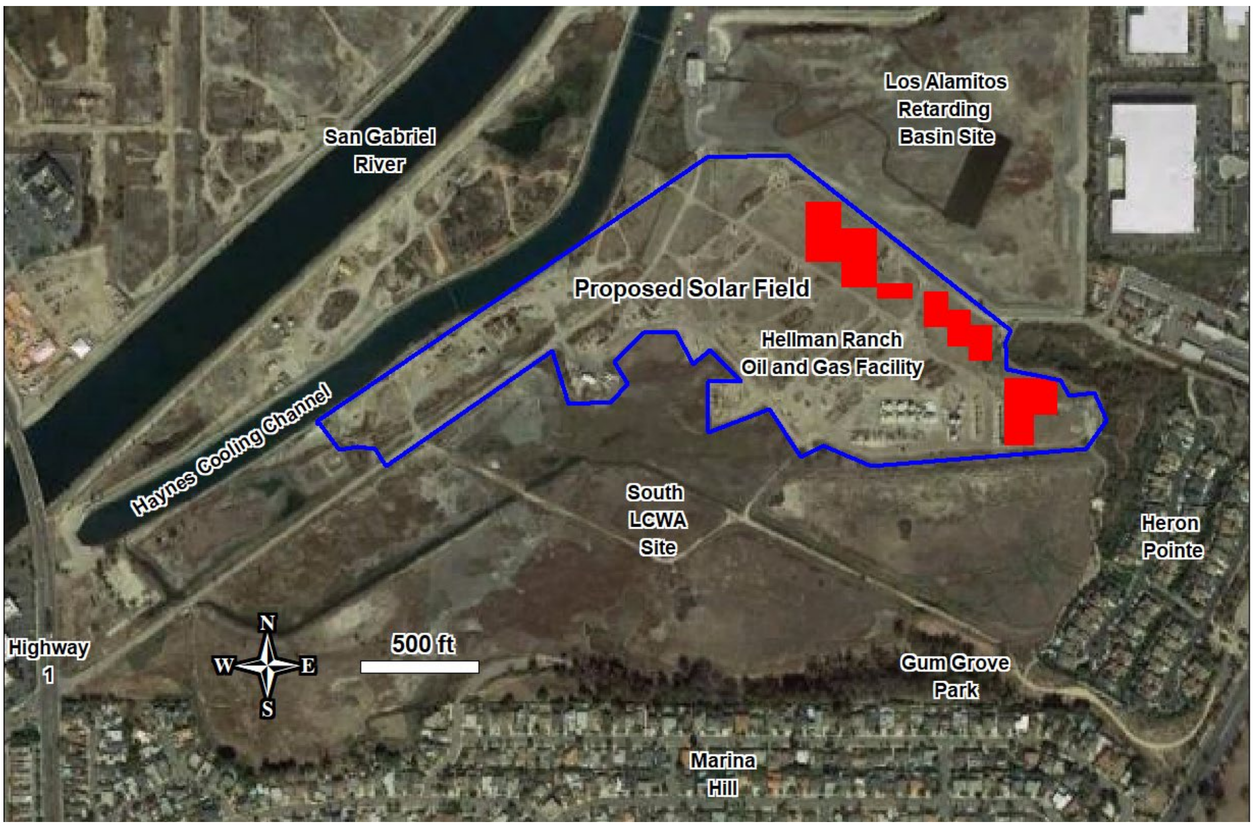
2.0 Project Description

The proposed Project would consist of the installation and operation of a 1.5 megawatt (MW) fixed-tilt ground mounted solar photovoltaic (PV) system on the Helman Ranch OGPF property. This system would interconnect with the Hellman Property's electrical infrastructure and operate in parallel with the utility grid to provide sustainable clean energy in support of the facilities operations. Electrical power generated in excess of Hellman facility needs would be exported to the SCE grid. Figure 2-1 shows location of the proposed solar PV system. The proposed system would be located on a 4.66 acre site within the existing Hellman Ranch OGPF. The system would be composed of 3 arrays with a total of 56 solar table structures supported by piles with concrete foundations. Appendix B provides detailed system drawings for the solar PV project.

Figure 2-1 Location of Proposed Solar PV System on Helman Ranch OGPF Site



Source: Google, Google Earth data © Google 2023.

2.1 Project Components

The major components of the solar system would include (1) the solar panels and support structures, (2) collector cables, inverters, and subpanels, and (3) power cables, transformer, and disconnect Switches. Each of these is discussed below.

2.1.1 Solar Panels and Support Structures

Solar energy would be captured by solar panels mounted to a fixed-tilt support structure. The system would be comprised of three arrays of solar tables. Table 2-1 provides a summary of the key elements of each of the solar arrays.

Table 2-1 Summary of Solar Array Elements

Array#	# Solar Tables	# Solar Panels	# Support Structures
Array 1	22	1,196	150
Array 2	17	952	119
Array 3	17	952	119
Total	***56***	***3,100***	***388***

Source: Hellman Plan Set 12-06-2022, Newport Power (see Attachment B).

All but one of the solar tables would be about 96.8 feet long by about 14.3 feet wide and would contain two rows of 28 solar panels. One of the solar tables in Array 1 would be about 34.6 feet long by about 14.3 feet wide and contain two rows of 10 solar panels. The solar tables would be tilted facing south at about a 10 degree angle. The front edge of the tables would be at a height of approximately 18-inches, with the back edge of the tables being at a height of about 50 inches. Figure 2-2 provides a picture of a typical solar array table.

Figure 2-2 Typical Solar Array Tables

Source: Newport Solar, QCells America

The larger tables would be supported by seven support structures. The one smaller table would be supported by three support structures. Each support structure would be attached to a metal pile that would be set six feet into the ground using concrete piers. The concrete piers would be about 18-inches in diameter. Figure 2-3 shows a picture of the type of solar table support structures that would be used for the proposed Project. The solar panels would be at a fixed tilt angle of 10 degrees facing the south.

2.1.2 Collector Cables, Inverters, and Subpanels

Underground collector cables, installed within trenches, would collect direct current (DC) power from each solar table and transport the power to a set of inverters. The inverters are used to convert the power from DC to alternating current (AC). There would be a total of 16 inverters located on four separate concrete pads. One of the inverter pads would be located at solar array 1, one at solar array 2 and two pads at solar array 3. Table 2-2 provides the dimensions for the Inverter pads.

Figure 2-3 Proposed Solar Table Support Structures

Source: Newport Solar, SOL Components

Table 2-2 Inverter Pad Dimensions

Pad Type	Location	Length (ft)	Width (ft)	Depth (ft)
Inverter/PV Subpanel Pad #1	Array #1	38	5.5	0.33
Inverter/PV Subpanel Pad #2	Array #2	33	5.5	0.33
Inverter/PV Subpanel Pad #3	Array #3	17	5.5	0.33
Inverter/PV Subpanel Pad #4	Array #3	17.25	5.5	0.33

Source: Newport Power email dated 8-3-23.

Most of each pad would be located under a solar table, with approximately two feet extending beyond the edge of the solar table. The inverter pads would be located on the back side of a solar table. The inverter would feed alternating current (AC) to a transformer via underground cables. Figure 2-4 shows a typical layout for an inverter string that would service a set of solar tables.

One of the inverter pads at each solar array would also house a PV subpanel. The subpanels would house a main electrical beaker as well as a breaker for each of the inverters. This would allow each solar array or inverter to be isolated from the system for maintenance work. Attachment B, Hellman Properties Seal Beach Solar PV Electrical System Installation Drawings, provides more detail on the layout of the solar tables, inverters, and subpanels.

2.1.3 Power Cables, Transformer, and Disconnect Switches

AC power from the inverters would be sent via underground power cables to a central transformer station, which would adjust the AC voltage for transmission to the existing Hellman facility main electrical service panel, which connected to the Southern California Edison (SCE) system. The pad for the transformer would be about 12 feet wide by 33 feet long. The pad would also house a subpanel and two disconnect switches.

The disconnect switches would be located on either side of the transformer. The subpanel would house a main electrical beaker as well as a breaker for each of the solar arrays.

Figure 2-4 Typical String Inverters

Source: Newport Solar, Chint Power Systems

This would allow each solar array or the entire solar system to be isolated for maintenance work. Attachment B, Hellman Properties Seal Beach Solar PV Electrical System Installation Drawings, provides more detail on the layout of the equipment on the transformer pad. Table 2-3 provides the dimensions of the equipment that would be on the transformer pad.

Table 2-3 Transformer Pad Equipment Dimensions

Equipment	Length (ft)	Width (ft)	Height (ft)
Transformer	7.25	7.75	7.0
Subpanel	3.96	10.5	7.63
Disconnect Switch	2.5	3.33	7.17

Source: Newport Power email dated 8-14-23.

Approximately 600 feet of underground trench would be needed to connect the inverters to the transformer. The trench would be approximately 2 feet wide and contain two 5-inch conduits. The depth of the trench would vary between 18-inches and 24-inches, with the larger depth being in areas of road crossings. The powerlines connecting the transformer pad to the existing Hellman facility's main electrical service panel would be placed underground in a 2.5-inch conduit.

2.2 Project Construction

Construction of the proposed Solar PV Electrical System would take about three to four months to complete and would involve several phases. Figure 2-5 shows the proposed Project layout and associated construction area. The remainder of this section discussed various aspects of the construction phase of the project.

2.2.1 Temporary Construction Work Areas

A temporary staging area would be required to stage equipment and supplies during construction as shown in Figure 2-5. The temporary staging would only be used during Project construction and would be restored to preconstruction conditions at the completion of construction. The area is currently an unpaved dirt pad. The staging area would be about 0.14 acres in size (120 feet x 50 feet) and would be entirely within the existing Hellman facility boundary. This area would be used for construction personnel parking, truck loading and unloading, and equipment and material delivery and staging. Heavy equipment not permitted on public roadways would be refueled on- site; however, fuel would not be stored overnight on the Project site. Equipment maintenance activities would be conducted off-site.

2.2.2 Site Disturbance

The area of temporary and permanent disturbance for each of the Project components is provided in Table 2-4. Areas of temporary disturbance include areas that would be allowed to revegetate following construction. The solar array area would be subject to limited grading during construction, but much of the solar array area would be allowed to naturally revegetate once the solar tables were installed. Temporary disturbance areas include temporary work areas and the portions of the project area are expected to revegetate after construction. The area of permanent disturbance includes the footprint of the solar arrays, and the equipment pads. While the area underneath and between the solar tables would be allowed to revegetate, it has been included in the permanent disturbance area.

Table 2-4 Proposed Project Site Disturbance Areas

Project Component	Temporary Disturbance (acres)	Permanent Disturbance (acres)	Total Disturbance (acres)
Solar Array Tables	1.48[b]	2.65[a]	4.13
Equipment Pads	0.00[c]	0.01	0.01
Underground Power Lines	0.29[d]	0.00	0.29
Staging Area	0.14	0.00	0.14
Total	**1.91**	**2.66**	**4.57**

a. Includes all areas within each solar array including the area under the solar tables.
b. Assumes up to 20 feet of temporary impact on all sides of the components, except where there is overlap.
c. Temporary impacts areas for equipment pads are included in the underground power lines.
d. Temporary impacted area is based upon the area of the trench work that is outside of the permanent or temporary impact areas of the solar arrays. Assumes 2 foot wide trench and 10 feet of work area on either side of trench.

Numbers may not add up due to rounding.
Appendix B provides detailed area calculations for the solar array tables.

2.2.3 Construction Phases

Construction of the proposed Project would involve several phases that include (1) site preparation; (2) support pile installation; (3) solar PV system, equipment, and conduit installation; and (4) testing and commissioning. Each of these phases is discussed below.

Figure 2-5 Proposed Solar PV Electrical System Footprint and Temporary Construction Areas

Source: Newport Solar

Site Preparation

The initial site preparation would involve removal of the vegetative cover, and the removal of any miscellaneous debris and other deleterious material. Organic matter and other material that may interfere with the completion of the work would be removed from the limits of the construction area. The site would require minimal grading since it is already flat and grading is not necessary for the installation of the solar support structures. Limited grading may be needed for the equipment pads areas. The project would not involve any cut and fill, or the import/export of any soil.

Portions of the site have already had vegetation removed as part of the required fuel modification program, which requires areas within 100 feet of oil wells, electrical equipment, and associated facilities to be periodically maintained to remove any vegetation that presents a fire hazard. Other portions of the site are clear of vegetation since they are existing road or pad areas.

The Applicant has proposed that archeological and Native American monitors would be present during all ground disturbance activities. These monitors would be actively involved in the planning and implementation of ground disturbance activities. As shown in Figure 2-5, a 20-foot buffer near the south end of solar array 3 will be maintained near the known archaeological site.

Support Pile Installation

Solar array construction would start with the installation of the support structure piles, which would be installed by drilling holes and setting the metal piles in concrete. The holes would likely be drilled with a backhoe that is equipped with an augur attachment. Each support structure would have one pile, so a total of 388 pilings would need to be installed. Each piling would be installed to a depth of six feet. A three-inch gravel base would be installed below each pile. The piles would be set in a concrete pier with a diameter of approximately 18-inches using casings.

Previous studies at the Hellman Property site have estimated depth to groundwater to be between four and seven feet below ground surface (bgs) (Wood 2018). Therefore, it is possible that water could be encountered during the installation of the piles. If groundwater is encountered, the pilings and concrete piers can be set in wet conditions. It is not anticipated that any dewatering would be needed to set the piles. Excess soil from the boring of the pile holes would be spread out on the surrounding ground, in the areas where the solar tables would be located.

Once the support structures piles are in place, the support structures and remaining solar PV system can be installed.

Solar PV System, Equipment and Conduit Installation

Once the piles have been installed the next step would be attaching the support structures to the piles. Other work that would proceed in parallel would be the installation of the equipment pads, and the digging of the conduit trenches. The final activities in this phase would be installation of the conduits and backfilling of the trenches, installation of the solar tables, and installation of the electrical equipment (inverters, subpanels, transformer, etc.).

The conduit trenches approximately 2 feet wide and 18 to 24 inches deep would be excavated using a backhoe along the collection-line corridors, as shown in Figure 2-5. The electrical conduits would be installed in the trenches and then the trenches would be backfilled with native soils. The construction of the five equipment pads would involve the setting of forms and placement of rebar, and then the pouring of concrete.

The final stage of this construction phase would be the placement of the solar panels/tables onto the support structures, the installation of the inverters, subpanels, and transformer, followed by the installation of the electrical wires for the system.

Underground power cables would be installed from the transformer pad to the existing Hellman property main service panel, which connects to the Hellman facilities as well as an existing SCE 12-kV distribution line.

Testing and Commissioning

Inspection, testing, and commissioning of the PV solar facility would be performed prior to operation of the Project, to establish an as-built baseline for the system, to ensure safe operation of the solar facility, and to confirm that the system is performing as expected.

2.2.4 Construction Workforce, Schedule, and Equipment

Workforce and Work Hours

The construction workforce would consist of approximately 4 to 10 construction personnel depending upon the construction phase as shown in Table 2-5. Approximately 10 construction personnel would be on-site daily at the peak construction. Construction would occur between 7 am and 6 pm Monday through Friday.

Table 2-5 Construction Activities, Duration, Personnel, and Vehicle Trips

Activity	Duration (days)	# Construction Workers per Day	# Vendor Visits per Day	# Delivery Trucks per Day
Site Preparation	3	6	0	2
Support Pile Installation	21	8	1	4
Solar PV System, Equipment, and Conduit Installation	20	10	1	4
Testing and Commissioning	20	4	2	0

Source: Newport Power

Project Schedule

Construction is anticipated to occur over an approximate three to four month period once all necessary regulatory permits and approvals have been obtained. Testing and commissioning would occur for approximately four weeks from the end of active construction. The anticipated duration of each construction activity is provided in Table 2-5.

Equipment

Table 2-6 provides a list of the estimated onsite equipment that would be needed for each phase of construction. Table 2-5 proves an estimate of the number of trucks that would be needed for delivering equipment and supplies to the project site during construction.

Construction Waste

Nonhazardous waste generated during construction (e.g., equipment packaging and trash generated by workers) would be temporarily stored in on-site dumpsters and disposed of off-site at an appropriate disposal facility. Any removed vegetation would be chipped on-site and spread on watershed property or composted. Typical construction-related hazardous substances such as lubricants, adhesives, and solvents would be disposed of off-site at an appropriate disposal facility.

Table 2-6 List of Offroad Construction Equipment by Phase

Phase/Equipment	Quantity	Hours/Day	Hp	Load Factor
Site Preparation				
Rubber Tire Dozer	1	8	84	0.37
Grader	1	8	148	0.41
Backhoe/Loader	1	8	84	0.37
Water Truck	1	4	376	0.38
Support Pile Installation				
Backhoe/Loader	1	7	84	0.37
Forklift	1	8	82	0.20
Generator	1	8	14	0.74
Water Truck	1	2	376	0.38
Solar PV System, Equipment, and Conduit Installation				
Forklift	1	8	82	0.20
Backhoe/Loader	1	7	84	0.37
Generator	1	8	14	0.74
Welding	1	8	46	0.45
Water Truck	1	2	376	0.38

Source: Estimates based upon input from Newport Solar and other similar solar array installation projects. Hp and load factors from CalEEMod default values, Online version 2022.1.1.17.

2.3 Project Operations

The solar facility operations would be monitored as part of the Hellman facility operations by the existing facility staff. The solar facility maintenance would be dispatched on an as-needed basis in response to equipment malfunction or decreased facility performance. It is estimated that five visits per year would be needed for general maintenance. Workers would visit the site in response to maintenance requests. Operation and maintenance of the facility would not create any new permanent employment positions.

Manual washing of the solar panels would require approximately 1,500 gallons of water and would take approximately 2 days to complete. No chemicals would be used for panel washing. Water would be applied to the solar panels at a rate that would not result in runoff from the site. Wash water would be absorbed into the soil and vegetation underneath the panels. Panel washing will occur, as needed, typically once per year. Vegetation would be allowed to regrow under the panels. Vegetation that shades or interferes with the solar panel function or that poses a fire risk would be trimmed or removed, as needed. Vegetation management would be limited to mechanical removal, which would occur approximately twice per year.

2.4 Proposed Solar Facility Lifetime

Solar panels typically have a functional lifetime of 25 to 30 years. Inverters typically operate without downtime-causing failure for extended periods of time – from 10 years to more than 25 years – when prescribed preventative maintenance is adhered to (DNV 2019). The manufacturer of the inverters for the proposed project offers extended warranties for up to 20 years (CPS 2021). At the end of their functional life, the inverters/panels could be replaced, or the system could be decommissioned and removed. The decision to replace the equipment or decommission the facility would likely be based upon several factors such as the remaining life of the oil field operations, the price of electrical power, the cost to replace the solar panels, etc.