

ENERGY SERVICES AGREEMENT – SOLAR

SONOMA COUNTY FLEET BUILDING

This Energy Services Agreement (“Agreement”) is made and entered into as of this ____ day of _____, 2019 (the “Effective Date”), between FFP BTM SOLAR, LLC, a Delaware limited liability company (“Provider”), and SONOMA COUNTY (“Purchaser”); and, together with Provider, each, a “Party” and together, the “Parties”).

RECITALS

- A. Purchaser desires that Provider install and operate a solar photovoltaic system at the Premises (as hereafter defined) for the purpose of providing Energy Services (as hereafter defined), and Provider is willing to have the Installation Work performed by using one or more qualified contractors holding the appropriate licenses required in the jurisdiction where the System will be installed;
- B. Provider and Purchaser acknowledged those certain General Terms and Conditions of Energy Services Agreement between [FFP Entity that signed General Terms and Conditions] and Purchaser dated as of _____, 2019 (“General Terms and Conditions”), which are incorporated by reference as set forth herein; and
- C. The terms and conditions of this Energy Services Agreement, excluding the General Terms and Conditions incorporated herein, constitute the “Special Conditions” referred to in the General Terms and Conditions.

In consideration of the mutual promises set forth below, and other good and valuable consideration, the receipt and sufficiency of which are hereby acknowledged, the Parties hereby agree as follows:

- 1. Incorporation of General Terms and Conditions. The General Terms and Conditions are incorporated herein as if set forth in their entirety.
- 2. Initial Term. The initial term of this Agreement shall commence on the Effective Date and shall continue for Twenty (20) years from the Commercial Operation Date (as defined in the General Terms and Conditions), unless and until extended or terminated earlier pursuant to the provisions of this Agreement (the “Initial Term”). After the Initial Term, this Agreement may be renewed for an additional five (5) year term (a “Renewal Term”). At least one hundred and eighty (180) days, but no more than three hundred and sixty-five (365) days, prior to the expiration of the Initial Term, Provider shall give written notice to Purchaser of the availability of the Renewal Term. Purchaser shall have ninety (90) days to agree to continuation of this Agreement for the Renewal Term. Absent agreement to the Renewal Term this Agreement shall expire on the Expiration Date. The Initial Term and the subsequent Renewal Term, if any, are referred to collectively as the “Term”.
- 3. Schedules. The following Schedules hereto are hereby incorporated into this Agreement:

Schedule 1	Description of the Premises, System and Subsidy
Schedule 2	Energy Services Payment
Schedule 3	Early Termination Fee
Schedule 4	Estimated Annual Production
Schedule 5	Notice Information
Schedule 6	Site-Specific Information and Requirements
Schedule 7	Specific Items for Scope of Work
Schedule 8	Technical Specifications

Schedule 9	Site Diagram
Schedule 10	Solar Radiance

4. Privacy. Purchaser acknowledges that the System may collect certain information about Purchaser's electricity usage and the System performance. Such information may be stored and processed in the United States or any other country in which Provider or its third-party service providers, or its or their respective affiliates, subsidiaries, or service providers, maintain facilities. Purchaser consents to any such transfer of information outside of Purchaser's country.
5. Purchase Requirement: Energy Services Payment. "Energy Services" means the supply of electrical energy output from the System and any associated reductions in Purchaser's peak demand from its Local Electric Utility. After the Commercial Operation Date (and subject to the right to defer in the event of no Final Acceptance), Purchaser agrees to purchase one hundred percent (100%) of the Energy Services generated by the System during each relevant month of the Term, up to 110% of the system designed output per Schedule 4. All output above 110% of projection shall accrue to Purchaser free of charge for Purchaser's use. While the Energy Services are calculated and billed on a per kWh basis as set forth in Schedule 2 of these Special Conditions, they represent a package of services and benefits.
6. Estimated Annual Production. The annual estimate of electricity generated by the system for each year of the initial term is set as forth in Schedule 4 of the Special Conditions ("Estimated Annual Production").
7. Minimum Guaranteed Output. If the System fails to generate at least ninety-five percent (95%) of the Estimated Annual Production for a full 12-month period commencing on the Commercial Operation Date (and each anniversary thereof) (such amount, the "Minimum Guaranteed Output"), other than as a result of the acts or omissions of Purchaser or the Local Electric Utility (including a Disruption Period), or an Event of Force Majeure, Provider shall credit Purchaser an amount equal to Purchaser's Lost Savings on the next invoice or invoices during the following Term Year. The formula for calculating Lost Savings for the applicable Term Year is as follows:

$$\text{Lost Savings} = (\text{MGO} * \text{WPR} - \text{AE}) \times \text{RV}$$

MGO = Minimum Guaranteed Output, as measured in total kWh, for System for the applicable Term Year.

WPR = Weather Performance Ratio, measured as the ratio of the actual insolation over typical (pro-forma) insolation as indicated in Schedule 10. Such Weather Performance Ratio shall only apply if the ratio is less than 1.00.

AE = Actual Electricity, as measured in total kWh, delivered by the System for the Term Year.

$$\text{RV} = (\text{ATP} - \text{kWh Rate})$$

ATP = Average tariff price, measured in \$/kWh, for the applicable Term Year paid by Purchaser with respect to the Premises. This price is determined by dividing the total cost for delivered electricity, including all charges associated with such electricity howsoever named, including, without limitation, charges for distribution, transmission, demand, and systems benefits, paid to the Local Electric Utility during the applicable Term Year by the total amount of delivered electricity by the Local Electric Utility during such Term Year.

kWh Rate = the kWh Rate in effect for the applicable Term year, measured in \$/kWh.

Lost Savings Cap = System size (DC) as installed in megawatts, multiplied by \$10,000. For the avoidance of doubt, the Lost Savings Cap is applicable to each Term Year.


If the RV is zero or less, then no Lost Savings payment shall be due to Purchaser. Such payment for any Lost Savings shall be made by Provider no later than sixty (60) days after the end of the Term Year during which such Lost Savings occurred (or following the date of termination, in the event of an early termination of this Agreement).

- 8. Sunlight Easements. Purchaser will take all reasonable actions as necessary to prevent other buildings, structures or flora from overshadowing or otherwise blocking access of sunlight to the System.
- 9. Use of System. Purchaser will not use electrical energy generated by the System for the purposes of heating a swimming pool within the meaning of Section 48 of the Internal Revenue Code.

IN WITNESS WHEREOF and in confirmation of their consent to the terms and conditions contained in this Agreement and intending to be legally bound hereby, Provider and Purchaser have executed this Agreement as of the Effective Date.

PROVIDER:
FFP BTM Solar, LLC

PURCHASER:
Sonoma County

By: 
Name: Go Mizoguchi
Title: President

By: _____
Name: _____
Title: _____
Date: _____

Approved as to form for County:

Deputy County Counsel

SCHEDULES

I. Schedule 1 – Description of the Premises, System and Subsidy

<u>A. Premises</u>	Sonoma County Fleet Building 709 Russell Ave, Santa Rosa, CA 95403
Site diagram attached:	X Yes <input type="checkbox"/> No
<u>B. Description of Solar System</u>	Behind the Meter
Solar System Size:	77.76 kW (DC) (this is an estimate (and not a guarantee) of the System size; Provider may update the System Size prior to the Commercial Operation Date, however, Provider shall promptly inform Purchaser and obtain Purchaser's consent upon discovering or anticipating a downward deviation in the System size of more than 15% of the stated estimate.)
<u>C. Anticipated Subsidy or Rebate</u>	\$0

II. Schedule 2 – Energy Services Payment

Purchaser shall pay to Provider a monthly payment (the "Energy Services Payment") for the Energy Services provided by the System during each calendar month of the Term equal to the product of (x) Actual Monthly Production for the System for the relevant month multiplied by (y) the kWh Rate.

The "Actual Monthly Production" means the amount of energy recorded by Provider's metering equipment during each calendar month of the Term.

The kWh Rate with respect to the System under this Agreement shall be in accordance with the following schedule:

Term Year	kWh Rate (\$/kWh)	Term Year	\$/kWh Rate (\$/kWh)
1	\$0.1150	11	\$0.1150
2	\$0.1150	12	\$0.1150
3	\$0.1150	13	\$0.1150
4	\$0.1150	14	\$0.1150
5	\$0.1150	15	\$0.1150
6	\$0.1150	16	\$0.1150
7	\$0.1150	17	\$0.1150
8	\$0.1150	18	\$0.1150
9	\$0.1150	19	\$0.1150
10	\$0.1150	20	\$0.1150

If distribution upgrades are required by the Local Electric Utility, within 30 days of receipt of notice from the Local Electric Utility of the distribution upgrade costs, Purchaser will provide written notice to Provider of Purchaser's election of one of the following options:

- a. For every \$0.01 per watt DC of such distribution upgrade costs, the kWh rate in Table 1 will increase \$0.0007 per kWh, with a maximum kWh rate increase of \$0.02 per kWh. Provider shall then be solely responsible for all associated costs and payments.
- b. Purchaser will pay the entire amount of such distribution upgrade costs, and the kWh rate as stated in Table 1 will remain unchanged. Purchaser shall make payments directly to the Local Electric Utility in accordance with the requirements of the Local Electric Utility.
- c. Purchaser will pay a portion of the amount of such distribution upgrade costs, and the kWh rate as stated in Table 1 will be adjusted per section a. of this clause by the remaining amount of such distribution upgrades.

If costs exceed the maximum increase kWh rate increase, the Provider has the option to terminate this agreement without liability therefor.

Except for in the event of any Purchaser-mandated cessation of work during construction (see Schedule 8, section 3.4(c)), if additional development and construction scope and or associated costs beyond those stated herein are required as part of the development and implementation of the System, within 90 days of receipt of notice from Provider reasonably substantiating the associated costs, Purchaser will provide written notice to Provider of Purchaser's election of one of the following options:

- d. For every \$0.01 per watt DC of such associated costs, the kWh rate in Schedule 2 Table 1 will increase \$0.0007 per kWh, with a maximum kWh rate increase of \$0.02 per kWh. Provider shall then be solely responsible for all associated costs and payments.
- e. Purchaser will pay the entire amount of such associated costs, and the kWh rate as stated in Schedule 2 Table 1 will remain unchanged.
- f. If costs exceed the maximum increase kWh rate increase, the Provider has the option to terminate this agreement without liability therefor.

III. Schedule 3 – Early Termination Fee

The Early Termination Fee with respect to the System under this Agreement shall be calculated in accordance with the following:

Early Termination Occurs in Year:	Column 1 Early Termination Fee where Purchaser does <u>not</u> take Title to the System (\$/Wdc does not include costs of removal)	Purchase Date Occurs on the 91st day following: (Each “Anniversary” below shall refer to the anniversary of the Commercial Operation Date)	Column 2 Early Termination Fee where Purchaser takes Title to the System (\$/Wdc, does <u>not</u> include costs of removal)
1*	\$3.05		--
2	\$2.46		--
3	\$2.29		--
4	\$2.12		--
5	\$1.95		--
6	\$1.78	5 th Anniversary	\$1.78
7	\$1.75	6 th Anniversary	\$1.75
8	\$1.73	7 th Anniversary	\$1.73
9	\$1.70	8 th Anniversary	\$1.70
10	\$1.68	9 th Anniversary	\$1.68
11	\$1.65	10 th Anniversary	\$1.65
12	\$1.63	11 th Anniversary	\$1.63
13	\$1.60	12 th Anniversary	\$1.60
14	\$1.57	13 th Anniversary	\$1.57
15	\$1.54	14 th Anniversary	\$1.54
16	\$1.51	15 th Anniversary	\$1.51
17	\$1.48	16 th Anniversary	\$1.48
18	\$1.45	17 th Anniversary	\$1.45
19	\$1.41	18 th Anniversary	\$1.41
20	\$1.38	19 th Anniversary	\$1.38

At Expiration (the end of the Initial Term), the amount in Column 1 shall be deemed to be zero (0).

*Includes Early Termination prior to the Commercial Operation Date.

If an early termination fee is due by Purchaser, and Purchaser is not taking title to the System, Purchaser shall reimburse Provider for the removal of the System at the actual cost, plus a 15% markup, with a maximum cost of \$0.75/W dc. The removal costs shall be in addition to and not in lieu of the Early Termination Fee as listed in Column 1 in the table above.

IV. **Schedule 4 – Estimated Annual Production**

Estimated Annual Production commencing on the Commercial Operation Date with respect to System under this Agreement shall be as follows:

Term Year	Estimated Production (kWh)	Term Year	Estimated Production (kWh)
1	119,673	11	113,822
2	119,075	12	113,253
3	118,479	13	112,687
4	117,887	14	112,123
5	117,297	15	111,563
6	116,711	16	111,005
7	116,127	17	110,450
8	115,547	18	109,898
9	114,969	19	109,348
10	114,394	20	108,801

The values set forth in the table above are estimates (and not guarantees), of approximately how many kWhs are expected to be generated annually by the System assuming the System size indicated in Schedule 1 and based on initial System designs. Provider may deliver to Purchaser an updated table on or about the Commercial Operation Date based on the actual System size and design, however, Provider shall promptly inform Purchaser and obtain Purchaser's consent upon discovering or anticipating a downward deviation of more than fifteen percent (15%) of the stated estimate.

V. **Schedule 5 – Notice Information**

Purchaser:

Sonoma County
General Services Purchasing
2300 County Center Drive
STE A208
Santa Rosa, CA 95403

With a copy to

Sonoma County Legal

Provider:

FFP BTM Solar, LLC
c/o Forefront Power, LLC
Attn: Director, Energy Services
100 Montgomery St., Suite 725
San Francisco, CA 94104

With a copy to

FFP BTM Solar, LLC
c/o Forefront Power, LLC
Attn: Legal Department
100 Montgomery St., Suite 725
San Francisco, CA 94104
Email: FPLegal@forefrontpower.com

Financing Party:

[To be provided by Provider when known]

VI. Schedule 6 – Site Specific Information and Requirements

In accordance with Section 7.2(f) of the General Terms and Conditions, the following information references any known restrictions on the use of the Premises for the construction, ownership, use and operation of the System, including any land use restrictions, known underground structures or equipment, or limitations arising under permits or applicable law, as well as any additional Environmental Documents, reports or studies in the possession or control of the Purchaser, which shall each have been delivered to Provider as of the Effective Date:

Type of Information	Purchaser is not aware of any relevant information	Relevant Document Provided by Purchaser
Phase I environmental site assessment	X	
Reports on site sampling (soil or groundwater)	X	
Cleanup plan, corrective action plan or permits applicable to Premises	X	
Open spill reports or unresolved release reports	X	
Known underground storage tanks, foundations, utilities	X	
Utility easements or public rights of way	X	
Completed closure or “cap” on buried waste or other materials	X	
Systems in place for extracting and collecting methane, groundwater or leachate	X	
Subject to the control of a trustee, group of entities or entities other than landlord and/or Purchaser	X	

VII. Schedule 7 – Specific Items for Scope of Work

1. Provider Responsibilities:

- 1.1. Provider shall complete all permitting activities for System construction and operation by obtaining approvals from authorities having jurisdiction over the System, including, but not limited to: Local Electric Utility and incentive authorities, the California Energy Commission, the Federal Aviation Administration, fire safety, California Occupational Safety and Health Administration (“OSHA”), utility interconnection, right-of-way permits, easement agreements and other codes and best practices. All systems shall meet all applicable seismic, wind-load, fire requirements as applicable. Provider shall cause all required permits to be issued on behalf of the project(s).
- 1.2. Prior to construction, Provider shall provide Purchaser copies of all design plans, local electric utility interconnection applications, and fire approvals and permits. Provider shall obtain and submit all documents to close out the System. In addition to stamped and approved plans, Provider shall provide Purchaser as-built design plans within one hundred and eighty (180) days of completion of construction of the System. As-built drawings shall show the final placement of all combiner boxes, connections, and conduit placement, electrical plans, including three line diagrams, and elevation drawings showing the final placement of the electrical equipment. Provider shall also provide copies of all start-up procedure measurements, copies of all testing data and reports, copies of Utility operation Approval, lien releases from all subcontractors.
- 1.3. Provider shall provide civil and structural engineering analysis and documentation, stamped and signed by a civil or structural engineer registered in the State of California, certifying that the mounting structures can support any loads resulting from local applicable seismic and wind-load activity. A Professional Engineer in the appropriate discipline must stamp all relevant drawings.
- 1.4. Provider shall be responsible for completing all required paperwork with the Local Electric Utility including interconnection agreements.
- 1.5. Provider shall coordinate with Purchaser on scheduled shutdowns with at least 5 days’ notice to Purchaser.
- 1.6. Provider shall be responsible for all fees associated with the interconnection application, except that Provider shall not be responsible for transmission and distribution upgrades determined necessary by the Local Electric Utility’s.
- 1.7. Provider intends to interconnect the System to Purchaser-owned 208 V service conductors at a mutually agreeable location. Provider assumes that existing the 208 V conductors and service equipment are sufficiently capable of accepting the additional electrical load of the System. Provider shall not bear responsibility for any required upgrades to the pre-existing electrical system.
- 1.8. Provider agrees to construct the System in no more than a single construction phase.
- 1.9. Provider shall be responsible for all tree trimming and tree removal in order to facilitate the installation of the Systems. Purchaser shall acknowledge and approve removal of trees identified by Provider, in order to install the system and such approval shall not be unreasonably withheld. Provider shall conduct underground survey work to identify potential underground irrigation and utility lines. Provider shall use all reasonable efforts to avoid irrigation re-routing and shall be responsible for re-routing of known irrigation

lines. If damage to the existing irrigation systems that were not detected by Provider or disclosed by Purchaser occurs during Installation Work or re-routing is required as a result of such undetected irrigation lines, Provider shall provide such repair or re-routing and the KWH rate in Schedule 2 shall be adjusted accordingly for repairs totaling over \$3,000.

- 1.10. Provider is responsible for identifying underground obstructions in the working area via a Purchaser approved underground contractor. Provider shall use all reasonable efforts to avoid underground utilities. If damage to underground utilities that were not detected by Provider or disclosed by Purchaser occurs during Installation Work or re-routing is required as a result of such undetected utilities, Provider shall provide such repair or re-routing and the KWH rate in Schedule 2 shall be adjusted accordingly for repairs totaling over \$5,000.
- 1.11. Provider will be completing the installation in an operating facility, and may need to coordinate activities. Planning for access and safe working conditions must be coordinated in advance with Purchaser.
- 1.12. Prevailing Wages.
 - 1.12.1. Prevailing Wage. Pursuant to California Labor Code Section 1770 *et seq.*, for all Work Provider shall pay not less than the prevailing rate of per diem wages as determined by the Director of the California Department of Industrial Relations (DIR). Up to two hundred dollars (\$200) shall be forfeited as penalty for each calendar day, or portion thereof, for each worker paid less than applicable prevailing wage rates. Copies of the general prevailing rates of per diem wages for each craft, classification, or type of worker needed to execute work, as determined by Director of the State of California Department of Industrial Relations and are deemed included in the Proposal Documents. State prevailing wage requirements are published by the Director of the State of California Department of Industrial Relations and can be found online at www.dir.ca.gov. Prevailing wage requirements can also be found at the General Service's Purchasing Department, located at 2300 County Center Dr., Suite A208, Santa Rosa, CA 95403. Said rates shall be posted at all public work job sites. Provider is advised that if it intends to use a craft or classification not on file on the general wage determinations, Provider may be required to pay the wage rate of the craft or classification most closely related to it as shown in the general determinations. Provider shall post (or cause the posting of) all required notices, including those required pursuant to 8 CCR 16451, and shall make them available to any interested party upon request. The difference between such prevailing wage rates and the amount paid each worker for each calendar day or portion thereof for which each worker was paid less than the prevailing wage rate shall be paid to each worker by Provider. Further, Provider shall make all applicable travel and subsistence payments to each worker entitled thereto as required pursuant to the Labor Code.
 - 1.12.2. Subcontracts. Provider shall insert in every subcontract or other arrangement which Provider may make for performance of such work or labor on work provided for in the Agreement, provision that Subcontractor shall pay persons performing labor or rendering service under subcontract or other arrangement not less than the general prevailing rate of per diem wages for work of a similar character in the locality in which the work is performed, and not less than the general prevailing rate of per diem wages for holiday and overtime work fixed in the Labor Code. Pursuant to Labor Code Section 1775(b)(1), Provider shall provide to each Subcontractor a copy of Sections 1771, 1775, 1776, 1777.5, 1813 and 1815 of the Labor Code.
 - 1.12.3. Hours of Work. Pursuant to California Labor Code Section 1810 and following, eight (8) hours of labor shall constitute a legal day's work, and workers may not work

more than eight hours a day or 40 hours in any one calendar week, unless compensated at not less than time and a half as set forth in Labor Code Section 1815 or as otherwise required by law. Twenty-five dollars (\$25) shall be forfeited as penalty for each worker employed in violation of the provisions of Labor Code sections 1810 et seq.

1.12.4. **Payment Bonds.** In accordance with California Labor Code section 3700, Provider is required to secure the payment of compensation of its employees and ensure the same by subcontractors and any other third parties. By signing this Agreement, Provider certifies awareness of the provisions of Section 3700 of the California Labor Code which require every employer to be insured against liability for workers' compensation or to undertake self-insurance in accordance with the provisions of that code, and certifies they will comply with such provisions before commencing work.

1.12.5. **Payroll Records.** All payroll record keeping, availability, certification, and confidentiality requirements set forth in Labor Code section 1776 and 8 CCR sections 16400 et seq. shall be complied with. Accurate records of the work performed, as set forth in Labor Code section 1812, shall be kept, or caused to be kept, including showing the name, address, social security number, work classification, straight time and overtime hours worked each day and week, and the actual per diem wages paid to each journeyman, apprentice, worker, or other employee employed by such Provider and subcontractor(s) in connection with all Work. All work is subject to the requirements of Labor Code section 1771.4 and Title 8, Cal. Code of Regulations Div. 1, Chapter 8, Subchapter 4.5 (starting at 8 CCR §16450), including the requirement to monthly furnish certified payroll records directly to the Labor Commissioner. Work under this Agreement is subject to compliance monitoring and enforcement by the Department of Industrial Relations. Provider has ten (10) days in which to comply subsequent to receipt of a written notice requesting the records described herein. In the event that Provider fails to comply with the ten-day period, he or she shall, as a penalty to County on whose behalf the contract is made or awarded, forfeit \$100.00 for each calendar day, or portion thereof, for each worker, until strict compliance is effectuated.

1.12.6. **Employment of Apprentices.** Prior to commencement of work, Provider shall contact the Division of Apprenticeship Standards and shall be responsible for compliance with Section 1777.5, 1777.6, and 1777.7 of the Labor Code and Title 8, Cal. Code of Regulations, Div. 1 Chapter 2 concerning the employment of registered apprentices in connection with the Work. Responsibility for compliance with these requirements lies solely with Provider.

1.12.7. **Registration.** Providers and subcontractors shall not be qualified to bid on, be listed in a bid proposal, subject to the requirements of Section 4104 of the Public Contract Code, or engage in the performance of any contract for public work, unless currently registered and qualified to perform public work pursuant to Labor Code Section 1725.5.

1.12.8. **Other Requirements.** Provider shall comply with and/or cause compliance with all requirements specified in Labor Code Sections 1776(g), 1777.5, 1810, 1813, and 1860, including all requirements to insert required provisions in subcontracts and other third party contracts.

2. Purchaser Responsibilities:

2.1. Purchaser shall enter into contract with any and all Inspectors required in order to fully inspect the project. Purchaser shall coordinate with Provider in order to facilitate and deliver all forms required in order to schedule and complete permitting processes. Purchaser shall be responsible for all Inspector Fees.

- 2.2. Purchaser shall deliver to Provider all as-built drawings in order to fully develop the solar plan sets and designs. Purchaser will support Provider by providing all available drawings and institutional knowledge that is available.
- 2.3. Purchaser shall provide all available records, drawings, maps, and information on the existence of irrigation lines and underground utilities.

VIII. Schedule 8 - Technical Specifications

With regard to the System, including but not limited to its design, installation, operation, and maintenance, Provider shall be responsible for all the following. Notwithstanding any specification or requirement stated herein, Purchaser is relying on Providers' technical and professional expertise and experience regarding the System and roof-top installations of such equipment, and accordingly Provider shall be solely responsible for the design, installation, operation and maintenance of the System and related components:

PART 1 CONSTRUCTION SUBMITTALS

1.1 PRE-CONSTRUCTION SUBMITTALS

- A Detailed design plans.
- B Professional Engineer (registered in the State of California) verification that the systems and the mounting structures and details will meet all local applicable seismic and wind-load requirements per the Specification.
- C Utility interconnection applications.
- D Copies of permits.
- E Fire jurisdiction approval for fire access.

1.2 POST CONSTRUCTION SUBMITTALS

- A As-built drawings showing the final placement of all combiner boxes, connections, and conduit placement, electrical plans, including three line diagrams, and elevation drawings showing the final placement of the electrical equipment.
- B Copies of all start-up procedure measurements.
- C Copies of all testing data and reports.
- D Copies of Utility operation Approval.
- E Lien releases from all subcontractors.

PART 2 MATERIALS SPECIFICATION

2.1 GENERAL

- A All generating equipment shall be certified by Underwriter Laboratories (UL). The system shall be comprised of UL listed components or in cases where a UL listed component is not available, the component shall be listed by another OSHA recognized National Recognized Testing Laboratory (NRTL).
- B All installations shall meet or exceed Cal-OSHA requirements for equipment access.
- C The installation shall not void the warranty or UL Listing of any existing equipment or electric panels
- D All components are to be new and direct from the manufacturer; no used or refurbished materials are permitted.
- E All materials that are used outdoors shall be sunlight and UV resistant.
- F Materials shall be designed to withstand the temperatures to which they are exposed.
- G Dissimilar materials should be isolated from one another using non-conductive shims, washers, or other methods.
- H Any materials, equipment, or workmanship that is found defective, based on the

acceptance tests or for any other reason, shall be reported to Purchaser. Defective material, equipment, and workmanship shall be replaced.

- I Metals shall be hot dipped galvanized steel, anodized aluminum, and stainless steel.
- J Aluminum shall not be placed in direct contact with concrete materials.
- K Only grade 316 or better stainless steel fasteners shall be used.
- L All electrical equipment shall be rated for the current and voltage ratings necessary for the application.
- M All required over-current protection devices will be included and accessible for maintenance. Each shall have trip ratings no greater than the de-rated amperage of the conductor it protects.

2.2 PREMISES ROOF MOUNTING

- A All systems shall meet the requirements of all applicable laws and regulations, including applicable provisions of the California Building Code.
- B The system shall be designed to minimize or eliminate penetrations of the existing roof.
- C PV module attachment must be four-point equally distributed over the frame
- D The installation must meet all fire department access requirements.
- E All systems shall be designed to meet all local seismic and wind-load requirements. Wind tunnel tested as designed for the specific application of the system for 90 mile per hour winds.
- F Provider shall provide stamped certification from a Professional Engineer in the appropriate discipline that the rack and fastening system is approved for its application.
- G The Provider must obtain written confirmation, in form approved by Purchaser, from the roof system manufacturer (listed below) certifying that the installation, and any penetrations, is per the manufacturer's approved procedures, and that the existing roof warranty is not affected and not voided by the installation.

Roof Manufacturer: SIKA Corporation - Roofing

100 Dan Road

Canton, MA 02021

Tel: 781-828-5400

Fax: 781-828-5365

usa.sarnafil.sika.com

- H The total system weight must be 5.5 pounds per square foot or less.
- I Materials shall be warranted for 25 years.
- J The racking system shall result in all panels achieving a 12 degree inclination and 180 degree azimuth orientation.

2.3 PHOTOVOLTAIC (PV) MODULES

- A PV modules shall be LG 300 mono or equal
- B PV modules shall be factory tested.

- C PV modules shall be on the California Energy Commission (CEC) list of approved products (see: <http://www.gosolarcalifornia.ca.gov/equipment/index.html>).

2.4 INVERTER

- A PV Inverter shall be SMA Sunny Tri-power or equal.
- B Each inverter shall be sized so that it can operate the PV arrays at a minimum of 98% of the array's kW rating.
- C Installation shall meet all applicable UL 1741, IEEE Standard 929-2000 and standard 519, California electric code, and the latest applicable ANSI and FCC standards and addenda dated prior to the award of the purchase order for this procurement.

2.5 ELECTRICAL ENCLOSURES AND BOXES

- A Exterior enclosures and boxes shall be minimum 14 gauge type NEMA 3R with seams continuously welded and ground smooth, and fast access door latches.
- B Interior enclosures and boxes shall be minimum 14 gauge NEMA 3R.
- C Outer doors shall have provisions for locking enclosure with standard padlocks.
- D A copper ground bus shall be provided in each enclosure or cabinet. It shall have provisions for connecting a minimum of ten grounding conductors.
- E Provide thermoplastic data pockets mounted on inside door. The As-Built drawings for the electrical enclosure shall be placed in a watertight plastic wrap and shipped with the enclosure to the jobsite.

2.6 CONDUIT

- A All exposed conduit shall be unpainted, electrical metallic tubing or schedule 40 Rigid galvanized, meeting NEMA/ANSI C80.3 and UL 797 standards.

2.7 WIRE

- A AC Conductors shall be aluminum except where they land on Purchaser owned equipment.
- B Wire shall be Class B stranded.
- C Insulation of all conductors and cables shall be rated for the voltage of the system.
- D Insulation type shall be moisture and heat resistant thermoplastic THWN, rated 90°C in dry locations and 75°C in wet locations, for #8 AWG and smaller. For #6 AWG and larger insulation shall be type XHHW.
- E Wire identification - all wires, field and interior (non-field) to equipment, shall be identified with machine permanent ink printed sleeve markers or clip-on markers covered with clear plastic heat shrinkable tubing. Hand lettered wire labels are not acceptable and shall be replaced at the Provider's expense. All wires that are electrically the same (connected to common termination points) and do not pass through a contact or other switching device shall have the same wire identification. The wire labeling code for each end of the same wire shall be identical. Tubing shall be sized for the wire and shrunk into place with the properly sized heat gun.

2.8 CIRCUIT BREAKERS

- A Circuit Breakers shall be of the indicated type, providing ON, OFF and TRIPPED positions. Circuit breakers shall be quick make, quick break with thermal magnetic action and shall be compatible with existing breaker panel at the power feed facility. The use of tandem or dual circuit breakers in normal single pole space to provide the number of poles

or spaces specified are not acceptable. All multiple-pole circuit breakers shall be designed so that an overload on one pole automatically causes all poles to open. Circuit breakers shall be manufactured by Square D or approved equivalent. Breakers shall be sized and have the minimum interrupting capacity as required.

2.9 CONCRETE

- A Concrete shall conform to Caltrans standard specification for class 2 concrete.
- B Concrete mix must exceed the compressive strength requirements of ASTM C387.
- C Type I Portland cement must be used.
- D Aggregate shall be hard, durable, selected, graded, and free from foreign materials.
- E Water shall be potable and free from foreign materials in amounts harmful to the concrete and embedded steel.
- F Utilize standard designs incorporating mixtures that facilitate the workability, curing, and strength.
- G Forms shall be sized to minimize air pockets and maximize strength.

2.10 ASPHALT AND CONCRETE CUTTING AND REPAIR

- A Perform cutting and demolition by methods that prevent damage to other portions of the Work and provide proper surfaces to receive installation of repair and new work.
- B Perform fitting and adjusting of products to provide finished installation complying with the specified tolerances and finishes.
- C Cuts made through any paved surface must be repaired in a non-discernible fashion. Cuts through concrete must be repaired by replacing the section between the nearest two joints - either construction or expansion. Cuts through asphalt must be repaired so that depressions or humps do not develop in the asphalt surface. If they do, they will have to be corrected, at the Provider's expense.
- D Asphalt and base compaction by "normal traffic" is not permitted. Proper compaction for the depth of the cut is required.
- E When cuts extend through pavement markings, the replaced pavement shall be marked to match the existing

PART 3 INSTALLATION SPECIFICATION

3.1 GENERAL INSTALLATION REQUIREMENTS

- A All safety, electric, building, and labor code requirements under all applicable laws and regulations shall be met.
- B The installations shall be performed and completed in a "workman like manner." The areas shall be kept clean and free of obstructions at all times.
- C The installations shall be completed per each manufacturer's installation manual.
- D All electrical connections and terminations shall be fully tightened, secured, and strain relieved as appropriate.
- E All mounting equipment shall be installed to the manufacturer's specifications.
- F All cables, conduit, exposed conductors, and electrical boxes should be secured and supported according to code requirements.
- G All applicable environmental regulations shall be met.

- H System switching and metering equipment shall have convenient access for resetting or repair during electrical outages, and regular monitoring for data retrieval.
- I The Provider shall employ personnel that are skilled and experienced in the installation and connection of all elements, equipment, devices, instruments, accessories, and assemblies. All installation labor shall be performed by qualified personnel who have had experience on similar projects.
- J Ensure that all equipment and materials fit properly in their installations.
- K Any work to correct improper installations shall be performed by Provider at no additional expense to the Purchaser.
- L The Purchaser's engineer or representative reserves the right to halt any work that is found to be substandard or being installed by unqualified personnel.

3.2 INSTALLATION STANDARDS

- A System Installations shall conform to Manufacturers' Installation Manuals and approved project drawings and specifications.
- B Mounting hardware shall be compatible with the site considerations and environment. Special attention shall be paid to minimizing the risk from exposed fasteners, sharp edges, and potential damage to the units or support canopies. Corrosion resistance and durability of the mechanical hardware shall be emphasized – the use of stainless steel fasteners and aluminum support canopies are required. The use of ferrous metals, wood, or plastic components is not acceptable.

3.3 WASTE DISPOSAL

- A All waste will be disposed of offsite.

3.4 COORDINATION

- A During on-site Construction activities, the Provider shall provide a daily update via email and shall participate in a weekly onsite meeting with Purchaser staff.
- B The Provider shall coordinate the electrical work with the other trades, code authorities and Engineer (Purchaser's engineer or representative); with due regard to their work, towards promotion of a rapid completion of the Project. If any cooperative work must be altered due to lack of proper supervision of such, or failure to make proper provisions, then the Provider shall bear expense of such changes as necessary to be made in work of others.
- C Provider shall cease work at any particular point, temporarily, and transfer operations to such portions of work as directed, upon 2 days' notice from Purchaser when in the judgment of Purchaser it is reasonably necessary to do so. If such cessation of work lasts more than five (5) working days, and if such cessation is of no fault of Provider, Provider shall work with Purchaser in good faith to determine a mutually-acceptable solution to compensate Provider for reasonable delay costs, including potentially an increase in the kWh rate in Schedule 2.
- D The Provider shall schedule all the required work with the Engineer, including each shutdown period. Each shutdown shall be implemented to minimize disruption of the existing operations. The work to be provided under this Agreement shall not disrupt any of the existing operations without prior approval.
 - 1 The Provider shall not have any unscheduled shutdown.
 - 2 Carry out scheduled shutdowns only after the time, date, and sequence of work proposed to be accomplished during shutdown has been authorized by the Engineer. Submit shutdown plans at least 2 days in advance of when the scheduled shutdown

is to occur.

- 3 The Engineer reserves the right to delay, change, or modify any shutdown at any time, at no additional cost to the Purchaser, when the risk of such a shutdown would jeopardize the operation of the facility.

3.5 SUPERVISION

- A The Provider shall schedule all activities, manage all technical aspects of the project, coordinate submittals and drawings, and attend all project meetings.
- B The Provider shall supervise and coordinate all work to insure each phase of the project, submittal, delivery, installation, and acceptance testing, etc. is completed within the scheduled timelines agreed-upon with the Engineer.
- C The Provider shall be responsible for obtaining, preparing, completing, and furnishing all paper work, which shall include transmittals, submittals, forms, documents, manuals, instructions, and procedures.

3.6 SPECIAL INSPECTIONS

- A All work or materials under this Agreement shall be subject to inspection, but without obligation, at any and all times by the applicable Engineer. If any material does not conform to the this Agreement, or does not have a favorably reviewed submittal status; then the Provider shall, within three days after being notified by the Engineer, remove said material from the premises; and if said material has been installed, the entire expense of removing and replacing same, including any cutting and patching that may be necessary, shall be borne by the Provider.
- B The Provider shall give the Engineer two (2) working days' notice of the dates and time for inspection. Date of inspection shall be as agreed upon by the Provider, Operations Manager and Engineer.
- C Work shall not be closed in or covered over before inspection and approval by the Engineer. All costs associated with uncovering and making repairs where non-inspected work has been performed shall be borne by the Provider.
- D The Provider shall cooperate with the Engineer and provide assistance at all times for the inspection of the electrical system under this Agreement. The Provider shall remove covers, provide access, operate equipment, and perform other reasonable work that, in the opinion of the Engineer, will be necessary to determine the quality and adequacy of the work.
- E The permitting authority shall be notified to perform required inspection either prior to or concurrent with Engineer's inspection in the close out process.
- F Before request for final inspection is made, the Provider shall submit to the Engineer in writing, a statement that the Provider has made his own thorough inspection of the entire project, enumerating punch list items not complete and that the installation and testing is complete and in conformance with the requirements of this Section.
- G The Purchaser's Engineer may arrange for a facility inspection by Cal-OSHA Consultation Service at any time. The Provider shall make the necessary corrections to bring all work in conformance with Cal-OSHA requirements, all at no additional cost to the Purchaser.
- H Provider will be responsible for any additional cost for overtime, weekend overtime or differential time, and expenses for Inspection of Defective Work that has to be re-inspected.

3.7 JOB CONDITIONS

- A The Provider shall make all arrangements and pay the costs thereof for temporary services required during construction of the project, such as temporary electrical power. Upon completion of the project, remove all temporary services, equipment, material and wiring from the site as the property of the Provider.
- B The normal outdoor, not in direct sunlight, ambient temperature range of the job site will vary between 5 to 115 degrees Fahrenheit. All equipment shall be rated to operate in these temperature ranges or provisions for adequate heating and cooling shall be installed, at no additional cost to Purchaser.

3.8 SAFETY

- A Testing shall conform to the respective manufacturer's recommendations. All manufacturers' safety precautions shall be followed.
- B The procedures stated herein are guidelines for the intended tests. Provider shall be responsible to modify these tests to fit the particular application and ensure personnel safety. Absolutely no tests shall be performed that endanger personal safety.
- C The Electrical Contractor shall have two or more Electricians present at all electrical field tests.
- D California Electrical Safety Orders (ESO) and Occupational Safety and Health Act (OSHA): The Contractor is cautioned that testing and equipment shall comply with ESO and OSHA as to safety, clearances, padlocks and barriers around electrical equipment energized during testing.
- E Field inspections and pre-energization tests shall be completed prior to applying power to equipment.

PART 4 METERS, MONITORING, AND DATA ACQUISITION

4.1 PV DATA ACQUISITION SYSTEM (DAS)

- A Purchaser shall have around-the-clock, read-only access to the most-current data within DAS with download capability. The DAS shall include instrumentation (with a stability < 2% change over a one year period) that allows the measurement of:
 - 1 Ambient temperature - accuracy $\pm 2^{\circ}\text{C}$
 - 2 PV module temperature - accuracy $\pm 2^{\circ}\text{C}$
 - 3 Wind speed - starting threshold 2.98 mph & accuracy < 5%
 - 4 Plane of array solar irradiation (accuracy $\pm 5\%$)
 - 5 A Net Energy package with the ability to monitor the energy used by the facility in all utility time-of-use periods.
 - 6 Monitoring must provide string level output and alarms.
 - 7 Inverter level monitoring.
- B All measurement equipment must be "revenue" grade.
- C The DAS shall capture and store data on 15-minute intervals.
- D Real-Time display will provide the following information. This information can be viewed via the Internet for the entire Term. Provider will use a regression to establish the system rating at PV-USA Test Conditions as the basis for projecting system output.
 - 1 Instantaneous system output in kW
 - 2 Instantaneous irradiation in watts/square meter.

- 3 Instantaneous ambient temperature in degrees Fahrenheit
- 4 Instantaneous wind speed
- 5 Daily and year-to-date system output in kWh
- 6 Data shall be provided in a format that easily facilitates graphing and analysis in third party database or spreadsheet programs.

PART 5 PROJECT CLOSEOUT

5.1 CLEANING AND TOUCH-UP

- A Clean all work areas and remove any debris.
- B Prior to Final Acceptance, all parts of the installation, including all equipment, exposed conduit, devices, and fittings shall be cleaned and given touch up by Provider as follows:
 - 1 Remove all grease and metal cuttings.
 - 2 Any discoloration or other damage to parts of the building, the finish, or the furnishings shall be repaired. Thoroughly clean any exposed work requiring repairs.
 - 3 Vacuum and clean the inside of all panel and electrical enclosures.
 - 4 Clean all above and below ground pull boxes and junction boxes from all foreign debris.
 - 5 Paint all scratched or blemished surfaces with the necessary coats of quick drying paint to match adjacent color, texture, and thickness. This shall include all primed painted electrical equipment, including enclosures, panels, poles, boxes, devices, etc.
 - 6 Repair damage to factory finishes with repair products recommended by Manufacturer.
 - 7 Repair any roof surfaces or structures to pre-existing conditions.
 - 8 Repair damage to PVC or paint finishes with matching touchup coating recommended by Manufacturer.

5.2 FINAL ACCEPTANCE/APPROVAL

- A Final acceptance ("Final Acceptance") will be given by the Purchaser after final documentation has been provided and all the requirements of design documents have been fulfilled. If Provider does not achieve Final Acceptance within 90 days of the Commercial Operation Date, Purchaser may defer payment for the Energy Services until such Final Acceptance has been achieved.
- B Upon completion of the project, prior to Final Acceptance, remove all temporary services, equipment, material, and wiring from the site.
- C Acceptance by Purchaser shall be based on:
 - 1 All operational tests performed to the satisfaction of Engineer.
 - 2 Receipt of all final documentations listed herein.

PART 6 SYSTEM START-UP

6.1 START-UP FORMS

- A Complete all start-up and testing forms contained in Part 7.
- B Bill of Materials: Include modules, inverters, disconnects, DAS, and combiner boxes.

- C Power conductor test form: Provider shall complete a megger test on all wiring at 500 volts for 10 seconds. Each reading shall be a minimum of 100 Meg-Ohms.
 - D Grounding system test form
 - 1 Provider shall complete a Fall of Potential test to NEC code standards, utilizing form in Part 7.
 - E System Visual and Mechanical Inspection Form: Complete Forms for all equipment listed below.
 - 1 PV System: complete a form for the inspection of the PV system. Include inspection of all DC connections, conduit, modules, etc.
 - 2 Combiner Box: Complete a form for each combiner box.
 - 3 Inverter: Complete a Form for each Inverter.
 - 4 Disconnects: Complete a form for each AC Disconnect
 - 5 Main Panel
 - F System Output Measurement Form: The Provider will establish the initial system output to demonstrate that the system is performing as designed, and to validate the estimated annual production stated in Schedule 4.
 - 1 The system output will be verified after construction of the system has been completed, on a clear, sunny day, with a minimum insolation of 700 watts per square meter.
 - 2 Data to be collected will include:
 - a. Volts open circuit
 - b. Volts maximum power (use max of instantaneous reading)
 - c. Current at maximum power (use the min of instantaneous reading)
 - 3 Voltages and currents shall be measured for each string, combiner box circuit, and the entire array.
 - 4 Irradiance measurements shall be in the plane of the array.
 - 5 Time, irradiance, and temperature measurements must be taken at a minimum of 15 minute intervals
- 6.2 Start-up shall be per all manufacturers' instruction.
- 6.3 System start-up procedure will be as outlined by the Manufacturer's installation manual and the inverter manual.
- 6.4 Commission inverters per factory instructions.

PART 7 FORMS

Start Up Sheets

POWER CONDUCTOR TEST FORM

[illegible]

GROUNDING SYSTEM TEST FORM TEST FORM (TF3)					
FALL IN POTENTIAL TEST					
MAIN GROUND LOCATION	APPLIED VOLTAGE V	MEASURED POINT VOLTAGE	MEASURED POINT 2 VOLTAGE	MEASURED POINT 3 VOLTAGE	CALCULATED RESISTANCE OHMS
TWO POINT TESTS					
EQUIPMENT NAME	EQUIPMENT #	CIRCUIT NUMBER	APPLIED CURRENT	MEASURED VOLTAGE	CALCULATED RESISTANCE

NOTES:					
TESTED BY:					
DATE:					
WITNESSED BY:					

VISUAL AND MECHANICAL INSPECTION FORM	
EQUIPMENT NAME:	LOCATION:
NAMEPLATE DATA	
MFG:	SERIES #:
MODEL #:	U.L.#:
VOLTAGE:	PHASE:
AMPERAGE:	SERVICE:
GRD. BUS:	NEU. BUS:
INSPECTION CHECK LIST	
ENTER: A-ACCEPTABLE, R-NEEDS REPAIR OR REPLACEMENT, NA-NOT APPLICABLE	
TIGHTEN ALL BOLTS AND SCREWS	
TIGHTEN ALL CONDUCTOR AND BUS CONNECTIONS	
CHECK BUS BRACING AND CLEARANCE	
CHECK MAIN GROUNDING AND CONNECTION SIZE	
INSPECT GROUND BUS BONDING	
CHECK EQUIPMENT GROUNDS	
CHECK CONDUIT GROUNDS AND BUSHINGS	
INSPECT NEUTRAL BUS AND CONNECTIONS	
CHECK VENTILATION AND FILTERS	
CHECK FOR BROKEN/DAMAGED DEVICES	
CHECK DOOR AND PANEL ALIGNMENT	
INSPECT ANCHORAGE	
CHECK FOR PROPER CLEARANCES	
REMOVE ALL DIRT AND DUST ACCUMULATION	
INSPECT ALL PAINTED SURFACES	
CHECK FOR PROPER WIRE COLOR CODES	
INSPECT ALL WIRING FOR WIRE LABELS	
CHECK FOR PROPER TERMINATIONS	
CHECK FOR PROPER WIRE SIZES	
INSPECT ALL DEVICES FOR NAMEPLATES	
CHECK IF DRAWINGS MATCH EQUIPMENT	
CHECK ACCURACY OF OPERATION & MAINTENANCE	
TESTED BY:	DATE:
WITNESSED BY:	

SYSTEM OUTPUT FORM

DATE:

Panel Make and Model:

[illegible]

TESTED BY:

DATE:

WITNESSED BY:

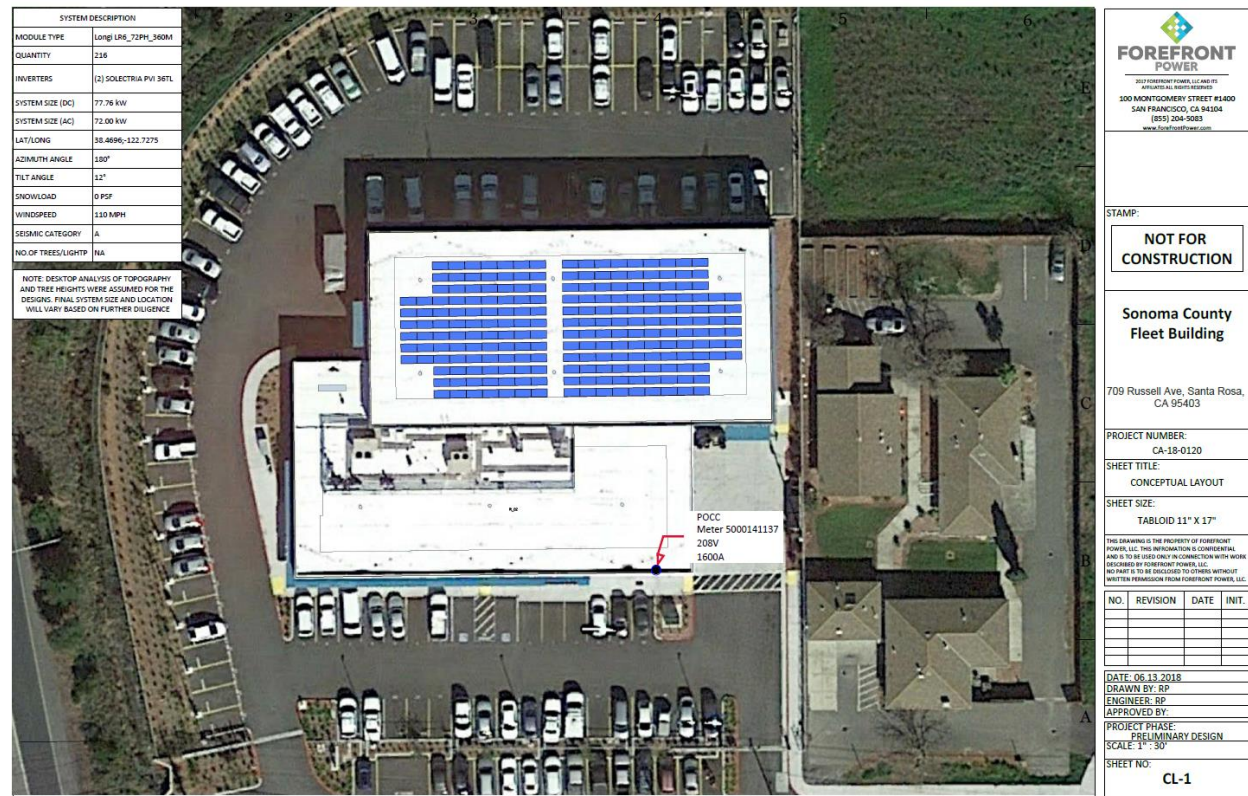
DATE:

BILL OF MATERIALS

PROJECT: _____
LOCATION: _____

DATE: _____
PAGE: _____

[illegible]



X. Schedule 10 – Solar Insolation

Solar Insolation = the amount of daily solar energy striking a square meter of the earth's surface at a specific location.

kWh = Kilowatt Hour unit of energy equal to 3.6 megajoules

M2 = Square Meter

$$\text{Year} = \text{Calendar Year}/365 \text{ days}$$

kWh/M2/Year	1770.2
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