

# Install Solar Array, LED Lighting, and Roof Replacement Springfield Field Maintenance Shop Springfield, Missouri

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MO STATE CERTIFICATE OF  
AUTHORITY#2016003099

OWNER: STATE OF MISSOURI  
MICHAEL L. PARSON,  
GOVERNOR  
MISSOURI NATIONAL GUARD  
OFFICE OF THE ADJUTANT GENERAL  
FACILITIES MANAGEMENT OFFICE  
PROJECT  
MANAGEMENT: OFFICE OF ADMINISTRATION  
DIVISION OF FACILITIES MANAGEMENT,  
DESIGN AND CONSTRUCTION

DESIGNER: GHN Architects+Engineers  
ENGINEER: Crossed Swords Engineering  
PROJECT NUMBER: T2035-01  
SITE NUMBER: 6283  
ASSET NUMBER: 8136283008



1 LOCATION MAP

**SHEET INDEX:**

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- E-001 ELECTRICAL SOLAR LEGEND AND NOTES
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- E-102 LUMINAIRE LAYOUT, LIGHT & SWITCHING LEGEND
- E-103 ELECTRICAL ROOF PLAN - SOLAR
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- E-601 ELECTRICAL ONE LINE DIAGRAM SOLAR ARRAY

**APPLICABLE STANDARDS**

THIS PROJECT SHALL COMPLY WITH THE 2018 ICC CODE SERIES (IBC, IFB, IMC, IPC), THE 2017 NATIONAL ELECTRIC CODE, THE 2009 ICC ANSI A117.1 STANDARD, AND ADOPTED LOCAL ORDINANCES, AS APPLICABLE.

THE DRAWINGS WERE PREPARED TO ILLUSTRATE DESIGN GEOMETRY AND RELEVANT CODE COMPLIANCE PERTAINING TO THE PUBLIC HEALTH, SAFETY, AND WELFARE.

**BUILDING CODE SUMMARY**

NO CHANGE OF USE, ONLY MAINTENANCE.

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ISSUE DATE: 02/13/2023

CAD DWG FILE: \_\_\_\_\_  
DRAWN BY: DMF  
CHECKED BY: \_\_\_\_\_  
DESIGNED BY: \_\_\_\_\_

SHEET TITLE:  
**SHEET INDEX  
& CODE  
SUMMARY**

SHEET NUMBER:

**G-002**

2 OF 13 SHEETS  
FEBRUARY 13, 2023

SYMBOLS LEGEND

NOTE: SYMBOLS SHOWN IN LEGENDS ARE TYPICAL AND ALL SYMBOLS MAY NOT OCCUR ON THIS PROJECT

SECTION REFERENCE, DETAIL REFERENCE, INTERIOR ELEVATION SYMBOL, CASEWORK ELEVATION, CASEWORK ELEVATION CENTER NUMBER, ROOM NAME & NUMBER, KEY NOTE SYMBOL, WINDOW SYMBOL, DOOR SYMBOL, EQUIPMENT NUMBER, WALL TYPE, COLUMN GRID SYMBOLS, NORTH ARROW, LEVEL LINE, EXISTING GRADE LINE, NEW GRADE LINE, PROPERTY LINE, FENCE, SETBACK LINE, FINISH SLAB ELEVATION, SPOT ELEVATION, SPECIAL NOTES

MATERIALS LEGEND - SECTIONS

Diagrammatic materials legend for sections showing patterns for Earth, Crushed Rock, Concrete, Precast Concrete, Masonry Block, Face Brick, Fire Brick, Structural Glazed Tile, Limestone, Marble, Finish Wood, Laminated Wood Beam, Continuous Wood Blocking, Noncontinuous Wood Blocking, Steel/Other Metals, Glass, Glass Block, Exterior Insulation, Rigid Insulation Board, Batt Insulation, Gypsum Board, Acoustical Tile, Asphalt Paving, Plywood

MATERIALS LEGEND - PARTITIONS - PLAN VIEW

Diagrammatic materials legend for partitions in plan view showing patterns for Wood Stud Wall, Metal Stud Wall, Concrete Wall, Masonry Block Wall, Brick Wall, Existing Wall

MATERIALS LEGEND - ELEVATIONS

Diagrammatic materials legend for elevations showing patterns for Modular Face Brick, 8" x 8" Face Brick, Cast Stone, Exterior Insulation, Sheet Metal Coping, Shingles/Siding, Glass, Masonry Block, Split Faced Masonry Block, Wood

ABBREVIATIONS

Table listing abbreviations and their full names, organized in columns. Includes terms like ABV, AE55, AFF, AFG, AP, AC BD, AC PLAS, AC TILE, ADH, ADJ, ADS, AGG, A/C, ALT, AL, AB, ANDD, ANCH, AD, ASPH, BSMT, BRG, BIT, BK(KG), BD, BS, BOT, BRK, BRZ, BLDG, B/U, BBD, CAB, CPT, CI, CST, CB, CLG, CAP, CHT, CEM, CER(CT), CHBD, CIP, CIR, CMT, CMP, CO, CLR, COL, COMP, CONC, CMU, CONST, CONT, CONTR, CJ, CG, CTR, CS, CT, DPL, DIAG, DIAM, DIM, DISP, DIV, DR, DH, DN, DS, DT, DWR, DWIG, DF, D, EA, EW, ELEC, EP, EWC, EL, ELEV, EMER, EQ, EQUIP, EXIST, EB, EJ, EXP, EXT, FIN, FFE, FA, FE, FEC, FHS, FP, FRAP, FLASH, FLRG, FCD, FD, FLDR, FTG, FRA, FV, GA, GALV, GC, GL, GCMU, GST, GB, GYP, GFR, GWB, H, HBD, HCD, HCF, HDWR, HD, HDR, HTG, HVAC, HGT, HC, HM, HORIZ, HB, HWH, I, ID, INS, INT, IWS, JT, JST, KO, LAM, LAV, LH, LT, LWC, LTL, LVR, LD, LP, MH, MANUF, MATL, MBC, MBL, MAS, MO, MAX, MECH, MED, MTL, MOD, MIN, MISC, M.B., MDV, MTD, MULL, MEP, NAT, NOM, NIC, NTS, OBS, OC, OPNG, OJ, OD, OHE, PNT, PNL, PTD, PTR, PRTN, PVT, PERF, PLAS, P.LAM, PLYWD, PVC, PSF, PSI, PREFAB, PREFIN, PL, PP, QT, RAD, REF, REFR, REG, REINF, RCP, REQD, RA, REV, RH, RDW, R, RD, RFG, RM, RO, RB, RBT, SCH, SECT, SSK, SHT, SHT, SHWR, SIM, SC, SPEC, SQ, SV, SS, STD, STA, STL, STD, SD, STR, SUSP, SYM, SYM, TB, TEL, TV, TEMP, TERR, TG, TH, THRS, TLT, TPD, T&G, TDW, TDS, TOM, TB, T, TYP, UNFIN, UNO, UR, UGE, VERT, VCT, VB, VT, VWC, WSCT, WH, WC, WP, WS, WWF, WDW, W/O, WD, WIDTH, TACKBOARD, TELEPHONE, TELEVISION, TEMPERED, TERRAZZO, TEMPERED GLASS, THICKNESS, THRESHOLD, TOILET, TOILET PAPER DISPENSER, TONGUE AND GROOVE, TOP OF WALL, TOP OF STEEL, TOP OF MASONRY, TOWEL BAR, TREAD, TYPICAL, VINYL COMPOSITION TILE, VINYL BASE, VINYL WALL, VINYL WALL COVERING, WAINSCOT, WALL HUNG, WATER CLOSET, WATERPROOFING, WATERSTOP, WELDED WIRE FABRIC, WINDOW, WITHOUT, WOOD, WIDTH

SPECIAL NOTES

- 1. IN THE EVENT THE CLIENT CONSENTS TO, ALLOWS, AUTHORIZES OR APPROVES OF CHANGES TO ANY PLANS, SPECIFICATIONS OR OTHER CONSTRUCTION DOCUMENTS, AND THESE CHANGES ARE NOT APPROVED IN WRITING BY THE DESIGN PROFESSIONAL, THE CLIENT RECOGNIZES THAT SUCH CHANGES AND THE RESULTS THEREOF ARE NOT THE RESPONSIBILITY OF THE DESIGN PROFESSIONAL... 2. THE PERSONAL SEAL OF THE REGISTERED ARCHITECT OR ENGINEER SHALL BE THE LEGAL EQUIVALENT OF HIS SIGNATURE WHENEVER & WHEREVER USED, AND THE OWNER OF THE SEAL SHALL AUTHENTICATE THIS SHEET AND THE SPECIFICATION SECTIONS PERTAINING TO THIS SHEET...

GENERAL NOTES

- 1. NOTICE: DRAWINGS ARE NOT SET UP SPECIFICALLY ACCORDING TO TRADE AND EACH CONTRACTOR AND SUB-CONTRACTOR OR TRADE IS REQUIRED TO REVIEW THE DRAWINGS AS A WHOLE AND PROVIDE ANY MISCELLANEOUS ITEMS, MATERIALS, WORK, ETC. REQUIRED TO COMPLETE THE WORK AS SHOWN ON ALL THE DOCUMENTS... 2. THE GENERAL CONTRACTOR IS OBLIGATED TO INSPECT FOR EXISTING CONDITIONS & AVAILABLE INFORMATION PRIOR TO SUBMITTING A BID... 3. NOTIFY ARCHITECT IF EXISTING CONDITIONS DEVIATE SUBSTANTIALLY FROM THOSE INDICATED HEREIN... 4. EXISTING UNDERGROUND INSTALLATIONS SUCH AS WATER MAINS/LINES, GAS MAINS/LINES, SEWER, TELEPHONE LINES, POWER LINES, AND BURIED STRUCTURES IN THE VICINITY OF THE WORK TO BE DONE HERE UNDER ARE INDICATED ON THE DRAWINGS ONLY... 5. DRAWINGS ARE NOT TO BE SCALED. DIMENSIONAL DATA SHALL BE OBTAINED FROM WRITTEN INFORMATION ONLY... 6. SHOULD A DISCREPANCY BETWEEN CONTRACT DOCUMENTS AND SPECIFICATIONS OCCUR, CONTRACTOR SHOULD IMMEDIATELY NOTIFY ARCHITECT FOR RESOLUTION BEFORE PROCEEDING WITH WORK... 7. ALL DIMENSIONS INDICATED IN CONTRACT DOCUMENTS ARE FROM FACE OF BLOCK TO FACE OF BLOCK FOR INTERIOR PARTITIONS... 8. GENERAL CONTRACTOR SHALL COORDINATE ALL MECHANICAL, ELECTRICAL, & PLUMBING WORK AND PROVIDE ALL NECESSARY CONSTRUCTION TO FACILITATE SAID WORK... 9. SPECIAL HAZARDOUS MATERIALS NOTE: AN ENVIRONMENTAL INSPECTION HAS NOT BEEN PERFORMED ON THIS PROJECT... 10. WHERE ITEMS/ASSEMBLIES ARE INDICATED TO BE REMOVED AND RELOCATED, THE REMOVAL INCLUDES ALL SURFACE MOUNTED BRACKETS, ANCHORAGE DEVICES AND SURFACE BLOCKING... 11. GENERAL CONTRACTOR SHALL COORDINATE AND PROVIDE NECESSARY TEMPORARY ENCLOSURE AND DUST CONTROL MEASURES TO MAINTAIN A CLEAN AND SECURE WORK ENVIRONMENT... 12. ANY SURFACES THAT BECOME EXPOSED DUE TO REMOVING OF EQUIPMENT, CEILING, OR WALLS ARE TO BE REFINISHED AND PAINTED TO MATCH AND BLEND WITH SURROUNDING SURFACES.

STATE OF MISSOURI MICHAEL L. PARSON, GOVERNOR



David Michael Frohling A-2010101554



OFFICE OF ADMINISTRATION DIVISION OF FACILITIES MANAGEMENT, DESIGN AND CONSTRUCTION

MISSOURI NATIONAL GUARD OFFICE OF THE ADJUTANT GENERAL FACILITIES MANAGEMENT OFFICE

INSTALL SOLAR ARRAY, LED LIGHTING, & ROOF REPLACEMENT SPRINGFIELD FMS

SPRINGFIELD FMS FACILITY 4061 WEST KEARNEY ST. SPRINGFIELD, MO 65803

PROJECT # T2035-01 SITE # 6283 ASSET # 8136283008

REVISION: DATE: REVISION: DATE: REVISION: DATE: ISSUE DATE: 02/13/2023

CAD DWG FILE: DRAWN BY: DMF CHECKED BY: DESIGNED BY:

SHEET TITLE: SYMBOLS & ABBREVIATIONS

SHEET NUMBER:

G-003



David Michael Frohling  
A-2010011354



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ISSUE DATE: 02/13/2023

CAD DWG FILE: \_\_\_\_\_  
DRAWN BY: DMF  
CHECKED BY: \_\_\_\_\_  
DESIGNED BY: \_\_\_\_\_

SHEET TITLE:  
**ROOF PLAN &  
NORTH  
ELEVATION**

SHEET NUMBER:

**A-101**

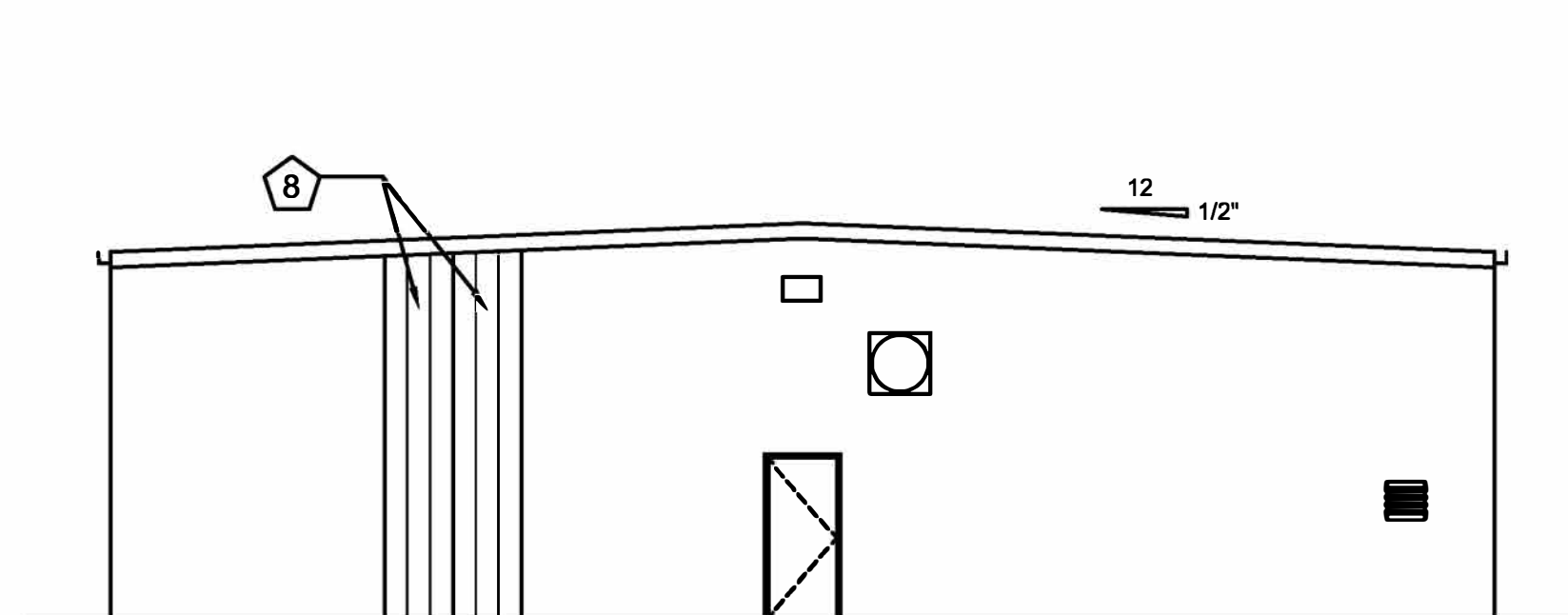
4 OF 13 SHEETS  
FEBRUARY 13, 2023

**KEYNOTES:**

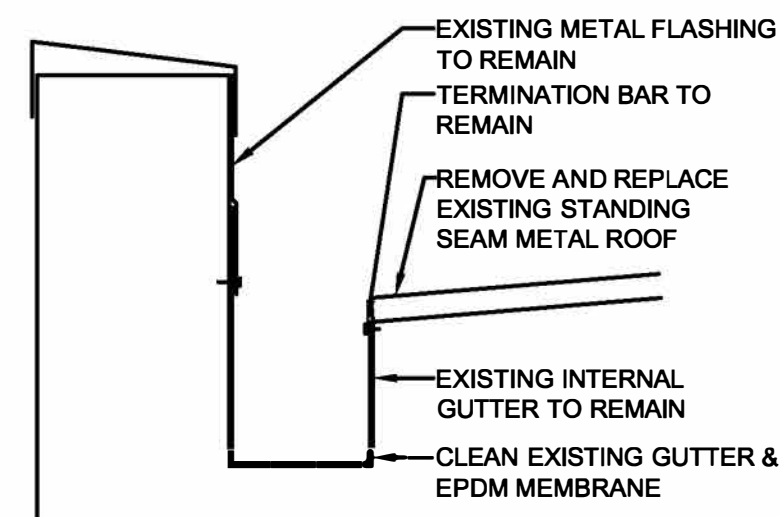
- 1 24 GAUGE, PREFINISHED, STANDING SEAM METAL ROOFING ON EXISTING ROOF PURLINS.
- 2 PREFINISHED, 24 GAUGE METAL STYLE A RECTANGULAR GUTTER, MATCH EXISTING SIZE AND PROFILE, SEE C/A-102.
- 3 PREFINISHED, 24 GAUGE METAL RECTANGULAR DOWNSPOUT, MATCH EXISTING SIZE AND PROFILE.
- 4 FLASH NEW ROOF INTO EXISTING WALL WITH 24 GAUGE PREFINISHED METAL FLASHING AND COUNTERFLASHING, SEE B/A-102.
- 5 24 GAUGE PREFINISHED METAL RIDGE CAP, SEE D/A-102.
- 6 SNOW & ICE GUARD, SEE C/A-102.
- 7 SOLAR PANELS, SEE ELECTRICAL & E/A-102 FOR INSTALLATION DETAILS.
- 8 REMOVE AND REPLACE TWO DAMAGED GABLE END WALL PANELS, MATCH EXISTING COLOR, PROFILE, AND GAUGE.
- 9 PREFINISHED, 24 GAUGE METAL RAKE TRIM, SEE A/A-102.
- 10 METAL CLAMP & UNISTRUT SYSTEM PIPE SUPPORT, SEE E/A-102.

**GENERAL NOTES:**

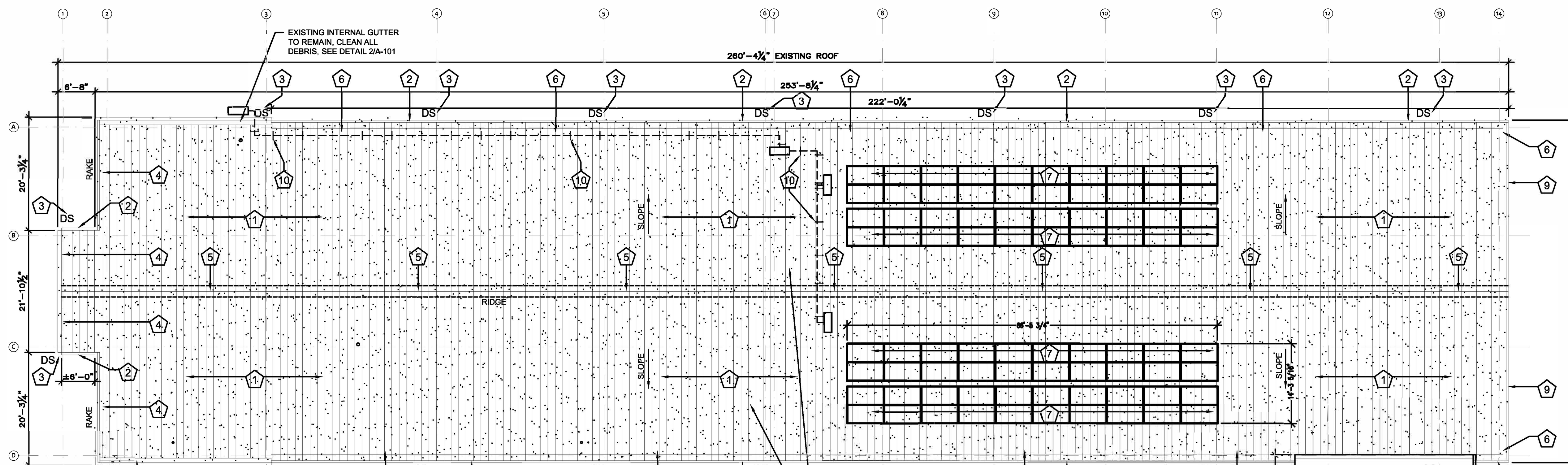
1. SEE GENERAL NOTES ON SHEET G-002 FOR ADDITIONAL INFORMATION.
2. CONTRACTOR TO FIELD VERIFY ALL DIMENSIONS AT EXISTING CONDITIONS
3. CONTRACTOR TO PATCH AND REPAIR ANY DAMAGE TO AREA THAT OCCURS DURING REMOVAL OR INSTALLATION OF WORK.
4. SCOPE OF WORK IS TO REMOVE AND REPLACED EXISTING ROOF AND ASSOCIATED GUTTERS, DOWNSPOUTS, TRIM, AND FLASHING.



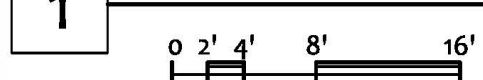
**3 NORTH ELEVATION**



**2 INTERNAL GUTTER**



**1 ROOF PLAN**



REMOVE AND REPLACE STANDING SEAM METAL ROOFING SYSTEM, INCLUDING RIDGE TRIM, METAL HEAD CLOSURES, FASTENERS, RAKE TRIM, AND ASSOCIATED STORM COLLARS AND FLASHING AT PENETRATIONS AND TRANSITIONS. EXISTING INSULATION TO REMAIN. PROVIDE PER ROOF MANUFACTURERS RECOMMENDATION, 24 GAUGE.

EXISTING METAL ROOFING TO REMAIN

EXISTING DOWNSPOUT TO REMAIN

EXISTING DOWNSPOUTS TO REMAIN

EXISTING SNOW/ICE GUARDS TO REMAIN

EXISTING INTERNAL GUTTER TO REMAIN, CLEAN ALL DEBRIS, SEE DETAIL 2/A-101



David Michael Frohling  
A-2010011354



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SITE # 6283  
ASSET # 8136283008

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ISSUE DATE: 02/13/2023

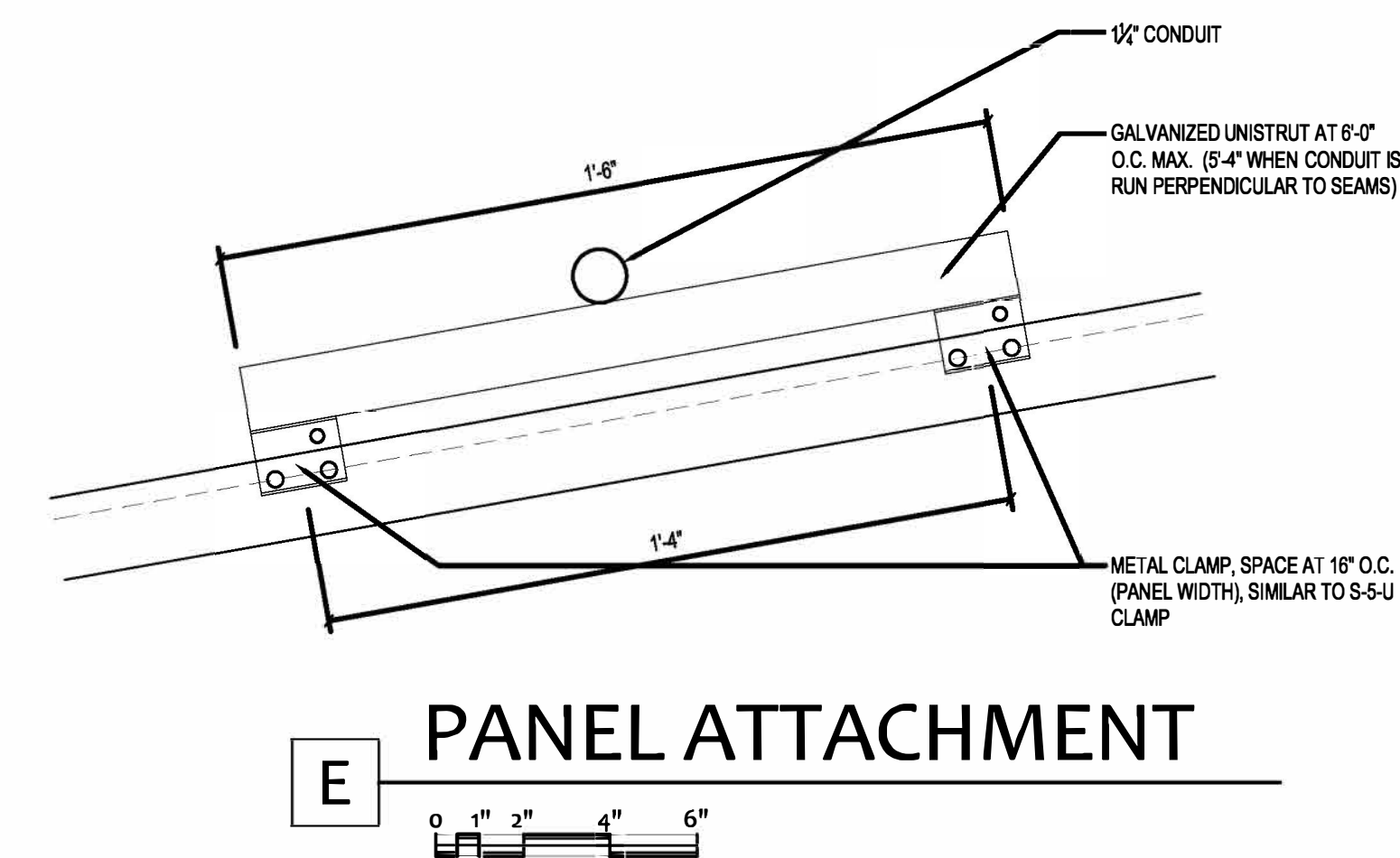
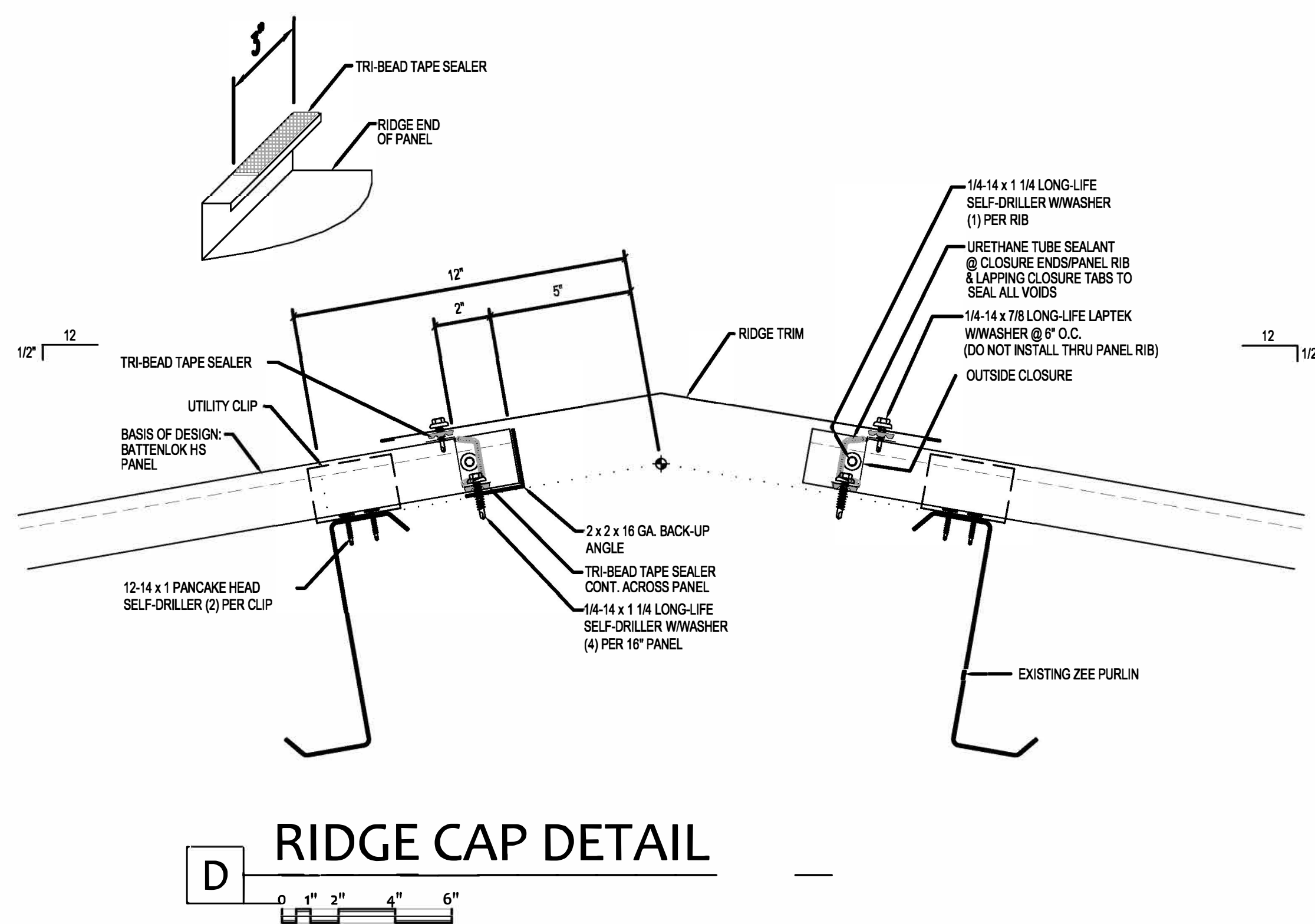
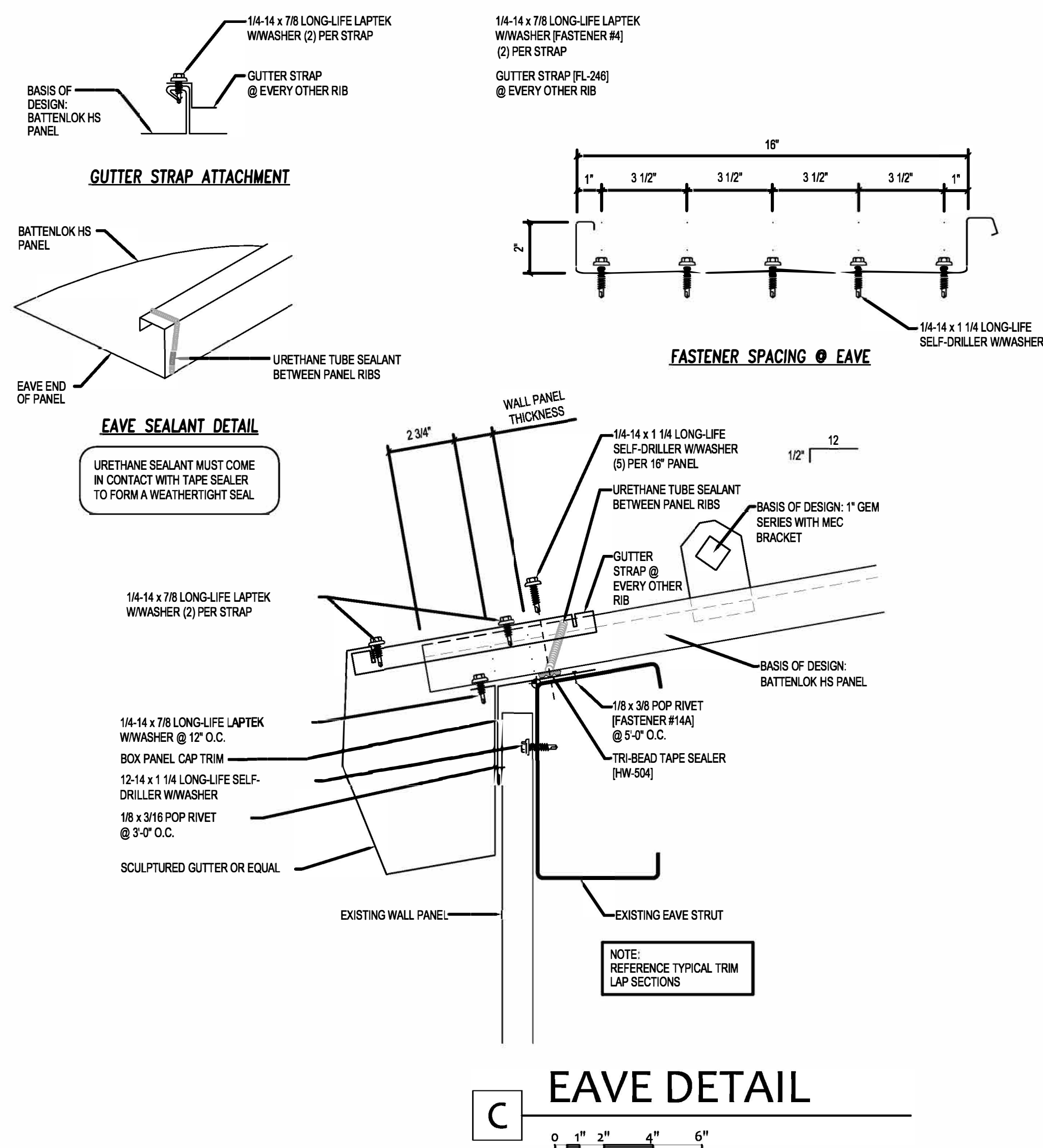
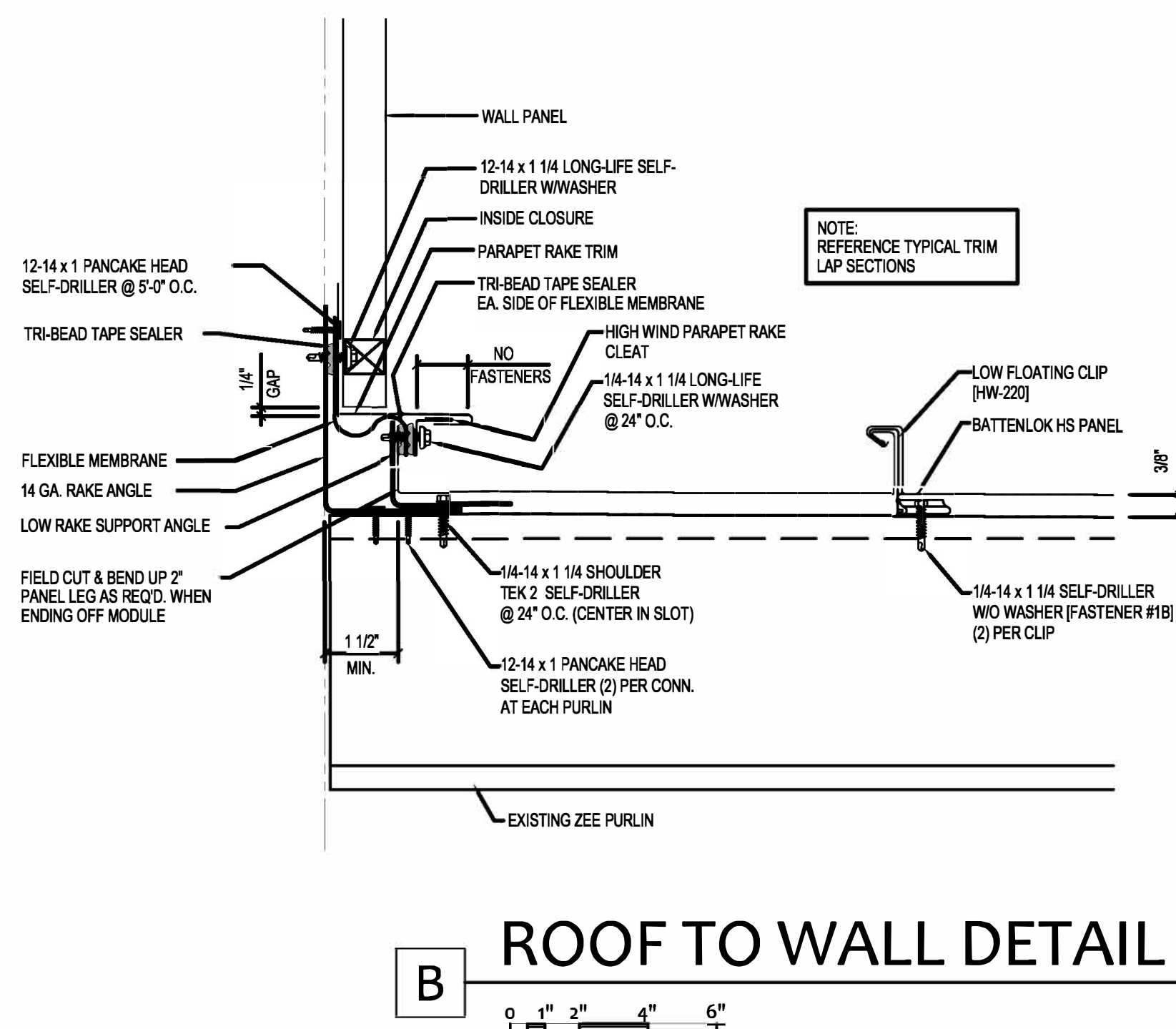
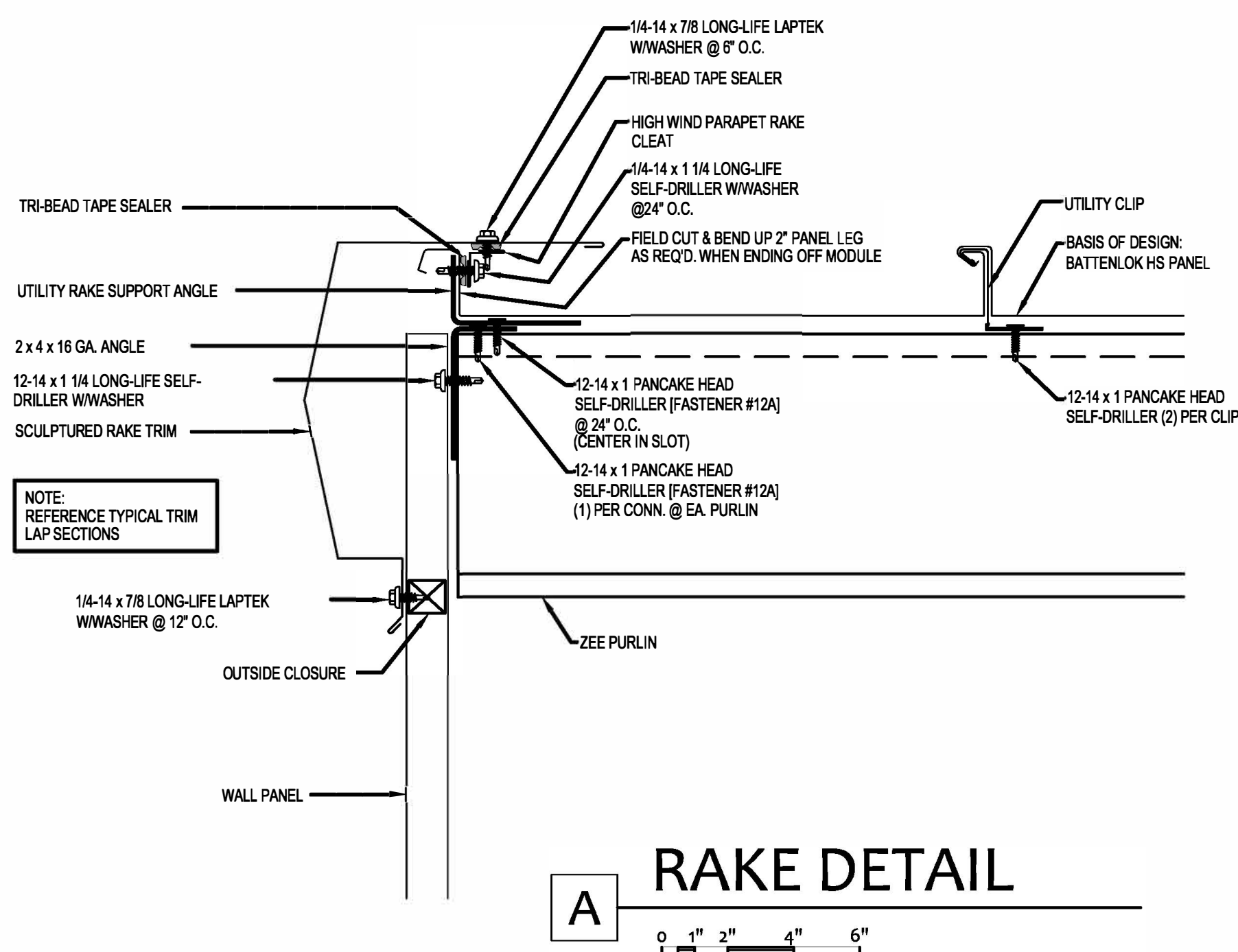
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DRAWN BY: DMF  
CHECKED BY: \_\_\_\_\_  
DESIGNED BY: \_\_\_\_\_

SHEET TITLE:  
ROOF DETAILS

SHEET NUMBER:

A-102

5 OF 13 SHEETS  
FEBRUARY 13, 2023



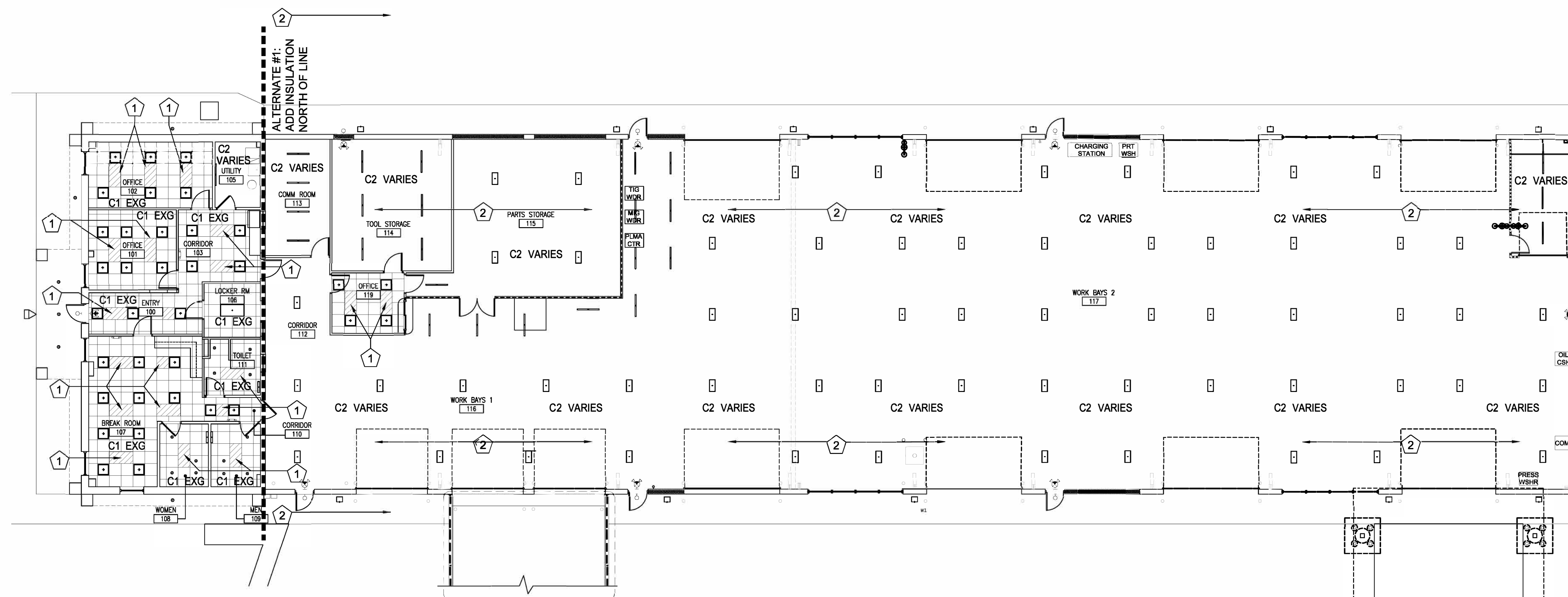


**KEYNOTES:**

- 1 INFILL AREA WHERE EXISTING LIGHT FIXTURE WAS REMOVED. USE CEILING PANELS REMOVED FROM NEW LIGHT LOCATIONS. MATCH EXISTING GRID AND PANELS.
- 2 ALTERNATE #1: PROVIDE ADDITIONAL LAYER OF PEMB BUILDING INSULATION (R-25) STRAPPED TO BOTTOM OF PURLINS. ADDITIONAL INSULATION REQUIRED FROM WALL SEPARATING WORK BAYS FROM ADMINISTRATION OFFICES TO THE NORTH.

**GENERAL NOTES:**

- 1. SEE GENERAL NOTES ON SHEET G-002 FOR ADDITIONAL INFORMATION.
- 2. CONTRACTOR TO FIELD VERIFY ALL DIMENSIONS AT EXISTING CONDITIONS
- 3. GUTTERS AND DOWNSPOUTS NOT SHOWN FOR CLARITY.
- 4. INFORMATION ON THIS SHEET GOVERNS THE LAYOUT OF THE CEILING GRID. SEE ELECTRICAL SHEETS FOR FIXTURE TYPES, QUANTITIES, CIRCUIT, AND SCHEDULING
- 5. SCOPE OF WORK IS TO REMOVE AND REPLACE INTERIOR LIGHTING AND EXTERIOR, BUILDING MOUNTED LIGHTING



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CAD DWG FILE: \_\_\_\_\_  
DRAWN BY: DMF  
CHECKED BY: \_\_\_\_\_  
DESIGNED BY: \_\_\_\_\_

SHEET TITLE:  
**REFLECTED  
CEILING PLAN**

SHEET NUMBER:

**A-201**

6 OF 13 SHEETS  
FEBRUARY 13, 2023

**CEILING TYPES:**

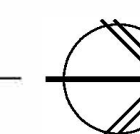
C1 2x2 ACOUSTICAL PANEL CEILING (MATCH EXISTING), EXISTING GRID TO REMAIN, EXISTING PANEL CEILING TO REMAIN AND BE INFILLED WITH MATCHING MATERIALS

C2 EXPOSED STRUCTURE

**CEILING LEGEND:**

- 2x4 OR 2x2 LED LAY-IN OR SUSPENDED LIGHT FIXTURE
  - LED RECESSED DOWNLIGHT
  - LED STRIP FIXTURE
  - WALL MOUNTED LED FIXTURE
  - EXTERIOR WALL MOUNTED LED LIGHT FIXTURE
  - WALL MOUNTED LED EXIT FIXTURE(S)
- C1 7'-11" CEILING TYPE  
CEILING HEIGHT

**REFLECTED CEILING PLAN**

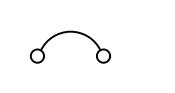
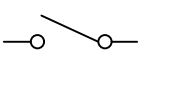
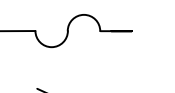
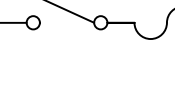

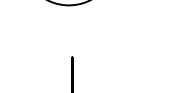
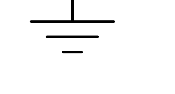
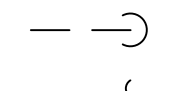

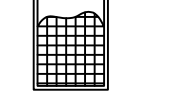

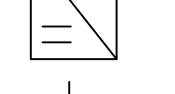


## GENERAL SOLAR SYSTEM ELECTRICAL NOTES

- PHOTOVOLTAIC (PV) SYSTEMS SHALL COMPLY WITH THE NATIONAL ELECTRIC CODE (NEC) ARTICLE 690.
- ALL WORK SHALL BE COMPLETED IN ACCORDANCE WITH MANUFACTURERS'S LISTING AND INSTALLATION INSTRUCTIONS, AND THE RELEVANT CODES AS SPECIFIED BY THE AUTHORITY HAVING JURISDICTION'S (AHJ) APPLICABLE CODES.
- THE UTILITY INTERCONNECTION APPLICATION MUST BE APPROVED AND PV SYSTEM INSPECTED PRIOR TO PARALLEL OPERATION
- LOAD-SIDE INTERCONNECTION SHALL BE IN ACCORDANCE WITH [NEC 690.64 (B)]
- ALL PV SYSTEM COMPONENTS; MODULES, UTILITY-INTERACTIVE INVERTERS, AND SOURCE CIRCUIT COMBINER BOXES ARE IDENTIFIED AND LISTED FOR USE IN PHOTOVOLTAIC SYSTEMS AS REQUIRED BY [NEC 690.4] & [NEC 690.60]
- PV MODULES:UL 1703 CERTIFIED, NFPA 70 CLASS C FIRE INVERTER(S):UL 1741 CERTIFIED, IEEE 1547, 929, 519 COMBINER BOX(S):UL 1703 OR UL 1741 ACCESSORY
- PV STRING HOME RUNS MUST BE LABELED AT ALL TERMINATIONS. UNLESS NOTED OTHERWISE, THE WORK SHALL INCLUDE FURNISHING MATERIALS, EQUIPMENT, ACCESSORIES, AND LABOR NECESSARY TO COMPLETE ALL INSTALLATION AS INDICATED ON THE DRAWINGS
- SUPPORT CONDUCTORS IN VERTICAL CONDUIT IN ACCORDANCE WITH THE REQUIREMENTS OF NEC 300.19.

## GROUNDING NOTES

- ONLY ONE CONNECTION TO AC CIRCUITS WILL BE USED FOR SYSTEM GROUNDING (NEC 690.42).
- RACKING AND STRUCTURAL COMPONENTS MUST BE ELECTRICALLY BONDED TOGETHER BY AN ACCEPTABLE MEANS. RACKING SYSTEM SHALL BE LISTED UL2703.
- MODULES SHALL BE GROUNDED WITH EQUIPMENT GROUNDING CONDUCTORS BONDED TO A LOCATION MEETING MANUFACTURER REQUIREMENTS WITH A MEANS OF BONDING LISTED FOR THIS PURPOSE.
- A GROUNDING ELECTRODE SYSTEM IN ACCORDANCE WITH NEC 690.47 AND NEC 250.50 THROUGH NEC 250.166 SHALL BE PROVIDED.
- PV SYSTEM SHALL BE GROUNDED IN ACCORDANCE WITH NEC 250.21 AND ALL METAL PARTS OR MODULE FRAMES ACCORDING TO NEC 690.43.
- ALL CONDUIT BETWEEN THE UTILITY AC DISCONNECT AND THE POINT OF CONNECTION IN THE MDP SHALL HAVE GROUNDED BUSHINGS AT BOTH ENDS.

ABBREVIATIONS	SYMBOLS LEGEND	SYSTEM NOTES	CONSTRUCTION GENERAL NOTES
<p>A AMPERE AC ALTERNATING CURRENT AFCI ARC-FAULT CIRCUIT INTERRUPTER AHJ AUTHORITY HAVING JURISDICTION AIC AMERAGE INTERRUPTION CAPACITY ATS AUTOMATIC TRANSFER SWITCH AWG AMERICAN WIRE GAUGE CB-# CIRCUIT BREAKER BLDG BUILDING DC DIRECT CURRENT DWG DRAWING EMT ELECTRICAL METALLIC TUBE GFCI GROUND FAULT CIRCUIT INTERRUPTER GFP GROUND FAULT PROTECTION GND GROUND GEC GROUNDING ELECTRODE CONDUCTOR IBC INTERNATIONAL BUILDING CODE IFC INTERNATIONAL FIRE CODE KW KILOWATT MCB MAIN CIRCUIT BREAKER MDP MAIN DISTRIBUTION PANEL MLO MAIN LUG ONLY MTS MANUAL TRANSFER SWITCH N NEUTRAL NEC NATIONAL ELECTRICAL CODE NTS NOT TO SCALE OC ON CENTER OCPD OVERCURRENT PROTECTION DEVICE P POLE PH PHASE POC POINT OF CONNECTION PV PHOTOVOLTAIC RMC RIGID METALLIC CONDUIT SC SOURCE CIRCUIT TYP TYPICAL UL UNDERWRITERS LABORATORY V VOLT OR VOLTAGE W WATT XFMR TRANSFORMER</p>	<p> ELECTRICAL BREAKER  ELECTRICAL DISCONNECT SWITCH  ELECTRICAL FUSE  ELECTRICAL FUSED DISCONNECT SWITCH  METER  SYSTEM OR EQUIPMENT GROUND  CONDUIT DOWN  CONTINUATION OF CONDUIT  PHOTOVOLTAIC (PV) MODULE  DC/AC INVERTER  POWER TRANSFORMER  CONNECTED CONDUCTOR</p> <p><b>APPLICABLE CODES</b></p> <p>NATIONAL ELECTRIC CODE (NEC), 2017 INTERNATIONAL BUILDING CODE (IBC), 2018 INTERNATIONAL FIRE CODE (IFC), 2018 CITY UTILITY REQUIREMENTS FOR NET METERING</p>	<p>1. SOLAR ARRAY CONSISTS OF PV MODULES, CONNECTED IN SERIES.</p> <p>2. ARRAYS HAVE BEEN PLACED TO MINIMIZE OR ELIMINATE SHADING IMPACT FROM ADJACENT STRUCTURES AND/OR OBSTRUCTIONS.</p> <p>3. INVERTERS SHALL BE TRANSFORMERLESS STRING INVERTERS, LOCATED PER PLAN.</p> <p><b>SITE INFORMATION</b></p> <p>UTILITY COMPANY: CITY UTILITIES</p> <p>POINT OF CONTACT: JASON SMITH, P.E. CITY UTILITIES OF SPRINGFIELD, MO JASON.SMITH@CITYUTILITIES.NET O: 417-831-8731</p>	<p>1. ALL ELECTRICAL WORK SHALL BE PERFORMED BY A QUALIFIED LICENSED ELECTRICIAN AND/OR APPRENTICES WORKING UNDER THE DIRECT SUPERVISION OF THE LICENSED CONTRACTOR.</p> <p>2. ALL WORK CARRIED OUT SHALL COMPLY WITH THE SPECIFICATIONS, APPLICABLE MUNICIPAL AND UTILITY COMPANY SPECIFICATIONS AND LOCAL JURISDICTIONAL CODES, ORDINANCES, AND APPLICABLE REGULATIONS.</p> <p>3. PRIOR TO COMMENCEMENT OF ANY WORK, THE CONTRACTOR SHALL NOTIFY THE ENGINEER OF ANY DISCREPANCIES NOTED AMONG SITE CONDITIONS, MANUFACTURER RECOMMENDATIONS, OR AUTHORITY HAVING JURISDICTION. IF THE SPECIFIED EQUIPMENT CANNOT BE INSTALLED AS SHOWN ON THESE DRAWINGS, THE CONTRACTOR SHALL SUBMIT TO THE ENGINEER OF RECORD A WRITTEN "RFI"(REQUEST FOR INFORMATION) PROPOSING AN ALTERNATIVE OR SEEKING CLARIFICATION.</p> <p>4. THE CONTRACTOR SHALL MAINTAIN IN GOOD CONDITION ONE COMPLETE SET OF PLANS WITH ALL REVISIONS, ADDENDA, AND CHANGE ORDERS ON THE PREMISES AT ALL TIMES.</p> <p>5. UNLESS NOTED OTHERWISE, THE WORK SHALL INCLUDE FURNISHING MATERIALS, EQUIPMENT, ACCESSORIES, AND LABOR NECESSARY TO COMPLETE ALL INSTALLATIONS AS INDICATED ON THE DRAWINGS.</p> <p>6. ALL MATERIALS FURNISHED AND INSTALLED SHALL BE IN STRICT ACCORDANCE WITH ALL APPLICABLE CODES, REGULATIONS, AND ORDINANCES. CONTRACTOR SHALL ISSUE ALL APPROPRIATE NOTICES AND COMPLY WITH ALL LAWS, ORDINANCES, RULES, REGULATIONS, AND LAWFUL ORDERS OF ANY PUBLIC AUTHORITY REGARDING THE PERFORMANCE OF WORK.</p> <p>7. THE CONTRACTOR SHALL INSTALL ALL EQUIPMENT AND MATERIALS IN ACCORDANCE WITH MANUFACTURER'S RECOMMENDATIONS UNLESS SPECIFICALLY STATED OTHERWISE.</p> <p>8. CONTRACTOR SHALL BE RESPONSIBLE FOR THE SAFETY OF WORK AREA, ADJACENT AREAS AND BUILDING OCCUPANTS THAT ARE LIKELY TO BE AFFECTED BY THE WORK UNDER THIS CONTRACT. WORK SHALL CONFORM TO ALL OSHA REQUIREMENTS AND THE LOCAL JURISDICTION.</p> <p>9. CONTRACTOR SHALL LEAVE PREMISES IN A CLEAN CONDITION. ALL DEBRIS AND OTHER REFUSE SHALL BE REMOVED FROM THE SITE AND DISPOSED OF IN A LAWFUL MANNER PER SPECIFICATIONS.</p> <p>10. THE CONTRACTOR SHALL PROTECT EXISTING IMPROVEMENTS, PAVEMENTS, CURBS, LANDSCAPING AND STRUCTURES NOT PART OF THE SCOPE OF WORK AS IDENTIFIED IN THESE PLANS.</p> <p>11. DUE TO THE FACT THAT PV MODULES ARE ENERGIZED WHENEVER THEY ARE EXPOSED TO LIGHT, CONTRACTOR SHALL DISABLE THE ARRAY DURING INSTALLATION AND SERVICE BY SHORT CIRCUITING, OPEN CIRCUITING, OR COVERING ARRAY WITH AN OPAQUE COVER ACCORDING TO MANUFACTURER'S INSTRUCTION.</p> <p><b>MONITORING AND CONTROLS</b></p> <p>CONTRACTOR SHALL PROVIDE A WIRELESS MONITORING AND CONTROLS NETWORK. THE SOLAR INVERTERS SHALL BE PROVIDED WITH MANUFACTURER STANDARD WIRELESS ACCESS CAPABILITY. CONTRACTOR SHALL PROVIDE CELLULAR HOTSPOT THAT WILL UPLOAD AND ALLOW CONTROL FROM A PASSWORD PROTECTED WEB ACCESS SYSTEM. A CONTROLS/MONITORING STATION SHALL BE SET UP INSIDE THE FMS BUILDING. THE CONTRACTOR SHALL INSTALL THE WEB MONITORING SOFTWARE ON AN EXISTING COMPUTER AS DESIGNATED BY THE STATE PROJECT MANAGER. SEE SPECIFICATION 263100 FOR ADDITIONAL INFORMATION.</p>

STATE OF MISSOURI  
MICHAEL L. PARSON,  
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INSTALL SOLAR ARRAY,  
LED LIGHTING, & ROOF  
REPLACEMENT  
SPRINGFIELD FMS

SPRINGFIELD FMS FACILITY  
4061 WEST KEARNEY ST.  
SPRINGFIELD, MO 65803

PROJECT # T2035-01  
SITE # 6283  
ASSET # 8136283008

REVISION: \_\_\_\_\_  
DATE: \_\_\_\_\_  
REVISION: \_\_\_\_\_  
DATE: \_\_\_\_\_  
REVISION: \_\_\_\_\_  
DATE: \_\_\_\_\_  
ISSUE DATE: 2/13/2023

CAD DWG FILE: E-001.DWG  
DRAWN BY: RFS  
CHECKED BY: CT  
DESIGNED BY: RFS

SHEET TITLE:  
ELECTRICAL SOLAR  
LEGEND AND NOTES

SHEET NUMBER:

**E-001**



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ISSUE DATE: 2/13/2023

CAD DWG FILE: E-101.DWG  
DRAWN BY: BPB  
CHECKED BY: RFS  
DESIGNED BY: BPB

SHEET TITLE:  
LIGHTING PLAN,  
GENERAL NOTES &  
LEGEND

SHEET NUMBER:

E-101

8 OF 13 SHEETS  
FEBRUARY 13, 2023

**LIGHTING GENERAL NOTES**

- ALL ELECTRICAL WORK SHALL BE UNDERTAKEN IN ACCORDANCE WITH NFPA 70, 2017 NATIONAL ELECTRICAL CODE (NEC) AS ADOPTED BY THE CITY OF SPRINGFIELD, MISSOURI AND ALL SUPPLEMENTARY STATE AND LOCAL REQUIREMENTS.
- CONTRACTOR SHALL BE RESPONSIBLE FOR INSTALLATION OF COMPLETE AND FUNCTIONAL ELECTRICAL SYSTEMS IN ACCORDANCE WITH THE NATIONAL ELECTRICAL CODE AND THE INTENT REPRESENTED ON THE DRAWINGS. IT SHALL BE THE CONTRACTORS RESPONSIBILITY TO FURNISH ALL LABOR, MATERIAL, EQUIPMENT, AND SERVICES NECESSARY OR REQUIRED.
- ALL ELECTRICAL CONDUCTORS ARE TO BE INSTALLED IN METAL RACEWAYS, UNLESS SPECIFIED OR NOTED OTHERWISE. CONDUIT MAY BE GALVANIZED STEEL OR RIGID ALUMINUM AS PERMITTED BY THE CODE AND GUIDELINES. NO CONDUIT SMALLER THAN 1/2" SHALL BE USED.
- WHEN CIRCUITS ARE COMBINED IN A COMMON RACEWAY, THE CONDUCTORS SHALL BE DERATED AS REQUIRED BY NFPA 70, AND WIRE SIZES INCREASED BY THE CONTRACTOR AS NECESSARY.
- CONTRACTOR SHALL INCREASE WIRE SIZES BASED ON CIRCUIT LENGTHS AS REQUIRED.
- ALL RACEWAY SHALL HAVE SEPARATE GROUNDING CONDUCTOR SIZED IN ACCORDANCE WITH NFPA 70 REQUIREMENTS.
- COORDINATE ALL WORK WITH OTHER DISCIPLINES. COORDINATE LIGHT LOCATIONS WITH ANY EXISTING CONFLICTS.
- ALL INTERIOR AND EXTERIOR LIGHTING AT THIS BUILDING IS BEING REPLACED. DEMOLISH AND REMOVE ALL LIGHTING AND ASSOCIATED CONTROLS, WIRING AND CONDUIT AS REQUIRED. EXISTING CONDUIT RUNS AND WIRING MAY REMAIN IN-PLACE TO SERVE NEW LIGHTING AS APPLICABLE. ALL ITEMS TO BE REMOVED SHALL COMPLY WITH ALL CODE REQUIREMENTS.
- NOT ALL CIRCUITRY SHOWN FOR CLARITY. GROUP LIGHTS WITH APPROPRIATE MOTION SENSOR OR SWITCHING AND VERIFY WIRE SIZE AND AMPERAGE COMPLIES WITH NEC.
- SEE DRAWING E-102 FOR FOOT CANDLE LAYOUT OF INTERIOR SPACES.

**LIGHTING PLAN NOTES**

- ROUTE CIRCUIT THROUGH EXISTING PHOTOCELL PC1.
- NEW CIRCUIT TO NEW SITE LIGHTING. SEE DRAWING E-401.
- MOUNT SIGN LIGHT ON NEW JUNCTION BOX AT VERTICAL WALL ABOVE SIGN.
- CONNECT ALL NEW EMERGENCY LIGHTING TO OPEN, UNSWITCHED CIRCUIT LP1-37 AND PROVIDE NEW 20A BREAKER.

**SWITCHING LEGEND - BASIS OF DESIGN**

MODEL NO. OR EQUIVALENT	DESCRIPTION
\$ ZSS10-G0Z	LUMINA RF 2.4GHZ DECORATIVE SWITCH, MECHANICAL SWITCHING RELAY, WIRE-IN, 3-WAY CAPABILITY, 120-277VAC, 50/60HZ, LEAKS TO LOAD (NO NEUTRAL WIRE REQUIRED), NAFTA COMPLIANT, COLOR: WHITE, LIGHT ALMOND, IVORY
\$ OSSMD-MDW	DUAL RELAY MULTI-TECH WALL BOX OCCUPANCY SENSOR W/NEUTRAL WIRE, 120/208/220/230/240/277V, 50/60HZ, CEC TITLE 20/24 COMPLIANT, 30S-30M TIME DELAY, AMBIENT LIGHT OVERRIDE, SELF ADJUSTING, FIELD CONFIGURABLE, NAFTA COMPLIANT, COLOR: WHITE
\$ ZS057-ALZ	LUMINA RF DECORA 0-10V LOW VOLTAGE WALL DIMMER, 2.4GHZ, 24VDC, 0-10V SINKING, 20MA, COLOR: WHITE, LIGHT ALMOND, IVORY
\$ ODD10-IDW	SMART PIR 0-10V DIMMING WALLBOX SENSOR, APP CONFIGURABLE: AUTO-ON/ AUTO-OFF OR MANUAL-ON/AUTO-OFF, NEUTRAL WIRE REQUIRED, 120/208/220/230/240/277VAC, 50/60HZ, WHITE
OSC	TECHNOLOGY: MULTI-TECHNOLOGY PIR/ULTRASONIC, MOUNT: CEILING, COVERAGE (SQ.FT.): 2000 SQ. FT., ADJUSTMENT: SELF-ADJUSTING, PATTERN DEGREES: 360, TITLE 24 COMPLIANT: YES, GRADE: COMMERCIAL, COLOR: OFF-WHITE
HB	PIR FIXTURE MOUNT HIGH BAY OCCUPANCY SENSOR WITH LIGHT SENSOR (PHOTOCELL), CURRENT CONSUMPTION: 20MA, 24V, TITLE 24 COMPLIANT, ASHRAE 90.1 COMPLIANT
OPP20	20A STANDARD POWER PACK FOR OCCUPANCY SENSORS, FEATURES INCLUDE AUTOON, MANUAL ON, LOCAL SWITCH, LATCHING RELAY: LINE VOLTAGE INPUT, 120/208/220/230/240/277V, 50/60HZ, LOW VOLTAGE: INPUT: 24VDC, 2MA, OUTPUT: 24VDC, 225MA, HOUSING: 1/2" THREADED NIPPLE W/LOCKNUT (FITS ON OR IN A 4" SQR BOX)

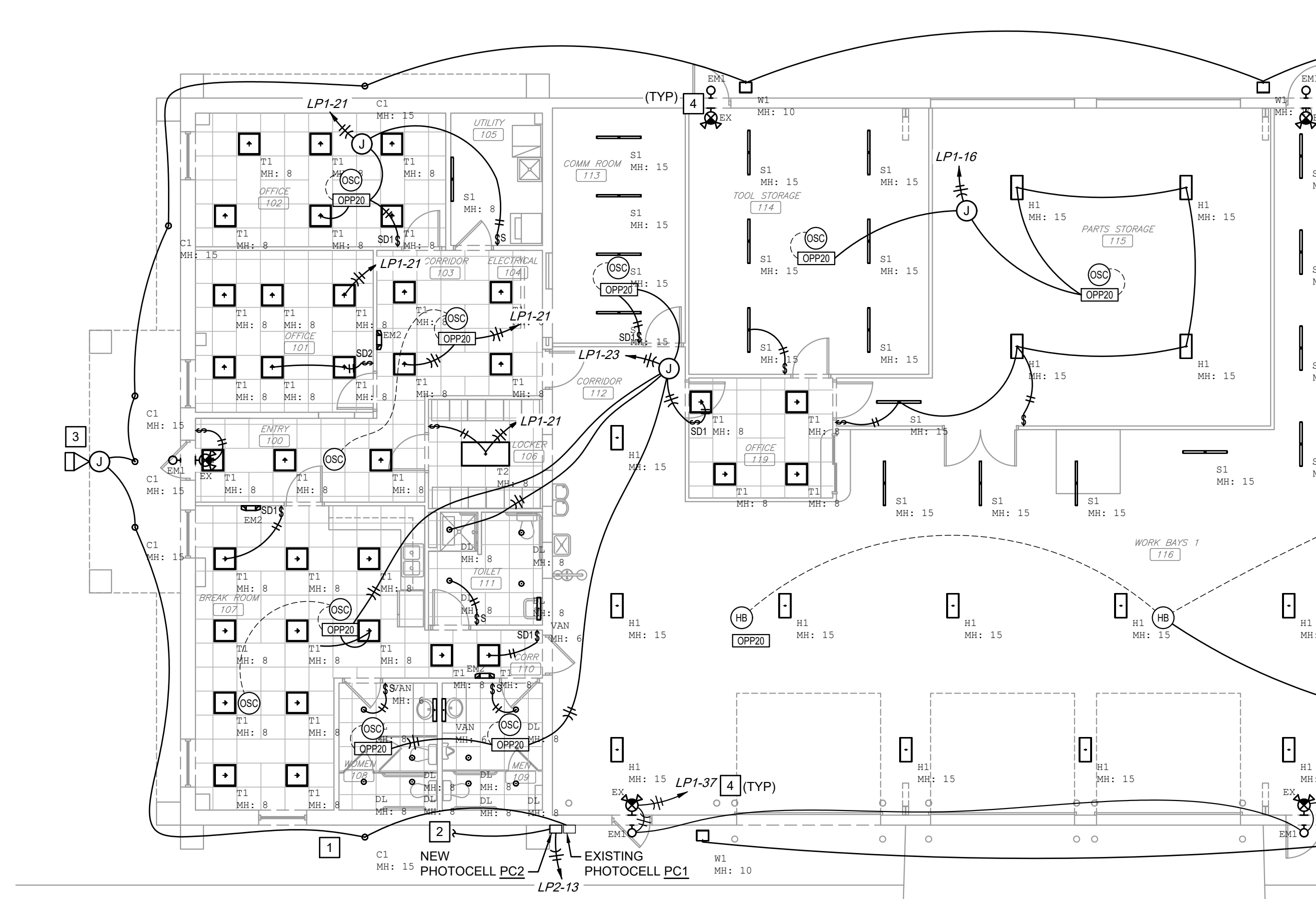
Symbol	Qty	Label	Arrangement	LLF	Lum. Watts	Lum. Lumens	Description (Basis of Design)
⊙	6	C1	SINGLE	0.950	30.3	2842	Z6RDL30835WCCD210U
⊙	12	DL	SINGLE	0.950	12,8808	1050	FM-05RN-935
⊙	59	H1	SINGLE	0.950	88.1	12139	FBY12L840-UNV
⊙	27	S1	SINGLE	0.950	57.9	7275	FSS470L835-UNV-DIM
⊙	35	T1	SINGLE	0.950	26.9	2951	2FGG30L835-2-D-UNV
⊙	1	T2	SINGLE	0.950	31.8	3847	2FGG38L835-4-D-UNV
⊙	3	VAN	SINGLE	0.950	16.6	1904	FSW220L835-UNV-DIM
⊙	13	W1	SINGLE	0.950	39	5669	SWP-SL-U-40-BR2
⊙	1	SN1	SINGLE	0.950	18	1265	RE12-LED1827

Label	CalcType	Units	Avg	Max	Min	Avg/Min	Max/Min
ROOM 100 - 103 - 104 Wor	Illuminance	Fc	49.44	64	32	1.55	2.00
ROOM 101 Workplane	Illuminance	Fc	60.38	74	41	1.47	1.80
ROOM 101 Workplane 1	Illuminance	Fc	67.57	85	38	1.78	2.24
ROOM 105 Workplane	Illuminance	Fc	48.04	76	27	1.78	2.81
ROOM 106 Workplane	Illuminance	Fc	28.36	50	15	1.89	3.33
ROOM 107 Workplane	Illuminance	Fc	62.92	81	30	2.10	2.70
ROOM 108 Workplane	Illuminance	Fc	46.05	63	31	1.49	2.03
ROOM 109 Workplane	Illuminance	Fc	39.45	58	28	1.41	2.07
ROOM 111 Workplane	Illuminance	Fc	38.76	72	21	1.85	3.43
ROOM 113 Workplane	Illuminance	Fc	51.87	62	36	1.44	1.72
ROOM 114 Workplane	Illuminance	Fc	53.41	66	36	1.48	1.83
ROOM 119 OFFICE Workplan	Illuminance	Fc	60.80	71	46	1.32	1.54
ROOM 116 PART STORAGE Wo	Illuminance	Fc	46.06	57	20	2.30	2.85
ROOM 118 Workplane	Illuminance	Fc	60.10	80	13	4.62	6.15
ROOM 118 Workplane	Illuminance	Fc	56.30	76	34	1.66	2.24

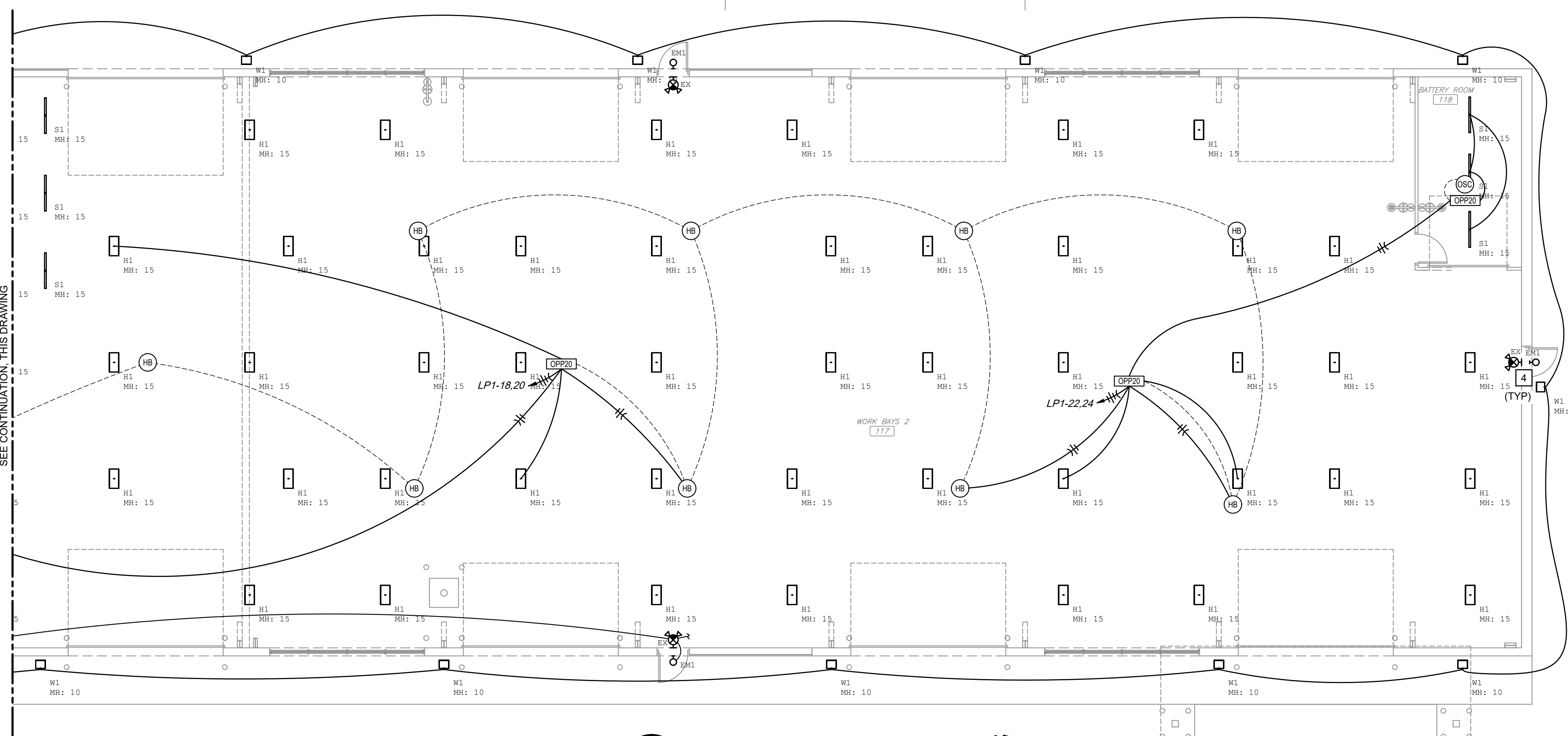
FOOTCANDLE READING TAKEN AT 2.5FT AFF  
REFLECTANCE 80/50/20

Symbol	Label	Description (Basis of Design)
⊙	EX	SURELITES LPX-6
⊙	EM1	LUMARK WPLLED
⊙	EM2	SURELITES CU2-LED

SEE CONTINUATION THIS DRAWING



2 LIGHTING PLAN - AREA B  
1/8" = 1'-0" NORTH



1 LIGHTING PLAN - AREA A  
1/8" = 1'-0" NORTH

SEE CONTINUATION THIS DRAWING





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SPRINGFIELD FMS

SPRINGFIELD FMS FACILITY  
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SPRINGFIELD, MO 65803

PROJECT # T2035-01  
SITE # 6283  
ASSET # 8136283008

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DATE: \_\_\_\_\_  
REVISION: \_\_\_\_\_  
DATE: \_\_\_\_\_  
ISSUE DATE: 2/13/2023

CAD DWG FILE: E-102.DWG  
DRAWN BY: BPB  
CHECKED BY: RFS  
DESIGNED BY: BPB

SHEET TITLE:  
LUMINAIRE  
LAYOUT, LIGHT &  
SWITCHING LEGEND

SHEET NUMBER:

E-102

9 OF 13 SHEETS  
FEBRUARY 13, 2023

**LIGHTING GENERAL NOTES**

1. SEE DRAWING E-101 FOR ELECTRICAL LIGHTING GENERAL NOTES.

Symbol	Qty	Label	Arrangement	LLF	Lum. Watts	Lum. Lumens	Description (Basis of Design)
○	6	C1	SINGLE	0.950	90.3	2842	24RDL30R15W20D2100
○	12	DL	SINGLE	0.950	12.800	1050	FM-0500-03
○	29	H1	SINGLE	0.950	85.1	12139	FSB121840-DIV
○	27	S1	SINGLE	0.950	57.9	7275	FS470L815-UNV-DIM
○	15	S1	SINGLE	0.950	26.9	2951	2F02018L815-4-D-UNV
○	1	CT	SINGLE	0.950	15.8	3847	2F02018L815-4-D-UNV
○	1	VAN	SINGLE	0.950	16.6	1904	FSW220L815-UNV-DIM
○	13	W1	SINGLE	0.900	19	3669	SM7-5L-D-40-BK2
○	1	RN1	SINGLE	0.900	15	1245	RM7-5L0192

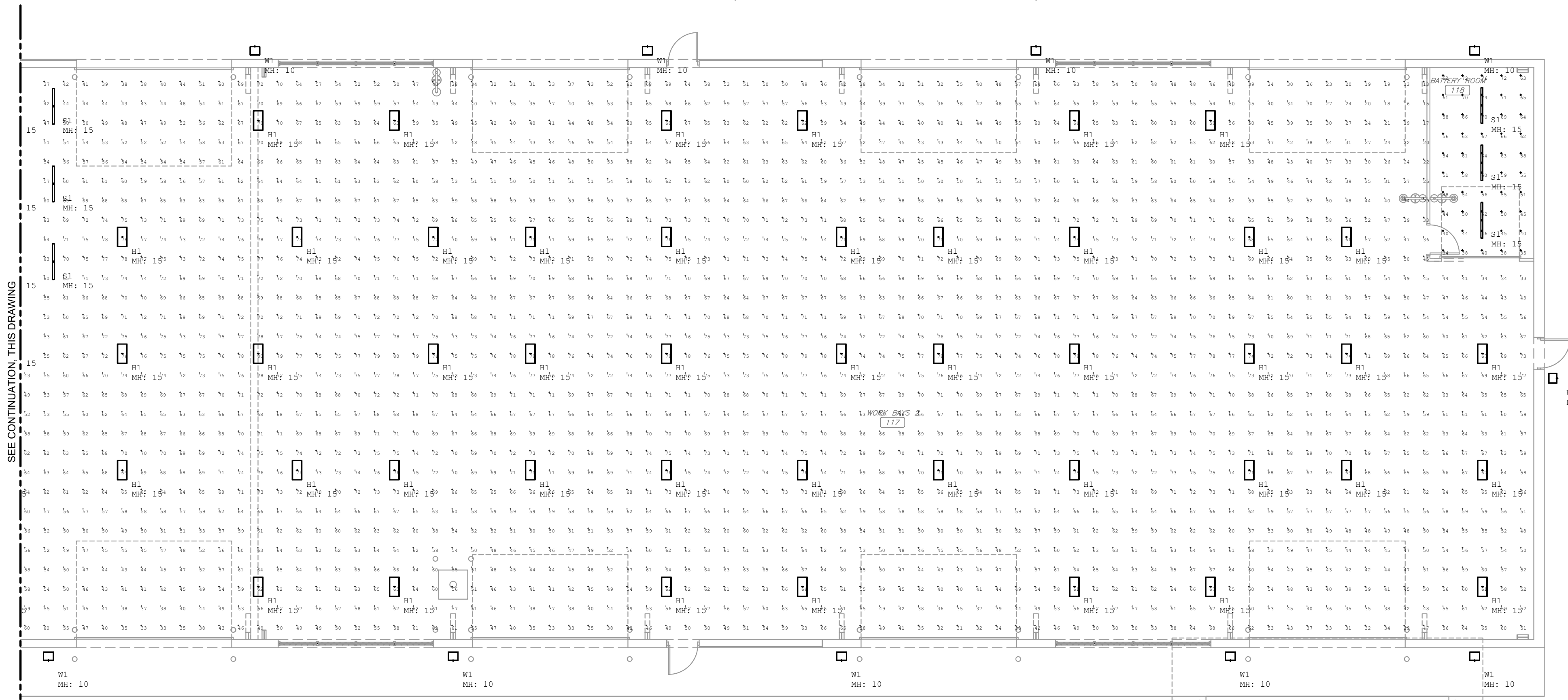
Labels	CalcType	Units	Avg	Max	Min	Avg/Min	Max/Min
ROOM 100 - 103 - 104 WOI	ILLUMINANCE	FC	49.44	64	32	1.55	2.00
ROOM 101 Workplane	ILLUMINANCE	FC	60.38	74	41	1.47	1.80
ROOM 101 Workplane 1	ILLUMINANCE	FC	67.57	85	38	1.78	2.24
ROOM 105 Workplane	ILLUMINANCE	FC	48.04	76	27	1.78	2.81
ROOM 106 Workplane	ILLUMINANCE	FC	28.36	30	15	1.89	3.33
ROOM 107 Workplane	ILLUMINANCE	FC	62.92	81	30	2.10	2.70
ROOM 108 Workplane	ILLUMINANCE	FC	46.05	63	33	1.39	2.03
ROOM 109 Workplane	ILLUMINANCE	FC	39.45	38	29	1.41	1.07
ROOM 111 Workplane	ILLUMINANCE	FC	38.76	72	21	1.83	3.43
ROOM 113 Workplane	ILLUMINANCE	FC	51.87	62	35	1.54	1.72
ROOM 114 Workplane	ILLUMINANCE	FC	55.41	66	36	1.58	1.83
ROOM 119 OFFICE Workplan	ILLUMINANCE	FC	60.80	71	46	1.32	1.54
ROOM 115 PART STORAGE WOI	ILLUMINANCE	FC	46.06	57	20	2.30	2.85
ROOM 116 Workplane	ILLUMINANCE	FC	60.10	80	19	4.92	6.15
ROOM 118 Workplane	ILLUMINANCE	FC	56.30	76	34	1.66	2.24

FOOTCANDLE READING TAKEN AT 2.5FT AFF  
REFLECTANCE 80/50/20

Symbol	Label	Description (Basis of Design)
○	EM1	LUMARK WFLLED
○	EM2	SURELITES CU2-LED



2 LUMINAIRE LAYOUT - AREA B  
1/8" = 1'-0" NORTH



1 LUMINAIRE LAYOUT - AREA A  
1/8" = 1'-0" NORTH

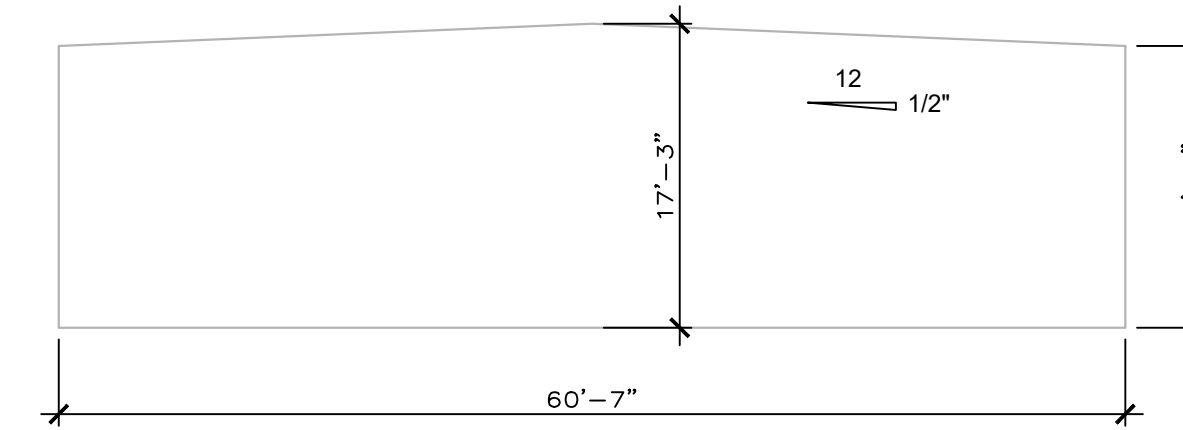
**GENERAL NOTES**

- SEE GENERAL NOTES SHEET E-001 FOR ADDITIONAL INFORMATION
- ALL CONDUIT RUNS ABOVE GRADE EXCEPT TO NEW LIGHT POLES.
- SYSTEM INFORMATION. (FOR REFERENCE ONLY)  
SOLAR MODULE WEIGHT: 49.6 LBS.  
SOLAR MODULE DIMENSIONS: 79.06"X39.45"X1.57"
- ALL WORK SHALL BE IN ACCORDANCE WITH THE NATIONAL ELECTRIC CODE (NEC) 2017 AND CITY UTILITY STANDARDS.

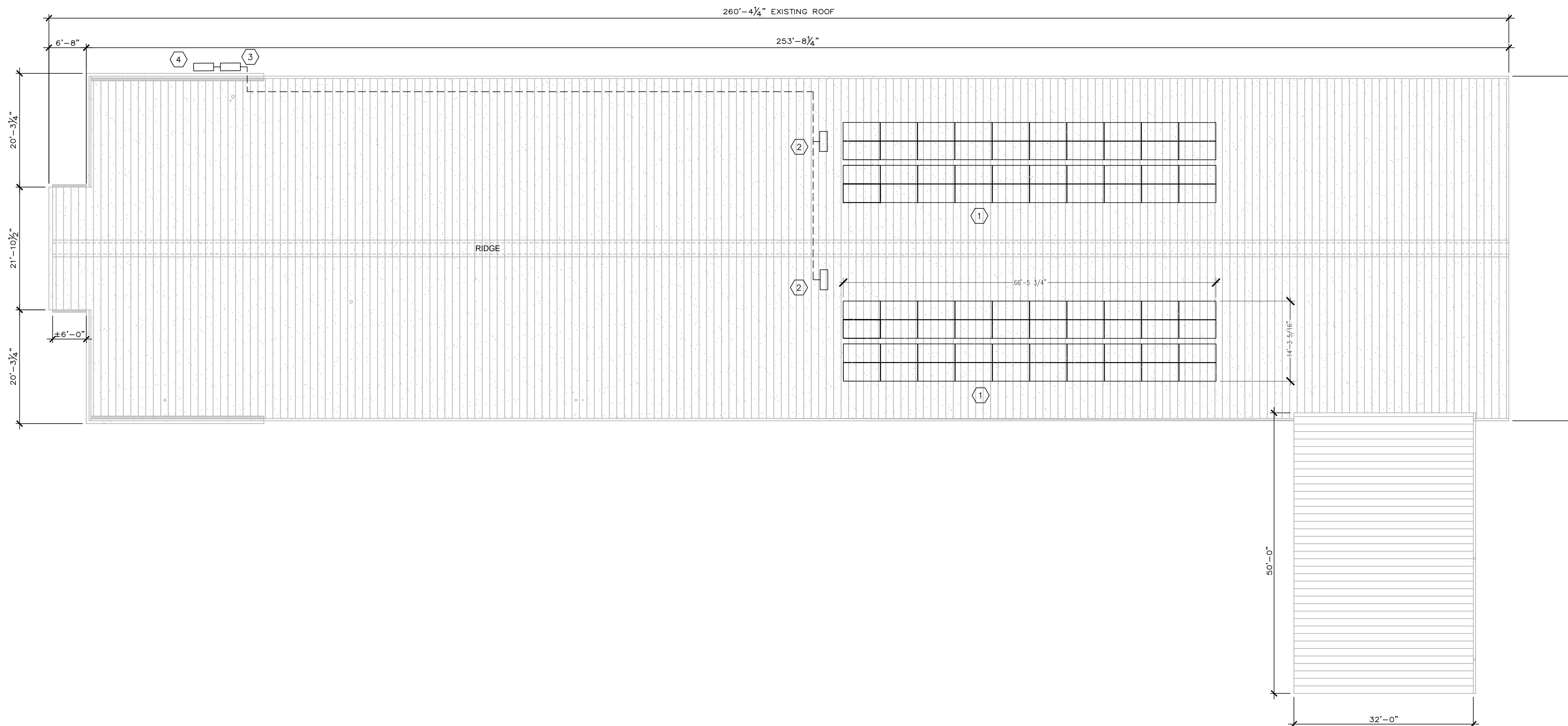
**PLAN NOTES**

- INSTALL ROOF MOUNTED SOLAR ARRAY. SEE SHEET E-601 FOR DETAILED SOLAR MODULE AND EQUIPMENT INFORMATION. ROOF MOUNTS SHALL BE PER DETAILS ON SHEET E-501.
- INSTALL NEW DC TO AC SOLAR INVERTER.
- INSTALL NEW COMBINER BOX.
- CONNECT SOLAR ARRAY AC VIA ROOF MOUNTED WIRE AND CONDUIT TO EXISTING ELECTRICAL MDP. INSTALL NEW AC DISCONNECT AND NET METER PER UTILITY COMPANY REQUIREMENTS.

NOTE:  
DIMENSIONS AND SLOPE ARE APPROXIMATE.  
CONTRACTOR TO FIELD VERIFY PRIOR TO  
THE START OF CONSTRUCTION

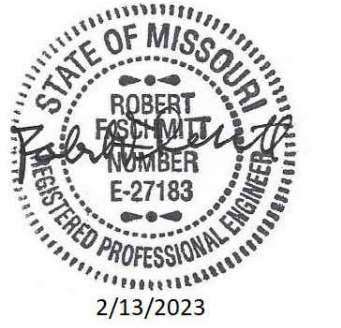


2	BUILDING SECTION DIAGRAM
1/4"=1'-0"	-



1	ROOF PLAN
3/32"=1'-0"	-

STATE OF MISSOURI  
MICHAEL L. PARSON,  
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ISSUE DATE: 2/13/2023

CAD DWG FILE: E-103.DWG  
DRAWN BY: RFS  
CHECKED BY: CT  
DESIGNED BY: RFS

SHEET TITLE:  
**ELECTRICAL  
ROOF PLAN - SOLAR**

SHEET NUMBER:

**E-103**

10 OF 13 SHEETS  
FEBRUARY 13, 2023



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REVISION: \_\_\_\_\_  
DATE: \_\_\_\_\_

ISSUE DATE: 2/13/2023

CAD DWG FILE: E-401.DWG  
DRAWN BY: BPB  
CHECKED BY: RFS  
DESIGNED BY: BPB

SHEET TITLE:  
SITE LIGHTING,  
DETAIL &  
SCHEDULES

SHEET NUMBER:

E-401

11 OF 13 SHEETS  
FEBRUARY 13, 2023

**LIGHTING GENERAL NOTES**

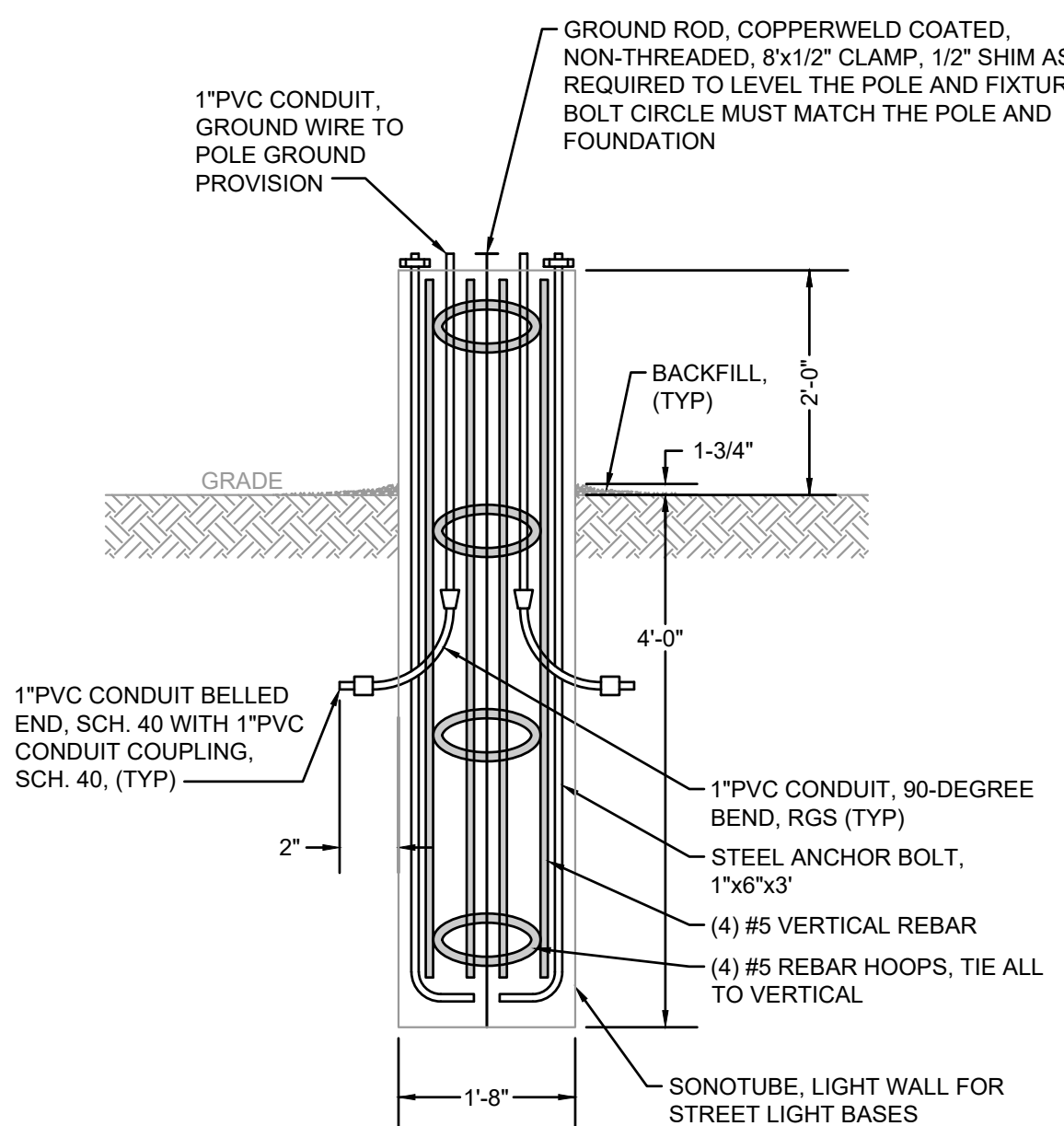
1. SEE DRAWING E-100 FOR ELECTRICAL LIGHTING GENERAL NOTES.

**LIGHTING PLAN NOTES**

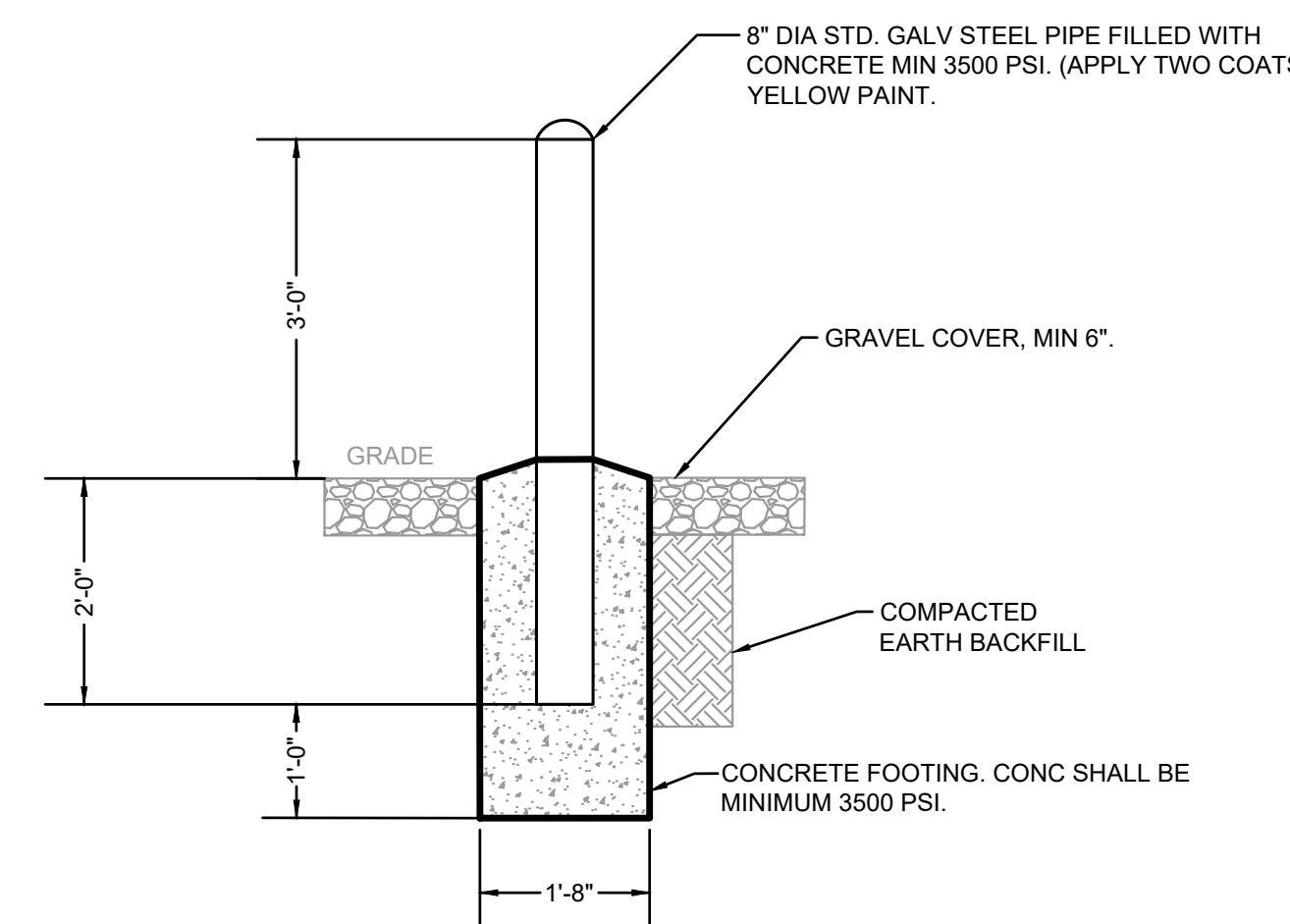
- 1 NEW CIRCUIT ROUTED TO NEW PHOTOCELL PC2 FOR NEW SITE LIGHTING, #10 CU. SEE DRAWING E-101.
- 2 SPILLOVER LUMENS FROM EXISTING PARKING LOT LIGHTING NOT ACCOUNTED FOR IN THIS LUMINAIRE LAYOUT PLAN.
- 3 BOLLARD - 8" DIAMETER IN STEEL SLEEVE, 36" ABOVE GRADE/36" BELOW GRADE. MAXIMUM SPACING 5'-6".
- 4 NEW TRENCH FOR ELECTRICAL POWER TO LIGHT POLES.

Luminaire Schedule							
Symbol	Qty	Label	Arrangement	LLF	Lum. Watts	Lum. Lumens	Description (Basis of Design)
+	2	S4-QUAD	4 @ 90 DEGRE	0.900	148.672	20989	(4)AL-150W-U-40-T4
Calculation Summary							
Label	CalcType	Units	Avg	Max	Min	Avg/Min	Max/Min
NORTH FIELD	Illuminance	Fc	2.07	20.5	0.0	N.A.	N.A.

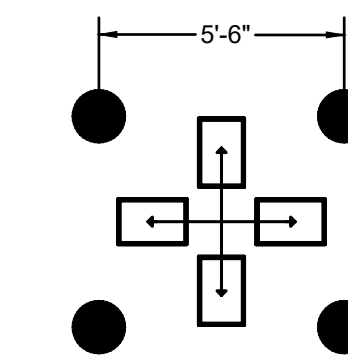
FOOTCANDLE READING TAKEN AT GRADE  
POLES ARE ESTIMATED AT 20FT TALL ON A 2FT CONCRETE BASE



**2 LIGHT POLE DETAIL**  
NOT TO SCALE



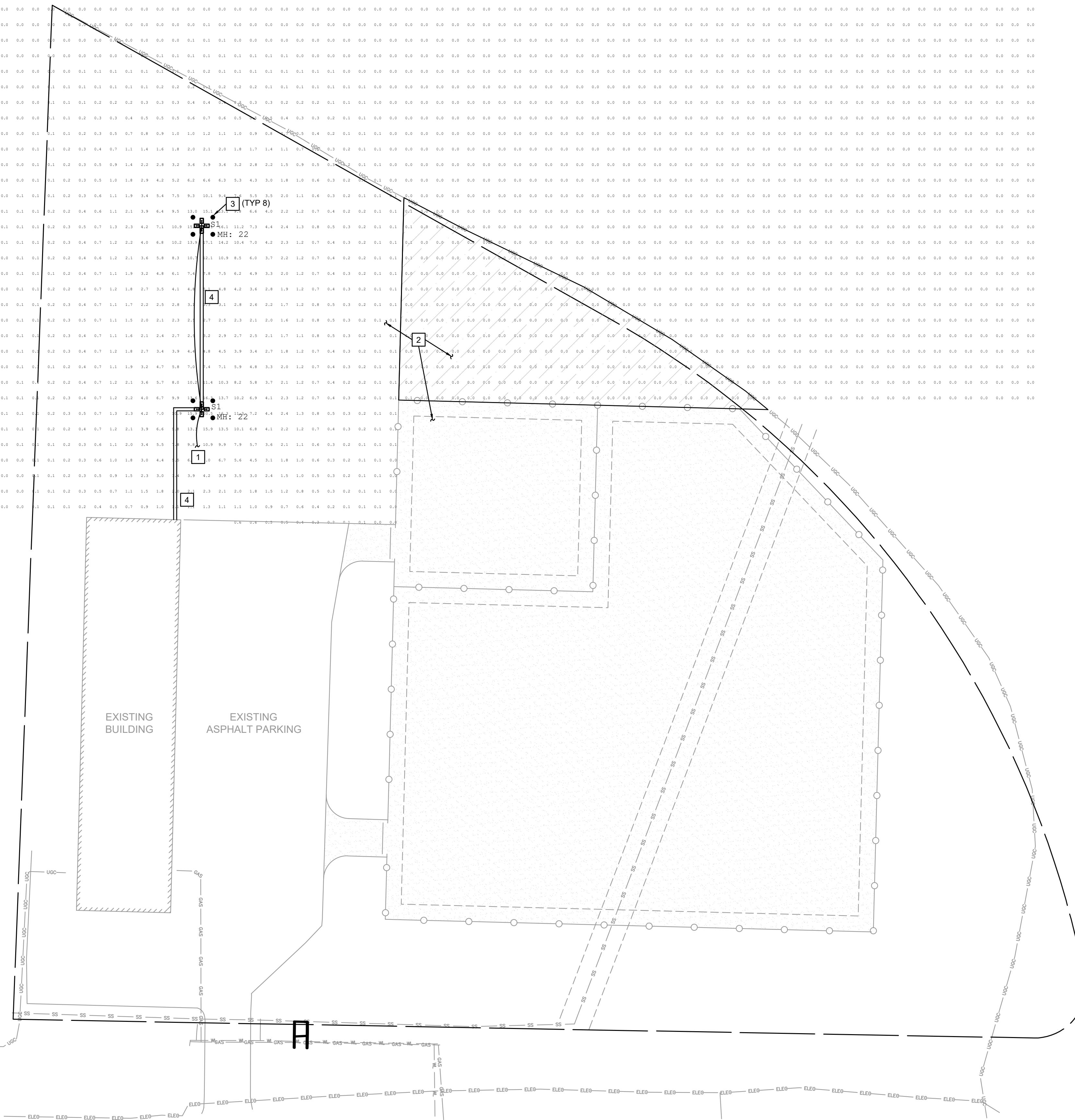
**SECTION VIEW**



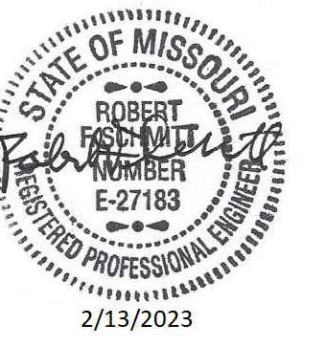
BOLLARD SPACING SHALL BE MAXIMUM OF 5'-6" TO PROTECT CENTER LIGHT POLE.

**PLAN VIEW**

**3 PIPE BOLLARD DETAILS**  
NOT TO SCALE



**1 SITE LIGHTING PLAN**  
1" = 40'-0"  
NORTH



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INSTALL SOLAR ARRAY,  
LED LIGHTING, & ROOF  
REPLACEMENT  
SPRINGFIELD FMS

SPRINGFIELD FMS FACILITY  
4061 WEST KEARNEY ST.  
SPRINGFIELD, MO 65803

PROJECT # T2035-01  
SITE # 6283  
ASSET # 8136283008

REVISION: \_\_\_\_\_  
DATE: \_\_\_\_\_  
REVISION: \_\_\_\_\_  
DATE: \_\_\_\_\_  
REVISION: \_\_\_\_\_  
DATE: \_\_\_\_\_

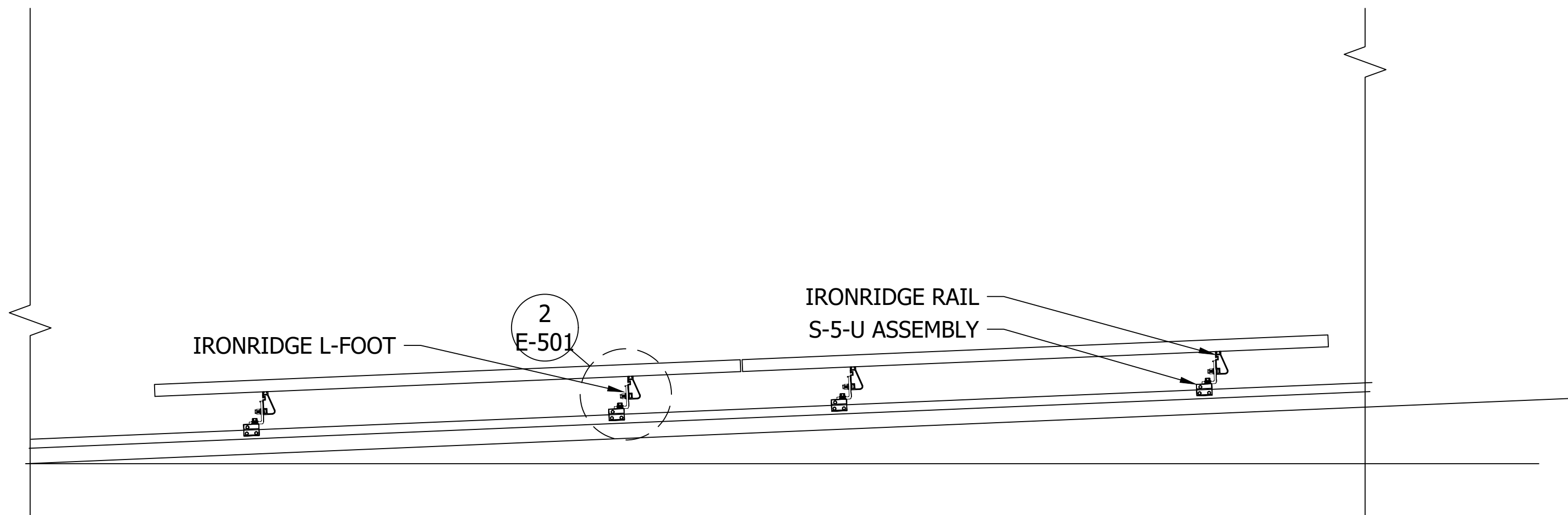
ISSUE DATE: 2/13/2023

CAD DWG FILE: E-501.DWG  
DRAWN BY: RFS  
CHECKED BY: RFS  
DESIGNED BY: RFS

SHEET TITLE:  
**ELECTRICAL  
DETAILS - SOLAR**

SHEET NUMBER:

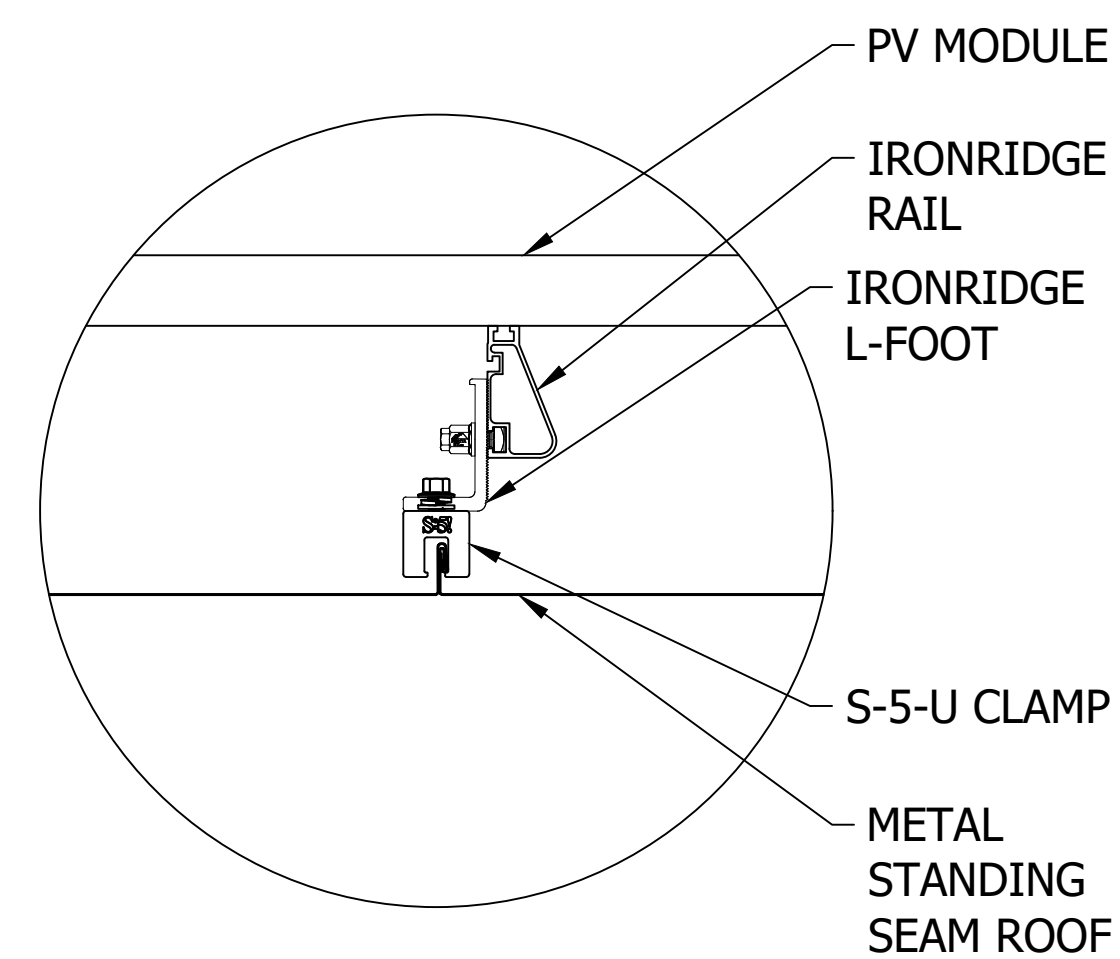
**E-501**



**NOTES**

- SOLAR MODULES SUPPORTS SHALL BE IRONRIDGE RAIL SERIES ROOF MOUNTS OR APPROVED EQUAL BY PROSOLAR, SNAPRACK OR UNIRAC, WITH S5 METAL SEAM ROOF CLIPS.

1 SOLAR PANEL ROOF SUPPORT DETAIL  
E-501 NOT TO SCALE



**NOTES**

- CONTRACTOR SHALL COORDINATE WITH SOLAR MODULE PROVIDER, RAIL SYSTEM PROVIDER, AND ROOF INSTALLER.

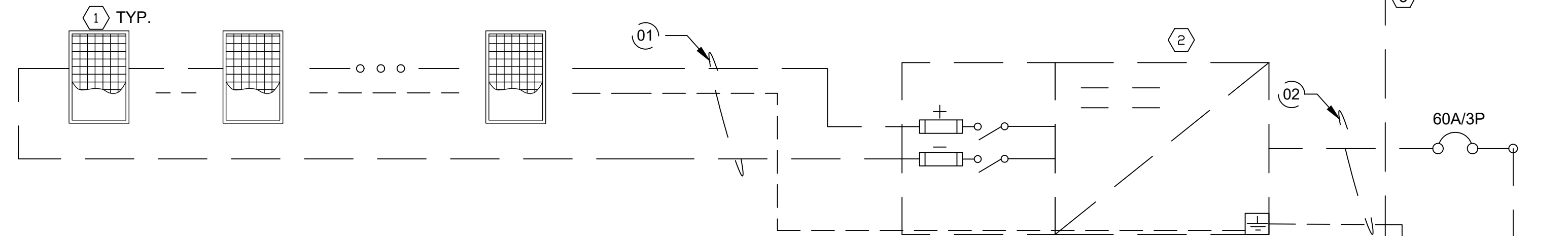
2 ROOF MOUNTING DETAILS  
E-501 NOT TO SCALE

**FMS BUILDING - 30 KW NOMINAL SOLAR ARRAY  
DC TO AC RATIO 1.067**

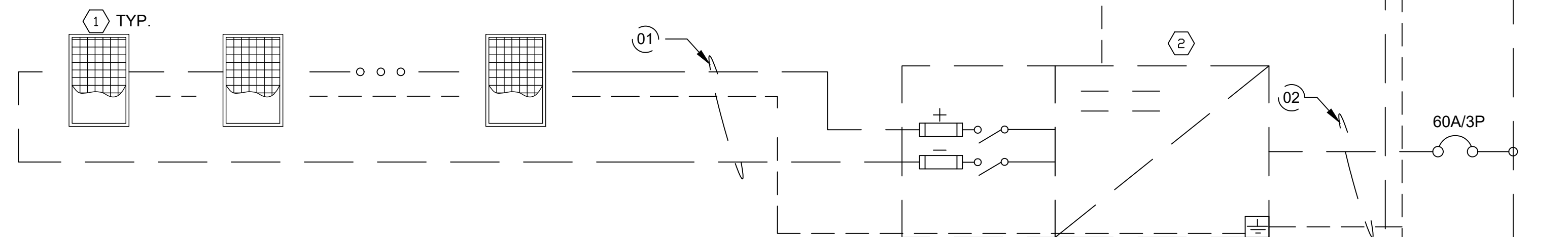
**SHEET NOTES**

- SOLAR MODULES INCLUDE OUTDOOR RATED QUICK CONNECTS WITH MULTI CONTACT CONNECTORS FOR MODULE INTERCONNECTION. DO NOT REMOVE THE QUICK CONNECTS, OTHERWISE THE MODULE WARRANTY AND THE UL LISTING MAY BE INVALIDATED.
- PV MODULES STRUNG IN SERIES. MODULE AND RACKING GROUNDING ACCOMPLISHED VIA CONTINUOUS CU CONDUCTOR.
- MODIFY EXISTING ELECTRICAL PANEL AS REQUIRED FOR THE CONNECTION OF INVERTER OUTPUT POWER TO THE PANEL.
- SEE SPECIFICATION 263100. INVERTERS SHALL BE PROVIDED WITH WIRELESS COMMUNICATION CAPABILITY TO WEB BASED MONITORING AND CONTROL SYSTEM USING CELLULAR HOTSPOT.

INVERTER #1  
MPPT1: 4 STRINGS OF 10 MODULES IN SERIES

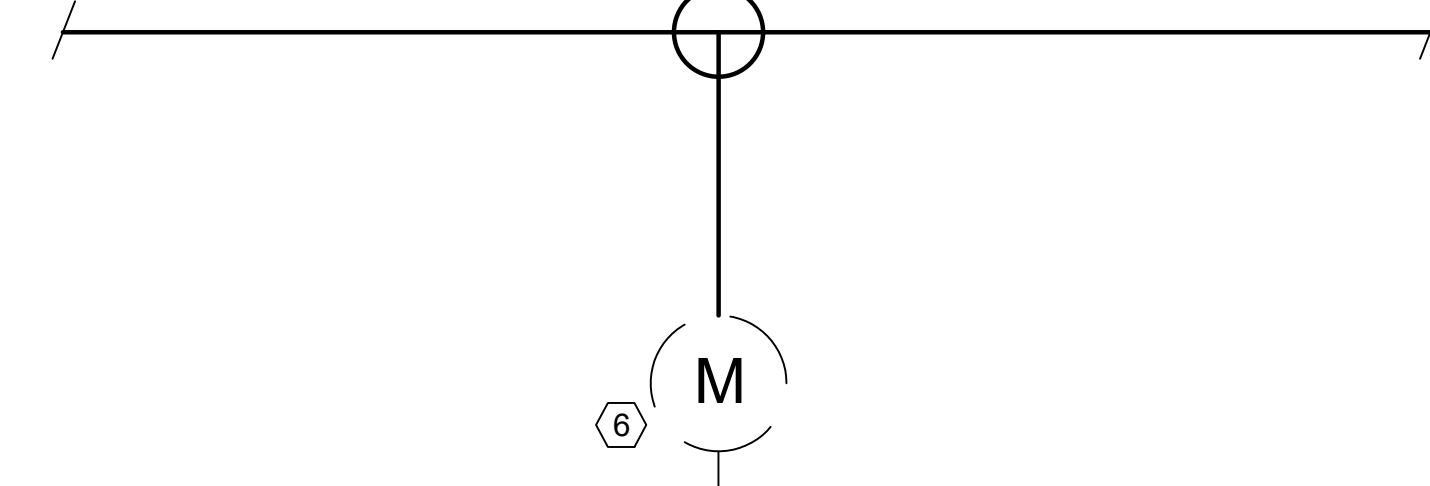


INVERTER #2  
MPPT1: 4 STRINGS OF 10 MODULES IN SERIES

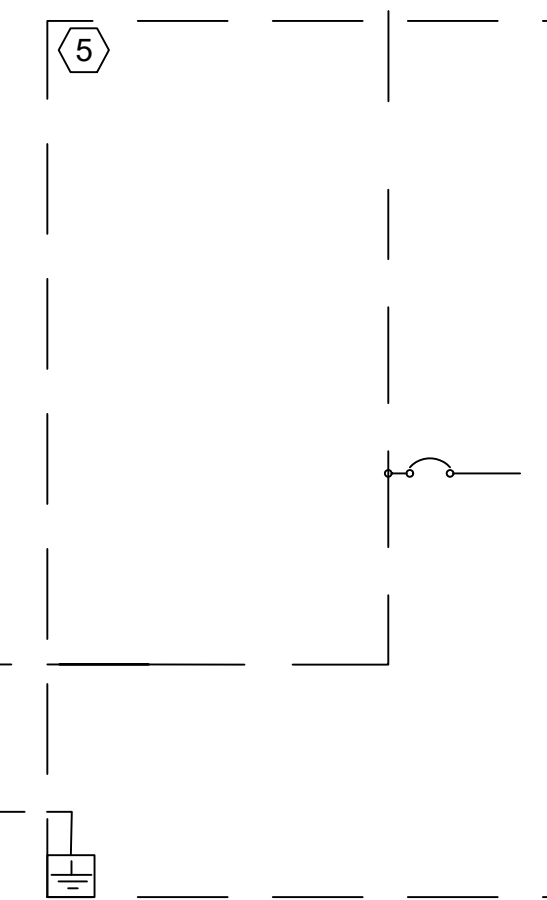


TO CONTROLS MONITORING SYSTEM  
SEE NOTE 4.

EXISTING ELECTRICAL UTILITY SERVICE



EXISTING MAIN SERVICE PANEL  
208V 3Ø, 4W  
MAIN BUSS: 400A



TO (E) LOADS

(E) GROUNDING  
ELECTRODE

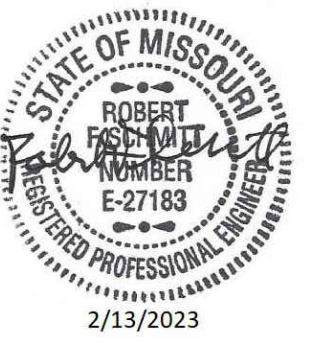
PV EQUIPMENT LIST - BASIS OF DESIGN		
ID	QTY	DESCRIPTION
1	80	JINKO JKM400M-72HL, SOLAR MODULE
2	2	15 kW STRING INVERTER. 1 MPPT WITH 6 INPUT PAIRS PER MPPT. 208V, 3 PHASE OUTPUT, 60 HZ. FRONIUS SYMO MODEL 15.0-3 208
3	1	AC COMBINING PANEL, 150A, 3P, 4 W, WITH (2) 60 A CIRCUIT BREAKERS, NEMA 3R
4	1	PV AC DISCONNECT, 200A, 3 PHASE, NEMA 3R SQUARE D324NRB
5	1	EXISTING MAIN DISTRIBUTION PANEL. 208V, 3PH, 4 WIRE, 400A
6	1	NEW UTILITY NET METER

WIRE AND CONDUIT SCHEDULE					
ID	CONDUCTOR	EGC	CONDUIT	CONDUCTORS IN CONDUIT	TEMPERATURE RATING
01	10 AWG PV WIRE	10 AWG	--	--	75C
02	3 AWG THWN-2	10 AWG	1 1/4"	4	75C
03	2 AWG THWN-2	10 AWG	1 1/4"	4	75C
04	2 AWG THWN-2	8 AWG	1 1/4"	4	75C

- ALL EXPOSED SOURCE CIRCUIT CONDUCTORS SHALL BE 600V RATED PV-WIRE SUITABLE FOR USE WITH TRANSFORMLESS INVERTERS.
- ALL CONDUIT TO BE PER SPECIFICATIONS UNLESS OTHERWISE REQUIRED BY LOCAL AHJ.
- ALL CONDUIT SIZES ARE BASED ON MINIMUM PER NEC CODE REQUIREMENTS.
- WIRE AMPACITY IS BASED ON NUMBER OF WIRES PER CONDUIT. IF CONDUITS ARE INSTALLED DIFFERENTLY THAN SHOWN, WIRE SIZES MAY BE AFFECTED.

SITE CONDITIONS:	
ASHRAE MAX AVG. TEMP:	94.8°F
ASHRAE EXTREME MIN TEMP	6.6°F
PV MODULE OUTPUT	
VOC:	49.8 Vdc
TEMP. COEFFICIENT OF Voc	-0.30 %/°C
ISC	10.36 Adc
VMP	41.7 Vdc
IMP	9.6 Adc
INVERTER DETAILS	
RATED POWER OUTPUT (kW)	15.0
OUTPUT VOLTAGE (V)	208
OUTPUT CURRENT (A)	50
SOURCE CIRCUIT DETAILS	
MODULES PER STRING	10
TEMPERATURE ADJUSTED VOC	558
SHORT CIRCUIT CURRENT	10.36

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DATE: \_\_\_\_\_

ISSUE DATE: 2/13/2023

CAD DWG FILE: E-601.DWG  
DRAWN BY: RFS  
CHECKED BY: CT  
DESIGNED BY: RFS

SHEET TITLE:  
**ELECTRICAL  
ONE LINE DIAGRAM  
SOLAR ARRAY**

SHEET NUMBER:

**E-601**