PV SYSTEM

This 16.5 kWstc, roof-mounted photovoltaic (PV) system is to be installed at the single-family dwelling in Fresno, CA. The energy produced by the PV system shall be interconnected with the utility grid through the existing on-site electrical equipment via load side connection in the main service panel. This project does not include storage batteries.

SCOPE OF WORK

(55) PV MODULES (TOTAL: 985 SQ. FT.)
(2) 6.0 kW INVERTER
(55) SOLAREDGE POWER OPTIMIZERS
(98) ATTACHMENT POINTS @ 72" O.C. MAX.
(1) AC COMBINER PANEL, 240 VAC, NEMA 3R
(1) AC DISCONNECT, 240 VAC, NEMA 3R

SITE SPECIFICATIONS

RISK CATEGORY: II
EXPOSURE CATEGORY: C
ASCE 7-10 WIND SPEED (MPH): 110
ASCE 7-10 GROUND SNOW LOAD (PSF): 0

GOVERNING CODES

2016 CA ELECTRICAL CODE: § 110, 240, 250, 690, 705
2016 CA BUILDING CODE: § 1507.17, 1510.7, 3111
2016 CA RESIDENTIAL CODE: § R324, R908
2016 CA FIRE CODE: § 605.11
COUNTY OF FRESNO TITLE 15 ORDNANCE CODE
UNDERWRITERS LABORATORIES (UL) STANDARDS
OSHA 29 CFR 1910.269

CONSTRUCTION NOTES

1.) CONTRACTOR SHALL FIELD VERIFY ALL DIMENSIONS PRIOR TO INITIATING CONSTRUCTION.
2.) CONTRACTOR SHALL REVIEW ALL MANUFACTURER INSTALLATION DOCUMENTS PRIOR TO INITIATING CONSTRUCTION.
3.) ALL EQUIPMENT SHALL BE LISTED BY A NATIONALLY RECOGNIZED TESTING LABORATORY (NRTL) FOR ITS SPECIFIC APPLICATION.
4.) ALL EQUIPMENT SHALL BE RATED FOR THE ENVIRONMENT IN WHICH IT IS INSTALLED.
5.) ALL EQUIPMENT SHALL BE INSTALLED IN ACCORDANCE WITH THE MANUFACTURER'S INSTALLATION INSTRUCTIONS.
6.) ACCESS TO ELECTRICAL COMPONENTS OVER 150 VOLTS TO GROUND SHALL BE RESTRICTED TO QUALIFIED PERSONNEL.
7.) ALL EQUIPMENTS SHALL BE COPPER AND RATED FOR 600 VOLTS AND 90°C WET ENVIRONMENT, UNLESS OTHERWISE NOTED.
8.) WHERE SIZES OF JUNCTION BOXES, RACEWAYS, AND CONDUITS ARE NOT SPECIFIED, CONTRACTOR SHALL SIZE THEM ACCORDING TO APPLICABLE CODES.
9.) GROUNDING ELECTRODE CONDUCTOR (G.E.C.) SHALL BE CONTINUOUS AND/OR IRREVERSIBLY SPLICED/WELDED.
10.) PV MODULE FRAMES SHALL BE BONDED TO RACKING RAIL OR BARE COPPER G.E.C. PER THE MODULE MANUFACTURER'S LISTED INSTRUCTION SHEET.
11.) PV MODULE RACKING RAIL SHALL BE BONDED TO THE BARE COPPER G.E.C. VIA AN APPROPRIATELY LISTED GROUNDING LUG.
12.) ALL JUNCTION BOXES, COMBINER BOXES, AND DISCONNECTORS SHALL BE INSTALLED IN AN ACCESSIBLE LOCATION.
13.) ROOF ACCESS POINTS SHALL BE LOCATED AT A STRUCTURALLY SOUND POINT ON THE BUILDING AND NOT REQUIRE THE PLACEMENT OF LADDERS OVER EXTERIOR WALL OPENINGS SUCH AS WINDOWS OR DOORS.
14.) WORKING SPACE AROUND ELECTRICAL EQUIPMENT SHALL COMPLY WITH NEC 110.26.

PARTS LIST

<table>
<thead>
<tr>
<th>QUANTITY</th>
<th>DESCRIPTION</th>
</tr>
</thead>
<tbody>
<tr>
<td>55</td>
<td>Mission Solar 300 W PV Module</td>
</tr>
<tr>
<td>55</td>
<td>SolarEdge P320 Power Optimizer</td>
</tr>
<tr>
<td>62</td>
<td>Iron Ridge Stopper Sleeve</td>
</tr>
<tr>
<td>98</td>
<td>Quickmount PV Qbase</td>
</tr>
<tr>
<td>98</td>
<td>Quickmount PV Aluminum Standoff</td>
</tr>
<tr>
<td>144</td>
<td>Iron Ridge Universal Fastening Object</td>
</tr>
<tr>
<td>196</td>
<td>Lag Screws</td>
</tr>
<tr>
<td>392</td>
<td>Feet of IronRidge XR-100 Rail</td>
</tr>
</tbody>
</table>
NOTE: ALL ROOF PLANES HAVE 20° PITCH
NOTE: EXISTING CONDUIT, JUNCTION BOXES, AND INVERTER ARE SHOWN IN GREY
NOTE: NEW CONDUCTORS SHALL BE ROUTED THROUGH EXISTING CONDUITS WHERE SHOWN. NO CONDUIT SHALL EXCEED 40% FILL, SEE PAGE E2.0 FOR DETAILS
NOTE: UPDATED AMPACITY CALCULATIONS FOR EXISTING CONDUITS AVAILABLE ON PAGE E2.0

STRING LEGEND:
1.2 (14)
STRING LENGTH
STRING ID #
INVERTER ID #

340°
N
PV AZIMUTH
70°

16.50 kWstc, 12.00 kW AC
FRESNO, COUNTY OF
ANSI B - 17" x 11"
A1.0

NOTE: UPDATED AMPACITY CALCULATIONS FOR EXISTING CONDUITS AVAILABLE ON PAGE E2.0

ROOF #3
STRING #2.2 (13)
36" ACCESS PATHWAYS
18" RIDGE CLEARANCE

PROPOSED PV ARRAY
PROPERTY LINE
OPTIMIZERS UNDER PV MODULES

EXISTING PV ARRAY (TYP.)
STRING #1.2 (12)
3/4" EMT (TYP.)
1" EMT (TYP.)

ELECTRICAL CLOSET

SCALE: 1" = 16'
**Structural Calculations**

<table>
<thead>
<tr>
<th>QTY.</th>
<th>Weight EA</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>PV Module</td>
<td>35 x 40.10 LB = 2206 LB5</td>
<td></td>
</tr>
<tr>
<td>Racking Rail</td>
<td>392 x 1.00 LBMT = 392 LB5</td>
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</tr>
<tr>
<td>Attachment</td>
<td>110 x 4.00 LB = 440 LB5</td>
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</tr>
<tr>
<td>MicroOpt.</td>
<td>55 x 2.50 LB5 = 138 LB5</td>
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<tr>
<td><strong>Total Weight:</strong></td>
<td><strong>3176 LB5</strong></td>
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</tr>
<tr>
<td>Array Area:</td>
<td>984 SQ. FT.</td>
<td></td>
</tr>
<tr>
<td>Dead Load:</td>
<td>3.2 PSF</td>
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<tr>
<td>Point Load:</td>
<td>28.9 LBS</td>
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</tbody>
</table>

**Notes:**
- Roof Plane #1 has rafters at 16" O.C. (Typ.)
- All other roof planes have rafters at 24" O.C. (Typ.)

**Refer to mounting manufacturer's instructions for type, size, and minimum embedment of roof attachments, if applicable.**
### Array Configuration
- **System**: 16.5 kWstc, 12 kW AC
- **New Equip. / Exist. Equip.**

### Power Optimizer Specifications
<table>
<thead>
<tr>
<th>Model Number</th>
<th>SolarEdge P320</th>
</tr>
</thead>
<tbody>
<tr>
<td>Max Input Power (W)</td>
<td>320</td>
</tr>
<tr>
<td>Max Input Voc (VDC)</td>
<td>48</td>
</tr>
<tr>
<td>Max Input Isc (A)</td>
<td>11.0</td>
</tr>
<tr>
<td>Output Current (A)</td>
<td>15.0</td>
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<tr>
<td>Output Voltage (VDC)</td>
<td>60</td>
</tr>
<tr>
<td>Min. String Length</td>
<td>8 Modules</td>
</tr>
<tr>
<td>Max. String Length</td>
<td>20 Modules</td>
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<tr>
<td>Max. String Power (W)</td>
<td>6000</td>
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</tbody>
</table>

### Inverter #1 - #2 Specifications
- **Model Number**: SolarEdge SE6000H-US [S1] |
- **Power Rating (kW AC)**: 6.00 |
- **Nominal AC Voltage (V)**: 240 |
- **Max Output Current (A)**: 200 |
- **CEC Weighted Efficiency**: 99.0%
- **Inverter Qty**: 2

### PV Module Specifications
- **Model Number**: Mission Solar MSE300SQST |
- **Dimensions (in)**: 65.5 x 39.3 x 1.6 |
- **Power @ STC (W)**: 300 |
- **Voc (VDC)**: 40.2 |
- **Isc (A)**: 9.61 |
- **Vmp (VDC)**: 35.4 |
- **Imp (A)**: 9.17 |
- **Max. String Power (W)**: 1000 |
- **Operating DC Voltage (V)**: 380 |

### CEC System Size
- **Operating Voltage**: 380 |
- **Max. String Power (W)**: 1000 |
- **Max Current (A)**: 15 |
- **Max Open Circuit Voltage**: 480 |
- **Max Short Circuit Current**: 15 |
- **Operating Current**: 12.6 |
- **String Qty**: 1 |
- **String Length**: 12 |
- **Max Open Circuit Voltage**: 480 |
- **Max Short Circuit Current**: 15 |
- **Operating Current**: 9.5 |
- **Rating (W)**: 35 A |

### Wire & Conduit Schedule
- **GND CONDUCTOR**: L1, L2, N, G |
- **PV STRING JUNCTION BOX**: (14) OPTIMIZERS CONNECTED IN SERIES |
- **ARRAY CONDUCTOR**: DC1, DC2, AC1, AC2 |
- **PV BREAKER**: AWG #8, THWN-2, 5 |
- **AC COMBINER PANEL**: (1) MODULE PER OPTIMIZER |

### PV System Maximum Voltage Calculation per NEC 690.5(A)
- **Local Record Low Temp.**: 4.800 kWstc TOTAL |

### Design & Drafting
- **BY**: Taylor Bohlen