

Request for Proposals (RFP) for Implementation of Renewable Energy & Energy Efficiency (REEE) Measures in Six (6) Local Communities and Two (2) Agricultural Associations in Lebanon

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Annex 3: Preliminary Design

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Beirut, Lebanon

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I. General Notes

1. The sections of this Annex describe the contractor's scope of work in each site of each lot.
2. The presented images are indicative only. The contractor shall propose its own layout of the listed solutions.
3. The contractor shall be responsible of the electrical and structural designs of each system based on the below mentioned systems sizing.
4. The contractor shall abide by the locations specified for the installation of the REEE measures.
5. All obstacles affecting the performance of the PV systems shall be taken into consideration in the contractors' design, as they might affect the guaranteed performance ratio mentioned in Form 6 of the RFP.
6. All PV systems shall be equipped with a bypass component for maintenance purposes.

II. Lot 1 - Preliminary Design

1. The REEE measures to be installed in sites of Lot 1 are the following:

Table 1: Lot 1 REEE measures

Site	Type of System	Description	Notes:
Kaa Elrim	Solar PV + Storage + EV Station	<p>PV system size: ≥ 40.3 kWp</p> <p>Hybrid inverter(s) power rating: ≥ 40 kW</p> <p>Battery bank size: ≥ 50 kWh</p> <p>EV charging station DC power rating: 30 kW</p>	<p>PV panels to be installed on unbuilt land owned by the municipality, as indicated in the images below.</p> <p>Inverter and batteries to be installed next to the PV panels, housed in a secure, well-ventilated prefabricated room.</p> <p>The prefabricated room and all PV panels to be enclosed within a fenced area with limited access.</p> <p>AC output of the hybrid inverter(s) to feed the following through AC Panel Board 1:</p> <ul style="list-style-type: none"> • EV charging station • Public school <p>AC Panel Board 1 to be installed on the main road next to the EV charging station as indicated in the images below.</p> <p>AC Panel Board 1 to feed AC Panel Board 2 located at the premises of the</p>

			public school as indicated in the images below. AC Panel Board 2 shall consist of an Automatic Transfer Switch (ATS) between EDZ meter and the newly installed solar PV system.
	Solar Streetlighting	<p>PV Panel size: $\geq 360 \text{ Wp}$</p> <p>Lithium battery capacity: $\geq 1,800 \text{ Wh}$</p> <p>LED Lamp rating: $\leq 150 \text{ W}$</p>	<p>All systems to be mounted on existing poles.</p> <p>Lighting fixtures to be installed next to the existing fixtures.</p> <p>Batteries to be either integrated within lighting fixtures or installed separately.</p> <p>Lighting fixtures to be dimmable.</p> <p>Lighting fixtures to be configured via remote control.</p>
Rayak	Solar Streetlighting	<p>PV Panel size: $\geq 360 \text{ Wp}$</p> <p>Lithium battery capacity: $\geq 1,800 \text{ Wh}$</p> <p>LED Lamp rating: $\leq 150 \text{ W}$</p>	<p>All systems to be mounted on existing poles.</p> <p>Lighting fixtures to be installed next to the existing fixtures.</p> <p>Batteries to be either integrated within lighting fixtures or installed separately.</p> <p>Lighting fixtures to be dimmable.</p> <p>Lighting fixtures to be configured via remote control.</p>

2. Indicative images of Kaa Elrim site in Lot 1:

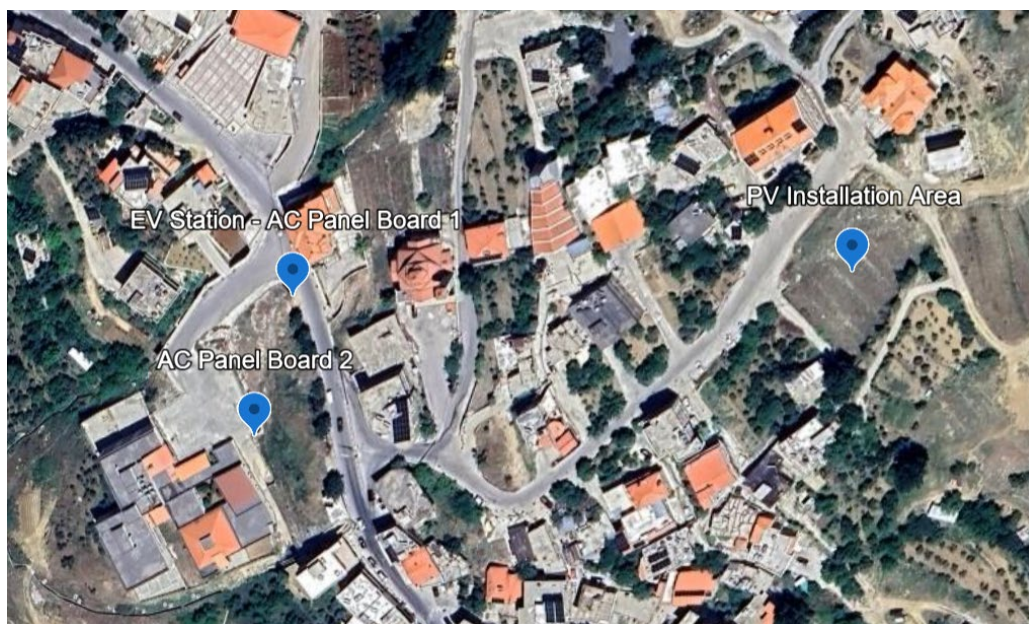


Figure 1: Kaa Elrim Site Plan

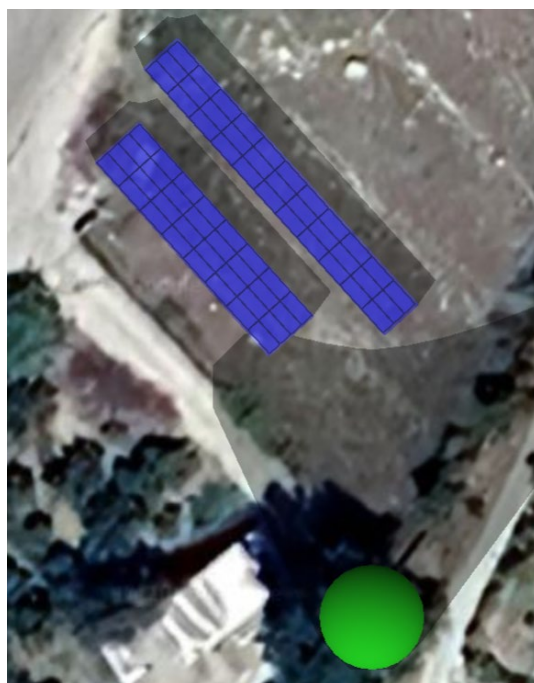


Figure 2: Kaa Elrim PV Site – Indicative Top View

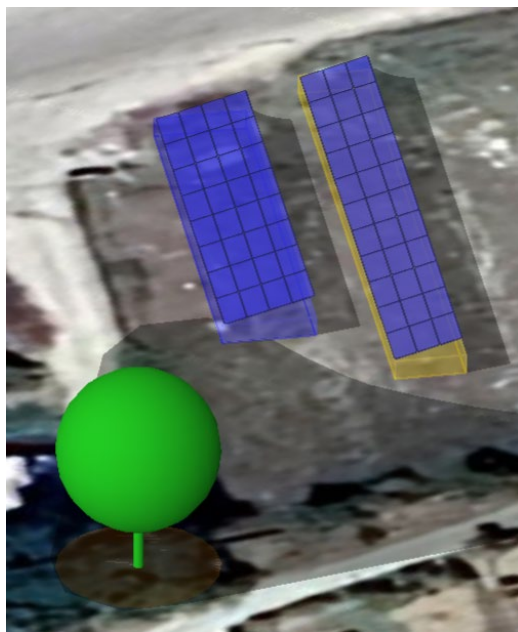


Figure 3: Kaa Elrim PV Site – Indicative Side View

III. Lot 2 - Preliminary Design

1. The REEE measures to be installed in sites of Lot 2 are the following:

Table 2: Lot 2 REEE measures

Site	Type of System	Description	Notes:
Baaloul	Solar PV + Storage	PV system size: ≥ 90 kWp Battery bank size: ≥ 150 kWh	PV panels to be installed on municipal land. The location of the PV installation area with respect to the generator room is indicated in the images below. PV system to supply electricity via municipal generators network to local community. Inverter and batteries to be installed adjacent to the PV panels in a secure, well-ventilated prefabricated room with limited access.

			A fence to be installed around both the PV panels and the prefabricated room.
Kawkaba	Solar Pumping + Storage	<p>PV system size: ≥ 70 kWp</p> <p>Power rating of variable frequency drive(s): ≥ 50 kW, 3-phase</p> <p>Power rating of solar hybrid inverter(s): ≥ 60 kW, 3-phase</p> <p>Battery bank size: ≥ 50 kWh</p> <p>New submersible pump to meet the following system requirement:</p> <ul style="list-style-type: none"> - Flow: ≥ 4.2 L/s - TDH: ≥ 410 m - Motor Rating: ≥ 40 HP <p>Eight (8) LED Projectors</p>	<p>PV system to be installed on unbuilt land owned by the municipality, next to the well and pumping station as indicated in images below.</p> <p>Existing submersible pump and booster pump to be both replaced with one (1) new submersible pump.</p> <p>Lowest point of PV structure installed on municipal land to be at least 2 meters above ground level.</p> <p>PV panels to be connected to the solar hybrid inverter(s) and battery bank.</p> <p>The AC output of the solar hybrid inverter(s) to be connected to the AC input of the variable frequency drive(s).</p> <p>The variable frequency drive(s) will operate the new submersible pump.</p> <p>Inverter(s), variable frequency drive(s), and batteries to be installed inside the pumping station room.</p>

			<p>Contractor to perform overall refurbishment of the existing electric panel boards (as shown in the images below) inside the pumping station room, including the replacement of control devices, protection devices, cables, and accessories, in alignment with the installation of the new submersible pump.</p> <p>A fence to be installed around both the PV panels and the pumping station room.</p> <p>LED projectors powered by the solar hybrid inverter(s), to be equally installed on top of the pumping station room and the corners of the fence.</p>
Lebanese Agricultural Research Institute (LARI)	Solar PV + Storage	<p>PV system size: ≥ 21.6 kWp</p> <p>Battery bank size: ≥ 40 kWh</p>	<p>PV panels to be installed on the rooftop of the LARI laboratory building, as indicated in the images below.</p> <p>Inverter and batteries to be installed adjacent to the EDL meter and the main electrical board, as shown in the images below, in a well-ventilated prefabricated room with limited access.</p>

2. Indicative images of Baaloul site in Lot 2:



Figure 4: Baaloul Site - PV Panels location with respect to Generator Room



Figure 5: Baaloul PV Site – Indicative Top View

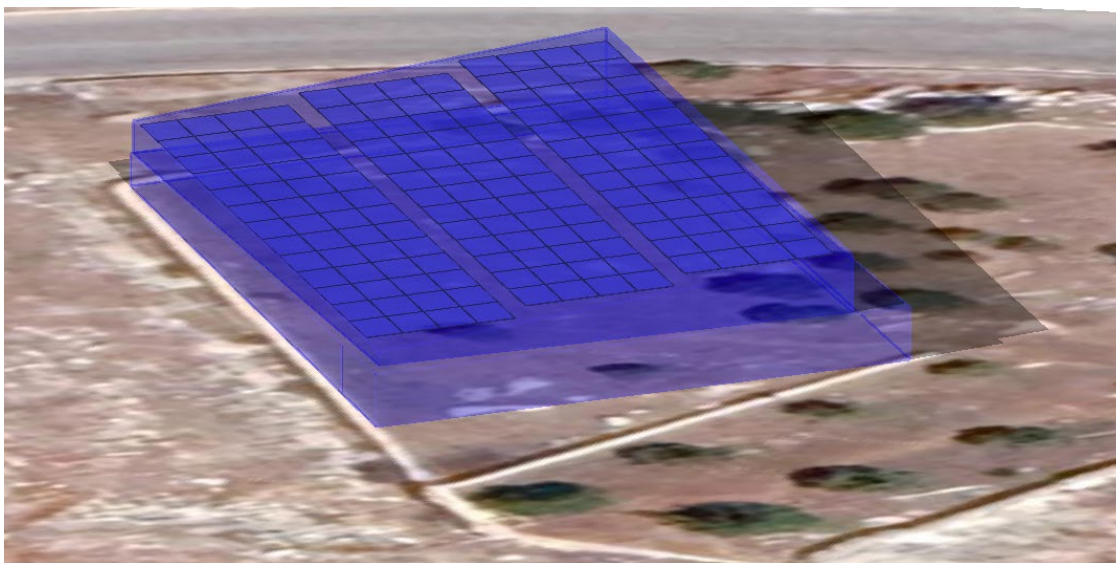


Figure 6: Baaloul PV Site – Indicative Side View

3. Indicative images of Kawkaba site in Lot 2:

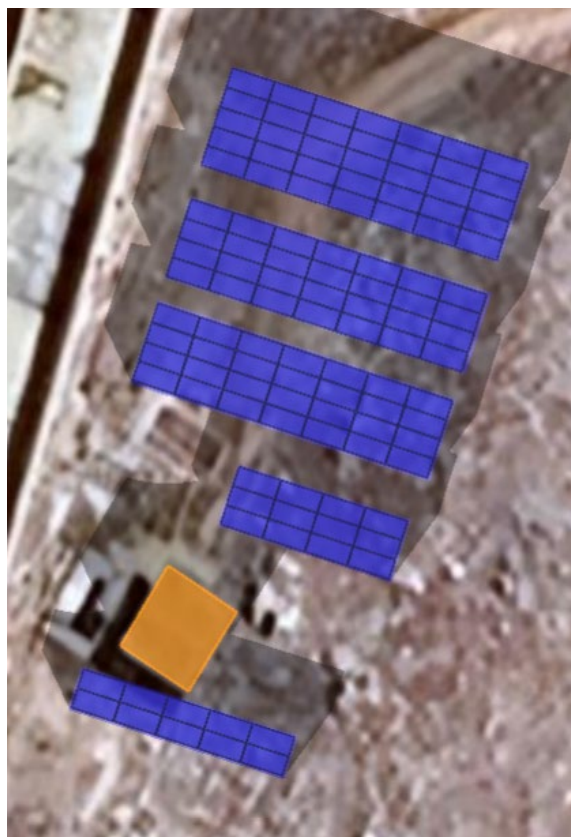


Figure 7: Kawkaba PV Site – Indicative Top View

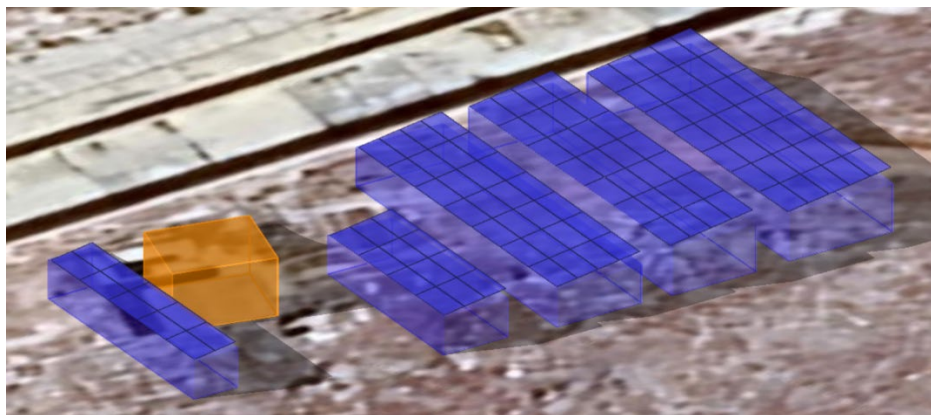


Figure 8: Kawkaba PV Site - Indicative Side View

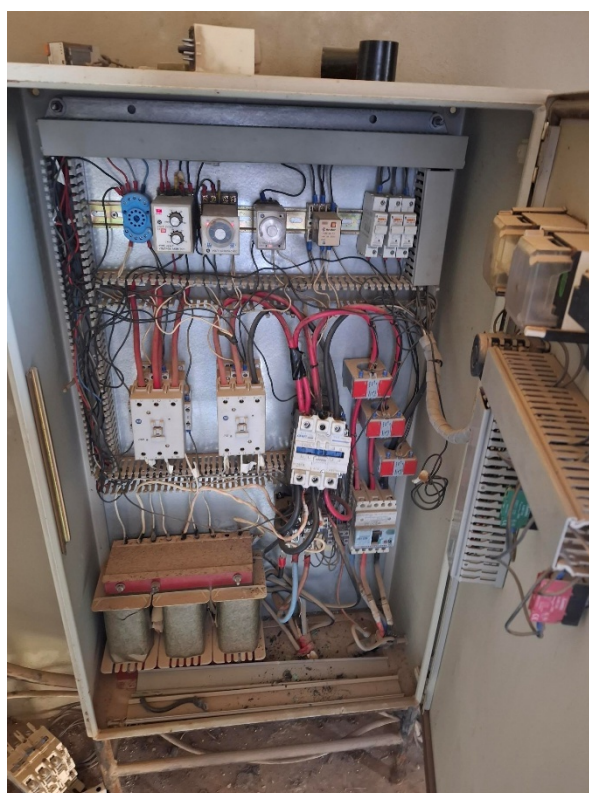


Figure 9 :Kawkaba Site – Electric Panel Board to be refurbished by Contractor

4. Indicative images of LARI site in Lot 2:



Figure 10: LARI Site - Location for the Prefabricated Room

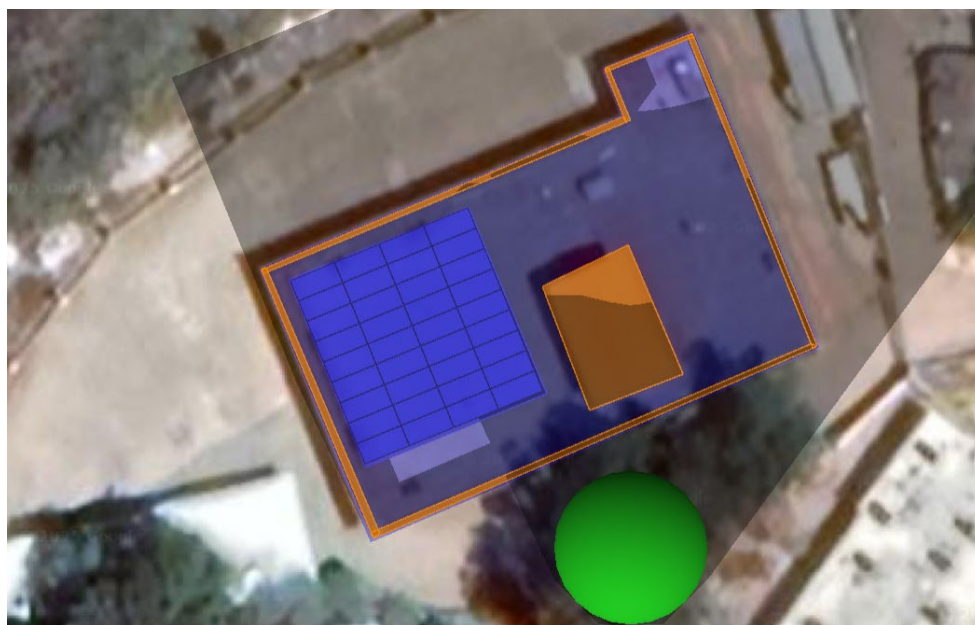


Figure 11: LARI PV Site - Indicative Top View

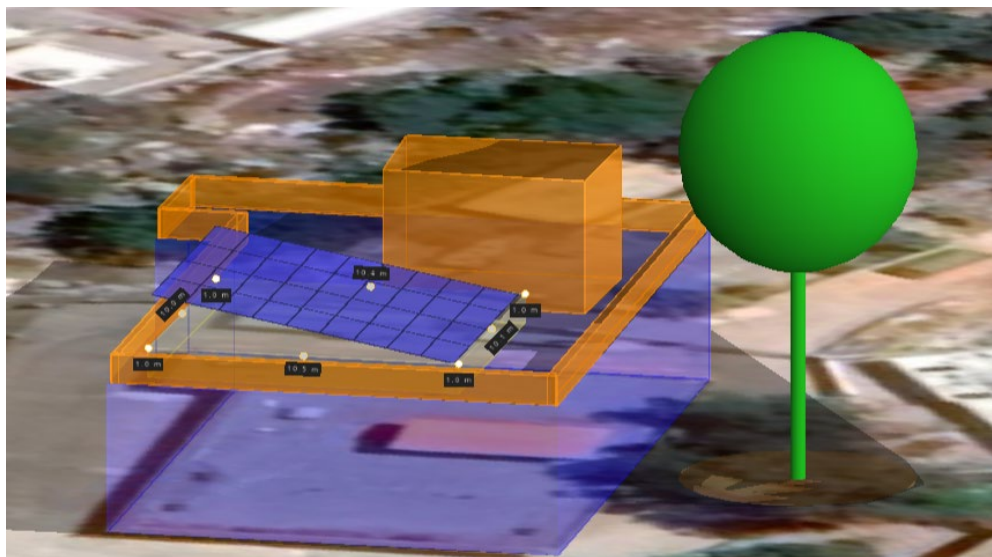


Figure 12: LARI PV Site - Indicative Side View

IV. Lot 3 - Preliminary Design

1. The REEE measures to be installed in sites of Lot 3 are the following:

Table 3: Lot 3 REEE measures

Site	Type of System	Description	Notes:
Qaraoun	Solar Pumping	PV system size: ≥ 150 kWp	<p>PV panels to be installed on empty terrain owned by the municipality. The location of the PV installation area with respect to the pump electrical room is shown in the images below.</p> <p>Solar inverter to be installed under the PV structure in a protective enclosure, as per Annex 6.</p> <p>Solar pumping system to power the submersible pump via AC connections between the solar pumping inverter and the electrical room.</p>

			Contractor to install poles where needed to route the AC cables between the solar pumping inverter and the public road.
Barouk	Solar Streetlighting	<p>PV Panel size: ≥ 360 Wp</p> <p>Lithium battery capacity: $\geq 1,800$ Wh</p> <p>LED Lamp rating: ≤ 150 W</p>	<p>All systems to be mounted on existing poles.</p> <p>Lighting fixtures to be installed next to the existing fixtures.</p> <p>Batteries to be either integrated within lighting fixtures or installed separately.</p> <p>Lighting fixtures to be dimmable.</p> <p>Lighting fixtures to be configured via remote control.</p>
Greenhouse Clusters	Solar Pumping + Storage	<p>A total of 22 systems, each consisting of the following components:</p> <p>PV system size: ≥ 2.4 kWp</p> <p>Variable frequency drive power rating: ≥ 3 kW</p> <p>Hybrid inverter power rating: ≥ 3 kW</p> <p>Battery bank capacity:</p>	<p>For each of the 22 systems:</p> <p>The solar PV structure to be installed on available area near the greenhouse(s) owned by each respective farmer.</p> <p>The minimum elevation of the solar PV structure to be 2 meters.</p> <p>A new irrigation pump to be installed to irrigate the greenhouse(s) in each location.</p> <p>The AC output of the solar hybrid inverter to be connected to the AC input of the variable frequency drive.</p>

		<p>≥ 5 kWh</p> <p>New irrigation pump size: 2 HP</p>	<p>Hybrid inverter, battery bank, and variable frequency drive to be installed inside a protective enclosure, as per Annex 6 at the PV panels location.</p> <p>The maximum distance between the irrigation pump and the variable frequency drive is 15 meters.</p> <p>The variable frequency drive will operate the new irrigation pump.</p> <p>System Distribution by Location:</p> <ul style="list-style-type: none"> • Ghaboun: 14 systems • Majdlaya: 3 systems • Bennay: 3 systems • Baysour: 1 system • Bhouara: 1 system
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2. Indicative images of Qaraoun site in Lot 3:

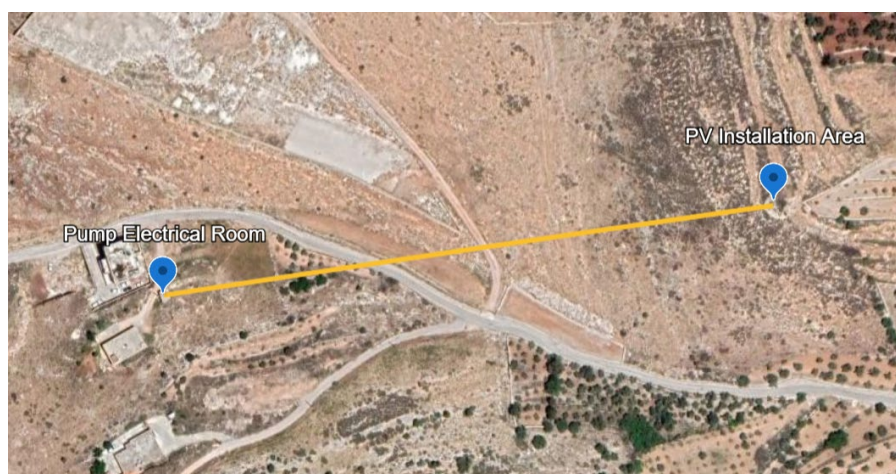


Figure 13: Qaraoun Site - PV installation area with respect to Pumping Station Room

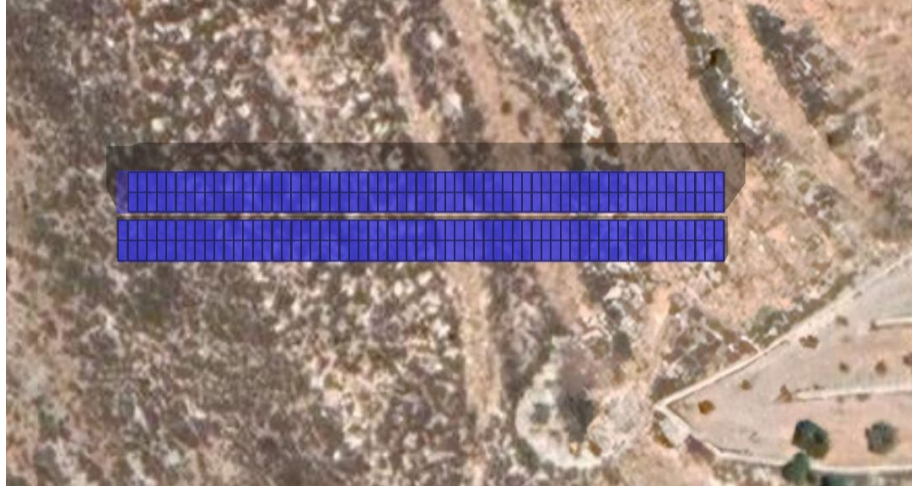


Figure 14: Qaraoun PV Site – Indicative Top View

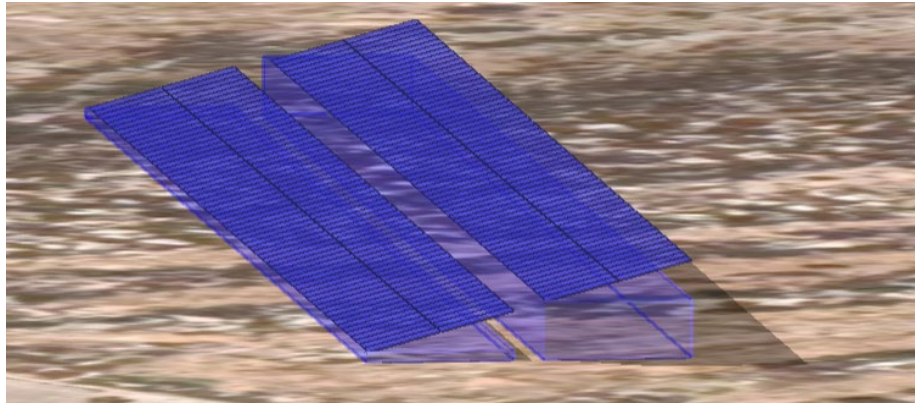


Figure 15: Qaraoun PV Site – Indicative Side View