	AEM

S3

SCALE: AS INDICATED



1 ROOF FRAMING PLAN

3/4" = 1'-0"

NOTES:

1. DENOTES (2) 1/2" Ø SS LAG SCREWS.
2. CONTRACTOR SHALL FIELD VERIFY ALL DIMENSIONS.
3. ZONES 1 & 2 DENOTE **R-BLADE AZENCO** PRODUCT.

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ISSUANCE SCHEDULE

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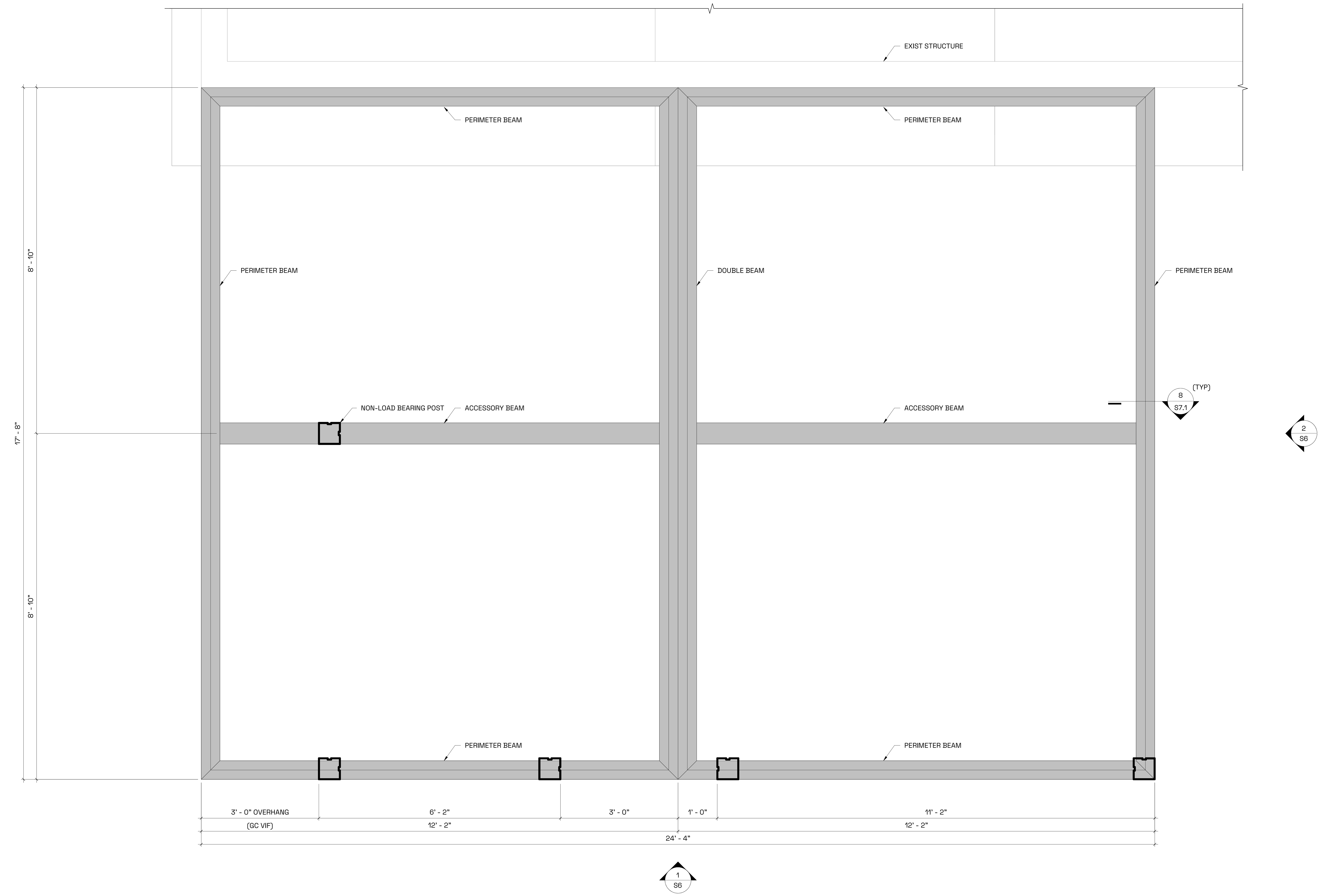
ROOF FRAMING PLAN

PROJECT #	250270
DATE	03/18/2025
DWN	MHR
CHK	AEM

S4

SCALE: AS INDICATED



1 REFLECTED CEILING PLAN
3/4" = 1'-0"

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ISSUANCE SCHEDULE

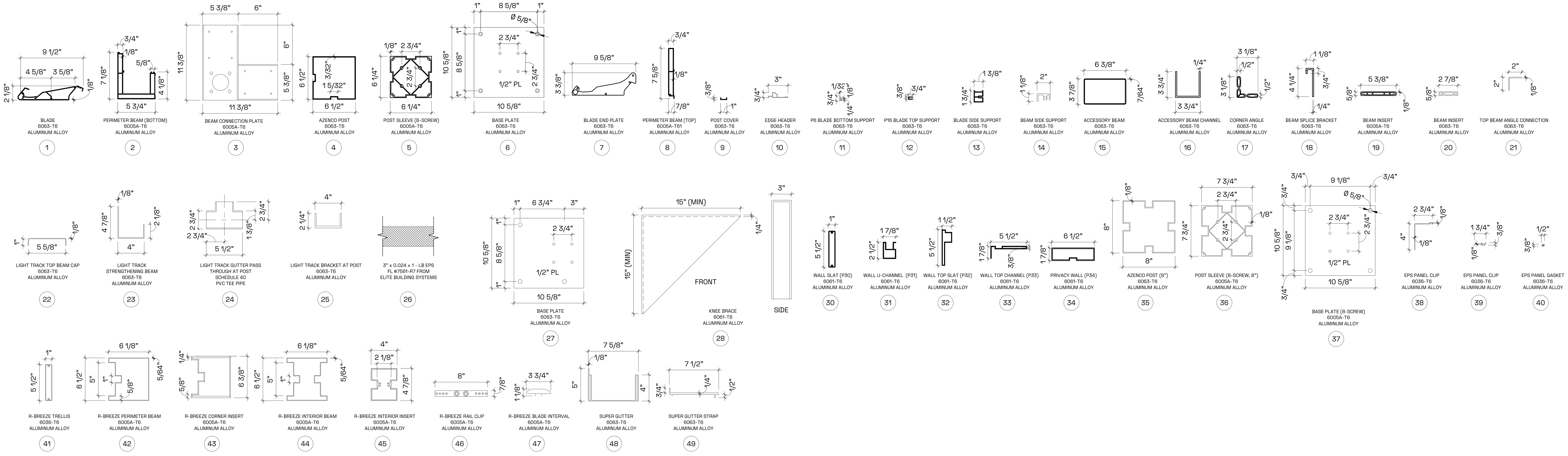
NO.	DESCRIPTION	DATE
0.	INITIAL ISSUANCE	03/18/2025

REFLECTED CEILING PLAN

PROJECT #	250270
DATE	03/18/2025
DWN	MHR
CHK	AEM

S5

SCALE: AS INDICATED



(A) STRUCTURAL COMPONENTS

1 1/2" = 1'-0"

AA	5/8" Ø X 5" SIMPSON TITEN HD ANCHORS 316 SS
BB	5/8" Ø X 6" SIMPSON TITEN HD ANCHORS 316 SS
CC	3/8" Ø X 3" SIMPSON TITEN HD ANCHORS 316 SS
DD	1/2" Ø X 4" SIMPSON TITEN HD ANCHORS 316 SS
EE	3/4" Ø X 7" SIMPSON TITEN HD ANCHORS 316 SS
A	1/4" Ø X 1" HWH SDS 410 SS
B	1/4" Ø X 3" HWH SDS 410 SS
C	3/8" Ø X 3" HEX LAG SCREW SS
D	3/8" Ø X 5" HEX LAG SCREW SS

E	3/8" Ø X 6" HEX LAG SCREW SS
F	5/8" Ø X 6" HEX LAG SCREW SS
G	1/2" Ø X 6" HEX LAG SCREW SS
H	1/4" Ø X 3" HEX LAG SCREW SS
I	3/8" Ø X 5" HEX SCREW ANCHOR 316 SS
J	#8 X 1" HWH SDS 410 SS
K	1/2" Ø X 5" DEWALT SCREW BOLT+ 316 SS
L	RISER KIT: (1) 3/8"-16 Ø X 7" SS HEX CAP BOLT, (2) 3/8" X 7/8" SS FLAT WASHERS, (1) 3/8"-16 Ø SS HEX NUT
M	1/4" Ø X 4" HWH SDS 410 SS
N	1/2" Ø F1554 THREADED ROD W/ DEWALT PURE110+ EPOXY
TS	#14 X 1" HWH SDS 410 SS

Q1	M12 X 120mm PIN
Q2	M4.8 X 16mm PAN HEAD TORX BIT SHEET METAL SCREW
Q3	#14 X 3/4" HEX HEAD SELF-DRILL 316 SS SCREW
Q4	M8 X 40mm PAN HEAD TORX BIT SHEET METAL SCREW
Q5	HTK10-1.00 HEX SELF-TAPPING 410SS #10 X 1"
Q6	M8 X 40mm FLAT HEAD TORX BIT SHEET METAL SCREW
Q7	M4.8 X 25mm FLAT HEAD TORX BIT SHEET METAL SCREW
Q12	M8 X 80mm SOCKET CAP HEX HEAD PARTIALLY THREADED SCREW
Q13	M8 SS NUT
Q14	M5.5 X 25mm PAN HEAD SCREW
Q15	M9.5 X 60mm PIN
Q17	1/8"Ø X 3/4" PIN
Q18	#14 X 2" SMS SCREW SS410
Q21	1/2" Ø X 2" SS HEX HEAD SCREW
Q22	1/2" Ø SS NUT

(B) STRUCTURAL CONNECTORS

6" = 1'-0"

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ISSUANCE SCHEDULE

NO.	DESCRIPTION	DATE
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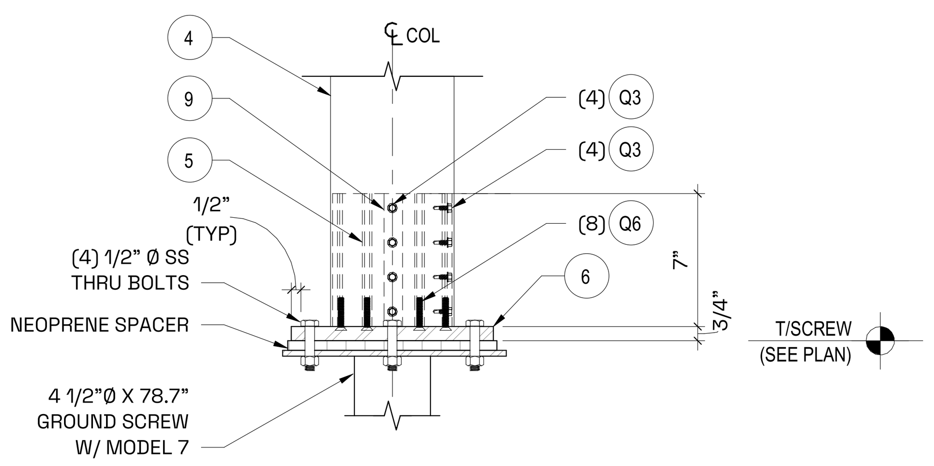
DETAILS

PROJECT #	250270
DATE	03/18/2025
DWN	MHR
CHK	AEM

S7.0

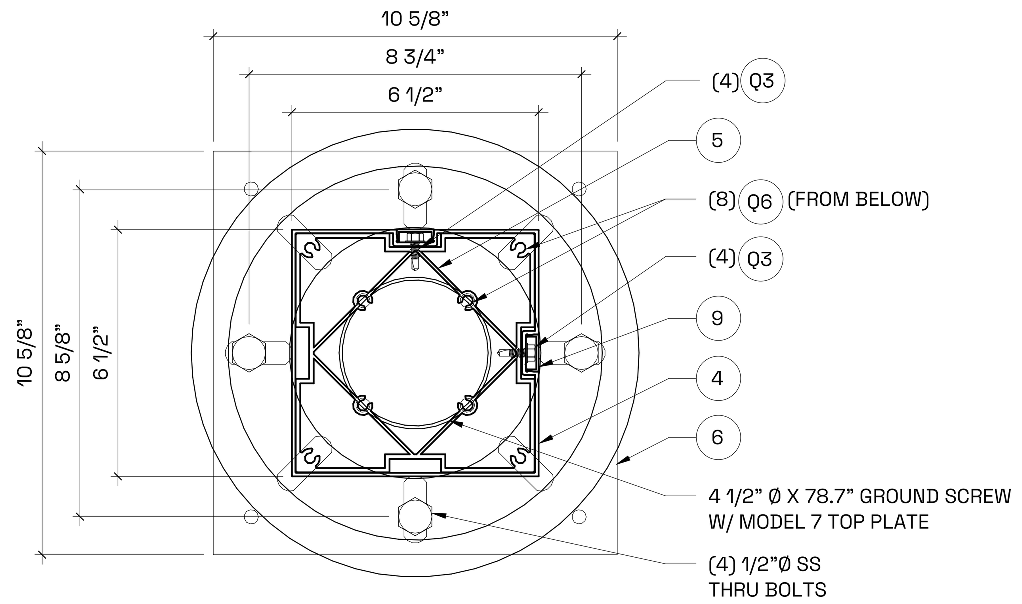
SCALE: AS INDICATED



POST BASE CONNECTION TO GROUND SCREW (M7)

1 SECTION

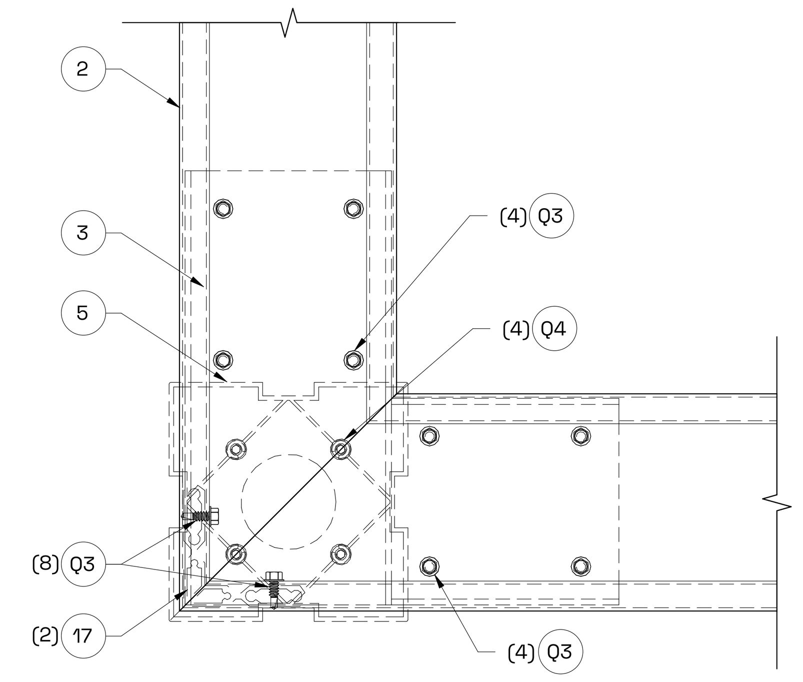
1 1/2" = 1'-0"



COLUMN POST AND BASE PLATE TO GROUND SCREW (M7)

2 DETAIL

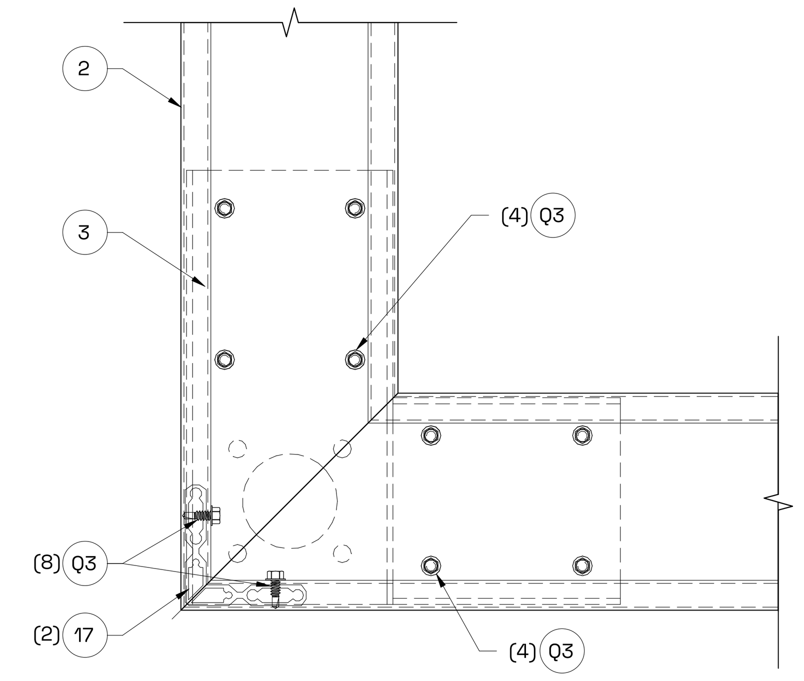
3" = 1'-0"



BEAM CORNER ASSEMBLY

3 DETAIL

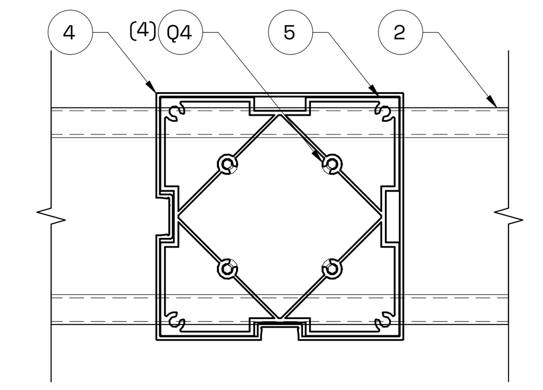
3" = 1'-0"



BEAM CORNER ASSEMBLY (NO POST)

4 DETAIL

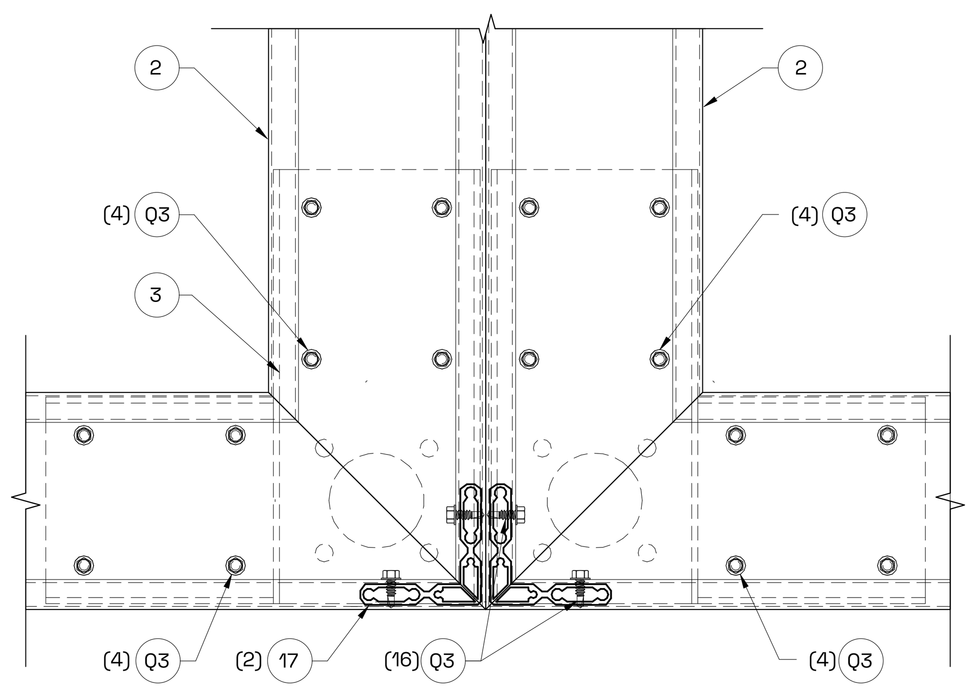
3" = 1'-0"



BEAM TO POST ASSEMBLY AT CANTILEVER

5 DETAIL

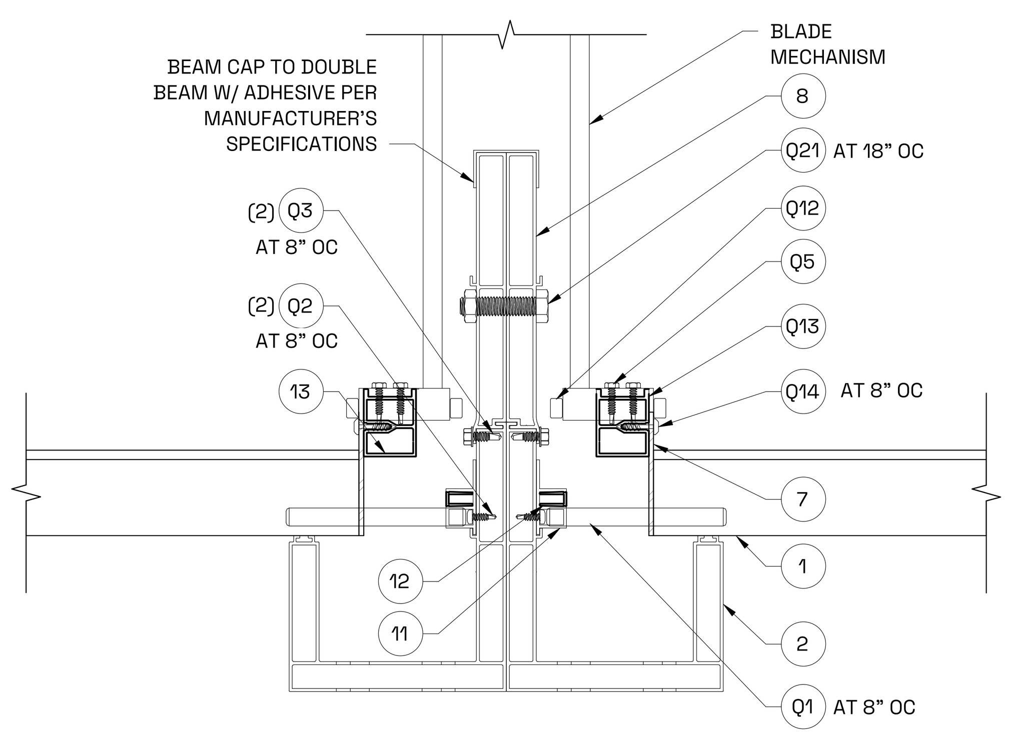
3" = 1'-0"



DOUBLE BEAM CORNER ASSEMEBLY - NO POST

6 DETAIL

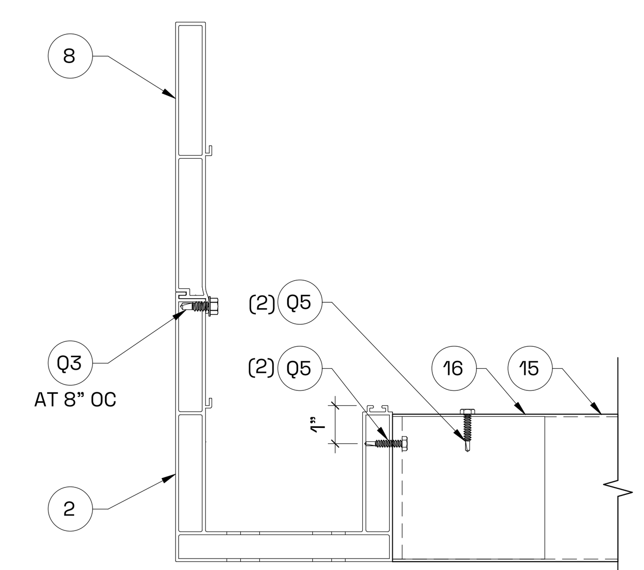
3" = 1'-0"



DOUBLE BEAM ASSEMBLY

7 SECTION

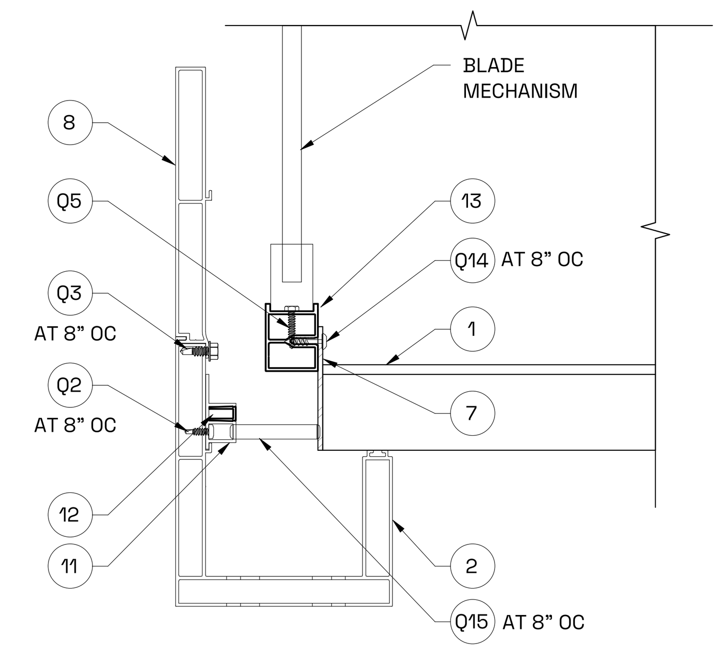
3" = 1'-0"



ACCESSORY BEAM TO MAIN BEAM CONNECTION

8 SECTION

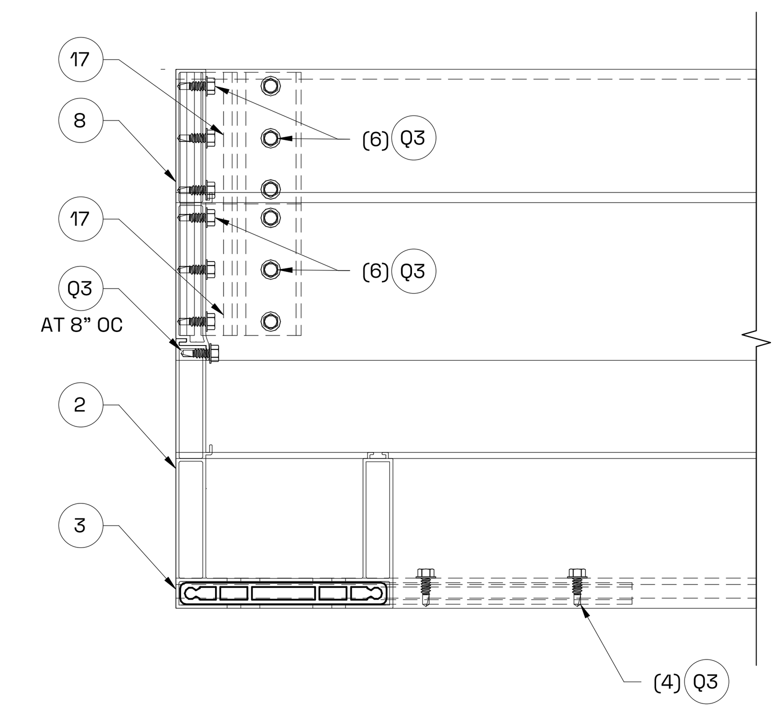
3" = 1'-0"



LOUVER ASSEMBLY AT BEAM - PARALLEL

9 SECTION

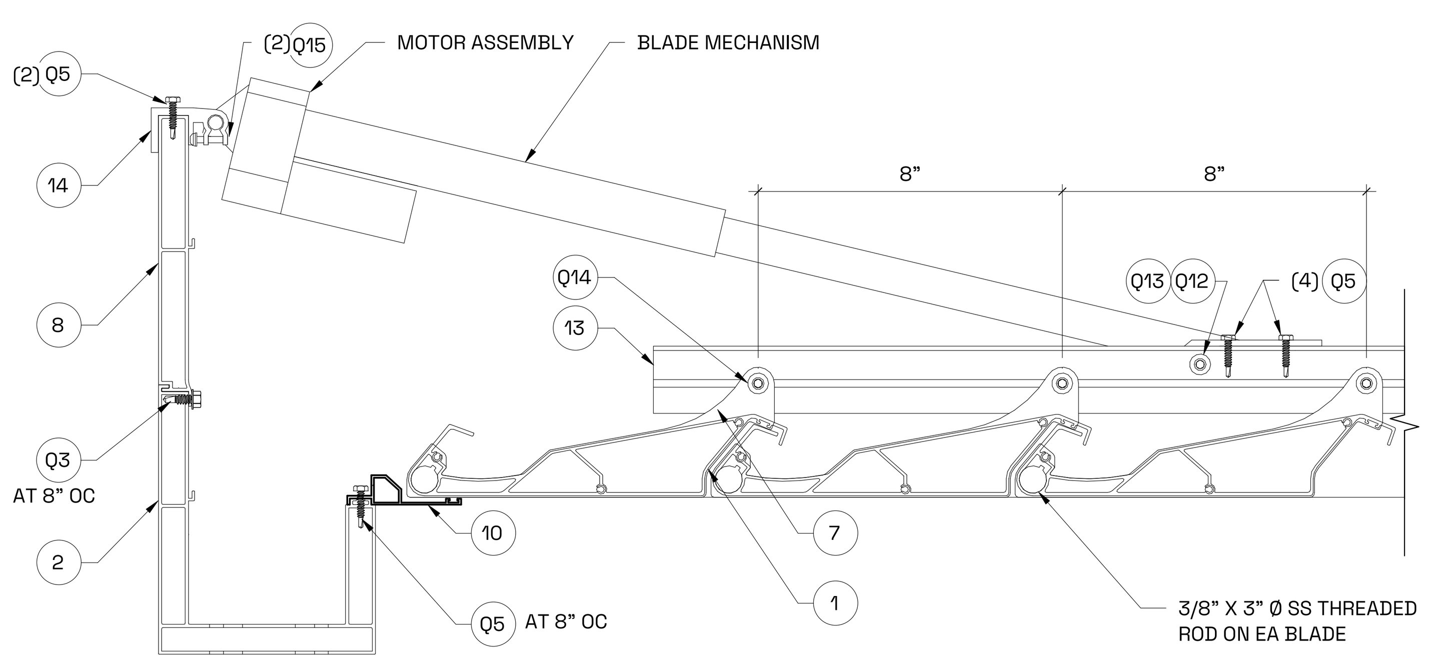
3" = 1'-0"



POST TO BEAM AT CORNER (NO POST)

10 SECTION

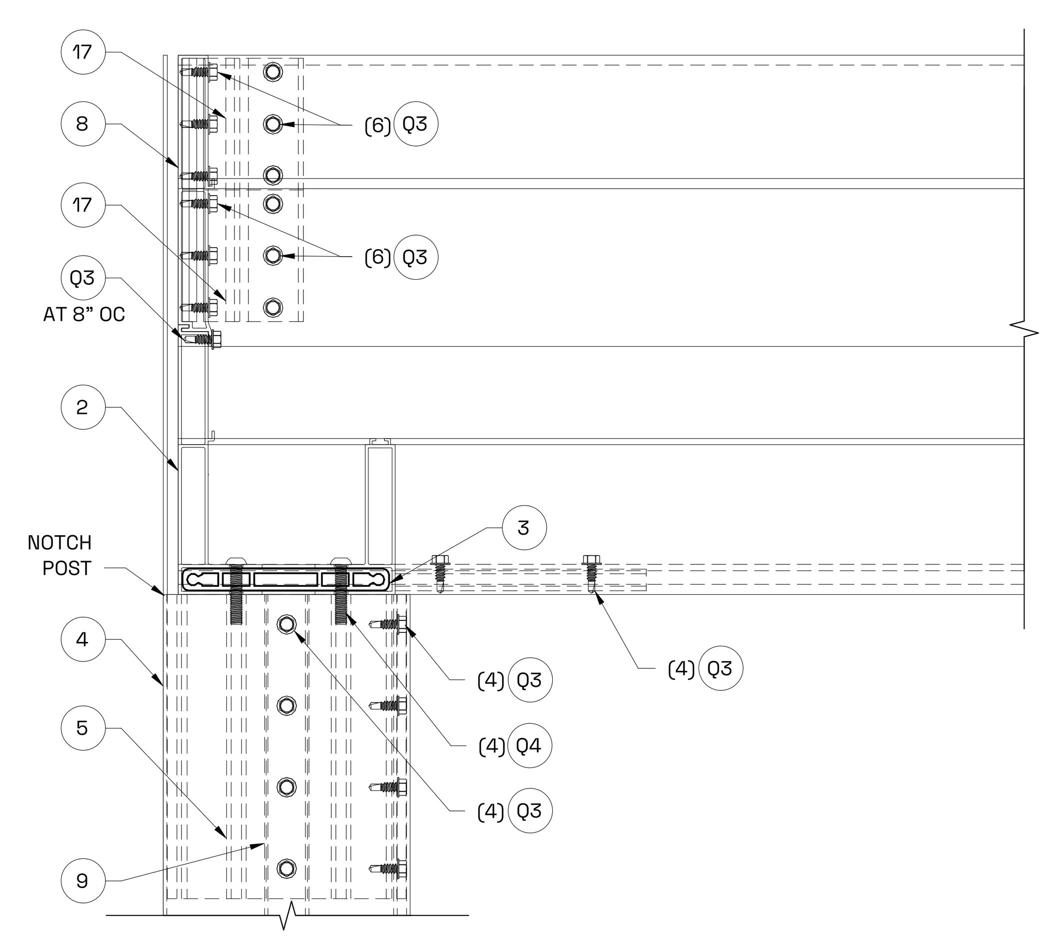
3" = 1'-0"



LOUVER ASSEMBLY AT BEAM - PERPENDICULAR

11 DETAIL

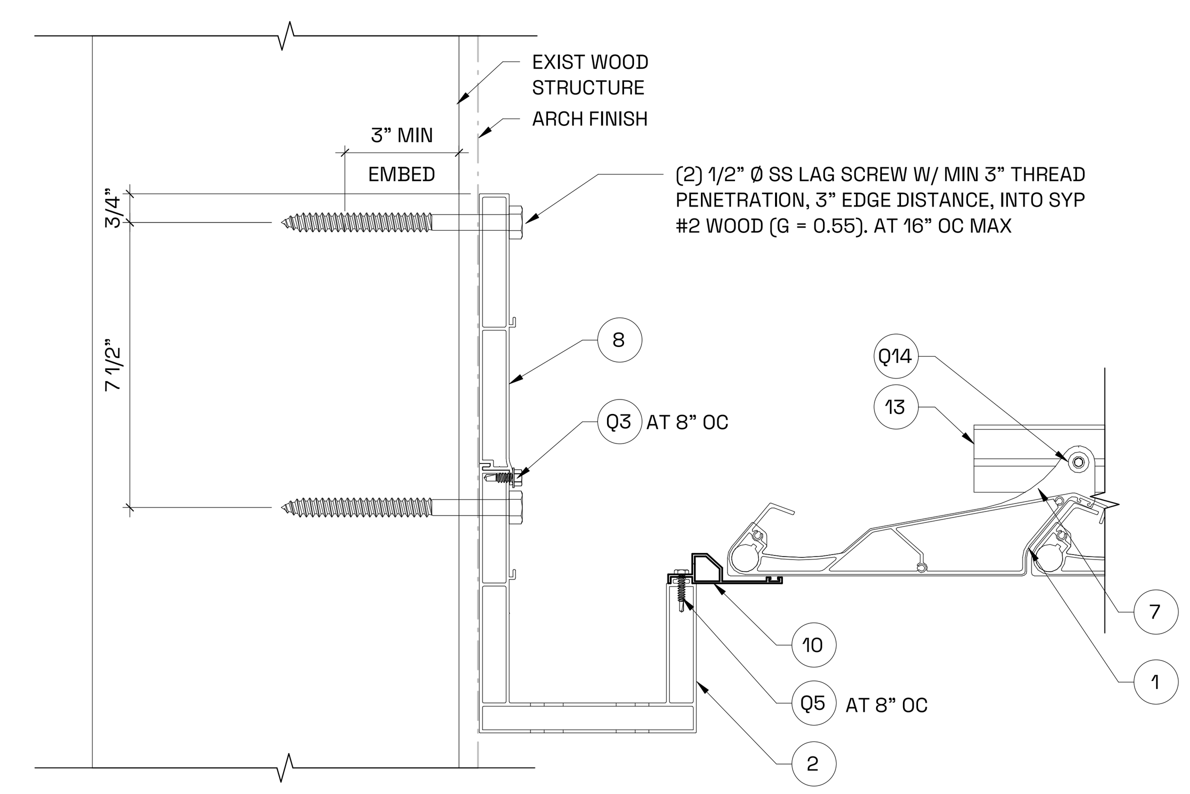
3" = 1'-0"



POST TO BEAM AT CORNER

12 SECTION

3" = 1'-0"



MAIN BEAM CONNECTION TO HOST STRUCTURE

13 SECTION

3" = 1'-0"

AM STRUCTURES

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JUPITER, FL 33458
(561) - 951 - 0099
AM-STRUCTURES.COM

ENGINEER'S SEAL

STATE OF OHIO
ANDREW McCANN
E-87255
REGISTERED
PROFESSIONAL ENGINEER

TIMAN CUSTOM WINDOW SHUTTERS CONTI

36 Pinewood Ln, Hudson, Ohio, 44236

ISSUANCE SCHEDULE

NO.	DESCRIPTION	DATE
0.	INITIAL ISSUANCE	03/18/2025

DETAILS CONT

PROJECT #	250270
DATE	03/18/2025
DWN	MHR
CHK	AEM

S7.1

SCALE: AS INDICATED

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Project # 250270

CALCULATION COVER SHEET

Calculations Prepared For:

TIMAN WINDOW TREATMENTS, INC
4533 WILLOW PARKWAY
CLEVELAND, OH

Project:

CONTI
36 PINEWOOD LANE
HUDSON, OH

Subject:

CANOPY CALCULATIONS

REFERENCE SEALED DRAWING BY BELOW-SIGNED ENGINEER FOR ALL NOTES AND DETAILS INCORPORATED HEREIN

This item has been digitally signed and sealed by Andrew McCann P.E. on date adjacent to the seal. Printed copies of this document are not considered signed and sealed and the signature must be verified on any electronic copies.

Engineer's Seal Valid For Pages
1 Through 47

STATE OF OHIO
ANDREW
McCANN
E-87255
REGISTERED
PROFESSIONAL ENGINEER
Seal Exp: 12/31/25
COA#: 6511
COA Exp: 06/30/26

OH

03/19/25

ANDREW McCANN
PE PE.87255
Cert Auth 6511

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1153 Town Center Drive #201 Jupiter, FL 33458
PH: 561-951-0099

Project # 250270

Timan Window Treatments, Inc
Conti

Wind Loading Criteria (ASCE 7-16)			ASCE	7-16
Basic Wind Speed	115	MPH		ASD
Wind Velocity (Vasd)	90	MPH		Residential
Risk Category	II			
Importance Factor	1.00			
Exposure Category	C			

Snow Loading Criteria (ASCE 7-16)		
Ground Snow Load	25	PSF
Flat Roof Snow Load	25.00	PSF
Snow Exposure Factor	1.00	
Snow Thermal Factor	1.20	
Snow Importance Factor	1.00	

Live Loading Criteria (ASCE 7-16)		
Roof Live Load	20	PSF

Dead Loading Criteria (ASCE 7-16)			
Dead Load	5	PSF	Azenco

Seismic Load Criteria (ASCE 7-16)				
Site Class	D	Host Attached?	Y	ONE SIDE
Occupancy Category	II	Host Supported?	N	
Mapped Spectral Response Accelerations:				
S_S	0.134			
S_1	0.049			
Spectral Response Coefficients:				
S_{DS}	0.143			
S_{D1}	0.078			
P	1.0			
SDC	B			
TL	12			

Load Combinations (ASCE 7-16)

Gravity D + (Lr or S or R)

Uplift 0.6D + 0.7E

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Project # 250270 - Conti

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DESIGN CRITERIA:

Enter custom loads:

Vult =	115 mph
Exposure:	C
Ground Snow Load:	25.00 psf
Live Load:	20.00 psf
Dead Load:	5.0 psf
Wind Porosity:	50%
Roof Type:	Louvered

Type of project: Residential

These are the loads that this calculator will utilize:

Vult =	115 mph
Exposure:	C
Ground Snow Load:	25.00 psf
Design Live Load:	20.00 psf
Design Dead Load:	5.00 psf
Wind Porosity:	50%
Critical positive grav comb. (+):	30.00 psf
Critical negative uplift comb. (-):	- 3.00 psf
Critical lateral pressure (+):	18.32 psf

Deflection criteria: L / 180

SYSTEM CONFIGURATION:

Louvers:

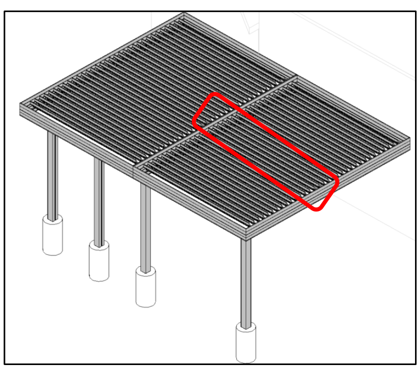
Overall Canopy Length:	24.3 ft
Overall Canopy Width:	17.7 ft
Roof Slope:	0.0 °

LOUVER BLADES CLOSED CHECK 6063-T6

Sx	2.9166	in^3	Mmax	460.88	**lb-ft**
Sy	1.26438	in^3	Stress	7.12	**ksi**

Length of Longest Louver Blade: 12 ft 2 in

Stress Check:	78.5%
Louver Length:	12.2 ft



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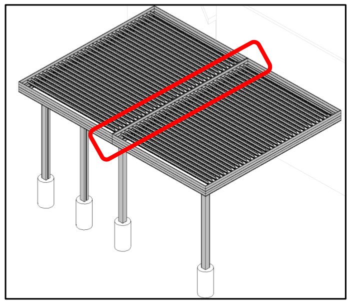
Louver Support Beam

Check intermediate or edge? Intermediate *(Intermediate uses full louver blade tributary)*

Intermediate Louver Beam Configuration



Louver Support Beam - Intermediate Condition Analysis

Support Spacing (Louver Beam Length): 17 ft 8 in

Reinf: N

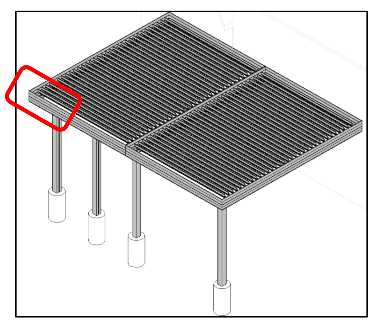
Single/Double/Triple/Quad: Double

Louver Beam Span:	17.7 ft
Louver Beam Trib:	12.2 ft
Shear at Ends:	3224 lb
Moment Check	61%
Deflection Check	42%

Main Beam

Check intermediate, edge, or none? Edge *(Intermediate doubles point loads from louver beams)*

Edge Main Beam Configuration



Main Beam - Edge Condition Analysis

Post Spacing (Main Beam Length): 3 ft 0 in

Reinf: N

Single/Double/Triple/Quad: Single

Quantity of louver between a set of posts: 1 *(0 indicates Louver Beam line up directly over posts)*

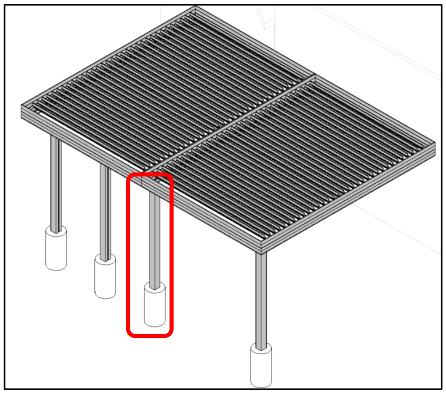
Assumed offset distance "a" of Louver Beam, measured from post (see diagram): 3.0 ft

Main Beam Span:	3.0 ft
Load from Louver Beam:	1612 lb
Shear at Ends:	1612 lb
Moment Check	36%
Deflection Check	8%

Support Posts

Check intermediate, edge, or none? Intermediate

Intermediate Support Post Configuration



Mounting Height Above Grade:	0.0 ft	*(Enter 0 for installations at ground level)*
Height of Posts:	8.5 ft	
Attached to host?	Y	

Total Mean Roof Height:	8.5 ft

Roof Eave Height= 20.0 ft
OPEN

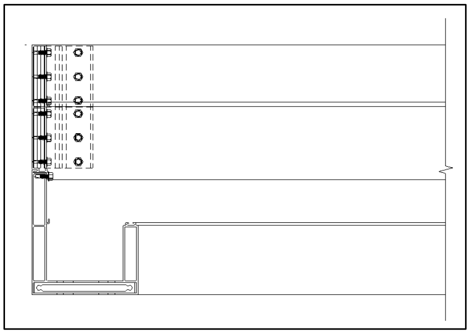
Support Posts - Intermediate Condition Analysis

Post Size: 6.5" x 6.5" x 0.125"

X - AXIS Post Trib =	*8.83*	*ft*
Y - AXIS Post Trib =	*7.58*	*ft* Host Attached
FH1 =	*14.13*	*in, (side fascia height at HT1, normal to lateral windload)*

	Max Moment/Axial/Shear	33%
	Moment/Axial Check:	33%
	Shear Check	3%
ASD Method	Required Tension:	201 lb
	Required Compression:	2010 lb
	Required Shear:	370 lb
	Required Moment	1.98 kip-ft

Beam to Beam (Clip in Shear)



Qty 6 Anchor Qty at Connection per Beam

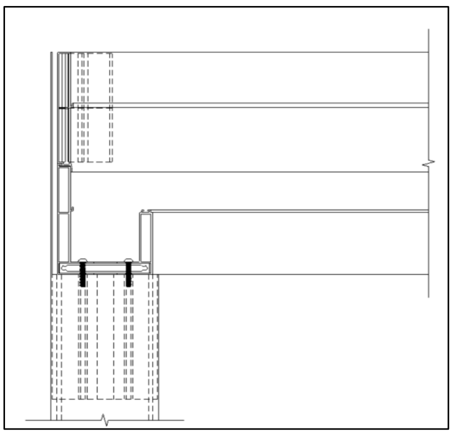
Required Tension:	0 lb
Required Shear:	1612 lb

(Analyzing 1/4-14 SMS, 316 SS, Steel Screw to 0.125" x 0.125" connecting parts thicknesses)

52%

OK, (6) anchors sufficient

Beam to Post Insert Connection



Qty 4 Anchor Qty at Connection

F	5148.59 lb	Ω = 4
Fsu	60000.00	
Ats	0.34 in^2	
n	20.00 threads/in	
LE	1.57 in	
Dsmin	0.31 in	
Enmax	0.28 in	

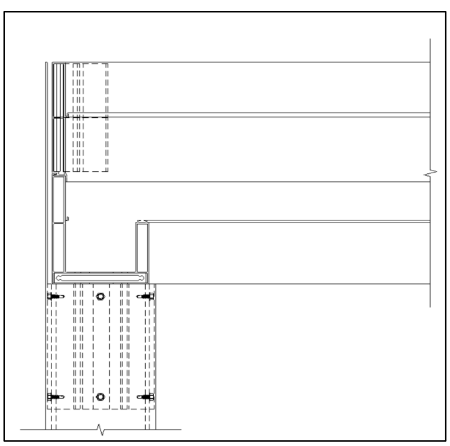
Required Tension:	201 lb
Capacity Shear:	20594 lb

Analyzing Beam to Post Insert with (4) M8x40 Machine screws

1%

OK

Post Insert to Post Connection



Qty 6 Anchor Qty at Connection

Required Tension:	0 lb
Required Shear:	370 lb

(Analyzing 1/4-14 SMS, 316 SS, Steel Screw to 0.125" x 0.125" connecting parts thicknesses)

12%

OK, (6) anchors sufficient

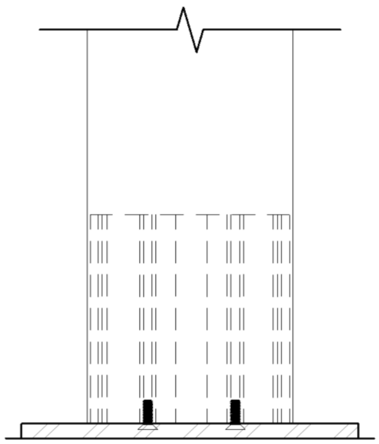
Foundation

SEE SKYCIV			
Foundation Reactions (K,K-FT)			
	P	V	*M*
D	0.335	0.000	0.000
W	0.629	0.458	3.296
E	0.010	0.055	0.326
Lr	1.032	0.000	0.000
S	1.675	0.000	0.000

Baseplate	4-Bolt		**Spacing:**	8.625	in	SEE ANCHOR CALC	
Plate Thickness:	0.5	in	**Width:**	10.625	in	35%	**Okay**

Post Insert to Base Plate Connection

Qty 8 Anchor Qty at Connection



F	5148.59	lb	Ω = 4
Fsu	60000.00		
Ats	0.34	in^2	
n	20.00	threads/in	
LE	1.57	in	
Dsmin	0.31	in	
Enmax	0.28	in	

Required Tension:	9993 lb
Capacity Shear:	41189 lb

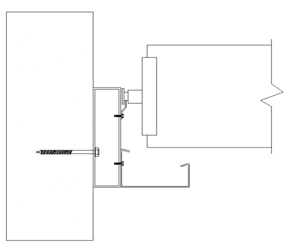
Analyzing Beam to Post Insert with (4) M8x40 Machine screws

24%

OK

Ledger Connection

Ledger Connection? Y



S=	16 inches	Anchor spacing along ledger
# of Screws=	2 pcs	Number of anchors per location
Required Tension:	16 lb	
Required Shear:	177 lb	

These are the ledger tributaries that this calculator will utilize:

W =	*8.83 ft*	*Tributary Width*
RL =	*30.00 psf*	*Vert. Load on Tributary (LL, WL, DL, etc)*
FL =	*18.32 psf*	*Lateral Load on Tributary (Fascia Load)*
DL =	*0.00 lb/ft*	*Additional Beam Load (Weight or Service Loads)*
Pv =	*265.00 lb/ft*	*Total Vert. Loading on Beam*
Pf =	*21.57 lb/ft*	*Total Lat. Loading on Beam*

1/2" diameter stainless steel lag screw with minimum 3" thread penetration, 3" edge distance, into southern yellow pine #2 wood (G = 0.55)

V_{allow} =	*195 lb*	*Shear Capacity per Anchor*
T_{allow} =	*477 lb*	*Tension Capacity per Anchor*

94%

Ledger Connection OK

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Work Prepared For:	Timan Window Treatments, Inc
Project:	250270 - Conti

DESIGN CRITERIA:

H =	8.50	ft, Mean Roof Height		ASCE:	7-16
Θ =	0.0 º	Roof Slope	F= 0.0000	Exposure:	C
Vult =	115	mph, Wind Velocity (3-Second Gust)		Building Category:	II
Kd =	0.85	Directionality Factor			
G =	0.85	Gust Effect Factor		Snow:	Y
Kz =	0.85	Velocity Pressure Coefficient		Ground Snow Load:	25.00 psf
Kzt =	1	Topographic Factor		Design Snow Load:	25.00 psf
				Design Live Load:	20.00 psf
				Design Dead Load:	5.0 psf
	Wind Flow:	Clear		Wind Porosity:	50%
L =	24.33	ft, Overall Canopy Length		Method:	ASD
W =	17.67	ft, Overall Canopy Width	Live Load	Lr:	15.40 psf
a =	3.00 ft		Reduction Per	Lo:	20.00 psf
			IBC	R1:	0.770111111
			1607.13.2.1	R2:	1

LOADS ON COMPONENTS & CLADDING:

(Roof Decking and Decking Fasteners)

L1 =	12.17	ft, Effective Deck Panel Length	
W1 =	4.06 ft	Effective Deck Panel Width	
A =	49.34 ft^2	Effective Wind Area, L1*W1	A > 4.0*a^2
CNp =	0.8	Positive Pressure Coefficient	
CNn =	-0.5	Negative Pressure Coefficient	
qz =	12.21 psf	Velocity Pressure w/ Porosity	
WLp =	9.39 psf	Positive Wind Load, = qz*G*CNp	
WLn =	-8.00 psf	Negative Wind Load, = qz*G*CNn	
Grav =	**30.00 psf**	**D + (Lr or S or R)**	**Critical positive DP**
Uplift =	**-3.00 psf**	**0.6D + 0.7E**	**Critical negative DP**

LOADS ON MAIN WIND FORCE RESISTING SYSTEM:

(Beams, Columns, Foundations)

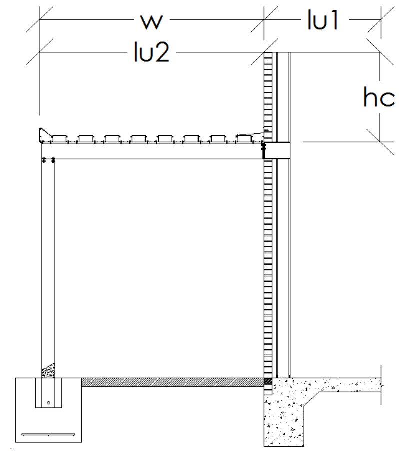
Wind Direction, γ = 0º			Wind Direction, γ = 180º		
CNWa =	1.2	Cnw value, load case A	CNWa =	1.2	Cnw value, load case A
CNWb =	-1.1	Cnw value, load case B	CNWb =	-1.1	Cnw value, load case B
CNLa =	0.3	Cnl value, load case A	CNLa =	0.3	Cnl value, load case A
CNLb =	-0.1	Cnl value, load case B	CNLb =	-0.1	Cnl value, load case B
Wind Direction, γ = 90º					
CNa =	-0.8	Cn value, load case A	CNb =	0.8	Cn value, load case B

CNp =	0.8	Critical Positive Pressure Coefficient	
CNn =	-0.5	Critical Negative Pressure Coefficient	
WLp =	9.39 psf	Critical Positive Wind Load, = qz*G*CNp	
WLn =	-8.00 psf	Critical Negative Wind Load, = qz*G*CNn	
Grav =	**30.00 psf**	**D + (Lr or S or R)**	**Critical positive DP**
Uplift =	**-3.00 psf**	**0.6D + 0.7E**	**Critical negative DP**

LOADS ON CANOPY FASCIA:

GCpn1 =	1.5	Combined Net Pressure Coefficient on windward fascia
GCpn1 =	-1	Combined Net Pressure Coefficient on leeward fascia
WL =	**18.32 psf**	**Average Wind Load on Fascia, qz*GCpn*0.6**

Work Prepared For: Timan Window Treatments, Inc
Project: 250270 - Conti



Snow Loads

Pg =	25	psf, Ground snow load
Ce =	1.0	Exposure factor (Table 7-2)
Ct =	1.2	Thermal factor (Table 7-3)
Is =	1.0	Importance factor (Table 7-4)
Evs =	1.00 °	Eave slope
S =	57.29	Roof slope run for a rise of one
W =	15.00	ft, Horizontal distance from eave to ridge
γ =	17.25 pcf	Snow density Eq. 7-3: 0.13(Pg)+14 < 30 psf
Cs =	1.00	Slope factor at 1° (Figure 7-2)

Balanced Snow Loads

Pf =	21.00 psf	Snow load on flat roofs (slope < 5°): Pf = max[(I)(20),(0.7)(Ce)(Ct)(I)(Pg)]
Ps =	21.00 psf	Sloped roof snow loads (slope > 5°): Ps = (Cs)(Pf)

Drifts on Lower Roofs (Aerodynamic Shade)

lu1=	20.00	ft, Length of upper roof
lu2=	15.00 ft	Length of lower roof projection
hc=	11.50	ft, Height from top of lower roof to top of eave

Drift snow required, hc/hb>0.2

hb=	1.22 ft	Height of balanced snow: Ps/(γ)
hd1=	1.34 ft	Height of snow drift (Fig 7-9): 0.43(lu)^(1/3)(Pg+10)^(1/4)-1.5 (Leeward)
hd2=	0.81 ft	Height of snow drift (Fig 7-9): 0.43(lu)^(1/3)(Pg+10)^(1/4)-1.5 (Windward)

ASCE 7-10/7-16 - Rain-On-Snow Surcharge (7.10)

Is Pg 20 PSF or less? NO

Unreducible Snow Load	Yes
Include Uniform Dist. Ice Load?	Yes
Include surcharge load?	Yes

hd=	1.34 ft	Governing drift height
w=	5.36 ft	Governing drift width
hend=	0.00 ft	Drift height at edge of lower roof
pd=	11.55 psf	Surcharge load Uniform Distribution Over Drift Width
	4.12 psf	Surcharge Load Distributed over Tributary Area

SL= 25.00 psf Unreducible Roof Snow Load

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Project: 250270 - Conti

Ice Load Due to Freezing Rain (per ASCE 7-16 - Chapter 10)

Acounting for Accumulating Ice on Louver Blades

t_i =	1.50	Nominal Ice Thickness (in.)
K_{zt} =	1.0	Topographic Factor
Z =	8.50 ft	System Height
I_i =	1.00	Importance Factor
I_d =	56.00	Ice Density (56 pcf default)
	II	Occupancy Category

Louver (6" O.C.)

Depth (d)	6.000 in.
Width (bf)	1.866 in.
Thickness	.065 in.
Length	12.17 ft

Per Table 10-1

t_d =	1.31	in, Design Ice Thickness	$t_d = t_i{*}I_i{*}f_z{*}(K_{zt})^{0.35}$
W_i =	6.11 psf	Weight of Ice (for td)	$W_i = (td/12){*}I_d$
F_z =	0.8732		$F_z = (Z/33)^{0.1}$

Ice Loading Ch 10.4

Louver Ice Loading

D_c = 6.32 in Circumscribing Diameter of Louver $D_c = \sqrt{d^2+bf^2}$

A_i = 31.38 in^2 Area of Ice = $\pi t_d{*}(D_c+t_d)$

$W_{i(Louver)}$ = 12.21 plf Uniform Distributed Ice Load (Single Louver Blade)

$W_i = (A_i/144){*}I_d$

Louver Beam Ice Loading from Louver Blades

$W_{i(Louver)}$ = 12.21 plf Distributed Ice Load on Louver Blade

L= 12.17 ft Length of Longest Louver Blade

$W_{i(Beam)}$= 74.2 plf Calculated Ice Load on Louver Beam

$W_{i(Beam)} = W_{i(Louver)}$*Louver Length*(1.866"/6")

(6" O.C. Louvers In Open Position)

$Wi_{(Louver)}$= 12.21 plf Uniform Linear Ice Load (Louver Blade)

$W_{i(Beam)}$= 148.49 plf Uniform Linear Ice Load (Louver Beam)

($W_{i(Beam)}$ doubled for intermediate Louver Beams)

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Project: 250270 - Conti

Seismic Loads Criteria

S_s =	0.134	Max considered response acceleration for a period of 0.2 s
S_1 =	0.049	Max response acceleration at period of 1 s

Height of Structure = 8.50 ft   Attached to host structure? Y

Site Class D

F_a =	1.6	short period amplification factor	
F_v =	2.4	long period amplification factor	
S_{MS} =	0.214	modified spectral response acceleration at a period of 0.2 s	F_a*S_s
S_{M1}=	0.118	modified spectral response acceleration at a period of 1.0 s	F_v*S_1

Spectral Response Acceleration Parameters

S_{DS} =	0.143	Design spectral response acceleration at a period of 0.2 s	$(2/3)*S_{ms}$
S_{D1}=	0.078	design spectral response acceleration at a period of 1.0 s	$(2/3)*S_{M1}$

Structural Design Requirements

T_a =	0.100	Approximate fundamental period (s)	$C_t*h_n^x$
T_L =	12.0	Long Transition Period (s)	
E_V=	0.100	Vertical Seismic Loads (PSF)	
Rp =	2.50		
ap=	2.500		
Ip=	1.000		

Wp=	334.93 lbs	Tributary Weight	
Fp=	19.15 lbs	Seismic Design Force	0.4ap*SDS*Wp/(Rp/Ip)*(1+2(z/h))
FpMAX=	76.60 lbs		
FpMIN=	14.36 lbs	Ω=	2.00
P=	1	**SERVICE =**	**0.7**
113.94 lb-ft		Effective Seismic Moment	(H*Fp)
		SDF OK?	OK

Work Prepared For: Timan Window Treatments, Inc
Project: 250270 - Conti

ALUMINUM DESIGN MANUAL (2020 EDITION)
Specifications for Aluminum Structures (Buildings)
Allowable Stress Design

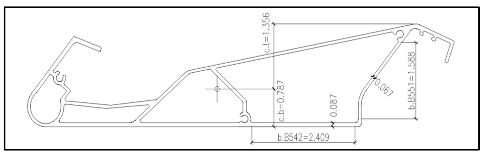
LOUVER BLADE CHECK

Design Check of Azenco Louver Blade0.087"x0.087"x2.14727"/1.0406" 6063-T6 Aluminum Tube

Per 2020 Aluminum Design Manual

Alloy:	6063	Temper:	T6	Critically Welded:	N

MEMBER PROPERTIES



Flange width	9.963"
Flange thickness	0.087"
Web height	2.147"
Web thickness	0.087"
Moment of inertia about axis parallel to flange	1.04 in^4
Moment of inertia about axis parallel to web	17.38 in^4
Section modulus compression x-axis	0.78 in^3
Section modulus tension x-axis	1.31 in^3
Section modulus tension y-axis	3.16 in^3
Section modulus compression y-axis	3.95 in^3
Radius of gyration about centroidal axis parallel to flange	0.71 in
Radius of gyration about centroidal axis parallel to web	2.92 in
Torsion constant	1.26 in^4
Cross sectional area of member	2.04 in^2
Plastic section modulus	1.30 in^3
Warping constant	5.73 in^6

MEMBER SPANS

Unsupported member length (between supports)	*L* =	12.17 ft
Unbraced length for bending (between bracing against side-sway)	*Lb* =	12.17 ft
Effective length factor	*k* =	1.0
Tensile ultimate strength	Ftu =	30 ksi
Tensile yield strength	Fty =	25 ksi
Compressive yield strength	Fcy =	25 ksi
Shear ultimate strength	Fsu =	18 ksi
Shear yield strength	Fsy =	15 ksi
Compressive modulus of elasticity	E =	10,100 ksi

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BUCKLING CONSTANTS

Compression in columns & beam flanges (Intercept)	*Bc* =	27.64 ksi
Compression in columns & beam flanges (Slope)	*Dc* =	0.14 ksi
Compression in columns & beam flanges (Intersection)	*Cc* =	78.38 ksi
Compression in flat plates (Intercept)	*Bp* =	31.39 ksi
Compression in flat plates (Slope)	*Dp* =	0.17 ksi
Compression in flat plates (Intersection)	*Cp* =	73.55 ksi
Compressive bending stress in solid rectangular bars (Intercept)	*Bbr* =	46.12 ksi
Compressive bending stress in solid rectangular bars (Slope)	*Dbr* =	0.38 ksi
Shear stress in flat plates (Intercept)	*Bs* =	18.98 ksi
Shear stress in flat plates (Slope)	*Ds* =	0.08 ksi
Shear stress in flat plates (Intersection)	*Cs* =	94.57 ksi
Ultimate strength coefficient of flat plates in compression (slenderness limit λ2)	*k1c* =	0.35
timate strength coefficient of flat plates in compression (stress for slenderness > λ2)	*k2c* =	2.27
Ultimate strength of flat plates in bending (slenderness limit λ2)	*k1b* =	0.50
Ultimate strength of flat plates in bending (stress for slenderness > λ2)	*k2b* =	2.04
Tension coefficient	*kt* =	1.0

D.2 Axial Tension

Tensile Yielding - Unwelded Members	*[Fty]*	Fty_n =	25.00 ksi
		Ω =	1.65
		Fty_n/Ω =	15.15 ksi
Tensile Rupture - Unwelded Members	*[Ftu]*	*Ftu_n* =	30.00 ksi
		Ω =	1.95
		Ftu_n/Ωt =	15.38 ksi

AXIAL COMPRESSION MEMBERS

E.2 Compression Member Buckling

Axial, gross section subject to buckling	Lower slenderness limit	*λ1* =	18.23	
	Upper slenderness limit	*λ2* =	78.38	
	Slenderness	*λ(max)* =	204.57	≥ λ2
	[0.85π²E/λ²]	*Fc_n* =	2.02 ksi	
		Ω =	1.65	
		Fc_n/Ω =	1.23 ksi	

E.3 Local Buckling

For column elements in uniform compression subject to local buckling, the uniform compressive strength is addressed in Section B.5.4 calculated below.

B.5.4.2 - Flat elements supported on both edges (Flang

B.5.4.2 - Flat elements supported on both edges (Web)

E.4 Buckling Interaction

Per Table B.5.1	*[π²*E/ (1.6*b/tb)²]*	*Fe(flange) =*	3.08 ksi	
	[Fc_n]	*Fc_n =*	2.02 ksi	
	Fe(flange) > Fc_n (E.2 Member Buckling)	*Ω =*	1.65	
		Fc_n/Ω =	1.23 ksi	
	*[π²*E/ (1.6*h/th)²]*	*Fe(web) =*	75.69 ksi	
	[Fc_n]	*Fc_n =*	2.02 ksi	
	Fe(web) > Fc_n (E.2 Member Buckling)	*Ω =*	1.65	
		Fc_n/Ω =	1.23 ksi	

FLEXURAL MEMBERS

F.2 Yielding and Rupture

Nominal flexural strength for yielding and rupture	Limit State of Yielding			
	*[Sc*Fcy]*	Mnp =	19.43 k-in	
	[Mnp/Sx]	Fb_n =	14.97 ksi	
		Ω =	1.65	
		Fb_n/Ω =	9.07 ksi	
	Limit State of Rupture			
	*[Z*Ftu/kt]*	Mnu =	38.93 k-in	
	[Mnu/Z]	Fb_n =	30.00 ksi	
		Ω =	1.95	
		Fb_n/Ω =	15.38 ksi	

F.4 Lateral-Torsional Buckling

Unsymmetric shape subject to lateral-torsional buckling

	Slenderness for closed shape about the bending axis	*λ F.4.2.5 =*	11.32	
	Maximum slenderness	*λ(max) =*	11.32	< Cc
Nominal flexural strength - lateral-torsional buckling				
	*[Mnp(1-(λ/Cc))+(π²*E*λ*Sx/Cc^3)]*	Mnmb =	18.44 k-in	
	[Mnmb/Sx]	Fb_n =	23.73 ksi	
		Ω =	1.65	
		Fb_n/Ω =	14.38 ksi	

UNIFORM COMPRESSION ELEMENTS

B.5.4.2 Flat Elements Supported on Both Edges - Web & Flange

Uniform compression strength, flat elements supported on both edges

	Lower slenderness limit	*λ1 =*	22.8	
	Upper slenderness limit	*λ2 =*	39.2	
	Flange Slenderness	*b/tb =*	112.52	≥ λ2
	Web Slenderness	*h/th =*	22.68	≤ λ1
	[k2c√(Bp*E)/(1.6*b/tb)]*	*Fc_n1 =*	7.10 ksi	
		Ω =	1.65	
		Fc_n1/Ω =	4.30 ksi	
	[Fcy]	*Fc_n2 =*	25.00 ksi	
		Ω =	1.65	
		Fc_n2/Ω =	15.15 ksi	

FLEXURAL COMPRESSION ELEMENTS

B.5.5.1 Flat Elements Supported on Both Edges - Web

Flexural compression strength, flat elements supported on both edges

Lower slenderness limit	*λ1* =	34.73	
Upper slenderness limit	*λ2* =	92.95	
Slenderness	*h/th* =	22.68	≤ λ1
*[1.5*Fcy]*	*Fb_n* =	37.50 ksi	
	Ω =	1.65	
	Fb_n/Ω =	22.73 ksi	

SHEAR

G.2 Shear Supported on Both Edges - Web

Members with flat elements supported on both edges

Lower slenderness limit	*λ1* =	38.73	
Upper slenderness limit	*λ2* =	75.65	
Slenderness	*h/th* =	22.68	≤ λ1
[Fsy]	*Fv_n* =	15.00 ksi	
	Ω =	1.65	
	Fv_n/Ω =	9.09 ksi	

ALLOWABLE STRESSES

Allowable bending stress	Fb =	9.07 ksi
Allowable axial stress, compression	Fac =	1.23 ksi
Allowable shear stress; webs	Fv =	9.09 ksi

Elastic buckling stress	*Fe* =	1.22 ksi
Weighted average allowable compressive stress (per Section E.3.1)	*Fao* =	6.12 ksi

Mmax	460.88	lb-ft	
Stress	7.12	ksi	
Fb	9.07 ksi		78.451%

Work Prepared For: Timan Window Treatments, Inc
Project: 250270 - Conti

ALUMINUM DESIGN MANUAL (2020 EDITION)
Specifications for Aluminum Structures (Buildings)
Allowable Stress Design

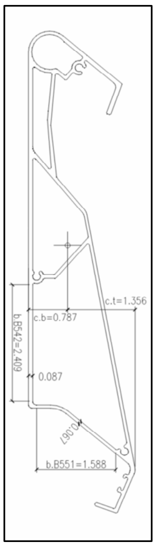
LOUVER BLADE CHECK

Design Check of Azenco Louver Blade0.087"x0.087"x9.9627"/17.3769" 6063-T6 Aluminum Tube

Per 2020 Aluminum Design Manual

Alloy:	6063	Temper:	T6	Critically Welded:	N

MEMBER PROPERTIES



Flange width	2.143"
Flange thickness	0.087"
Web height	9.963"
Web thickness	0.087"
Moment of inertia about axis parallel to flange	17.38 in^4
Moment of inertia about axis parallel to web	1.04 in^4
Section modulus compression x-axis	3.16 in^3
Section modulus tension x-axis	3.95 in^3
Section modulus tension y-axis	0.78 in^3
Section modulus compression y-axis	1.31 in^3
Radius of gyration about centroidal axis parallel to flange	2.92 in
Radius of gyration about centroidal axis parallel to web	0.71 in
Torsion constant	1.26 in^4
Cross sectional area of member	2.04 in^2
Plastic section modulus	5.19 in^3
Warping constant	5.73 in^6

MEMBER SPANS

Unsupported member length (between supports)	*L* =	12.17 ft
Unbraced length for bending (between bracing against side-sway)	*Lb* =	12.17 ft
Effective length factor	*k* =	1.0
Tensile ultimate strength	Ftu =	30 ksi
Tensile yield strength	Fty =	25 ksi
Compressive yield strength	Fcy =	25 ksi
Shear ultimate strength	Fsu =	18 ksi
Shear yield strength	Fsy =	15 ksi
Compressive modulus of elasticity	E =	10,100 ksi

BUCKLING CONSTANTS

Compression in columns & beam flanges (Intercept)	*Bc* =	27.64 ksi
Compression in columns & beam flanges (Slope)	*Dc* =	0.14 ksi
Compression in columns & beam flanges (Intersection)	*Cc* =	78.38 ksi
Compression in flat plates (Intercept)	*Bp* =	31.39 ksi
Compression in flat plates (Slope)	*Dp* =	0.17 ksi
Compression in flat plates (Intersection)	*Cp* =	73.55 ksi
Compressive bending stress in solid rectangular bars (Intercept)	*Bbr* =	46.12 ksi
Compressive bending stress in solid rectangular bars (Slope)	*Dbr* =	0.38 ksi
Shear stress in flat plates (Intercept)	*Bs* =	18.98 ksi
Shear stress in flat plates (Slope)	*Ds* =	0.08 ksi
Shear stress in flat plates (Intersection)	*Cs* =	94.57 ksi
Ultimate strength coefficient of flat plates in compression (slenderness limit λ2)	*k1c* =	0.35
timate strength coefficient of flat plates in compression (stress for slenderness > λ2)	*k2c* =	2.27
Ultimate strength of flat plates in bending (slenderness limit λ2)	*k1b* =	0.50
Ultimate strength of flat plates in bending (stress for slenderness > λ2)	*k2b* =	2.04
Tension coefficient	*kt* =	1.0

D.2 Axial Tension

Tensile Yielding - Unwelded Members	*[Fty]*	Fty_n =	25.00 ksi	
		Ω =	1.65	
		Fty_n/Ω =	15.15 ksi	
Tensile Rupture - Unwelded Members	*[Ftu]*	*Ftu_n* =	30.00 ksi	
		Ω =	1.95	
		Ftu_n/Ωt =	15.38 ksi	

AXIAL COMPRESSION MEMBERS

E.2 Compression Member Buckling

Axial, gross section subject to buckling	Lower slenderness limit	*λ1* =	18.23	
	Upper slenderness limit	*λ2* =	78.38	
	Slenderness	*λ(max)* =	204.57	≥ λ2
	[0.85π²E/λ²]	*Fc_n* =	2.02 ksi	
		Ω =	1.65	
		Fc_n/Ω =	1.23 ksi	

AM | STRUCTURES

E.3 Local Buckling

For column elements in uniform compression subject to local buckling, the uniform compressive strength is addressed in Section B.5.4 calculated below.

B.5.4.2 - Flat elements supported on both edges (Flang

B.5.4.2 - Flat elements supported on both edges (Web)

E.4 Buckling Interaction

Per Table B.5.1	*[π²*E/ (1.6*b/tb)²]*	*Fe(flange) =*	76.04 ksi
	[Fc_n]	*Fc_n =*	2.02 ksi
	Fe(flange) > Fc_n (E.2 Member Buckling)	Ω =	1.65
		Fc_n/Ω =	1.23 ksi
	*[π²*E/ (1.6*h/th)²]*	*Fe(web) =*	3.08 ksi
	[Fc_n]	*Fc_n =*	2.02 ksi
	Fe(web) > Fc_n (E.2 Member Buckling)	Ω =	1.65
		Fc_n/Ω =	1.23 ksi

FLEXURAL MEMBERS

F.2 Yielding and Rupture

Nominal flexural strength for yielding and rupture	Limit State of Yielding		
	*[Sc*Fcy]*	Mnp =	78.88 k-in
	[Mnp/Sx]	Fb_n =	25.00 ksi
		Ω =	1.65
		Fb_n/Ω =	15.15 ksi
	Limit State of Rupture		
	*[Z*Ftu/kt]*	Mnu =	155.83 k-in
	[Mnu/Z]	Fb_n =	30.00 ksi
		Ω =	1.95
		Fb_n/Ω =	15.38 ksi

F.4 Lateral-Torsional Buckling

Unsymmetric shape subject to lateral-torsional buckling				
	Slenderness for any close shape about the bending axis	*λ F.4.2.5 =*	46.09	
	Maximum slenderness	*λ(max) =*	46.09	< Cc
Nominal flexural strength - lateral-torsional buckling				
	*[Mnp(1-(λ/Cc))+(π²*E*λ*Sx/Cc^3)]*	Mnmb =	62.60 k-in	
	[Mnmb/Sx]	Fb_n =	19.84 ksi	
		Ω =	1.65	
		Fb_n/Ω =	12.02 ksi	

UNIFORM COMPRESSION ELEMENTS

B.5.4.2 Flat Elements Supported on Both Edges - Web & Flange

Uniform compression strength, flat elements supported on both edges				
	Lower slenderness limit	*λ1 =*	22.8	
	Upper slenderness limit	*λ2 =*	39.2	
	Flange Slenderness	*b/tb =*	22.63	≤ λ1
	Web Slenderness	*h/th =*	112.51	≥ λ2
	[Fcy]	*Fc_n1 =*	25.00 ksi	
		Ω =	1.65	
		Fc_n1/Ω =	15.15 ksi	
	[k2c√(Bp*E)/(1.6*h/th)]*	*Fc_n2 =*	7.10 ksi	
		Ω =	1.65	
		Fc_n2/Ω =	4.30 ksi	

FLEXURAL COMPRESSION ELEMENTS

B.5.5.1 Flat Elements Supported on Both Edges - Web

Flexural compression strength, flat elements supported on both edges

Lower slenderness limit	$\lambda 1$ =	34.73		
Upper slenderness limit	$\lambda 2$ =	92.95		
Slenderness	*h/th* =	112.51	≥ $\lambda 2$	
*[k2b*SQRT(Bbr*E)/(m*h/th)]*	*Fb_n* =	19.04 ksi		
	Ω =	1.65		
	Fb_n/Ω =	11.54 ksi		

SHEAR

G.2 Shear Supported on Both Edges - Web

Members with flat elements supported on both edges	Lower slenderness limit	$\lambda 1$ =	38.73	
	Upper slenderness limit	$\lambda 2$ =	75.65	
	Slenderness	*h/th* =	112.51	≥ $\lambda 2$
	*[π²E/(1.25*h/th)²]*	*Fv_n* =	5.04 ksi	
		Ω =	1.65	
		Fv_n/Ω =	3.05 ksi	

ALLOWABLE STRESSES

Allowable bending stress	Fb =	11.01 ksi
Allowable axial stress, compression	Fac =	1.23 ksi
Allowable shear stress; webs	Fv =	3.05 ksi

Elastic buckling stress	*Fe* =	1.22 ksi
Weighted average allowable compressive stress (per Section E.3.1)	*Fao* =	6.12 ksi

Mmax	99.12	lb-ft	
Stress	0.38	ksi	
Fb	11.01 ksi		3.42%

AM | STRUCTURES

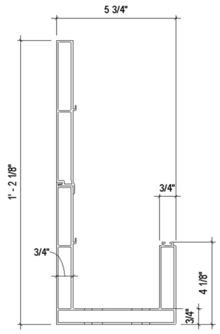
Work Prepared For:	Timan Window Treatments, Inc
Project:	250270 - Conti
Detail/Member:	Louver Beam

ALUMINUM DESIGN MANUAL (2020 EDITION)
Specifications for Aluminum Structures (Buildings)
Allowable Stress Design

Design Check of 5.75"x14.125"x0.125"/0.125" 6005A-T6 Aluminum Tube
Per 2020 Aluminum Design Manual

Alloy:	6005A	Temper:	T6	Critically Welded:	N

MEMBER PROPERTIES



Flange width	*b* =	5.750"
Flange thickness	*tb* =	0.125"
Web height	*h* =	14.125"
Web thickness	*th* =	0.125"
Moment of inertia about axis parallel to flange	*Ix* =	80.77 in^4
Moment of inertia about axis parallel to web	*Iy* =	17.42 in^4
Section modulus compression x-axis	*Sxc* =	8.94 in^3
Section modulus tension x-axis	*Sxt* =	15.88 in^3
Section modulus tension y-axis	*Syt* =	4.34 in^3
Section modulus compression y-axis	*Syc* =	10.03 in^3
Radius of gyration about centroidal axis parallel to flange	*rx* =	4.36 in
Radius of gyration about centroidal axis parallel to web	*ry* =	2.02 in
Torsion constant	*J* =	1.90 in^4
Cross sectional area of member	*A* =	4.25 in^2
Plastic section modulus	*Z* =	16.60 in^3
Warping constant	Cw =	5.75 in^6

MEMBER SPANS

Unsupported member length (between supports)	*L* =	17.67 ft
Unbraced length for bending (between bracing against side-sway)	*Lb* =	17.67 ft
Effective length factor	*k* =	1.0

MATERIAL PROPERTIES

Tensile ultimate strength	*Ftu* =	38 ksi
Tensile yield strength	*Fty* =	35 ksi
Compressive yield strength	*Fcy* =	35 ksi
Shear ultimate strength	*Fsu* =	23 ksi
Shear yield strength	*Fsy* =	21 ksi
Compressive modulus of elasticity	*E* =	10,100 ksi

BUCKLING CONSTANTS

Compression in columns & beam flanges (Intercept)	*Bc* =	39.37 ksi
Compression in columns & beam flanges (Slope)	*Dc* =	0.25 ksi
Compression in columns & beam flanges (Intersection)	*Cc* =	65.67 ksi
Compression in flat plates (Intercept)	*Bp* =	45.00 ksi
Compression in flat plates (Slope)	*Dp* =	0.30 ksi
Compression in flat plates (Intersection)	*Cp* =	61.42 ksi
Compressive bending stress in solid rectangular bars (Intercept)	*Bbr* =	66.82 ksi
Compressive bending stress in solid rectangular bars (Slope)	*Dbr* =	0.67 ksi
Shear stress in flat plates (Intercept)	*Bs* =	27.24 ksi
Shear stress in flat plates (Slope)	*Ds* =	0.14 ksi
Shear stress in flat plates (Intersection)	*Cs* =	78.95 ksi
Ultimate strength coefficient of flat plates in compression (slenderness limit $\lambda 2$)	*k1c* =	0.35
Ultimate strength coefficient of flat plates in compression (stress for slenderness > $\lambda 2$)	*k2c* =	2.27
Ultimate strength of flat plates in bending (slenderness limit $\lambda 2$)	*k1b* =	0.50
Ultimate strength of flat plates in bending (stress for slenderness > $\lambda 2$)	*k2b* =	2.04
Tension coefficient	*kt* =	1.0

D.2 Axial Tension

Tensile Yielding - Unwelded Members	*[Fty]*	Fty_n =	35.00 ksi
		Ω =	1.65
		Fty_n/Ω =	21.21 ksi
Tensile Rupture - Unwelded Members	*[Ftu/kt]*	*Ftu_n* =	38.00 ksi
		Ω =	1.95
		Ftu_n/Ωt =	19.49 ksi

AXIAL COMPRESSION MEMBERS

E.2 Compression Member Buckling

Axial, gross section subject to buckling	Lower slenderness limit	*λ1 =*	17.76	
	Upper slenderness limit	*λ2 =*	65.67	
	Slenderness	*λ(max) =*	104.73	≥ λ2
	[0.85π²E/λ²]	*Fc_n =*	7.72 ksi	
		Ω =	1.65	
		Fc_n/Ω =	4.68 ksi	

E.3 Local Buckling

For column elements in uniform compression subject to local buckling, the uniform compressive strength is addressed in Section B.5.4 calculated below.

B.5.4.2 - Flat elements supported on both edges (Flange)

B.5.4.2 - Flat elements supported on both edges (Web)

E.4 Buckling Interaction

Per Table B.5.1	*[π²*E/ (1.6*b/tb)²]*	*Fe(flange) =*	20.11 ksi	
	[Fc_n]	*Fc_n =*	7.72 ksi	
	Fe(flange) > Fc_n (E.2 Member Buckling)	Ω =	1.65	
		Fc_n/Ω =	4.68 ksi	
	*[π²*E/ (1.6*h/th)²]*	*Fe(web) =*	3.16 ksi	
	*[0.85π²E/λ(max)²]^1/3 * [Fe^2/3]*	*Fc_n =*	4.26 ksi	
	Fe(web) < Fc_n (E.2 Member Buckling)	Ω =	1.65	
		Fc_n/Ω =	2.58 ksi	

FLEXURAL MEMBERS

F.2 Yielding and Rupture

Nominal flexural strength for yielding and rupture	Limit State of Yielding			
	*[1.5*Sc*Fcy]*	Mnp =	312.73 k-in	
	[Mnp/Sx]	Fb_n =	35.00 ksi	
		Ω =	1.65	
		Fb_n/Ω =	21.21 ksi	
	Limit State of Rupture			
	*[Z*Ftu/kt]*	Mnu =	839.60 k-in	
	[Mnu/Z]	Fb_n =	38.00 ksi	
		Ω =	1.95	
		Fb_n/Ω =	19.49 ksi	

F.4 Lateral-Torsional Buckling

Unsymmetric shape subject to lateral-torsional buckling				
	Slenderness for shapes any shape about the bending axis	*λ F.4.2.5 =*	45.48	
	Maximum slenderness	*λ(max) =*	45.48	< Cc
Nominal flexural strength - lateral-torsional buckling				
	*[Mnp(1-(λ/Cc))+(π²*E*λ*Sx/Cc^3)]*	Mnmb =	239.17 k-in	
	[Mnmb/Sx]	Fb_n =	26.77 ksi	
		Ω =	1.65	
		Fb_n/Ω =	16.22 ksi	

UNIFORM COMPRESSION ELEMENTS

B.5.4.2 Flat Elements Supported on Both Edges - Web & Flange

Uniform compression strength, flat elements supported on both edges				
	Lower slenderness limit	*λ1 =*	20.8	
	Upper slenderness limit	*λ2 =*	32.8	
	Flange Slenderness	*b/tb =*	44.0	≥ λ2
	Web Slenderness	*h/th =*	111.0	≥ λ2
	[k2c√(Bp*E)/(1.6*b/tb)]*	*Fc_n1 =*	21.74 ksi	
		Ω =	1.65	
		Fc_n1/Ω =	13.17 ksi	
	[k2c√(Bp*E)/(1.6*h/th)]*	*Fc_n2 =*	8.62 ksi	
		Ω =	1.65	
		Fc_n2/Ω =	5.22 ksi	

FLEXURAL COMPRESSION ELEMENTS

B.5.5.1 Flat Elements Supported on Both Edges - Web

Flexural compression strength, flat elements supported on both edges

Lower slenderness limit	$\lambda 1$ =	33.10	
Upper slenderness limit	$\lambda 2$ =	77.22	
Slenderness	*h/th* =	111.00	≥ λ2
*[k2b*SQRT(Bbr*E)/(m*h/th)]*	*Fb_n* =	23.23 ksi	
	Ω =	1.65	
	Fb_n/Ω =	14.08 ksi	

SHEAR

G.2 Shear Supported on Both Edges - Web

Members with flat elements supported on both edges

Lower slenderness limit	$\lambda 1$ =	35.29	
Upper slenderness limit	$\lambda 2$ =	63.16	
Slenderness	*h/th* =	111.00	≥ λ2
*[π²E/(1.25*h/th)²]*	*Fv_n* =	5.18 ksi	
	Ω =	1.65	
	Fv_n/Ω =	3.14 ksi	

ALLOWABLE STRESSES

Allowable bending stress	Fb =	16.22 ksi
Allowable axial stress, compression	Fac =	3.18 ksi
Allowable shear stress; webs	Fv =	3.14 ksi

Elastic buckling stress	*Fe* =	4.66 ksi
Weighted average allowable compressive stress (per Section E.3.1)	*Fao* =	7.48 ksi

MEMBER LOADING

Bending Moments

Bending moment developed in member	*Mz* =	7.12 kip-ft	
Bending stress developed in member	fb =	9.56 ksi	
Allowable bending stress of member	Fb =	16.22 ksi	< 1.0

Axial Loads

Axial load developed in member	*Fx* =	0 lb	
Axial stress developed in member	fa =	0.00 ksi	
Allowable compressive axial stress of member	Fac =	3.18 ksi	< 1.0

Shear Loads

Shear load developed in member	*Vz* =	1,612 lb	
Shear stress developed in member	fv =	0.46 ksi	
Allowable shear stress of member webs	Fv =	3.14 ksi	< 1.0

Interaction Equations

	√ [(fb/Fb)^2 + (fv/Fv)^2] =	0.61	< 1.0
Eq H.1-1	fa/Fa + fb/Fb =	0.00	< 1.0
Eq H.3-2	fa/Fa + (fb/Fb)^2 + (fv/Fv)^2 =	0.00	< 1.0

CONFIGURATION AND MOMENT TABULATION TOOLS

# of beam= 2

Support Type	Beam =	Simple
Beam Length	L =	17.67 ft
Tributary Width	W =	12.17 ft
Load on Tributary (LL, WL, DL, etc)	RL =	30.00 psf
Additional Beam Load (Weight or Service Loads)	DL =	0.00 lb/ft
Total Loading on Beam	w =	365.00 lb/ft
Shear Loading at End of Beam	Vy =	3224 lbs
CALCULATED MOMENT	**Mmax =**	**14.2 kip-ft**

Deflection Check

	Support =	Simple	
	Deflection Limit =	L / 180	
	w =	365.00 lb/ft	
ALLOWABLE DEFLECTION	**∆Allow =**	**1.18 in**	
MAXIMUM DEFLECTION	**∆Max =**	**0.49 in**	42%

Simple Max Deflection = 5wl^4/384EI

OK, Allowable Deflection Sufficient

AM STRUCTURES
1153 Town Center Drive #201 Jupiter, FL 33458
PH: 561-951-0099

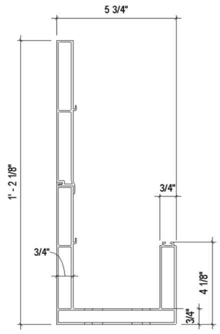
Work Prepared For:	Timan Window Treatments, Inc
Project:	250270 - Conti
Detail/Member:	Main Beam

ALUMINUM DESIGN MANUAL (2020 EDITION)
Specifications for Aluminum Structures (Buildings)
Allowable Stress Design

Design Check of 5.75"x14.125"x0.125"/0.125" 6005A-T6 Aluminum Tube
Per 2020 Aluminum Design Manual

Alloy:	6005A	Temper:	T6	Critically Welded:	N

MEMBER PROPERTIES



Flange width	*b* =	5.750"
Flange thickness	*tb* =	0.125"
Web height	*h* =	14.125"
Web thickness	*th* =	0.125"
Moment of inertia about axis parallel to flange	*Ix* =	80.77 in^4
Moment of inertia about axis parallel to web	*Iy* =	17.42 in^4
Section modulus compression x-axis	*Sxc* =	8.94 in^3
Section modulus tension x-axis	*Sxt* =	15.88 in^3
Section modulus tension y-axis	*Syt* =	4.34 in^3
Section modulus compression y-axis	*Syc* =	10.03 in^3
Radius of gyration about centroidal axis parallel to flange	*rx* =	4.36 in
Radius of gyration about centroidal axis parallel to web	*ry* =	2.02 in
Torsion constant	*J* =	1.90 in^4
Cross sectional area of member	*A* =	4.25 in^2
Plastic section modulus	*Z* =	16.60 in^3
Warping constant	Cw =	5.75 in^6

MEMBER SPANS

Unsupported member length (between supports)	*L* =	3.0 ft
Unbraced length for bending (between bracing against side-sway)	*Lb* =	3.0 ft
Effective length factor	*k* =	2.0

MATERIAL PROPERTIES

Tensile ultimate strength	*Ftu* =	38 ksi
Tensile yield strength	*Fty* =	35 ksi
Compressive yield strength	*Fcy* =	35 ksi
Shear ultimate strength	*Fsu* =	23 ksi
Shear yield strength	*Fsy* =	21 ksi
Compressive modulus of elasticity	*E* =	10,100 ksi

BUCKLING CONSTANTS

Compression in columns & beam flanges (Intercept)	*Bc* =	39.37 ksi
Compression in columns & beam flanges (Slope)	*Dc* =	0.25 ksi
Compression in columns & beam flanges (Intersection)	*Cc* =	65.67 ksi
Compression in flat plates (Intercept)	*Bp* =	45.00 ksi
Compression in flat plates (Slope)	*Dp* =	0.30 ksi
Compression in flat plates (Intersection)	*Cp* =	61.42 ksi
Compressive bending stress in solid rectangular bars (Intercept)	*Bbr* =	66.82 ksi
Compressive bending stress in solid rectangular bars (Slope)	*Dbr* =	0.67 ksi
Shear stress in flat plates (Intercept)	*Bs* =	27.24 ksi
Shear stress in flat plates (Slope)	*Ds* =	0.14 ksi
Shear stress in flat plates (Intersection)	*Cs* =	78.95 ksi
Ultimate strength coefficient of flat plates in compression (slenderness limit λ2)	*k1c* =	0.35
Ultimate strength coefficient of flat plates in compression (stress for slenderness > λ2)	*k2c* =	2.27
Ultimate strength of flat plates in bending (slenderness limit λ2)	*k1b* =	0.50
Ultimate strength of flat plates in bending (stress for slenderness > λ2)	*k2b* =	2.04
Tension coefficient	*kt* =	1.0

D.2 Axial Tension

Tensile Yielding - Unwelded Members	*[Fty]*	Fty_n =	35.00 ksi
		Ω =	1.65
		Fty_n/Ω =	21.21 ksi
Tensile Rupture - Unwelded Members	*[Ftu/kt]*	*Ftu_n* =	38.00 ksi
		Ω =	1.95
		Ftu_n/Ωt =	19.49 ksi

AXIAL COMPRESSION MEMBERS

E.2 Compression Member Buckling

Axial, gross section subject to buckling	Lower slenderness limit	λ_1 =	17.76	
	Upper slenderness limit	λ_2 =	65.67	
	Slenderness	$\lambda(max)$ =	35.57	< λ_2
	$[(Bc-Dc*\lambda)(0.85+0.15*((Cc-\lambda)/(Cc-\lambda_1))]$	Fc_n =	28.92 ksi	
		Ω =	1.65	
		Fc_n/Ω =	17.53 ksi	

E.3 Local Buckling

For column elements in uniform compression subject to local buckling, the uniform compressive strength is addressed in Section B.5.4 calculated below.

B.5.4.2 - Flat elements supported on both edges (Flange)

B.5.4.2 - Flat elements supported on both edges (Web)

E.4 Buckling Interaction

Per Table B.5.1	$[\pi^2*E/ (1.6*b/tb)^2]$	Fe(flange) =	20.11 ksi	
	$[0.85\pi^2E/\lambda(max)^2]$^1/3 * [Fe^2/3]	Fc_n =	30.03 ksi	
	Fe(flange) < Fc_n (E.2 Member Buckling)	Ω =	1.65	
		Fc_n/Ω =	18.20 ksi	
	$[\pi^2*E/ (1.6*h/th)^2]$	Fe(web) =	3.16 ksi	
	$[0.85\pi^2E/\lambda(max)^2]$^1/3 * [Fe^2/3]	Fc_n =	8.75 ksi	
	Fe(web) < Fc_n (E.2 Member Buckling)	Ω =	1.65	
		Fc_n/Ω =	5.30 ksi	

FLEXURAL MEMBERS

F.2 Yielding and Rupture

Nominal flexural strength for yielding and rupture	Limit State of Yielding			
	*[1.5*Sc*Fcy]*	Mnp =	312.73 k-in	
	[Mnp/Sx]	Fb_n =	35.00 ksi	
		Ω =	1.65	
		Fb_n/Ω =	21.21 ksi	
	Limit State of Rupture			
	*[Z*Ftu/kt]*	Mnu =	839.60 k-in	
	[Mnu/Z]	Fb_n =	38.00 ksi	
		Ω =	1.95	
		Fb_n/Ω =	19.49 ksi	

F.4 Lateral-Torsional Buckling

Unsymmetric shape subject to lateral-torsional buckling				
	Slenderness for shapes any shape about the bending axis	λ F.4.2.5 =	27.49	
	Maximum slenderness	$\lambda(max)$ =	27.49	< Cc
Nominal flexural strength - lateral-torsional buckling				
	$[Mnp(1-(\lambda/Cc))+(\pi^2*E*\lambda*Sx/Cc^3)]$	Mnmb =	268.27 k-in	
	[Mnmb/Sx]	Fb_n =	30.02 ksi	
		Ω =	1.65	
		Fb_n/Ω =	18.20 ksi	

UNIFORM COMPRESSION ELEMENTS

B.5.4.2 Flat Elements Supported on Both Edges - Web & Flange

Uniform compression strength, flat elements supported on both edges				
	Lower slenderness limit	λ_1 =	20.8	
	Upper slenderness limit	λ_2 =	32.8	
	Flange Slenderness	b/tb =	44.0	≥ λ_2
	Web Slenderness	h/th =	111.0	≥ λ_2
	$[k2c*\sqrt{(Bp*E)}/(1.6*b/tb)]$	Fc_n1 =	21.74 ksi	
		Ω =	1.65	
		Fc_n1/Ω =	13.17 ksi	
	$[k2c*\sqrt{(Bp*E)}/(1.6*h/th)]$	Fc_n2 =	8.62 ksi	
		Ω =	1.65	
		Fc_n2/Ω =	5.22 ksi	

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FLEXURAL COMPRESSION ELEMENTS

B.5.5.1 Flat Elements Supported on Both Edges - Web

Flexural compression strength, flat elements supported on both edges

Lower slenderness limit	*λ1 =*	33.10	
Upper slenderness limit	*λ2 =*	77.22	
Slenderness	*h/th =*	111.00	≥ λ2
*[k2b*SQRT(Bbr*E)/(m*h/th)]*	*Fb_n =*	23.23 ksi	
	Ω =	1.65	
	Fb_n/Ω =	14.08 ksi	

SHEAR

G.2 Shear Supported on Both Edges - Web

Members with flat elements supported on both edges

Lower slenderness limit	*λ1 =*	35.29	
Upper slenderness limit	*λ2 =*	63.16	
Slenderness	*h/th =*	111.00	≥ λ2
*[π²E/(1.25*h/th)²]*	*Fv_n =*	5.18 ksi	
	Ω =	1.65	
	Fv_n/Ω =	3.14 ksi	

ALLOWABLE STRESSES

Allowable bending stress	Fb =	18.20 ksi
Allowable axial stress, compression	Fac =	7.48 ksi
Allowable shear stress; webs	Fv =	3.14 ksi

Elastic buckling stress	*Fe =*	40.40 ksi
Weighted average allowable compressive stress (per Section E.3.1)	*Fao =*	7.48 ksi

MEMBER LOADING

Bending Moments

Bending moment developed in member	*Mz =*	4.84 kip-ft	
Bending stress developed in member	fb =	6.50 ksi	
Allowable bending stress of member	Fb =	18.20 ksi	< 1.0

Axial Loads

Axial load developed in member	*Fx =*	0 lb	
Axial stress developed in member	fa =	0.00 ksi	
Allowable compressive axial stress of member	Fac =	7.48 ksi	< 1.0

Shear Loads

Shear load developed in member	*Vz =*	1,612 lb	
Shear stress developed in member	fv =	0.46 ksi	
Allowable shear stress of member webs	Fv =	3.14 ksi	< 1.0

Interaction Equations

	√ [(fb/Fb)^2 + (fv/Fv)^2] =	0.39	< 1.0
Eq H.1-1	fa/Fa + fb/Fb =	0.00	< 1.0
Eq H.3-2	fa/Fa + (fb/Fb)^2 + (fv/Fv)^2 =	0.00	< 1.0

CONFIGURATION AND MOMENT TABULATION TOOLS

# of beam=	1
# P load=	1
a=	3.00 ft

Support Type	Beam =	Cantilever
Beam Length	L =	3.00 ft
Tributary Width	W =	0.00 ft
	P Load=	1612.1 lb
Load on Tributary (LL, WL, DL, etc)	RL =	0.00 psf
Additional Beam Load (Weight or Service Loads)	DL =	0.00 lb/ft
Total Loading on Beam	w =	0.00 lb/ft
Shear Loading at End of Beam	Vy =	1612 lbs
CALCULATED MOMENT	**Mmax =**	**4.84 kip-ft**

Deflection Check

	Support =	Cantilever	
	Deflection Limit =	L / 180	
	w =	0.00 lb/ft	
ALLOWABLE DEFLECTION	**ΔAllow =**	**0.40 in**	
MAXIMUM DEFLECTION	**ΔMax =**	**0.03 in**	8%

OK, Allowable Deflection Sufficient

AM STRUCTURES
1153 Town Center Drive #201 Jupiter, FL 33458
PH: 561-951-0099

AM | STRUCTURES

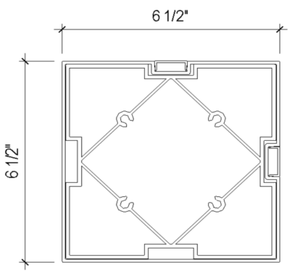
Work Prepared For:	Timan Window Treatments, Inc
Project:	250270 - Conti
Detail/Member:	Post Design

ALUMINUM DESIGN MANUAL (2020 EDITION)
Specifications for Aluminum Structures (Buildings)
Allowable Stress Design

Design Check of 6.5"x6.5"x0.125"/0.125" 6063-T6 Aluminum Tube
Per 2020 Aluminum Design Manual

Alloy:	6063	Temper:	T6	Critically Welded:	N

MEMBER PROPERTIES



Flange width	*b* =	6.500"
Flange thickness	*tb* =	0.125"
Web height	*h* =	6.500"
Web thickness	*th* =	0.125"
Moment of inertia about axis parallel to flange	*Ix* =	40.50 in^4
Moment of inertia about axis parallel to web	*Iy* =	40.50 in^4
Section modulus about the x-axis	*Sx* =	12.46 in^3
Radius of gyration about centroidal axis parallel to flange	*rx* =	2.33 in
Radius of gyration about centroidal axis parallel to web	*ry* =	2.33 in
Torsion constant	*J* =	32.39 in^4
Cross sectional area of member	*A* =	7.44 in^2
Plastic section modulus	*Z* =	6.05 in^3

MEMBER SPANS

Unsupported member length (between supports)	*L* =	8.5 ft
Unbraced length for bending (between bracing against side-sway X-Axis)	*Lbx* =	8.5 ft
Unbraced length for bending (between bracing against side-sway Y-Axis)	*Lby* =	8.5 ft
Effective length factor	*kx* =	2.0
	ky =	1.0

MATERIAL PROPERTIES

Tensile ultimate strength	*Ftu* =	30 ksi
Tensile yield strength	*Fty* =	25 ksi
Compressive yield strength	*Fcy* =	25 ksi
Shear ultimate strength	*Fsu* =	18 ksi
Shear yield strength	*Fsy* =	15 ksi
Compressive modulus of elasticity	*E* =	10,100 ksi

BUCKLING CONSTANTS

Compression in columns & beam flanges (Intercept)	*Bc* =	27.64 ksi
Compression in columns & beam flanges (Slope)	*Dc* =	0.14 ksi
Compression in columns & beam flanges (Intersection)	*Cc* =	78.38 ksi
Compression in flat plates (Intercept)	*Bp* =	31.39 ksi
Compression in flat plates (Slope)	*Dp* =	0.17 ksi
Compression in flat plates (Intersection)	*Cp* =	73.55 ksi
Compressive bending stress in solid rectangular bars (Intercept)	*Bbr* =	46.12 ksi
Compressive bending stress in solid rectangular bars (Slope)	*Dbr* =	0.38 ksi
Shear stress in flat plates (Intercept)	*Bs* =	18.98 ksi
Shear stress in flat plates (Slope)	*Ds* =	0.08 ksi
Shear stress in flat plates (Intersection)	*Cs* =	94.57 ksi
Ultimate strength coefficient of flat plates in compression (slenderness limit λ2)	*k1c* =	0.35
Ultimate strength coefficient of flat plates in compression (stress for slenderness > λ2)	*k2c* =	2.27
Ultimate strength of flat plates in bending (slenderness limit λ2)	*k1b* =	0.50
Ultimate strength of flat plates in bending (stress for slenderness > λ2)	*k2b* =	2.04
Tension coefficient	*kt* =	1.0

D.2 Axial Tension

Tensile Yielding - Unwelded Members	*[Fty]*	Fty_n =	25.00 ksi
		Ω =	1.65
		Fty_n/Ω =	15.15 ksi
Tensile Rupture - Unwelded Members	*[Ftu/kt]*	*Ftu_n* =	30.00 ksi
		Ω =	1.95
		Ftu_n/Ωt =	15.38 ksi

AXIAL COMPRESSION MEMBERS

E.2 Compression Member Buckling

Axial, gross section subject to buckling	Lower slenderness limit	*λ1 =*	18.23	
	Upper slenderness limit	*λ2 =*	78.38	
	Slenderness	*λ(max) =*	87.46	≥ λ2
	[0.85π²E/λ²]	*Fc_n =*	11.08 ksi	
		Ω =	1.65	
		Fc_n/Ω =	6.71 ksi	

E.3 Local Buckling

For column elements in uniform compression subject to local buckling, the uniform compressive strength is addressed in Section B.5.4 calculated below.

B.5.4.2 - Flat elements supported on both edges (Flange)

B.5.4.2 - Flat elements supported on both edges (Web)

E.4 Buckling Interaction

Per Table B.5.1	*[π²*E/ (1.6*b/tb)²]*	*Fe(flange) =*	15.58 ksi	
	[Fc_n]	*Fc_n =*	11.08 ksi	
	Fe(flange) > Fc_n (E.2 Member Buckling)	Ω =	1.65	
		Fc_n/Ω =	6.71 ksi	
	*[π²*E/ (1.6*h/th)²]*	*Fe(web) =*	15.58 ksi	
	[Fc_n]	*Fc_n =*	11.08 ksi	
	Fe(web) > Fc_n (E.2 Member Buckling)	Ω =	1.65	
		Fc_n/Ω =	6.71 ksi	

FLEXURAL MEMBERS

F.2 Yielding and Rupture

Nominal flexural strength for yielding and rupture	Limit State of Yielding			
	*[Z*Fcy]*	Mnp =	151.29 k-in	
	[Mnp/Z]	Fb_n =	25.00 ksi	
		Ω =	1.65	
		Fb_n/Ω =	15.15 ksi	
	Limit State of Rupture			
	*[Z*Ftu/kt]*	Mnu =	181.55 k-in	
	[Mnu/Z]	Fb_n =	30.00 ksi	
		Ω =	1.95	
		Fb_n/Ω =	15.38 ksi	

F.4 Lateral-Torsional Buckling

Square or rectangular tubes subject to lateral-torsional buckling				
	Slenderness for shapes symmetric about the bending axis	*λ F.4.2.1 =*	14.04	
	Slenderness for closed shapes	*λ F.4.2.3 =*	13.63	
	Slenderness for any shape	*λ F.4.2.5 =*	14.04	
	Maximum slenderness	*λ(max) =*	14.04	< Cc
Nominal flexural strength - lateral-torsional buckling				
	*[Mnp(1-(λ/Cc))+(π²*E*λ*Sx/Cc^3)]*	Mnmb =	160.41 k-in	
	[Mnmb/Sx]	Fb_n =	12.87 ksi	
		Ω =	1.65	
		Fb_n/Ω =	7.80 ksi	

UNIFORM COMPRESSION ELEMENTS

B.5.4.2 Flat Elements Supported on Both Edges - Web & Flange

Uniform compression strength, flat elements supported on both edges				
	Lower slenderness limit	*λ1 =*	22.8	
	Upper slenderness limit	*λ2 =*	39.2	
	Flange Slenderness	*b/tb =*	50.0	≥ λ2
	Web Slenderness	*h/th =*	50.0	≥ λ2
	[k2c√(Bp*E)/(1.6*b/tb)]*	*Fc_n1 =*	15.98 ksi	
		Ω =	1.65	
		Fc_n1/Ω =	9.68 ksi	
	[k2c√(Bp*E)/(1.6*h/th)]*	*Fc_n2 =*	15.98 ksi	
		Ω =	1.65	
		Fc_n2/Ω =	9.68 ksi	

FLEXURAL COMPRESSION ELEMENTS

B.5.5.1 Flat Elements Supported on Both Edges - Web

Flexural compression strength, flat elements supported on both edges

Lower slenderness limit	*λ1 =*	34.73	
Upper slenderness limit	*λ2 =*	92.95	
Slenderness	*h/th =*	50.00	λ1 - λ2
*[Bbr-m*Dbr*h/th]*	*Fb_n =*	33.71 ksi	
	Ω =	1.65	
	Fb_n/Ω =	20.43 ksi	

SHEAR

G.2 Shear Supported on Both Edges - Web

Members with flat elements supported on both edges

Lower slenderness limit	*λ1 =*	38.73	
Upper slenderness limit	*λ2 =*	75.65	
Slenderness	*h/th =*	50.00	λ1 - λ2
*[Bs-1.25Ds*h/th]*	*Fv_n =*	13.84 ksi	
	Ω =	1.65	
	Fv_n/Ω =	8.39 ksi	

ALLOWABLE STRESSES

Allowable bending stress	Fb =	6.54 ksi
Allowable axial stress, compression	Fac =	6.71 ksi
Allowable shear stress; webs	Fv =	8.39 ksi
Allowable axial stress, Tension	Fat =	15.15 ksi
Elastic buckling stress	*Fe =*	6.68 ksi
Weighted average allowable compressive stress (per Section E.3.1)	*Fao =*	9.68 ksi

MEMBER LOADING

Bending Moments

Bending moment developed in member	*Mz =*	1.98 kip-ft	
Bending stress developed in member	fb =	1.90 ksi	
Allowable bending stress of member	Fb =	6.54 ksi	< 1.0

Compression Loads

Compression load developed in member	*P =*	2,010 lb	
Compression stress developed in member	fc =	0.27 ksi	
Allowable compressive axial stress of member	Fac =	6.71 ksi	< 1.0

Tension Loads

Tension load developed in member	*T =*	201 lb	
Tension stress developed in member	ft =	0.02 ksi	
Allowable Tension axial stress of member	Fat =	15.15 ksi	< 1.0

Shear Loads

Shear load developed in member	*Vz =*	370 lb	
Shear stress developed in member	fv =	0.24 ksi	
Allowable shear stress of member webs	Fv =	8.39 ksi	< 1.0

Interaction Equations

√ [(fb/Fb)^2 + (fv/Fv)^2] =	0.29	< 1.0
fa/Fa + fb/Fb =	0.33	< 1.0
fa/Fa + (fb/Fb)^2 + (fv/Fv)^2 =	0.33	< 1.0

CONFIGURATION AND MOMENT TABULATION TOOLS

Member Loads:

Mx =	23.73 kip-in	Applied Moment Per Member	30 PSF	Total Gravity Load
My =	1.08 kip-in	Applied moment Per Member	8.8 FT	Post Trib Area in X-Axis
Tn =	0.12 kip-in	Applied Torsion Per Member	7.6 FT	Post Trib Area in Y-Axis
Vx =	275 lbs	Applied Shear Load Per Member	3 PSF	Uplift
Vy =	248 lbs	Applied Shear Load Per Member	18 PSF	Lateral Load
V =	370 lbs	Applied Resultant Shear Load Per Member		
P =	2,010 lbs	Applied axial compression load		
T =	201 lbs	Applied axial tension load	1.37 kip-in	Seismic Moment

AM STRUCTURES
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PH: 561-951-0099

Work Prepared For:	Timan Window Treatments, Inc
Project:	250270 - Conti
Member/Detail:	Beam To Beam

Steel Spaced Thread Tapping Screw to Aluminum Connections

†2020 Aluminum Design Manual, *AMMA TIR-A9-2014

Anchor:	1/4-14 SMS, 316 SS, Steel Screw	
Size:	1/4-14 SMS	Nominal Anchor Size Designation
Alloy:	316 SS	Screw Material
Ftu=	100 ksi	Anchor Ultimate Tensile Strength
Fy =	65 ksi	Anchor Yield Strength
D =	0.250''	Nominal Screw Diameter (*Table 20.1,20.2)
Dmin =	0.185''	Basic Minor Diameter (*Table 20.1,20.2)
As =	0.027 in²	Tensile Stress Area (*Table 20.1,20.2)
Ar =	0.027 in²	Thread Root Area (*Table 20.1,20.2)
n =	14	Thread Per Inch
Dw=	0.625''	Washer Diameter ☐ Consider Washer?
Dws =	0.500''	Anchor Head Diameter
Dh =	0.250''	Nominal Hole Diameter
Screw Boss?	No	Is anchor placed in a screw boss/chase/slot?
Countersunk?	No	Yes or No?
CS Depth =		Countersink depth
de =	0.500''	Aluminum Edge Distance

Member in Contact with Screw Head:

Alloy 1:	6063-T6	
t1 =	0.125''	Thickness of Member 1
Ftu1 =	30 ksi	Tensile Ultimate Strength of Member 1
Fty1 =	25 ksi	Tensile Yield Strength of Member 1

Member not in Contact with Screw Head:

Alloy 2:	6063-T6	
t2 =	0.125''	Thickness of Member 2
Le =	0.125''	Depth of Full Thread Engagement Into *t2* (Not Including Tapping/Drilling Point)
Ftu2 =	30 ksi	Tensile Ultimate Strength of Member 2
Fty2 =	25 ksi	Tensile Yield Strength of Member 2
t3 =	0.125''	Screw Boss Wall Thickness
Le1 =	0.500''	Minimum Depth of Full Thread Engagement Into S*crew Boss If Applicable* (Not Including Tapping/Drilling Point)

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Allowable Tension

C=	1.0	Coeff. Dependent On Screw Location (†Sect. J.5.4.2)
Ks=	1.2	Coeff. Dependent On Member 2 Thickness (†Sect. J.5.4.1.1b)
Rn_t1 =	937.5 lb	Nominal Pull-Out Strength Of Screw (†Sect. J.5.4.1.1b)
Rn_t2 =	937.5 lb	Nominal Pull-Over Strength Of Screw (†Sect. J.5.4.2)
Rn_t3 =	N/A	Nominal Pull-Out Strength From Screw Boss (if applicable) (†Sect. J.5.4.1.2)
Pnt =	896.0 lb	Allowable Tensile Capacity Of Screw (*Eqn. 10.4-10.7)
Ω =	3.0	Safety Factor For Connections; Building Type Structures
Ω =	3.0	Safety Factor For Anchor

Allowable Tension = 313 lb

Allowable Shear:

Rn_v1 =	1875.0 lb	Bearing On Member 1 (†Sect. J.5.5.1)
Rn_v2 =	1875.0 lb	Bearing On Member 2 (†Sect. J.5.5.1)
Rn_v3 =	2784.2 lb	Screw Tilting (†Sect. J.5.5.2)
Rn_v4 =	N/A	Shear Capacity Of Screw Boss Wall
Pnv =	517.3 lb	Allowable Shear Capacity Of Screw (*Eqn. 7.5)
Ω =	3.0	Safety Factor For Connections; Building Type Structures
Ω =	3.0	Safety Factor For Anchor

Allowable Shear = 517 lb

Alternate Options:

- ☐ Disregard the limiting allowable capacities from Member 1 (member in contact with screw head)
- ☐ Disregard the limiting allowable capacities from Member 2 (member in NOT in contact with screw head)

Concentrated Shear & Tensile Reactions ☑ (Select this connection type)

Qty	6	Anchor Qty at Connection
Treq	0 lb	Required Tensile Loading on Connection
Vreq	1612 lb	Required Shear Loading on Connection
n	1.00	Exponent factor
Tcap	1875 lb	Tensile capacity of connection (Qty * Rz)
Vcap	3104 lb	Shear capacity of connection (Qty * Rx)

$$\frac{R_Z}{T_{CAP}} + \frac{R_X}{V_{CAP}} = \quad 0.52$$

OK, (6) anchors sufficient

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Work Prepared For:	Timan Window Treatments, Inc
Project:	250270 - Conti
Member/Detail:	CLIP TO POST CONNECTION

Steel Spaced Thread Tapping Screw to Aluminum Connections

†2020 Aluminum Design Manual, *AMMA TIR-A9-2014

Anchor: 1/4-14 SMS, 316 SS, Steel Screw

Size:	1/4-14 SMS	Nominal Anchor Size Designation
Alloy:	316 SS	Screw Material
Ftu=	100 ksi	Anchor Ultimate Tensile Strength
Fy =	65 ksi	Anchor Yield Strength
D =	0.250''	Nominal Screw Diameter (*Table 20.1,20.2)
Dmin =	0.185''	Basic Minor Diameter (*Table 20.1,20.2)
As =	0.027 in²	Tensile Stress Area (*Table 20.1,20.2)
Ar =	0.027 in²	Thread Root Area (*Table 20.1,20.2)
n =	14	Thread Per Inch
Dw=	0.625''	Washer Diameter ☐ Consider Washer?
Dws =	0.500''	Anchor Head Diameter
Dh =	0.250''	Nominal Hole Diameter
Screw Boss?	No	Is anchor placed in a screw boss/chase/slot?
Countersunk?	No	Yes or No?
CS Depth =		Countersink depth
de =	0.500''	Aluminum Edge Distance

Member in Contact with Screw Head:

Alloy 1:	6063-T6	
t1 =	0.125''	Thickness of Member 1
Ftu1 =	30 ksi	Tensile Ultimate Strength of Member 1
Fty1 =	25 ksi	Tensile Yield Strength of Member 1

Member not in Contact with Screw Head:

Alloy 2:	6063-T6	
t2 =	0.125''	Thickness of Member 2
Le =	0.125''	Depth of Full Thread Engagement Into *t2* (Not Including Tapping/Drilling Point)
Ftu2 =	30 ksi	Tensile Ultimate Strength of Member 2
Fty2 =	25 ksi	Tensile Yield Strength of Member 2
t3 =	0.125''	Screw Boss Wall Thickness
Le1 =	0.500''	Minimum Depth of Full Thread Engagement Into S*crew Boss If Applicable* (Not Including Tapping/Drilling Point)

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PH: 561-951-0099

Allowable Tension

C=	1.0	Coeff. Dependent On Screw Location (†Sect. J.5.4.2)
Ks=	1.2	Coeff. Dependent On Member 2 Thickness (†Sect. J.5.4.1.1b)
Rn_t1 =	937.5 lb	Nominal Pull-Out Strength Of Screw (†Sect. J.5.4.1.1b)
Rn_t2 =	937.5 lb	Nominal Pull-Over Strength Of Screw (†Sect. J.5.4.2)
Rn_t3 =	N/A	Nominal Pull-Out Strength From Screw Boss (if applicable) (†Sect. J.5.4.1.2)
Pnt =	896.0 lb	Allowable Tensile Capacity Of Screw (*Eqn. 10.4-10.7)
Ω =	3.0	Safety Factor For Connections; Building Type Structures
Ω =	3.0	Safety Factor For Anchor

Allowable Tension = 313 lb

Allowable Shear:

Rn_v1 =	1875.0 lb	Bearing On Member 1 (†Sect. J.5.5.1)
Rn_v2 =	1875.0 lb	Bearing On Member 2 (†Sect. J.5.5.1)
Rn_v3 =	2784.2 lb	Screw Tilting (†Sect. J.5.5.2)
Rn_v4 =	N/A	Shear Capacity Of Screw Boss Wall
Pnv =	517.3 lb	Allowable Shear Capacity Of Screw (*Eqn. 7.5)
Ω =	3.0	Safety Factor For Connections; Building Type Structures
Ω =	3.0	Safety Factor For Anchor

Allowable Shear = 517 lb

Alternate Options:

☐ Disregard the limiting allowable capacities from Member 1 (member in contact with screw head)

☐ Disregard the limiting allowable capacities from Member 2 (member in NOT in contact with screw head)

Concentrated Shear & Tensile Reactions ☑ (Select this connection type)

Qty	6	Anchor Qty at Connection
Treq	0 lb	Required Tensile Loading on Connection
Vreq	370 lb	Required Shear Loading on Connection
n	1.00	Exponent factor
Tcap	1875 lb	Tensile capacity of connection (Qty * Rz)
Vcap	3104 lb	Shear capacity of connection (Qty * Rx)

$$\frac{R_Z}{T_{CAP}} + \frac{R_X}{V_{CAP}} = \quad 0.12$$

OK, (6) anchors sufficient

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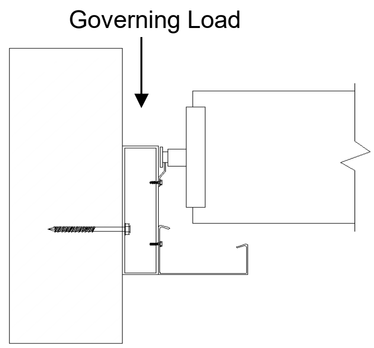
Work Prepared For:	Timan Window Treatments, Inc
Project:	250270 - Conti
Detail:	Ledger connection to Host

Loading

Design Uplift (WL) = 3.00 psf

Design Gravity Load ("Grav") = 30.00 psf



Ledger Configuration

W =	8.83 ft	Tributary Width
RL =	30.00 psf	Load on Tributary (LL, WL, DL, etc)
FL =	18.32 psf	Load on Tributary (LL, WL, DL, etc)
DL =	0.00 lb/ft	Additional Beam Load (Weight or Service Loads)
Pv =	265.00 lb/ft	Total Vertical Loading on Beam
Pf =	21.57 lb/ft	Total Lateral Loading on Beam
S=	1.33 ft	Anchor spacing
# of Screws=	2 pcs	Number of anchors per location

Shear required=	176.67 lb	Per anchor
Tension required=	15.64 lb	Per anchor

Shear Connection Capacity= 195.00 lb

Tension Connection Capacity= 477.00 lb

Connection Check= 0.94 **Ledger Connection OK**

Work Prepared For:	Timan Window Treatments, Inc
Project:	Conti
Detail/Member:	Base Connection Thru Bolt

ANCHOR SPACING CALCULATION

Ma	1978	Max Allowable Moment for Anchor Connection	[lb-ft]
Va	370	Max Allowable Shear for Anchor Connection	[lb]
Spacing	8.625	Anchor Row Spacing	[in]
OC Spacing	8.625	Anchor Column Spacing	[in]

Shear & Tensile Reactions

Rz	1376	Tensile Reaction on member being anchored	[lb]
Rx	93	Shear Reaction on member being anchored	[lb]

Anchor Capcaities

Anchor Strength	A307		
Anchor Diameter	1/2"	Ø	[in]
Ta	4418	Tensile allowable capacity of anchor	[lb]
Va	2651	Shear allowable capacity of anchor	[lb]

$$\frac{R_Z}{T_{CAP}} + \frac{R_X}{V_{CAP}} = \quad 0.34633$$

OK, 8.6" O.C. spacing is valid

ICC EVALUATION SERVICE®

ICC-ES Evaluation Report

Reissued March 2022

ESR-4226

This report is subject to renewal March 2024.

DIVISION: 31 00 00—EARTHWORK
Section: 31 63 00—Bored Piles

REPORT HOLDER:

AMERICAN GROUND SCREW, INC.

EVALUATION SUBJECT:

GROUND SCREW SYSTEMS

1.0 EVALUATION SCOPE

Compliance with the following codes:

- 2018 and 2015 *International Building Code®* (IBC)
- 2018 and 2015 *International Residential Code®* (IRC)

Properties evaluated:

- Structural
- Geotechnical

2.0 USES

The Ground Screw Systems are used to transfer axial compression, axial tension and lateral loads from the supported structures to the surrounding soil. When the Ground Screw Systems are installed under the IRC, an engineered design is required in accordance with IRC R301.1.3.

3.0 DESCRIPTION

3.1 General:

The Ground Screw Systems consist of a steel screw shaft with helical-shaped screw threads; the screw shafts are screwed into the ground by application of torsion and simultaneously-applied downward pressure until the desired depth is reached. The ground screws come in two configurations depending on the top connection device; a ground screw with a welded flange as described in Section 3.2.2.2 of this report and the Model 3 ground screw which uses flange inserts described in Section 3.2.2.3 of this report.

3.2 System Components:

3.2.1 Screw Shafts: The screw shafts are composed of a central tubular shaft with factory welded steel screw threads. The screw shafts come in 3 and 4.5-inch (76 and 114 mm) outside diameter and 63, 70.9 and 78.7 inches (1600, 1800 and 2000 mm) lengths. The screw shaft diameter tapers to a pointed tip at the bottom of the screw shaft. The top of the screw shafts on the welded flange configuration and the three welded nuts on the Model 3 ground screws are used to connect the driver head for ground screw installation. The Model 3 ground screws come with factory welded steel nuts that are used to connect to the flange inserts described in Section 3.2.2.3 of this report. See Figure 3 for typical ground screws configurations. The screw shafts are made from round tubular steel having a minimum wall thickness of 0.148-inch (3.75 mm). The steel screw threads have a minimum thickness of 0.079-inch (2 mm). The screw shafts are hot-dipped galvanized in accordance with ASTM A123.

3.2.2 Top Connection Devices:

3.2.2.1 General: The top connection devices come in different flange configurations, such as welded flange and flange inserts. The welded flange is factory welded to the top of the ground screws. The flange inserts are composed of factory welded steel tube and flange plate that is inserted into the top of the ground screw shaft and connected using three friction bolts as described in Section 3.2.2.4 of this report. See Figures 1 and 2 for typical configurations.

3.2.2.2 Welded Flanges: The welded flanges are available in the configurations described in Table 1B of this report. The welded flanges also come with predrilled holes, which are used to connect to the supported structural element. The welded flanges are hot-dipped galvanized in accordance with ASTM A123. See Table 1B for welded flanges dimensions and configurations.

3.2.2.3 Flange Inserts: The flange inserts consist of a steel round sleeve (collar) factory welded to a flange plate or steel channel. The flange plate or steel channel come with predrilled holes. The connection between the flange insert and the ground screw is made by the use of three friction bolts complying with Section 3.2.2.4 of this report. The flange inserts are hot-dipped galvanized in accordance with ASTM A123. See Table 1A for flange insert dimensions and configurations.

3.2.2.4 Friction Bolts: The friction bolts used to connect the flange collar to the screw shaft must be 0.63-inch-diameter by 1.18-inch-long (16 x 30 mm) hex head bolts complying with DIN 933, Property Class 4.8. The friction bolts must be hot-dipped galvanized in accordance with ASTM A153.

3.3 Material Specifications:

3.3.1 Screw Shafts and Screw Threads: The screw shafts and screw threads comply with GB/T 700 Q235B carbon steel specification having a minimum yield strength of 36 ksi (248 MPa) and a minimum ultimate tensile strength of 58 ksi (400 MPa). The screw shaft and screw threads are hot-dipped galvanized in accordance with ASTM A123.

3.3.2 Welded Flanges and Flange Inserts: The welded flanges and flange inserts are made from carbon steel complying with GB/T 700 Q235B carbon steel specification having a minimum yield strength of 36 ksi (248 MPa) and a minimum ultimate tensile strength of 58 ksi (400 MPa). The flanges are hot-dipped galvanized as assemblies in accordance with ASTM A123.

4.0 DESIGN AND INSTALLATION

4.1 Design:

4.1.1 General: Engineering calculations (analysis and design) and drawings, prepared by a registered design professional, must be submitted to and approved by the code official for each project, and must be based on accepted engineering principles as described in IBC Section 1604.4. The engineering analysis must address ground screw system performance related to structural and geotechnical requirements. The calculations must address the ability (considering strength and stiffness) of the supported structure to transmit the applied loads to the Ground Screw System and the ability of the ground screws and surrounding soils to support the loads applied by the supported structure. The design method for the steel components is Allowable Strength Design (ASD), described in IBC Section 1602 and AISC 360 Section B3. The design method for soils is ASD as prescribed in IBC Sections 1801.2 and 1602.

The structural analysis must consider all applicable internal forces (axial forces, shears, bending moments and torsional moments, if applicable) due to applied loads; eccentricity between applied loads and reactions acting on the screw-supported structure; the loading exerted on the supported structure by the top connection devices; and the design span(s) between ground screws. The loading exerted on the supported structure by the top connection device should be equal in magnitude and opposite in direction to the force in the ground screw. A small lateral force is developed at the supported structure if the ground screw is not perfectly plumb but within the permitted inclination from vertical of ±1 degree. The result of this analysis and the structural capacities must be used to select a ground screw system.

The ground screw embedment into the soil is based on the ground screw length and must be selected based on the project specific requirements.

For Ground Screw Systems subject to combined lateral and axial (compression or tension) loads, the allowable strength of the shaft under combined loads must be determined using the interaction prescribed in Chapter H of AISC 360.

The geotechnical analysis must address the suitability of the ground screw system for the specific project. It must also address the center-to-center spacing of the ground screws, considering both effects on the supported structure and group effects on the screw-soil capacity. The analysis must include estimates of the axial tension, axial compression and lateral capacities of the ground screws, whatever is relevant for the project, and the expected total and differential screw movements due to single screw or screw group, as applicable.

A site-specific geotechnical report is required for proper application of ground screw systems, unless exempted by the building official in accordance with IBC Section 1803.2. When required, geotechnical investigations shall be conducted in accordance with IBC Section 1803.2 and reported in accordance with IBC Section 1803.6. The geotechnical report must include, but not be limited to, the following information:

1. A plot showing the location of the soil investigation.
2. A complete record of the soil boring and penetration test logs and soil samples.
3. A record of the soil profile.
4. Information on groundwater table, frost depth and corrosion-related parameters, as described in Section 5.0 of this report.
5. Soil design parameters as shown in Table 5 of this report.
6. Confirmation of the suitability of ground screw systems for the specific project.
7. Recommendations for design criteria, including but not limited to, mitigation of effects of differential settlement and varying soil strength; and effects of adjacent loads.
8. Recommended center-to-center spacing of ground screws, if different from spacing noted in Section 5.0 of this report; and reduction of allowable loads due to the group action, if necessary.
9. Field inspection and reporting procedures (to include procedures for verification of the installed bearing capacity, when required).
10. Load test requirements.
11. Any questionable soil characteristics and special design provisions, as necessary.
12. Expected total and differential settlement.
13. The axial compression, axial tension and lateral load soil capacities if values cannot be determined from this evaluation report.

There are four primary structural/geotechnical elements associated with the ground system: top connection device capacity, ground screw shaft capacity, ground screw thread capacity and ground screw soil capacity, which are described in Sections 4.1.2, 4.1.3, 4.1.4, and 4.1.5, respectively. The allowable capacity of overall ground screw system is described in Section 4.1.6.

4.1.2 Top Connection Devices:

The allowable load capacities of the welded flanges are shown in Table 2A and flange inserts is shown in Table 2B of this report. The supported structural element and its connection to the top connection device of the ground screw system must be designed by a registered design professional and must not exceed the published values in Tables 2A and 2B of this report.

4.1.3 Ground Screw Shaft Capacity: The allowable load capacities of the screw shafts are shown in Tables 3A and 3B of this report.

The elastic shortening of the pile shaft will be 0.009 in/ft of shaft and the elastic lengthening will be 0.007 in/ft of shaft.

4.1.4 Ground Screw Thread Capacity: The allowable load capacities of the ground screw threads are shown in Table 4 of this report.

4.1.5 Soil Capacity: The allowable load capacity of the ground screws installed in specified soils is shown in Table 5 of this report. The soil capacity of the ground screws shall be determined by a registered design professional for soil conditions that substantially differ from those shown in the table. Soil conditions shall be determined by a site-specific geotechnical report, as described in Section 4.1.1.

4.1.6 Ground Screw System: The overall allowable load capacity of the Ground Screw System depends upon the analysis of interaction of top connection devices (Section 4.1.2), ground screw shafts (Section 4.1.3), ground screw threads (Section 4.1.4) and ground screw soil capacity (Section 4.1.5), and must be based on the lowest value of those for top connection device capacity, ground screw shaft capacity, ground screw thread capacity and ground screw soil capacity. The applied load from the supported structure must not exceed the overall allowable load capacity of the Ground Screw System.

4.2 Installation:

4.2.1 General: The Ground Screw Systems must be installed in accordance with this section (Section 4.2), the site-specific approved construction documents (engineering plans and specifications), and the manufacturer's written installation instructions. In case of a conflict, the most stringent requirement governs.

4.2.2 Ground Screw Installation:

1. The ground screws must be located and installed in accordance with the site-specific approved construction documents.
2. The equipment used to install the ground screws must be in accordance with the manufacturer's published installation instructions.
3. The ground screws must be installed in a clockwise rotation.
4. During installation the rotation of the ground screw must be accompanied by downward pressure (crowd) to advance the screw one thread pitch per rotation. The crowd force must not exceed 5 percent of the allowable axial compression load of the ground screw shaft or ground screw threads reported in Tables 3 or 4, as applicable, whichever is lower.
5. Ground screws must be installed vertically plumb into the ground with a ±1 degree of tolerance. The torque induced within the ground screws depends on the density of surrounding soils. The ground screw shaft maximum installation torque capacities are provided in Tables 3A and 3B and cannot be exceeded during ground screw installation.
6. Torque must be measured with a calibrated in-line indicator or calibrated hydraulic torque motor via differential pressure. Calibration of torque motors and/or torque indicators must be performed on equipment whose calibration is traceable back to NIST (National Institute of Standards and Technology)
7. The final depth must equal the length of the ground screws, except for 3 inches (76 mm) protruding from the ground surface. The length of the ground screw chosen must meet the minimum depth required for frost protection.
8. In order to avoid group effect for lateral loading, the center-to-center spacing of ground screws in the direction of lateral force must be at least eight times the ground screw outside diameter (76 or 114 mm).
9. In order to avoid group effect for axial loading, the center-to-center spacing of ground screws must be at least three times the ground screw outside diameter (76 or 114 mm).
10. The eccentricity between the applied vertical load by supported structures and the center of the ground screw shaft must not exceed 5 percent of the shaft maximum diameter.
11. The field cutting, bolting and welding must be in accordance with the most restrictive requirements described in this evaluation report, IBC, AISC 360, and the manufacturer's written instructions.

4.2.3 Top Connection Devices: Once the ground screw has been installed, the supported structure must be connected to the top connection device (welded flange or flange insert) in accordance with the approved plans as determined by registered design professional. In addition to requirements in Section 4.2.2, the flange insert installation must comply with the following requirements:

1. The flange must be fully seated (bearing) on top of the ground screw and must be centered to the screw shaft diameter body.
2. Three (3) friction bolts as described in Section 3.2.2.4 of this report must be used to connect the ground screw to the flange insert collar. The bolts must be installed through the factory-welded nuts by hand tightening until contact with the flange insert collar is made and ensuring that the flange collar is centered to the screws shaft inside diameter body.
3. The friction bolts must be installed in a snug-tight condition until contact has been made with the friction bolt hex head and the factory-welded nuts plus ¼ turn.

4.3 Special Inspections:

Special inspection in accordance with Section 1705.1.1 of the IBC must be performed during the installation of the Ground Screw Systems (screw shafts and top connection devices). Where jobsite cutting, bolting or welding of steel elements is required, inspection in accordance with IBC Section 1705.2 is also required. Items to be recorded and confirmed by the special inspector include, but are not limited to, the following:

1. Verification of the product manufacturer.
2. Product configuration and identification (including catalog numbers) for ground screws and top connection devices.
3. Installation equipment used.
4. Written installation procedures.
5. Friction bolts as specified in the approved construction documents and this evaluation report.
6. Inclination and position of ground screws.
7. Verification that the maximum installation torque noted in Tables 3A and 3B, as applicable, is not exceeded. Verification that the ground screw soil embedment complies with Table 5, as applicable.
8. Verification that top flange bracket is installed in accordance with Section 4.2.3 of this report.
9. Compliance of the installation with the approved construction documents and this evaluation report, including conditions and limitations described in the footnotes to the tables in this report.

5.0 CONDITIONS OF USE

The American Ground Screw Ground Screw Systems described in this report comply with, or are suitable alternatives to what is specified in, those codes noted in Section 1.0 of this report, subject to the following conditions:

5.1 The American Ground Screw Ground Screw Systems are manufactured, identified and installed in accordance with this report, the approved construction documents (engineering drawings and specifications), and the manufacturer's written installation instructions, which must be available at the jobsite at all times during installation. In case of a conflict, the most stringent requirement governs.

5.2 The American Ground Screw Ground Screw Systems have been evaluated for support of structures assigned to Seismic Design Categories A and B and Site Classes A through D in accordance with IBC Section 1613. Ground screw systems that support structures assigned to Seismic Design Category C, D, E or F, or that are located in Site Class E or F, are outside the scope of this report, and are subject to the approval of the code official based upon submission of a design in accordance with the code by a registered design professional.

5.3 Ground screw systems are limited to support structures constructed from steel or wood materials.

5.4 Use of the ground screw systems in exposure conditions that are indicative of potential pile deterioration or corrosion situations as defined by the following: (1) soil resistivity less than 1,000 ohm-cm; (2) soil pH less than 5.5; (3) soils with high organic content; (4) soil sulfate concentrations greater than 1,000 ppm; (5) soils located in a landfill, or (6) soil containing mine waste is beyond the scope of the evaluation report.

5.5 Supported steel structures in contact with top connection devices must be zinc-coated steel in accordance with ASTM A123 or ASTM A153. Fasteners used to connect supported structure elements to top connection devices must be corrosion resistant.

5.6 The ground screws must be installed vertically into the ground, with a maximum allowable angle of inclination of ±1 degree.

5.7 Special inspection is provided in accordance with Section 4.3 of this report.

5.8 Engineering calculations and drawings, in accordance with recognized engineering principles as described in IBC Section 1604.4, and complying with Section 4.1 of this report, are prepared by a registered design professional and approved by the code official.

5.9 The adequacy of the supported structures that are connected to the brackets must be verified by a registered design professional in accordance with applicable code provisions and subjected to the approval of the code official.

5.10 A geotechnical investigation report for each project site must be provided to the code official for approval in accordance with Section 4.1.1 of this report.

5.11 The load combinations prescribed in IBC Section 1605.3.1 or 1605.3.2 must be used to determine the applied loads. When using the alternative basic load combinations prescribed in IBC Section 1605.3.2, the allowable stress increases permitted by material chapters of the IBC or the referenced standards are prohibited.

5.12 In order to avoid the group effects on lateral load behavior, the minimum center-to-center spacing of ground screws in the direction of lateral force must be at least eight times the ground screw shaft outside diameter; and to avoid the group effects on axial load behavior, the center-to-center spacings of the ground screws must be at least three times the ground screw shaft outside diameter.

5.13 Settlement of helical piles is beyond the scope of this evaluation report and must be determined by a registered design professional.

5.14 The applied loads must not exceed the allowable capacities described in Section 4.1 of this report.

5.15 The ground screw systems are manufactured in Huanghua City, Hebei Province, China under a quality control program with inspections by ICC-ES.

6.0 EVIDENCE SUBMITTED

Data in accordance with the ICC-ES Acceptance Criteria for Screw Foundation Systems (SFSs) (AC443), dated June 2012 (editorially revised October 2019).

7.0 IDENTIFICATION

7.1 The ground screw products described in this report must be identified with a tag or label with the following information: report holder name and address; product model number and batch number and the ICC-ES evaluation report number (ESR-4226).

7.2 The report holder's contact information is the following:

AMERICAN GROUND SCREW, INC.
512 TUTTLE STREET
DES MOINES, IOWA 50309
(833) 359-9475
www.americangroundsccrew.com

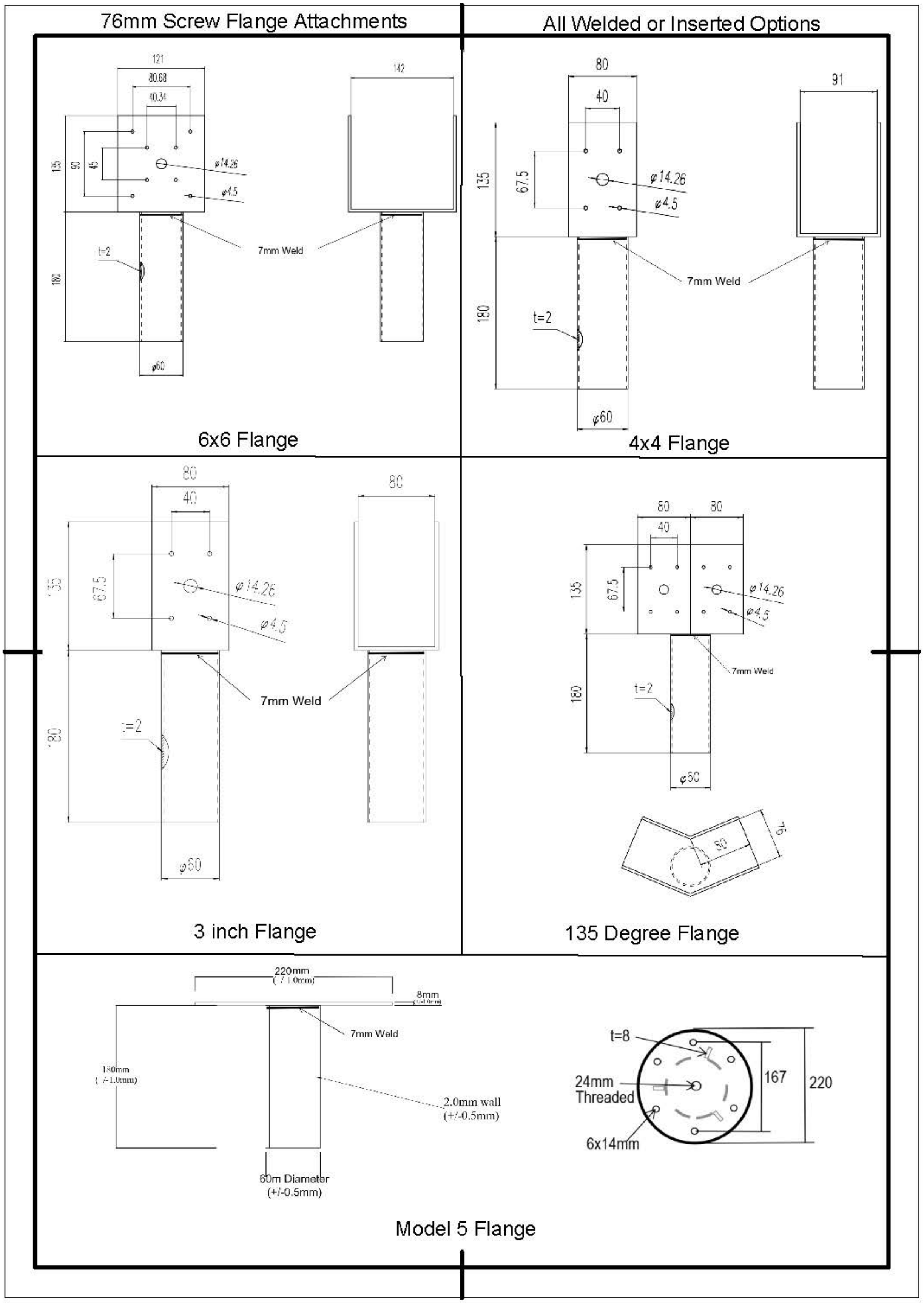


FIGURE 1—3-INCH DIAMETER MODEL 3 AND WELDED FLANGE GROUND SCREWS FLANGES (units shown in metric)

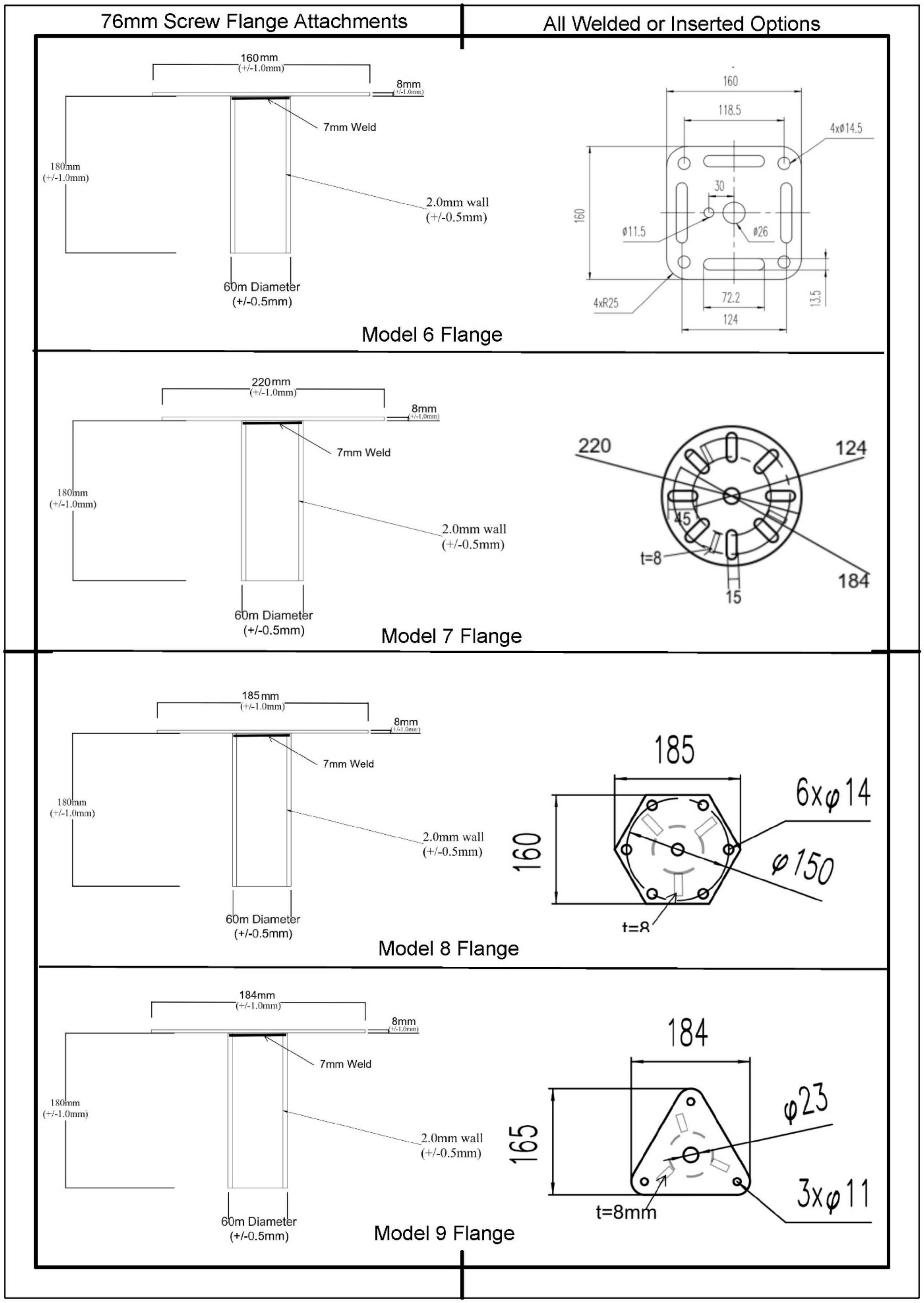


FIGURE 1—3-INCH DIAMETER MODEL 3 AND WELDED FLANGE GROUND SCREWS FLANGES (units shown in metric) (continued)

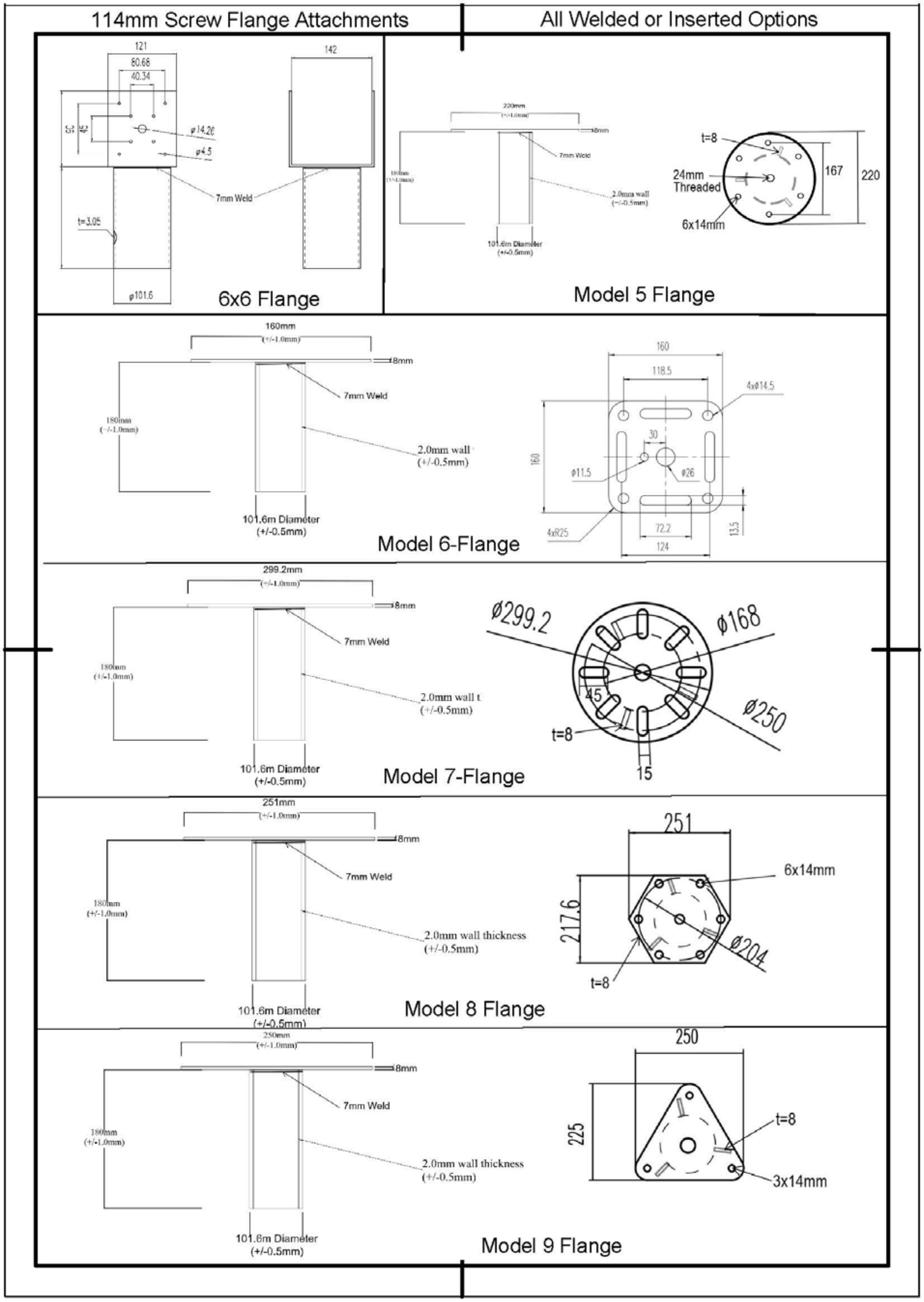
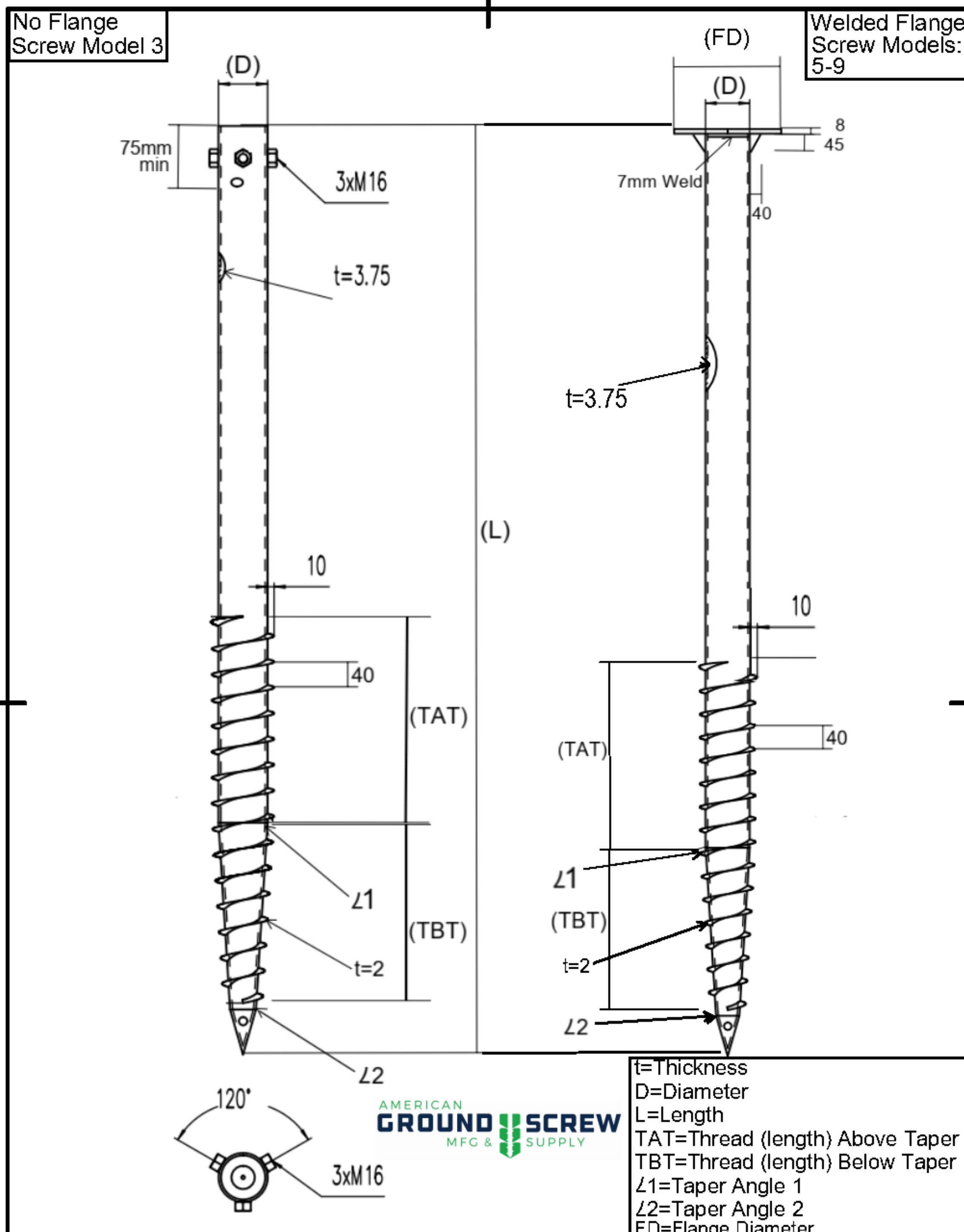


FIGURE 2—4.5-INCH DIAMETER MODEL 3 AND WELDED FLANGE GROUND SCREWS FLANGES (units shown in metric)



All Dimensions in millimeters
All Steel Components Q235B
Steel Equivalent ASTM A36
Galv ASTM 123 75 or Greater

D	L	TAT	TBT	∠1	∠2	FD*
76	1600-2000	235	375	3.29	9.12	160-220
114	1600-2000	375	235	5.07	6.53	160-299

FD* is based on Flange Diameters shown in following Tables.

FIGURE 3—MODEL 3 AND WELDED FLANGE GROUND SCREWS (units in metric)

TABLE 1A—MODEL 3 GROUND SCREW MODELS

GROUND SCREW MODEL No.	**Ground Screw Diameter (inches)**	**Flange Inserts**[1]								
		6x6 Flange	4x4 Flange[2]	3-inch Flange[2]	135 Degree Flange[2]	Model 5 Flange	Model 6 Flange	Model 7 Flange	Model 8 Flange	Model 9 Flange
Model 3	3	See Figure 1 for product description and dimensional details								
	4.5	See Figure 2 for product description and dimensional details								

For **SI**: 1 inch= 25.4 mm.

[1]Flange inserts must be used with Model 3 ground screws shown in Figure 3.
[2]Available only for 3-inch (76 mm) ground screw shaft.

TABLE 1B—WELDED FLANGE GROUND SCREW MODELS

GROUND SCREW MODEL	**Ground Screw Diameter (inches)**	**Welded Flanges**[1,2]							
		6x6 Flange	4x4 Flange[3]	3-inch Flange[3]	Model 5 Flange	Model 6 Flange	Model 7 Flange	Model 8 Flange	Model 9 Flange
Welded Flange	3	See Figure 1 for product description and dimensional details[2]							
	4.5	See Figure 2 for product description and dimensional details[2]							

For SI: 1 inch=25.4 mm.

[1] Welded flanges are only available with Welded Flange Screw Model shown in Figure 3.
[2]Welded flanges do not include the welded sleeve shown in Figure 1 or Figure 2.
[3]Available only for 3-inch-diameter (76 mm) ground screw shaft.

TABLE 2A—WELDED FLANGE GROUND SCREWS TOP CONNECTION ALLOWABLE CAPACITY[1,2]

Welded Flange	**Ground Screw Diameter (inches)**	**Allowable Load Capacity (kips)**		
		Axial Tension	**Axial Compression**[3]	**Lateral**
Model 5	3	2.153	37.96	13.66
Model 5	4.5	5.540	57.85	20.50
Model 6	3	2.563	37.96	13.66
Model 6	4.5	8.143	57.85	20.50
Model 7	3	1.814	37.96	13.66
Model 7	4.5	2.164	57.85	20.50
Model 8	3	2.646	37.96	13.66
Model 8	4.5	8.141	57.85	20.50
Model 9	3	2.563	37.96	13.66
Model 9	4.5	3.419	57.85	20.50
6x6	3	0.286	37.96	13.66
6x6	4.5	0.451	57.85	20.50
4x4	3	0.660	37.96	13.66
3-inch	3	0.921	37.96	13.66

For **SI:** 1 inch= 25.4 mm; 1 kip=1000 lbf= 4.45 kN.

[1] Tabulated allowable load capacities include corrosion losses of 0.013-inch over a 50-year service life.
[2]Tabuluated allowable load values are based on internal strength properties of welded flanges. Connection capacity of flange to supported structural element must be determined by registered design professional.
[3]Tabulated allowabled axial compression capacity is based on welded flange bearing on top of ground screw shaft based on the assumption that the supported structure will transfer the load to the top of the ground screw shaft through direct bearing. Other applicable limit states must be determined by registered design professional.

TABLE 2B—MODEL 3 GROUND SCREW FLANGE INSERTS TOP CONNECTION ALLOWABLE CAPACITY[1,2]

Flange Inserts	Ground Screw Diameter (inches)	Allowable Load Capacity (kips)		
		Axial Tension	Axial Compression[3]	Lateral
4 x 4	3	0.660	37.96	3.08
6 x 6	3	0.286	37.96	3.08
6 x 6	4.5	0.451	57.85	5.28
135 Degree	3	0.501	37.96	3.08
3-inch Beam	3	0.921	37.96	3.08
Model 5	3	1.445	37.96	3.08
Model 5	4.5	4.004	57.85	5.28
Model 6	3	1.618	37.96	3.08
Model 6	4.5	4.029	57.85	5.28
Model 7	3	1.247	37.96	3.08
Model 7	4.5	1.767	57.85	5.28
Model 8	3	1.618	37.96	3.08
Model 8	4.5	4.029	57.85	5.28
Model 9	3	1.618	37.96	3.08
Model 9	4.5	2.663	57.85	5.28

For **SI:** 1 inch= 25.4 mm; 1 kip=1000 lbf= 4.45 kN.

[1]Tabulated allowable load capacities include corrosion losses of 0.013-inch over a 50-year service life.
[2]Tabuluated allowable load values are based on internal strength properties of welded flanges. Connection capacity of flange to supported structural element must be determined by registered design professional.
[3]Tabulated allowabled axial compression capacity is based on welded flange bearing on top of ground screw shaft based on the assumption that the supported structure will transfer the load to the top of the ground screw shaft through direct bearing. Other applicable limit states must be determined by registered design professional.

TABLE 3A—WELDED FLANGE GROUND SCREW MODEL SHAFT ALLOWABLE CAPACITY

Ground Screw Diameter (inches)	Ground Screw Length (mm)	Allowable Load Shaft Capacities[1]				
		Axial Tension (kips)	Axial Compression[2] (kips)	Lateral		Maximum Torque (ft-lbf)
				Bending (kip-ft)	Shear (kips)	
3	63	20.4	25.3	1.69	7.6	4829
	70.9	20.4	25.3	1.69	7.6	4829
	78.7	20.4	25.3	1.69	7.6	4829
4.5	63	25.7	38.7	3.75	11.5	6687
	70.9	25.7	38.7	3.75	11.5	6687
	78.7	25.7	38.7	3.75	11.5	6687

For **SI:** 1 inch= 25.4 mm; 1 kip=1000 lbf= 4.45 kN; 1 ft-lb= 1.36 N-m.

[1]Tabulated allowable load capacities include corrosion losses of 0.013-inch over a 50-year service life.
[2]Allowable axial compression capacity of the shaft is based on the ground screw installed in a fully braced condition.

TABLE 3B—MODEL 3 GROUND SCREW MODEL SHAFT ALLOWABLE CAPACITY

Ground Screw Diameter (inches)	Ground Screw Length (mm)	Allowable Load Shaft Capacities[1]				
		Axial Tension (kips)	Axial Compression[2] (kips)	Lateral		Maximum Torque (ft-lbf)
				Bending (kip-ft)	Shear (kips)	
3	63	9	25.3	1.83	7.6	4829
	70.9	9	25.3	1.83	7.6	4829
	78.7	9	25.3	1.83	7.6	4829
4.5	63	9	38.7	4.36	11.5	6687
	70.9	9	38.7	4.36	11.5	6687
	78.7	9	38.7	4.36	11.5	6687

For **SI:** 1 inch= 25.4 mm; 1 kip=1000 lbf= 4.45 kN; 1 ft-lb= 1.36 N-m.

[1]Tabulated allowable load capacities include corrosion losses of 0.013-inch over a 50-year service life.
[2]Allowable axial compression capacity of the shaft is based on the ground screw installed in a fully braced condition.

TABLE 4—WELDED FLANGE AND MODEL 3 GROUND SCREWS SCREW THREADS ALLOWABLE CAPACITY[1]

Ground Screw Diameter (inches)	Maximum Allowable Torsion (ft-lb)	Axial Tension/Compression Thread Capacity (kips)
3	4829	39.2
4.5	6687	47.7

For **SI:** 1 inch= 25.4 mm; 1 kip=1000 lbf= 4.45 kN; 1 ft-lb= 1.36 N-m.

[1]Tabulated allowable load capacities include corrosion losses of 0.013-inch over a 50-year service life.

TABLE 5—WELDED FLANGE AND MODEL 3 GROUND SCREWS ALLOWABLE SOIL CAPACITY[4]

Ground Screw Diameter (inches)	Ground Screw Length (inches)	Ground Screw Soil Embedment Depth (inches)	Axial Tension (lbf)		Axial Compression (lbf)		Lateral (lbf)[3]	
			Soil Classification					
			Silty Sand[1]	Sandy Clay[2]	Silty Sand[1]	Sandy Clay[2]	Silty Sand[1]	Sandy Clay[2]
3	63	60	1700	6321	2450	8129	1774	2360
	70.9	67.9	1700	6321	2450	8129	1774	2360
	78.7	75.7	1700	6321	2450	8129	1774	2360
4.5	63	60	3400	9644	4977	12823	3519	4394
	70.9	67.9	3400	9644	4977	12823	3519	4394
	78.7	75.7	3400	9644	4977	12823	3519	4394

For **SI:** 1 inch= 25.4 mm; 1 lbf= 4.45 N.

[1]Silty sand classified soil has a blow count of 13.
[2]Sandy clay classified soil has a blow count of 25 and a plasticity index of 30.
[3]Lateral load applied 12 inches above ground surface.
[4]Maximum installation torque must not exceed the maximum torque values in Table 3A and 3B of this report.

ICC-ES Evaluation Report

ESR-4226 CBC and CRC Supplement

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DIVISION: 31 00 00—EARTHWORK
Section: 31 63 00—Bored Piles

REPORT HOLDER:

AMERICAN GROUND SCREW, INC.

EVALUATION SUBJECT:

GROUND SCREW SYSTEMS

1.0 REPORT PURPOSE AND SCOPE

Purpose:

The purpose of this evaluation report supplement is to indicate that the Ground Screw Systems, described in ICC-ES report ESR-4226, has also been evaluated for compliance with the codes noted below.

Applicable code editions:

- 2019 *California Building Code* (CBC)

For evaluation of applicable chapters adopted by the California Office of Statewide Health Planning and Development (OSHPD) and Division of State Architect (DSA), see Sections 2.1.1 and 2.1.2 below.

- 2019 *California Residential Code* (CRC)

2.0 CONCLUSIONS

2.1 CBC:

The Ground Screw Systems, described in Sections 2.0 through 7.0 of the evaluation report ESR-4226, comply with CBC Chapters 18, provided the design and installation are in accordance with the 2018 *International Building Code*® (IBC) provisions noted in the evaluation report and the additional inspection requirements of CBC Chapters 16 and 17, as applicable.

2.1.1 OSHPD: OSHPD requirements as indicated in the CBC are beyond the scope of this supplement.

2.1.2 DSA: DSA requirements as indicated in the CBC are beyond the scope of this supplement.

2.2 CRC:

The Ground Screw Systems, described in Sections 2.0 through 7.0 of the evaluation report ESR-4226, comply with CRC Chapter 3, provided the design and installation are in accordance with the 2018 *International Residential Code*® (IRC) provisions noted in the evaluation report.

This supplement expires concurrently with the evaluation report reissued March 2022.