



Norwegian Ministry
of Foreign Affairs

Construction of Solar Energy System
For
Khan Younis Waste Water Treatment Plant
(KY WWTP)



Norwegian Ministry
of Foreign Affairs



**ITB-PAL-0000123905 - Construction of Solar Energy System
For
Khan Younis Waste Water Treatment Plant
(KY WWTP)**

Tender Documents
SCHEDULES OF PRICES

Executing Entity: UNDP
Employer:
January 2021

Consultant
EMCC



Preamble to the Bill of Quantities

The Contractor shall while pricing the bill of quantity (BOQ) take into consideration, include, and allow for costs or expenses of all requirements stipulated in the section entitled "Preamble to Bill of Quantities" preceding the Bill of quantity.

- 1 Metric units of measurements have been adopted. All dimensions given in the item descriptions of the Bill of Quantities are in millimetres unless stated otherwise.
- 2 The terms "include", "is included", "including", and similar, are used herein to indicate that the items are not specifically mentioned in the descriptions but the costs of which are to be included in the measured items.
- 3 The contractor has to consider that the project is located in a region with special climatic, geological conditions and subject to special political and security circumstances and the siege imposed on Gaza Strip.
- 4 General instructions and detailed descriptions of work and materials are not necessarily repeated in the Bill of Quantities. Reference should be made to the Conditions of Contract, Specification and the Drawings for this information and these documents are to be read in conjunction with the Bill of Quantities.

The Tenderer is deemed to have visited the project site and fully acquainted himself as to the location of each of the project components to be carried out and to all conditions which may affect the performance of the works, including but not limited to:

- 5
 - Access to the project site, equipment, and materials.
 - Surface conditions.
 - Restrictions applicable to working in Gaza Strip area.
 - All safety regulations and employer site safety procedures.
 - Israeli restrictions applicable to working in the project site such, precautions and security measures and provide all the site personnel with orange vests.
- The Tenderer is also deemed to have surveyed the actual condition of the site and made his own assessment of the type and extent of the works prior to submitting his offer.

- 6 The unit prices inserted in the Bill of Quantities by the Contractor (when tendering) shall be a fully inclusive value of the work described under the respective items including all necessary labor, installation supply of equipment and goods, plant, materials, and temporary works, and all other costs and expenses which may be required in, and for the construction of the Works described, together with all risks, liabilities, and obligations set forth or implied in the Tender Documents, except only those works for which provision is made under separate items in the Bill of Quantities.
- Unless clearly stated otherwise in the Bill of Quantities, the unit prices entered against the various Bill items shall include for executing such items in all locations in accordance with the Contract Documents and shall include for all associated temporary works.

- 7 The Contractor (when tendering) shall not enter any new items in the Bill of Quantities except as where expressly provided for.

- 8 The unit prices quoted by the Contractor (when tendering) shall inter alia be deemed to cover tolerances, waste, cutting to waste, working round obstructions, overbreak, and for a proportion of the works being in small quantities.



- 8.1 The equipment and fittings supplied under the Contract, the unit prices shall also include for boxing out, fixing, building in, making good, and all other incidental work.
- 8.2 The quantities shown in the Bill of Quantities are approximate only and the work will be measured strictly net to the limits indicated on the Drawings or as otherwise defined.
- 9 Where items are provided for the removal and reinstatement of specific features the unit prices shall include the cost of removal of such features and for cleaning, storing, and reinstatement on completion of the appropriate section of work.
- 10 The unit prices shall allow for the maintenance, temporary diversion, support, and protection of existing services, sewers, and the like and also for working in a manner such as to avoid causing them damage.
- 10.1 Where the Works may affect adjacent structures or services the unit prices in the Bill of Quantities shall be deemed to cover any temporary works which may be necessary to prevent damage to the structures or services during the construction of the Works including any temporary diversion of services which may be necessary.
- 10.2 The unit prices in the Bill of Quantities shall also be deemed to cover any permanent measures required to support and protect such structures and services except insofar as specific provision is made in the Contract for payment for such work.
- The works, materials, or activities listed in the following shall always be considered as auxiliary works to be included in the Unit Prices bid for any item in the Bill of Quantities:
- Any measurement for execution and payment of the works, including the provision of measuring instruments, gauges, setting out marks, marking paint and relevant tools, labor, etc., the maintenance and preservation of gauges, and setting-out marks during the execution of the works.
 - Provision of small tackle tools or any other equipment required for the execution of the works.
 - Supply of consumables for the Contractor's equipment.
 - Removal of all contamination (refuse, debris, building rubbish, and the like) arising from or in connection with the Contractor's work.
- 11
- Protection of the executed works and of the items made available for execution of the works from damage, fire, inclement weather, vandalism, and theft, etc., to the time of final acceptance.
 - Transportation of all materials and structural components from the storage places on the site to the points of use and return transportation, if required.
 - Submitting and transporting any samples required.
 - Carrying out tests on materials and works, etc., that is required by the Engineer.
 - Fuel and lubricants for the operation of the Contractor's equipment.
 - All safety precautions and measures for safeguarding labor as well as securing surrounding areas.
 - Lighting of the worksite.

Employer:



Construction of Solar Energy System
For
Khan Younis Waste Water Treatment Plant
(KY WWTP)



Item No.	DESCRIPTION	UNIT	QUANTITY	UNIT PRICE (USD)	Total AMOUNT (USD)
BILL NO.1 - General Civil Works					
1	Site Preparation and Interior Roads Works 1.The Contractor has to submit Detailed Shop Drawings to be approved by the Engineer before commencement of the work, and all required materials should be supplied as specified and subject to the Engineer approval. 2.All works has to be done according to the Engineer's instructions, Approved Drawings and as specified. 3.The Contractor should include in his price the costs of sampling and testing as required and according to technical specifications and work requirement. 4.The works must be executed in accordance with the drawings, contract's conditions, specifications and the engineer's instructions 5-Any surplus material shall be transfered out the site				
1.1	Grubbing and cleaning all the project site of undesired material such as; rubbish, trees, shrubs, debris...etc. The work includes; cutting, removing & transferring off-site the first upper layer with depth of 15cm to authorized place as per engineer's instructions.	M2	17,000		
1.2	Leveling the site including cutting, excavation and backfilling, to any required depth according to the design levels, for the interior roads and open areas of the site, including; leveling, watering and compaction $\geq 95\%$ MDD and transferring off-site the surplus to authorized place as per engineer's instructions.	M2	17,000		
1.3	Supply and lay approved Kurkar material with CBR > 30% on one layer 15 cm for open areas and wherever required including watering and compaction up to 98% maximum dry density according to modified proctor test.	M2	13,700		
1.4	Supply and lay approved Kurkar material with CBR > 30% on layers 45 cm (two equall layers) for interior roads and wherever required including watering and compaction up to 98% maximum dry density according to modified proctor test.	M2	3,500		
1.5	Supply, lay and compact approved pre-cast concrete interlocking paving tiles 80mm thick for carriage way with minimum compressive strength B450 including 50mm clean sand and bedding the work includes all tests.	M2	3,000		
1.6	Supply and cast in place reinforced concrete (B250 F.F) for the edge beams for interior road,the work includes but not limited to; all the required material, earthworks, plywood formworks, shuttering, testing, finishing, smoothing, the item also includes; supply and install polystyrene sheets 20mm for expansion joints every 23m and filling 20mm depth with mixture of hot bituminous, cement and sand (as a filler)	M3	40		



4	Transformer Room Supply and built a complete Transformer room with dimension of 780cmx540cm, all works as per the drawings, specifications, and the engineer's instruction The works shall include all necessary works to hand over completely ready, including but not limited to the followings: 1. Excavation, soil replacement and, backfilling with imported clean sand. 2. Concrete works and trenching. 3. Masonry works 4. Plastering work. 5. Tiling work. 6. Painting work. 7. Carpentry, aluminum and, steel works 8. Roof insulation including; foam concrete & bituminous sheets 4mm thick. 9. Mechanical works 10. Earthing system and Electrical works 11. Transformer's installation requirements 12. Extinguisher. 13. All other required material and works	No	1		
5	Perimeter Fence				
5.1	Reinforced Concrete Supply and cast in place reinforced concrete (B300 F.F) for the Fence Beam, as shown on drawings, the work includes but not limited to; all the required material, earthwork, plywood formworks, shuttering, testing, finishing, smoothing, the item also includes; supply and install polystyrene sheets 20mm for expansion joints every 23m and filling 20mm depth with mixture of hot bituminous, cement and sand (as a filler)	M3	67		
5.2	Chain Link Fence Supply and install prefabricated HOT-DIP post Galvanized fence 150x50x4.5mm as indicated on the drawings and specifications. This work includes, but is not limited to, supply and install all required materials, galvanized steel profiles/posts, angels, plastic end cap, joining clips, bracing profiles, clips, stiffeners, extension arms, bottom rail, welding, bolts, anchor bolts, fixation plates and all necessary fittings and accessories.	L.M	530		
5.3	Main Entrance Gate Supply, fix and paint double leaves prefabricated and post galvanized steel gate size 600 cm wide x 250 cm high (covered with prefabricated HOT-DIP Galvanized fence 150x50x4.5mm mech). This work includes, but is not limited to, supply and install all required materials, galvanized steel profiles, hinges, lock, steel end cap, joining clips, bracing profiles, clips, stiffeners, extension arms, bottom rail, welding, bolts, anchor bolts, fixation plates, plain concrete foundation and all necessary fittings, accessories and earth works .	No	1		



6	Cleaning System				
6.1	Ground Slab for Tanks Supply and cast in place reinforced concrete (B250) for the slab on grade, as shown on drawings, the work includes but not limited to; all the required material, earthwork, formworks, shuttering, testing, finishing, mechanical smoothing with helicopter polyethylene sheet.	M3	7		
6.2	Steel Shed for Tanks Fabricate, supply, and install in position a steel structure is comprising the followings: - (for details refer to drawings) 1. Square hollow section: 100x100x3.0mm 2. Rectangular hollow section: 40x80x3.0mm 3. Steel base plate 200x200x6mm 4. 0.55mm thick pre-painted corrugated Steel sheets. (painted with 25 microns of Silicon Polyester paint from both sides) The work includes but not limited to; 1. All required materials such as steel profiles, plates, stiffener plates, bracing rods, bolts, nuts, and any other materials needed to complete the works. 2. Fabrication, cutting, and welding. 3. All open ends of steel profiles must be closed with galvanized steel plates with 3mm thickness. 4. Priming all steel members using anti-corrosive products and painting with two coats of hammer painting. 5. All steel members shall be HOT-DIP Galvanized with minimum thickness of 60 microns.	M2	34		
6.3	Water Tanks Supply and install HDPE water storage tank with 5 m3 capacity, and weight not less than 125 Kg, complete with vent, overflow, drain valve, float valve, valves, painted galvanized steel base 200x200x80 cm made of galvanized profile sections 80x80x3 mm and 40x80x3 mm and 50mm thick wood plates and all related works, as per drawings and engineer instruction. The price shall include all connections necessary to connect with each other and connect with the water line.	No	4		
6.4	HDPE Pipe main water supply pipe line Supply and install 50mm HDPE pressure water pipes 10 bars, the depth of excavation shall be at least 80 cm from the ground levels. The work includes; excavation work, bedding of clean sand under and above the pipe, backfilling with selected soil, watering, compaction. The work also includes; supply and install all required coupling, tapping saddle, tee, elbow, warning tape, sleeves under roads, pressure testing, and all required works and materials to connect with the existing pipe line.	L.M	200		



Construction of Solar Energy System
For
Khan Younis Waste Water Treatment Plant
(KY WWTP)



6.5	HDPE Pipe network Supply and install 40mm HDPE pressure water pipes 10 bars, the depth of excavation shall be at least 60 cm from the ground levels. The work includes; excavation work, bedding of clean sand under and above the pipe, backfilling with selected soil, watering, compaction. The work also includes; supply and install all required coupling, elbow, warning tape, sleeves under internal roads, and pressure testing.	L.M	500		
6.6	Booster Pump Supply, install, test, and commission single impeller centrifugal pump completed with collectors, DAB type or equivalent, the price shall include all necessary isolating valves, fittings, dry run protection and supports with electrical control panel, automatic head control, and all required cable connections, drawings, and Engineer's instruction. <i>Pump Head: 15.5m - Flow Capacity: 4 m3/h</i>	No	1		
6.7	Connections Point Supply and install 32mm PPR connection point for Inlet water supply of cleaning equipment, the work includes; excavation work, bedding with clean sand, plain concrete, saddles, elbow, valve, and Geka connector compatible with the cleaning equipment.	No	17		
6.8	Cleaning equipment Supply, install, test, and commission Kärcher iSolar Complete Set, Germany made, including the following equipment: 1. HD 9/23 G petrol-powered cold-water high-pressure cleaner with Honda petrol engine. 2. Hose reel kit 15m 3. iSolar 800 (700-1000 l/h) Solar Panel cleaning brush. 4. iSolar TL 7 H, Telescopic lance. 5. Inlet water supply hose 30m. The price includes all required fittings, nozzles, and Geka connectors.	Set	1		
Total General Civil Works (\$)					



Construction of Solar Energy System
For
Khan Younis Waste Water Treatment Plant
(KY WWTP)



Item No.	DESCRIPTION	UNIT	QUANTITY	UNIT PRICE (USD)	Total AMOUNT (USD)
BILL NO.2 - Lighting & Medium Voltage Works					
	<p>The prices and the unit rates inserted in the Bill of Quantities by the Contractor (when tendering) shall be full inclusive value of the work described under the respective items including all necessary labour, installation supply of equipment and goods, plant, materials and temporary works, and all other costs and expenses which may be required in, and for the construction of the Works described, together with all risks, liabilities and obligations set forth or implied in the Tender Documents, except only those works for which provision is made under separate items in the Bill of Quantities.</p> <p>Unless clearly stated otherwise in the Bill of Quantities, the unit rates entered against the various Bill items shall include for executing such items in all locations in accordance with the Contract Documents and shall include for all associated temporary works.</p> <p>*All the equipment will be paid on the basis of a lump sum rate per unit for completion of the works, including design, manufacture, transport, installation, fixing, concrete embedding if necessary, electrical connections to distribution panels for all motorized equipment, testing, commissioning and all other contingencies to deliver the work in accordance with the technical specifications and drawings and to the satisfaction of the Engineer."</p> <p>* All materials and installation works must be according to the Specification, GEDCO's specifications, technical guarantees and technical study, drawings, and the Engineer's instruction.</p> <p>The unit rates of the following items must include but not limited to the following:</p> <p>1- The costs of sampling and testing as required and according to the Specification and work requirement.</p> <p>2- The contractor is requested to pay planning and supervision fees and cost for GEDCO as per the GEDCO's specifications, technical guarantees and technical study.</p> <p>3- providing and using all equipment, machines, cranes ... etc. needed for proper execution and completion of work activities.</p> <p>4- Supplying and installing UPVC SN8 pipes of 10" diameter inside each concrete foundations of the steel poles for future.</p>				



Construction of Solar Energy System
For
Khan Younis Waste Water Treatment Plant
(KY WWTP)



	<p>5- Dismantling and reinstating the the soil layers at the places of excavation for cables and poles.</p> <p>6- Preparation of proper access to the work sites as necessary and as per the Engineer's instructions.</p> <p>7- Protection of the existing facilities during implementation and in case of damages, the unit rates shall include repairing properly or replacing these facilities according to the Specification and the Engineer's instructions.</p> <p>8- Dismantling and removal of any damaged external Lantern, poles , wires, surplus materials, etc., then transporting them to locations nominated by the Engineer.</p> <p>9- Obtaining GEDCO approval on all materials and works that must be according to GEDCO's specifications, technical guarantees and technical study ,where obtaining the approval of GEDCO is pre-requisite to starting any activity.</p> <p>10-All needed materials, personnel and works that are deemed necessary for the safety during implementation along with all communication needed with GEDCO to coordinate for activities. Safety plan and implementation of its items will be pre-requisite to commence any relevant activities according to the Engineer's approval and instructions.</p> <p>11- Commissioning works for electricity network system and operating all the new and the existing networks complete according to the GEDCO specifications.</p>				
--	---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------	--	--	--	--



1	External Security lighting				
1.1	Supply, install, connect and test external security lighting lantern unit according the following specification : -Lower frame in pressure–die–cast aluminum and upper canopy in techno polymer with UV-protection treatment. - Four different positions adjustable light beam. -Internal parabola with optimized performance in 99.85% aluminum, installed in the upper canopy. -Diffuser: extra-clear tempered glass, 5 mm thick, resistant to thermal shocks and impacts (UNI-EN 12150-1: 2001).. -Insulating gear tray in glass-fibre-reinforced techno polymer includes: power supply unit, switch - Cable entry into the device through IP66 cable gland. -Stainless-steel screws. 1-LED 52W (type DISANO 3360 lseo 1 - roto symmetrical MODEL 330560-00 or equivalent). 2- Impact Protection Code : IK08 3- Housing Material : Alminum Dia- Cast 4- Input Voltage : AC100V - 240V 5- Luminous Flux : 5667 Lm 6- Index Of Protect : IP65 7- Measurements : 656 x460 x 70mm 8- Led Chips : Bridgelux Chip 4(4*3LED) 9- Driver : DISANO or equ. 10- Usefull Life: 120,000hours 11- Laminaire Efficacy : 108LM/W 12- Color Rendering Index (CRI): >70 13- Correlated Color Temperature : 4000K 14- Power Factor(PF): >0.95 - NYV cable 3X2.5 mm2 connecting cable from terminal	No.	26		
1.2	Supplying, Install and connect hot galvanized steel lighting pole including coated with two layers, 4m long ,90Kg (one piece) this is applicable for all accessories such as bolts ,nuts, washers, steel arm and supports. 2.5 mm2 cable from C.B to projector .The door cover is connected to the pole by galvanized steel chain ,with all accessories according to drawings and supervising engineer's instructions.	No.	26		
1.3	Supplying , install operation unit inside the pole with fiber glass plate 6cm x30cm x 0.5cm at minimum ,CB 10A ,Is=10KA (E.T.N) according security lighting lantern unit numbers ,and outlet terminal blocks for 3 phase cables connection ,and connect the neutral line , earthing line in the pole , Z holder etc	No.	26		
1.4	Supplying and install concrete foundation B200 for lighting pole 0.15 m3 (50x50x60cm) with hot galvanized base (four anchor bolts /0.75" dia /H=80cm) lattice shaped , nuts, washers and excavation ,backfilling as per drawing, specification and engineer's instruction ,including covering the penning between pole metal base and pole concret base with pyramids shaped concrete mortar.	No.	26		



Construction of Solar Energy System
For
Khan Younis Waste Water Treatment Plant
(KY WWTP)



1.7	Supply, install and connect external lighting control panel frame (80x100x20)cm ,water proof MOLLER type or approved equivalent including 3 phase digital KWH meter , LTL 3X100/80A fuses ,NZMB1-80A,two photo cell(KAJA type), three contactor 45A/AC3 MOLLER type and two timer 24 hour , two selector switches with all circuit breakers (MOLLER type) as per drawings and all accessories to satisfy the job.	Unit	1		
1.8	Supply install and test complet earth unit with Electrodes for lighting poles ,the work shall include joint ,clamps copper insulated conductors,P.G clamp & concrete manhole diam 60 cm with cast iron cover (5 ton capacity) to give areistance less than 2 ohm with all zccessories according engineer instructions.(for external lighting)	Unit	1		
1.9	Supply ,install and connect Corrugated (spiral) PVC pipes 3" diam for lighting pole, yellow warning tapes (Arabic- English) 30cm depth from design level, the work include excavation depth of 80cm from desgin level ,back filling with clean sand with compaction.(for external lighting)	MT	600		
1.10	Supply and install underground cable XLPE/CU/PVC 5X6 mm2 (min depth 100cm). The work shall include connecting with alla ccessories as per drawing and engineer instructions.(for external lighting)	MT	600		
1.11	Supply and install underground cable XLPE/CU/PVC 5X16 mm2 (min depth 100cm). The work shall include connecting the cable in guard room with all a ccessories as per drawing and engineer instructions.(for guard room)	MT	150		



2	CCTV SYSTEM and FIBER CABLES:				
	Supply, install, test and commission Complete CCTV system with all required CAT 7A cable from camera site to NVR and power cable to all components as following:				
2.1	<p>High quality BrandName NVR 16 Ch Support 12MP camera</p> <ul style="list-style-type: none"> • Third-party network cameras supported • Up to 12 Megapixels resolution recording • Support 1-ch HDMI, 1-ch VGA, HMDI1 at up to 4K(3840x2160) (Cables Included as Control Room Needed) resolution • Up to 12 IP cameras can be connected with 320M incoming bandwidth • Up to 2 SATA interfaces (2X8TB Purple Included) • Support various VCA detection alarm and VCA search • Support H.265/H.264/MPEG4 video formats <p>Live view / Playback/Recording Resolution: 12MP/8MP/6MP/5MP/4MP/3MP/1080p/UXGA/720p/VGA/4CIF/DCIF/2CIF/CIF/QCIF</p> <p>Network Interface: 1 16 RJ-45 10/100/1000Mbps self-</p> <p>NVR Termination: Supply, install and operate full system in camera control room, and the system view the cath's cameras only in Cath's room by using PC as in (item 10.7), and all necessary devices to operate the system must be included, and activate all Futures in NVR, and apply Document Sheet about operate the system (According to Supervisor Engineer)</p>	No.	1		



2.2	<p>Indoor camera :Supply, install, test and commission of Indoor Surveillance cameras in accordance to the key features and technical specifications :</p> <p>Indoor HighQuality BrandName Fix/Dome Camera 4 MP</p> <p>Key Features</p> <ul style="list-style-type: none"> • Up to 4 megapixel high resolution • Max. 3840 × 2160@20fps • 2.8 mm • H.265, H.265+, H.264+, H.264 •120dB Wide Dynamic Range • 3D Digital Noise Reduction • DC12V & PoE (802.3af) • IR range: 30m • Support on-board storage, up to 128 GB • IP67, IK10 • Network Storage: microSD/SDHC/SDXC card (Included 128G Storage/camera) • 4 behavior analyses and face detection • Setting all need Configuration such as: Motion detection, tampering alarm, HDD full, HDD error, network disconnected, IP address conflicted, illegal login Type Is Hikevision DS-2CD2143G0-I) <p>the work included under ground pvc pipes 2" and data cable</p> <ul style="list-style-type: none"> • Smart Feature-set: Face Detection, Line crossing detection, Intrusion detection, Unattended baggage detection, Object removal detection • IR Range:30m, New IR Technology <p>Note:</p> <ul style="list-style-type: none"> • All image outputs are to be connected to existing CCTV NVR Server which is located Surveillance Control Room <p>Termination and connection : All IP cameras must have power from POE switch in the same floor</p> <p>Numbered all cameras with sticky plastic label, and must numbered in the other termination, and apply datasheet with Numberd cameras and their places in the map</p>	No.	3		
2.3	Ditto , but outdoor camera :Supply, install, test and	No.	8		
2.4	<p>Supply, install, test and commission Complete Smart LED 50 Samsung or eq 4K Full HD, smart TV with 2X HDMI , 1X VGA, Ethernet interface Cable including connections to NVR With HDMI</p> <p>Termination: all monitors must be arrange in suitable form in Surveillance Control room to be easy to view all cameras, and all Suitable furniture and chairs must be included</p>	No.	1		
2.5	<p>Supply, install, test and commission Rack 10U: 10 U 45cm depth steel rack,with glass cover and lock ,Brand Name two removal sides panels with Front and back doors integrated locks , Circuit breaker 10A, ups 1kva ,Equipment :2x fan in roof cooling panel; 1x 1U brand name Metered Rack PDU 6 node with cuircuit breaker, cable management patch, patch panel for fiber cable and modules and all necessary accessories to complete the job according the Drawing and engineer instructions.(Type is Absolute or Euivelent)</p>	Set	2		



Construction of Solar Energy System
For
Khan Younis Waste Water Treatment Plant
(KY WWTP)



2.6	Supply, install, test and commission IDF Switch I : Switch 24-Port, Rack mounted,manageable,SD-Access enables, Model: ALCATEL-24PS-L ,POE 370w or equivalent Ports: 24 x 10/100/1000 + 4 SFP USB Console ports & COM console port attached,stack cable.	NO	2		
2.7	Supply, install, test and commission Fiber Cable Singlemode 12core connected between rooms and connected with scada room in KYWWTP with SFB ,patch management ...els ,and all necessary accessories to complete the job according the Drawing and engineer instructions (type is Premium Line or Equivalent)	Lm	1750		
2.8	Supply, install, test and commission Patch Cable 50cm:Original Cat 7A ,SFTP , 50 cm (type is Premium Line or Equivalent)	NO	30		
2.9	Supply, install, test and commission Patch Cable 2m: Original Cat 7A ,SFTP , 2m (type is Premium Line or Equivalent)	NO	5		
2.10	Supply and install 2x4" UPVC pipes SN8 include warining tape soft clean sand 40 cm and all necessary fitting to satisfy the job (Data network).	MT	750		
2.11	Supply and install inspection manhole diam 80 cm for data network with cast iron cover (5ton capacity). Including excavation and all necessary fitting to satisfy the job.	Unit	15		
2.12	Ditto,but manhole diam 60 cm for data network with cast iron cover (5ton capacity). Including excavation and all necessary fitting to satisfy the job.	Unit	6		
3	Medium Voltage				
3.1	Supply and install 4x6" UPVC pipes SN8 include one raw of 45x45x5cm concrete tiles B-250 warining tape soft clean sand 40 cm and all necessary fitting to satisfy the job (crossing ducts for medium network)	MT	40		
3.2	Supply and install underground cable 12/20 kV NA2XSY, XLPE Insulated, Aluminum Conductor,Single Core Medium Voltage Power Cables with XLPE insulation and aluminium circular stranded conductor - AL Cable 3No (1x240/25 mm2) (min width 60cm & depth 100cm). The work shall include one raw of 45x45x5cm concrete tiles B-250 warining tape soft clean sand 40 cm,250A , 24 kv Indoor Screened Separable Elbow Termination Kit for 12/20 kv XLPE Cable 1x240/25 mm2 , Fixing M.V Cable Clamp on the Steel Arm and all a ccessories as per drawing and engineer instructionsand connecting with all a ccessories as per drawing and engineer instructions.	MT	420		
3.3	Ditto, but 12/20 kV Single Core Cable with XLPE Insulation and Copper Circular Stranded Conductor AL Cable 3No(1x50/16 mm2)the work include Fixing M.V Cable Clamp on the Steel Arm,24 kv Indoor Screened Separable Elbow Termination Kit for 12/20 kv and all a ccessories as per drawing and engineer instructions(for conection between transformer and CTC)(The supply of materials will be according to M.V cables general specifications and technical	MT	90		



Construction of Solar Energy System
For
Khan Younis Waste Water Treatment Plant
(KY WWTP)



3.4	Supply , install, operate and test 22/0.4 KV Low Losses , 3 phase , Indoor Distribution Transformer 1600 KVA Rating (The supply and installation shall be according to GEDCo specification and instructions) and connecting with all accessories as per drawing and engineer instructions.	Unit	1		
3.5	Supply , install, operate and test MV , 24 KV ,630A switchgear and 20KA short circuit current ,Current Ring Main Unit SF6 , two incoming Switch Disconnectors, OneTransformer Protection Fuse ,Switch combination (CTC) with all needed to fixing & connection (The supply and installation shall be according to GEDCo specification and instructions). The work shall include connecting between switches, concrete trunks internal the switch room and all civil works as per drawing and engineer instructions.	Unit	1		
3.6	Supply and install 22 kV Porcelain Fuse 100 A	Pcs	3		
3.7	Supply install and test complete earth unit with Electrodes for M.V network ,the work shall include joint ,PVC Insulated Wire with Solid Stranded Copper Conductor 70 mm ² , Yellow/Green,clamps,Earth Rod Joint 15 mm Diameter,P.G clamp & concrete manhole diam 80 cm with cast iron cover (5 ton capacity) to give resistance less than 2 ohm with all accessories according engineer instructions.(for medium voltage network) Copper Connection Clamp Between Earth Rod and Earth Cable	unit	7		
3.8	Supply , install, operate and test MV , 24 KV ,630A switchgear and 20KA short circuit current , AUTOMATIC METAL CLAD 4incoming switch disconnectors (CMMCCC) with modern and all needed to fixing & connection (The supply and installation shall be according to GEDCo specification and instructions). The work shall include connecting between switches, concrete trunks internal the switch room and all civil works as per drawing and engineer	Unit	1		
Total Lighting & MV & CCTV Works (\$)					



Item No.	DESCRIPTION	UNIT	QUANTITY	UNIT PRICE	Total AMOUNT
				(USD)	(USD)
	BILL NO.3 - PV PLANT				
1	PV Modules				
1.1	<p>Solar Panels (340W half cell mono PERC) Supply install test operate and commissioning with all fittings and accessories required. Cell: Mono, Weight: 18.7kg±3%, Dimensions: 1689±2mm×996±2mm×35±1mm, Cable Cross Section Size: 4mm², No. of cells: 120(6×20), Junction Box: IP68, 3 diodes</p> <p>Connector: QC 4.10-35, Cable Length (Including Connector): Portrait: 300mm(+)/400mm(-); Landscape: 1000mm(+)/1000mm(-). including all necessary DC cables, cable trays, cable ducts, trenches, conduits, cable-ties, and all fittings and accessories for interconnections and string from PV array to inverter. DC Cable '4 sq.mm Single Core XLPE/PVC Stranded Copper, 1500V DC, 40A above, -40C to +90C, UV resistant. This range of low voltage armoured cable is often referred to as mains power cable, mains armoured cable, booklet and non-booklet armoured cable. The single core cable is armoured with aluminium wires (AWA) to prevent induced current in the armour.</p>	kWp	1306.62		
1.2	<p>PV steel structure</p> <p>Supply and install prefabricated steel mounting structure units with dimension indicated in the drawing, with 15 degrees fixed inclination angle.</p> <p>The work includes but not limited to;</p> <ol style="list-style-type: none"> 1. All required materials such as steel profiles, plates, stainless steel bolts, nuts, lock washers, aluminum clamps & gasket, reinforced concrete foundations and all required earthwork. 2. Fabrication, cutting, and welding. 3. All steel members of the structure unit shall HOT-DIP galvanized steel with minimum thickness of 60 microns and with the following profile sections: 4. Square hollow section: 40x40x2.5mm 5. Angle section: 40x40x4.0mm 6. Steel base plate 140x140x5mm 7. All welded area shall be re-galvanized 8. All open ends of steel profiles must be closed with steel plates with 3mm thickness. 9. Reinforced concrete foundation (B250) with dimension of 30cmx30cmx70cm and 30cmx30cmx50cm as shown in the drawings. 10. All bolts, nuts and washers shall be stainless-steel. 11. Galvanizing minimum thickness must be 80micron at least. And all welding or drilling spots must be treated with zinc based paint and as per engineer instructions. The contractor at his own expense and without any extra cost for the item, shall make any modification required on the structure units in case the dimensions of PV panels changed 	kWp	1,306.62		



2	PV String Inverters				
2.1	<p>String Inverter Supply install test operate and commissioning with all fittings and accessories required.</p> <p>-Touch free commissioning and remote firmware upgrade</p> <p>-Online IV curve scan and diagnosis</p> <p>-Fuse free design with smart string current monitoring</p> <p>LOW COST</p> <p>-Compatible with Al and Cu AC cables</p> <p>-DC 2 in 1 connection enabled</p> <p>-Q at night function</p> <p>PROVEN SAFETY</p> <p>-IP65 and C5 protection</p> <p>-Type II SPD for both DC and AC</p> <p>-Compliant with global safety and grid code DC reverse connection Protection: Yes</p> <p>AC short circuit protection: Yes</p> <p>Leakage current protection: Yes , Grid monitoring: Yes</p> <p>Ground fault monitoring:Yes , DC switch / AC switch: Yes/No</p> <p>PV String current monitoring: Yes, Q at night function:Yes</p> <p>PID recovery function: Yes , Overvoltage protection:Yes</p> <p>Night power consumption: IP66 < 2W</p> <p>Operating ambient temperature range: -30 to 60 °C (> 50 °C derating)</p> <p>Allowable relative humidity range (non-condensing): 0 – 100 %</p> <p>Cooling method: Smart forced air cooling</p> <p>Max. operating altitude: 4000 m (> 3000 m derating)</p> <p>Display: LED, Bluetooth+APP</p> <p>Communication: RS485 / Optional: Wi-Fi, Ethernet</p> <p>DC connection type: MC4 (Max. 6 mm²)</p> <p>AC connection type: OT terminal (Max. 240 mm²)</p>	Nos.	11		



2.2	<p>DataLogger With a data logger integrated inside, it is featured with flexible networking, auxiliary maintenance, and easy operation.</p> <p>Flexible networking</p> <ul style="list-style-type: none">-Support of RS485, Ethernet, and WiFi communication-Support of access by various environment sensors, energy meters, and Meteo Stations <p>Auxiliary maintenance</p> <ul style="list-style-type: none">-Support of batch inverter parameter setting and software upgrading-Support of remote desktop function, lower maintenance costs-Support of automatic search and allocation of inverter address, easier onsite debugging-Support of grid control instruction and power factor control- Support of local real-time monitoring, unnecessary to connect the Internet <p>Easy operation</p> <ul style="list-style-type: none">-Equipped with lighting device for ease of night maintenance- Plastic enclosure, lighter weight and easier installation <p>This Data Logger can monitor running information of the PV system in real time and transfer the information to the background.</p>		1		
-----	---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------	--	---	--	--



3	Environmental Monitoring				
3.1	Supply, install, test operate and commission Pyranometer - First Class ISO 9060 PYRANOMETER SPECIFICATION FIRST CLASS Response time: time to reach 95% response $\leq 30s$ Zero-offset: Offset-A: response to 200 W/m ² net thermal radiation, ventilated + 7 W/m ² Offset-B: response to 5 K/h change in ambient temperature ± 2 W/m ² Non-stability: % change in responsivity per year $\pm 1.5\%$ Non-linearity: % deviation from responsivity at 500 W/m ² due to change in irradiance from 100 ... 1000 W/m ² $\pm 1\%$ Directional response (for beam irradiance): the range of errors caused by assuming that the normal incidence responsivity is valid for all directions when measuring from any direction, a beam radiation whose normal incidence irradiance is 1000 W/m ² ± 20 W/m ² Spectral selectivity: % deviation of the product of spectral absorbance and transmittance from the corresponding mean, from 0.35 ... 1.5 μm $\pm 5\%$ Temperature response: % deviation due to change in ambient within an interval of 50K, (e.g. -10 ... +40°C typical) $\pm 4\%$ Tilt response: % deviation in responsivity relative to 0 ... 90° tilt at 1000 W/m ² beam irradiance $\pm 2\%$ Achievable uncertainty (95% confidence level) Hourly totals 8% Daily totals 5%	Nos.	2		
3.2	Supply, install, test operate and commission Ambient Temp Sensor Construction UV-stabilized white thermoplastic plates, aluminum mounting bracket, white powdercoated, stainless-steel U-bolt clamp Plate Diameter 196 mm Plate Height 110mm Measuring Range Temperature: 0 to 100 deg C Humidity: 0 to 100% RH Accuracy ± 0.5 deg C Output A, B, C . A. 0 – 5 VDC B. 4 – 20 mA C. MODBUS RTU Supply Voltage 12 to 24 VDC Housing Electronics ABS Plastic watertight enclosure Sensors Humidity Thin Film Capacitor, Temperature: Chip Temp Compensation $\pm 0.008\%RH/deg C$ Response	Nos.	1		



3.3	Supply, install, test operate and commission Module Temp Sensor Measurement Range : -40° to +110°C Temperature Accuracy : ±0.2°C, Class A Temperature Stability : <0.1°C per year Sensor Cable-Length : Silicon insulated cable – 3 meters Operating Ambient Temperature : -10°C to +70°C Operating Ambient Humidity : 0.1 to 99.9% RH Communication: RTD PT100/1000 4 to 20mA	Nos.	1		
3.4	Supply, install, test operate and commission Wind Speed Sensor Sensor Type Three cups Material Control Head UV-resistant ABS Wind Cups Polycarbonate Range 0 to 250 km/hr Startup wind speed 0.5 m/s or 1.8 km/hr Accuracy ± 3% Output A. 0 – 5 VDC B. 4 – 20 mA C. MODBUS RTU-RS485 D. Pulse, 62 Hz = 250 km/hr Dimensions 3 cup dia. 15 cm Operating Temperature - 40 ~ 75 ° C Potential lead Two wire	Nos.	1		
4	LV Panels				
4.1	Type-Tested LV Panel. Supply install test operate and commissioning with all fittings and accessories required. Indoor IP42 RAL 7035 (90 above microns) Floor Standing type. Form class 3A or above. Cable entry: bottom LV panel containing Incoming: 11 MCCB 3 pole 200A 25A + 4 x MCB 2 pole 10A 10kA + 2 x MCCB 3 pole 63A 10kA Outgoing: 1 ACB 3 pole 2500A withdraw able 50/56kA LSING protection. Panel contain all standard ancillaries including: CTs: 3 x 2500/5A 0.5 10VA Eergy analyser 0.5 class with communication provision on Modbus RS485 and Ethernet. Push buttons for opening and closing of all breakers. Phase indication lights R Y B. Common trip circuit. Copper Tinned Bus bar capable to hold 3000 Amps current, neutral and earth bus bar of half size is allowable. VT & CT signals should be provided via fuses and shorting link. Inter trip circuit from respective RMU shall be made.	Nos.	1		



5	AC LV Power Cables				
5.1	Transformer's Secondary LV Power Cables. Supply install test operate and commissioning with all fittings and accessories required. 300 mm ² Single Core CU/XLPE/PVC, 600/1000V GRADE. -12 x D minimum bending radius -90° max operating temperature -250° Max short circuit temperate -UV resistance -0.6/1kV Rated voltage Uo/U -3.5kV AC test voltage -Flame propagation test on single cable as per EN60332-1 -Lead free - Min. Operating temperature -25° Standard certificate XP C 32-321:2014-, EN60332-1	meters	200		
5.2	String Inverters LC AC power cable. Supply install test operate and commissioning with all fittings and accessories required. 70 mm ² 3.5 core CU/XLPE/PVC, 600/1000V GRADE . The excellent resistance to thermal deformation and the excellent aging property of XLPE cable permit it to carry large current under normal (90 oC) and emergency (130 oC) XLPE cable withstands smaller radius bending and is lighter in weight, allowing for easy and reliable installation. -12 x D minimum bending radius -90° max operating temperature -250° Max short circuit temperate -UV resistance -0.6/1kV Rated voltage Uo/U -3.5kV AC test voltage -Flame propagation test on single cable as per EN60332-1 -Lead free - Min. Operating temperature -25° Standard certificate XP C 32-321:2014-, EN60332-1	meters	700		
6.00	Control Cables				
6.1	4 mm ² 4 Core CU/PVC/CU-TAPE/PVC (FLEXIBLE) 600/1000V . Electric Cables - PVC Insulated, Non-armoured Cables For Voltages Up To And Including 600/1000 V, For Electric Power, Lighting and Internal Wiring. Control Flexible cable, or SY Cable, CY Cable and YY cable.	meters	90		
6.2	1.5 mm ² 6 Core CU/PVC/CU-TAPE/PVC (FLEXIBLE) 600/1000V . Electric Cables - PVC Insulated, Non-armoured Cables For Voltages Up To And Including 600/1000 V, For Electric Power, Lighting and Internal Wiring. Control Flexible cable, or SY Cable, CY Cable and YY cable.	meters	20		
6.3	1.5 mm ² 12 Core CU/PVC/CU-TAPE/PVC (FLEXIBLE) 600/1000V . Electric Cables - PVC Insulated, Non-armoured Cables For Voltages Up To And Including 600/1000 V, For Electric Power, Lighting and Internal Wiring. Control Flexible cable, or SY Cable, CY Cable and YY cable.	meters	10		
7	Aux. Cables				
7.1	4 mm ² 2 Core CU/PVC (Flexible). Fire resistant screened	meters	8		



Construction of Solar Energy System
For
Khan Younis Waste Water Treatment Plant
(KY WWTP)



7.2	6 mm ² 2 Core CU/PVC (Flexible). Fire resistant screened cables having low emission of smoke and corrosive gases when affected by fire.	meters	60		
7.3	10 mm ² 2 Core CU/PVC (Flexible). Fire resistant screened cables having low emission of smoke and corrosive gases when affected by fire.	meters	30		
8	Earthing & Lightning				
8.1	Supply, install, test operate and commission Lightning Rods 3 meter pole height, 1meter 20 sqm pure copper rod. Lightning Rod Lightning is one of the most naturally destructive phenomena. There is no device capable of preventing the formation of lightning, but it is possible to minimize its effects with a lightning protection system.	Nos.	4		
8.2	Supply, install, test operate and commission. Earthing Pits Complete Scope	Nos.	10		
9	Earthing Cables				
9.1	Solar Field PV modules Bonding 2.5 mmsq Single Core, flexible	meters	700		
9.2	Inter Row bonding of PV Structures 10 mmsq Single Core, flexible Class 5, CU/PVC, Green/yellow. In system grounding, one of the circuit (current-carrying) conductors is bonded (connected) to the equipment grounding system and also to earth. This is known as functional grounding in the ROW	meters	500		
9.3	Earthpit and Rod Electrode. Supply install test operate and commissioning with all fittings and accessories required. A. Unless otherwise specified, earth electrodes shall be solid drawn high conductivity copper rods. B. The earth rods shall be of proprietary manufacture 15-20 mm diameter driven into the ground to a minimum depth of 2.4 meters providing the ground conditions are suitable, made up of sections 1.2 meters long with internal screw and socket joints and fitted with a hardened steel tip and driving cap. C. Connections to the earth electrodes shall be readily accessible for periodic inspection and shall be protected against mechanical damage and corrosion. The actual connection to the rod shall be by means of a purpose made clamp and shall be made below ground level in a concrete inspection pit having a removable cover.	Nos.	21		
9.4	Inverter's Earthing 35 mmsq Single Core, flexible Class 5, CU/PVC, Green/yellow. Three phase PCU/ inverter shall be used with each power plant system (10kW and/or above) but in case of less than 10kW single phase inverter can be used.	meters	300		
9.5	LV Earthing 95 mmsq Single Core, flexible Class 5, CU/PVC, Green/yellow. New LV networks shall be designed using Protective Multiple Earthing (PME), whereas extensions and additions to existing LV networks must take account of the existing network conditions and the customer connections.	meters	30		



Construction of Solar Energy System
For
Khan Younis Waste Water Treatment Plant
(KY WWTP)



9.6	Transformer Earthing 120 mmsq Single Core, flexible Class 5, CU/PVC, Green/yellow. This is done to isolate any ground potential rise (GPR) voltage emanating from the MV network to the LV earth system, as this will be transferred directly to the customers on the LV feeders if there is a direct connection between the MV and LV earth.	meters	30		
9.7	Down conductor 50 mmsq Single Core, flexible Class 5, CU/PVC, Green/yellow. The vertical portion of an electric conductor used in a lightning protection system to provide a lightning current path from the air terminals to ground.	meters	100		
10	PVCMS - PV SCADA & CONTROL System	L.S.	1		
10.1	SCADA - 5000 Tags Server License with Advanced Reporting Features		1		
10.2	License For Client Station		1		
10.3	Web Client		1		
10.4	Server Station With 19Inch Screen		1		
10.5	Client Station With 23 Inch Screen		1		
10.6	PPC - Power Plant Controller The power plant controller (PPC) facilitates comprehensive regulation of active and reactive power as well as the voltage of heterogeneous PV systems. A high-accuracy power quality analyzer records all grid parameters during operation. This enables fast and stable control at the grid connection point.		1		
10.7	GPS clock Even fairly accurate computer clocks are likely to vary due to manufacturing defects, changes in temperature, electric and magnetic interference, the age of the quartz crystal, or even system load. Additionally, even the smallest errors in keeping time can significantly add up over a long period. Consider two clocks that are synchronized at the beginning of the year, but one consistently takes an extra 0.04 milliseconds to increment itself by a second. By the end of a year, the two clocks will differ in time by more than 20 minutes		1		
10.8	Unmanaged Switch 2Fx/4Tx Unmanaged switches are plug and play devices without the need of a complex setup. These switches allow Ethernet devices to communicate with one another (such as a PC or network printer) by providing a connection to the network and passing on information to where it needs to go		3		
10.9	Redundant Power Supply 220VAC/24VDC - 10Amp The Power supply must have a minimum of 90% Efficiency measured at 20% output loading with nominal input AC voltage condition. It shall have minimum 94% peak efficiency for 230Vac input without fan power as Platinum level		2		
10.10	Firewall A firewall is a system designed to prevent unauthorized access to or from a private network. You can implement a firewall in either hardware or software form, or a combination of both.		1		



Construction of Solar Energy System
For
Khan Younis Waste Water Treatment Plant
(KY WWTP)



10.11	SCADA Server Panel Rittal Improve production quantity and quality, while reducing costs and waste. Realize efficiency gains across various systems. Increase availability and lengthen the lifecycle of assets. Improve equipment performance. Reduce maintenance costs.		1		
11.0	PV Kiosk				
11.1	PPC coupler with 8DI/DO The Axioline bus coupler is the link between the Axioline system and the higherlevel PROFIBUS network. The address can be easily set using two rotary coding switches and the fieldbus is connected via a 9-pos. D-SUB socket. Features: – 9-pos. D-SUB socket connection – Up to 63 additional Axioline devices can be connected – Typical cycle time of the Axioline system bus is around 10 µs – Runtime in bus coupler is negligible (almost 0 µs) – I&M functions – Diagnostic and status indicators		5		
11.2	Unmanaged Switch 2Fx/4Tx Unmanaged switches are plug and play devices without the need of a complex setup. These switches allow Ethernet devices to communicate with one another (such as a PC or network printer) by providing a connection to the network and passing on information to where it needs to go		5		
11.3	Power Meter With Modbus TCP/IP		5		
11.4	Redundant Power Supply 220VAC/24VDC - 10Amp The Power supply must have a minimum of 90% Efficiency measured at 20% output loading with nominal input AC voltage condition. It shall have minimum 94% peak efficiency for 230Vac input without fan power as Platinum level		5		
11.5	UNO UPS - .8Ah of Battery Phoenix Contact UNO uninterruptible power supplies (UPS) continue to deliver power even in the event of mains failure. We offer UPS solutions for AC and DC applications and protect your system against power supply failure. Furthermore, our integrated solutions with power supply or energy storage offer a space-saving UPS system. Our software allows you to configure and monitor your UPS system. You can use the buffer modules to extend your UPS system and to also bridge short failure times lasting up to 30		5		
11.6	Panel Boards with all ancillaries & Integration When a panelboard is used as service entrance equipment, it must be located near the point of entrance of building supply conductors. In a main lugs only panel, the number of breakers or switches directly connected to the main bus must be limited to six. In a panel having a main breaker or main switch, the number of circuits are not limited except as may be provided under other panelboard requirements, i.e., lighting and appliance branch circuit panelboards		5		



Construction of Solar Energy System
For
Khan Younis Waste Water Treatment Plant
(KY WWTP)



12.0	Spare Parts And Measurment equipments				
12.1	String Inverter	Nos.	1		
12.2	PV modules	%	1		
12.3	Clamps, Bolts, Nuts&Washers and fittings.	%	1		
12.4	Circuit breakers	%	3		
12.5	DC cables	meters	2000		
12.6	Connectors, MC4-Evo2	%	1		
12.7	Supply, callibrate brand new measurment equipment: industrial-grade low and medium voltage voltmeter, power analyzer, IR camera, DC/AC insulation tester, Megger, clamp meter DC/AC	L.S.	1		
Total PV PLANT Works (\$)					



Construction of Solar Energy System
For
Khan Younis Waste Water Treatment Plant
(KY WWTP)



Item No.	DESCRIPTION	UNIT	QUANTITY	UNIT PRICE	Total AMOUNT
				(USD)	(USD)
	BILL NO.4 - MicroGrid				
1	Electrical Equipments				
2.1	Transformer 1600kVA, stepup 400 /22kV, ONAN. Dyn11, Impedance not less than 4%. Main Functions And Features -High reliability, advances level of performances, reasonable economical indicators. -The core joints are of stepped shape with 3 steps, and the surface of the core is coated with cured paint to lower losses and noise. -The winding has novel structure and its oil passage is reasonable designed. Its newly designed insulation structure helps enhance its mechanical strength and the short circuit withstanding ability.	Nos.	1		
1.2	MV panel 24kV 630A 20kA 3sec Metal clad VCB (CTTTC) Service voltage 22kV Rated Voltage 24kV Rated Frequency 50Hz Temperature zone -10 +55C Lightning impulse withstand voltage 75 - 95kV Ingress protection for high voltage compartments IP66 Ingress protection for low voltage compartments IP3xD Operating sequence 0-0 3s-CO-0-15s-CO Disconnecter. Earth Switch and Surge Arrestor included. Capacitive voltage indicator Gas pressure indicator Current and voltage transformer of 0.5 class for metering Relay REF616/Siprotech 7SJ80 Protections required: 50/51, 50/51N, 67, 67N, 46, 46PD, SOTF, 27, 59, 86, 81, 49, 21FL, 50BF, 68. Communication RS485, Ethernet and USB port.accuracy class	Nos.	1		



Construction of Solar Energy System
For
Khan Younis Waste Water Treatment Plant
(KY WWTP)



1.3	LV Panel Indoor IP42 RAL 7035 (90 above microns) Floor Standing type. Form class 3A or above. Cable entry: bottom BTD entry: top LV panel containing Incoming: 1 ACB 3 pole 3200A 50kA withdraw-able + 1 ACB 3 pole 2500A 50kA withdraw-able + 1 ACB 3 pole 1500A 50kA withdraw-able Outgoing: 3 ACB 3 pole 3200A withdraw-able 100kA LSING protection. Panel contain all standard ancillaries including: CTs: 3 x 2500/5A 0.5 10VA Eergy analyser 0.5 class with communication provision on Modbus RS485 and Ethernet. Push buttons for opening and closing of all breakers. Phase indication lights R Y B. Common trip circuit. Under and Over Voltage Protection Phase Sequence Indication on all incomings. Bus bar capable to hold 9000 Amps current, neutral and earth bus bar of half size is allowable. VT & CT signals should be provided via fuses and shorting link. Inter trip circuit from respective.	Nos.	1		
2	Cables and Conductors				
2.1	Supply and install underground cable 12/20 kV NA2XSY, XLPE Insulated, Aluminum Conductor,Single Core Medium Voltage Power Cables with XLPE insulation and aluminium circular stranded conductor - AL Cable 3No (1x150/25 mm2) (min width 60cm & depth 100cm). The work shall include one raw of 45x45x5cm concrete tiles B-250 warining tape soft clean sand 40 cm,250A ,630A, 24 kv Indoor Screened Separable Elbow Termination Kit for 12/20 kv XLPE Cable 1x150/25 mm2 , Fixing M.V Cable Clamp on the Steel Arm and all a ccessories as per drawing and engineer instructionsand connecting with all a ccessories as per drawing and engineer instructions.(The supply of materials will be according to M.V cables general specifications and technical guarantees NO.IT24 50)	meter	400		
2.2	300 mm ² Single Core CU/XLPE/PVC, 600/1000V GRADE. The excellent resistance to thermal deformation and the excellent aging property of XLPE cable permit it to carry large current under normal (90 oC) and emergency (130 oC) XLPE cable withstands smaller radius bending and is lighter in weight, allowing for easy and reliable installation. Furthermore, the splicing and terminating methods for XLPE cable are simpler in comparison with other kinds of cables.	meter	1000		



Construction of Solar Energy System
For
Khan Younis Waste Water Treatment Plant
(KY WWTP)



2.3	Control Cables 1.5 mm ² 6 Core CU/PVC/CU-TAPE/PVC (FLEXIBLE) 600/1000V . Electric Cables - PVC Insulated, Non-armoured Cables For Voltages Up To And Including 600/1000 V, For Electric Power, Lighting and Internal Wiring. Control Flexible cable, or SY Cable, CY Cable and YY cable, are predominantly found within automation, process and control industries. They are used to interconnect cable to measure, control and regulate computer programmed production machines. The flexible cables are most commonly used on production lines.	meter	100		
2.4	Control Cables 1.5 mm ² 12 Core CU/PVC/CU-TAPE/PVC (FLEXIBLE) 600/1000V . Electric Cables - PVC Insulated, Non-armoured Cables For Voltages Up To And Including 600/1000 V, For Electric Power, Lighting and Internal Wiring. Control Flexible cable, or SY Cable, CY Cable and YY cable, are predominantly found within automation, process and control industries. They are used to interconnect cable to measure, control and regulate computer programmed production machines. The flexible cables are most commonly used on production lines.	meter	200		
2.5	Aux. Cables 4 mm ² 2 Core CU/PVC (Flexible). Fire resistant screened cables having low emission of smoke and corrosive gases when affected by fire	meter	100		
2.6	Aux. Cables 10 mm ² 2 Core CU/PVC (Flexible). Fire resistant screened cables having low emission of smoke and corrosive gases when affected by fire	meter	120		
3	Earthing Cables				
3.1	Earthpit and lightning Rod Electrode 25 mmsq Single Core, flexible Class 5, CU/PVC, Green/yellow. The lightning rod is an essential piece of the lightning protection system. It must be the point of controlled impact of a discharge, so as to provide the lightning current with a path to ground without damaging the protected structureod Electrode	meter	800		
3.2	LV earthing 95 mmsq Single Core, flexible Class 5, CU/PVC, Green/yellow. New LV networks shall be designed using Protective Multiple Earthing (PME), whereas extensions and additions to existing LV networks must take account of the existing network conditions and the customer connections.	meter	300		



Construction of Solar Energy System
For
Khan Younis Waste Water Treatment Plant
(KY WWTP)



3.3	MV and Transformer earthing 120 mmsq Single Core, flexible Class 5, CU/PVC, Green/yellow. This is done to isolate any ground potential rise (GPR) voltage emanating from the MV network to the LV earth system, as this will be transferred directly to the customers on the LV feeders if there is a direct connection between the MV and LV earth.	meter	400		
-----	-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------	-------	-----	--	--



Construction of Solar Energy System
For
Khan Younis Waste Water Treatment Plant
(KY WWTP)



4	Ducts & Manholes				
4.1	Supply, laying underground PVC piping system for the underground electrical network as per drawing The work , excavation, laying 15x6" UPVC pipes SN.8, warning tapes , backfilling and all required to complete the job as specified and as shown on the drawings	L.M	40		
4.1	Ditto, but 4x6" UPVC pipes as shown on the drawings.	L.M	20		
4.1	Supply, install concrete manholes 100X120X140 cm with 25 ton steel ring cover as per drawings.	No.	6		
5	Civil works				
5.1	Generators Building Supply and built complete generators building with area of 255 m2, all work as per the drawings, specifications, and the engineer's instruction The works shall include all necessary works to hand over completely ready, including but not limited to the followings: 1. Cutting asphalt, excavation, soil replacement and, backfilling with imported granular soil. 2. Concrete works and trenching. 3. Masonry works and insulation. 4. Plastering work. 5. Painting work. 6. Steel works. 7. Roof insulation including; foam concrete & bituminous sheets 4mm thick. 8. Mechanical works. 9. Earthing system and Electrical works 10. Extinguisher. 11. Reinstall all the sound insulation system dismantled from the existing generator room and supplying the required quantities to complete insulation of the generator's hall with same material specification. 12. Reinforced concrete overflow tank for Daily Tanks including manhole and connections. 13. All other required material and works	L.S	1		
5.3	Modifications on Existing Generator room	L.S	1		
5.4	Underground Fuel Tank Supply and install under-ground packaged fuel storage tank and pumping equipment (20m3, 8mm thick steel Diesel tank) as shown on the drawings . This work includes, but is not limited to, supply and installation of the reinforced concrete pad, protective bollards, tank level and leak detection monitoring equipment, overfill level alarm, valves, vents, metering/pumping equipment, connective pipe and hoses, and accessories, electrical works: including control panel, control cables, instruments, measuring devices and all required accessories and feeding pipes. and including all required for connecting with the relocated existing daily fuel tanks.	L.S	1		



Construction of Solar Energy System
For
Khan Younis Waste Water Treatment Plant
(KY WWTP)



5.4	Reinstatement -1 Cut and restore the existing asphalt with the required width needed for installation of the electrical sleeves, trenches, and where ever required, the price shall include:- <ul style="list-style-type: none"> •Supply & lay new two layers of basecourse 15cm each layer, and new 7cm layer thick of 3/4" gradation of hot asphalt mix after compaction. •The contractor must submit a job mix design for hot asphalt mix and get the approval of the engineer. •The ratio of bitumen in hot asphalt mix shall not be less than 5.2 %. • Excavation, leveling, watering, and compaction ratio not less than 100% according to Modified Proctor for base coarse layer & CBR not less than 80%. •Disposal of surplus material as directed by the Engineer and specifications. Measurements will be based on the meter length of the trench regardless of what will be installed	LM	40		
5.4	Reinstatement -2 Dismantle and reinstall the existing interlock tiles with the required width needed for installation of the electrical sleeves, trenches, and where ever required, the price shall include:- <ul style="list-style-type: none"> •Supply & lay new one layer of basecourse 15cm and reinstall the dismantled tiles and replace the damaged tiles •Disposal of surplus material as directed by the Engineer and specifications. Measurements will be based on the meter length of the trench regardless of what will be installed.	LM	20		
6	Synchronization control system				
6.1	Synchronization controller for Mains Mains can be connected via CAN bus are easily set up for parallel operation as the controllers automatically detect each other at the CAN network. If you at a later stage connect more grids, the controller automatically identifies and connects them via CAN bus, and application configuration is possible via the display	Unit	1		
6.2	Synchronization controller for Genset Gensets connected via CAN bus are easily set up for parallel operation as the controllers automatically detect each other at the CAN network. If you at a later stage connect more gensets, the controller automatically identifies and connects them via CAN bus, and application configuration is possible via the display. Brand DEIF/COM-Ap	Unit	3		
6.3	Battery Charger Using switched-mode power supply technology to reduce energy waste, this charger is also vibration-resistant and provides the function of activating a dry contact alarm relay in the event of detection of a fault, as well as increasing/equalizing battery life and advanced (transient) overvoltage protection	Unit	1		



Construction of Solar Energy System
For
Khan Younis Waste Water Treatment Plant
(KY WWTP)



6.4	Ethernet Switch -16Tx Brand :Phoenix Contact/Schneider/Equivalent	Unit	1		
6.5	Panel Boards with all ancillaries & Integration When a panelboard is used as service entrance equipment, it must be located near the point of entrance of building supply conductors. In a main lugs only panel, the number of breakers or switches directly connected to the main bus must be limited to six. In a panel having a main breaker or main switch, the number of circuits are not limited except as may be provided under other panelboard requirements, i.e., lighting and appliance branch circuit panelboards Brand: Local	Unit	2		
6.6	Controller for Trafo Sequential closing To perform logic in sequential closing of Trafo LV outgoing breakers Brand:Phoenix Contact/Schneider/Equivalent	Unit	1		
7	Relocated the Generators dismantle the existing three generators (1825KVA, 1300KVA,810KVA) and reinstall and re-connect in the new generator's building. The price includes but not limited to; dismantle the separated daily fuel tanks and reinstall them in the new location beside the generators building and re-connect the daily tanks with the existing underground fuel tank (beside the workshop), including all required pipings, fittings, accessories with the same existing specification and Connecting the exhausts outside the building through the exhaust louver windows with required isolation.	L.S	1		
Total MicroGrid Works (\$)					



Construction of Solar Energy System
For
Khan Younis Waste Water Treatment Plant
(KY WWTP)



Item No.	DESCRIPTION	UNIT	QUANTITY	UNIT PRICE	Total AMOUNT
				(USD)	(USD)
	BILL NO.5 - Admin Building				
1	EXCAVATION WORKS Notes: All prices of Excavation works items shall be include the following: 1- Submit shop drawings for all works and approved it by the engineer before commencement the works. 2- Submit grid of the natural ground levels (existing) every 3m×3m before starting the works and approved it from the supervisor engineer. 3- Remove & Clear the site from rubbish, trees, shrubs, debris, concrete, boundary of wallsetc. to be ready of starting the works. 4- Remove any obstacles may be facing the works. 5- Excavation works in any soil (sand, clay, rocks, kurkar ,etc.). 6- Storing selected excavated material inside the site (which approved by the supervisor engineer) to re-use it another time in backfilling process, and the other material or surplus should be transfer it out of the site according to instruction of the supervisor engineer. 7- If the excavated material is not fit use for backfilling, the contractor must supply new material (clean sand or kurkar) from out of the site for backfilling. 8- Support all excavation sides of the works from the heights point to the lowest point of the design levels to be safe, the same thing must be done for the neighborhood buildings and structures that occur near the location of excavation boundary. 9- All Works must to be according to drawings , specifications				
1.1	Excavation from natural ground level up to required designed level. The works including compacting the design level soil surfaces to get at least (98% MDD) and deposit the selected excavated material on the site and remove the excess excavated material to any site according to engineer instructions	M3	18		
1.2	Backfilling, compact Imported selected soil (kurkar or clean sand) and fill in layers 20 cm thick in all places require for soil replacement and backfilling to make up levels according to the drawings, (98% MDD) as per specifications, drawings and engineers instructions	M3	32		



2	CONCRETE WORK The Prices for all concrete works (items) shall include the following: 1- Submit shop drawings for all concrete works and approved it by the supervisor engineer before commencement the works. 2- All material must be approved before starting the works. 3- All concrete to be used in the project, must be from ready mix concrete. 4- Approved additives and admixtures 5- Factory of Ready mix concrete must be approved from competent authorities. (The Ministry of Public Works and Housing) 5- Supplying, Casting, vibrating and curing all elements of concrete as shown in the documents. 6- All form works, shuttering in any form (wood or steel), shape, decoration, fabrication, arches and size. Making chamfered and curved edges, making good grooves and sleeves, surface finishing 7- Painting all exposed surfaces of underground reinforced concrete elements with at least one primer coat & two coats of hot bituminous paint (75/25), the strokes of each layer to be opposite to each other 8- Supplying reinforcement steel of any grade needed, size and length as detailed in the drawings, storing on the site including cutting, bending and fixing in position and providing all tying wires, spacers, testing and bar bending schedules 9- All material needed to execute the works completely for example but not limited: (all concrete types, Vibrators, steel with all diameters & size, shuttering, hollow blocks, pipes &				
2.1	Supply and cast plain concrete; (B200) for Blinding; thickness as per drawings .	M3	2		
2.2	Supply and Cast Reinforced Concrete (B250) for Foundations	M3	4		
2.3	Supply and Cast Reinforced Concrete (B250) for Suspended for solid slab 20cm thick including (inverted & hidden beams) , decorative arches) , also the item includes supplying , installing and fixing all necessary mechanical (rain water , drainage , plumbing & sewage) and electrical works buried inside concrete.	M2	70		
2.4	Supply and Cast Reinforced Concrete (B250) for ground slab 10 cm thick with steel mesh 8mm diameter every 20 cm including polythene sheets below concrete slab, also the item includes supplying, installing and fixing all necessary and electrical works underground slab for ground floor utility . as per specifications, drawings and engineer instructions.	M2	60		
2.5	Supply and Cast Reinforced Concrete (B250) for Ground beams	M3	8		
2.6	Supply and Cast Reinforced Concrete (B250) for sills, and lintels, and where it is required , as per drawings, and engineer instruction	M3	1.5		
2.7	Supply and Cast Reinforced Concrete (B300) for Neck Columns & Columns (fair face).	M3	4		



3	MASONRY WORKS Notes: All prices of Masonry works items shall be include the following: 1- Submit shop drawings before starting the works & approved it by supervisor engineer. 2- Supplying and testing all required materials. 3- Samples must to be approved before supplying material to the site 4- Minimum compressive strength of hollow blocks not less than 35 kg/cm ² , and 70kg/cm for solid blocks. 5- Workmanship, material {(mortar of cement (1 Cement: 3 sand), sand, Lime, water, R.Steel ,etc.)} , loading & unloading material. 6- The method of construction the block walls should be as a zig-zag. 7- Curing blocks before & after erection. 8- Supply & cast filling R.Concrete (B250) between hollow block walls & other concrete elements & where is necessary with 2T10 mm vertical reinforcement and 1T8 mm horizontal every 42 cm.				
3.1	SUPPLY & BIULDING 200 mm Thick hollow blocks.	m2	115		
3.2	SUPPLY & BIULDING 100 mm Thick hollow blocks.	m2	38		
4	PLASTERING WORKS The Prices of Plastering Works shall include the following: 1- Supply all of materials needed to execute the work completely, like (galvanized angles for exposed edges , galvanized mesh (wire mesh) between block and concrete , mixing , scaffolding , curing , workmanship , cement , sand , lime , B.G.bond , water , tools , and.....etc, anywhere else ,needed). 2- Fill and close all spaces & holes around & above the electrical and water installation works with cement & sand mortar , (using slice of G.S mesh - width 20cm). 3- Clean the surfaces and remove all objects like :(wood , nails , wires ,concrete , &.....etc) before plastering. 4- Additional coat of plastering with mix (1 cement : 2 sand) should be executed for the first of 40cm from the bottom for internal walls only. 5- Galvanized steel angles should be fixed from all Sides of (wall, columns , soffits and...etc. / Where is necessary) edges, and from internal and external walls. 6- All the works must be according to specifications ,				
4.1	Supply and make internal plastering of 15mm thick for internal walls, columns and ceiling with two coats: the first one is 5 mm (rough primer nail rendering) with (1 cement: 2 sand), the other coat is 10 mm with (1 cement: 3 sand 0.25 lime). All surfaces must be smooth & ready to receive the painting works	m2	120		



4.2	Supply and execute Gar Gameesh Italian - oikos finish (قسارة/شلخنة إيطالية) and plastering 25mm thick for the external elevations with the following coats: the first coat is cement and sand mix (1:2) of 5mm thick, the 2nd coat is 5 mm rough primer nail rendering with (1 cement: 2 sand), the 3rd coat is cement: lime: sand (1:0.5:4) and the 4th coat is primer (blankor) coat of gar gameesh, the last coat is gar gameesh Italian finish with minimum thick 3mm. The price includes Galvanized Steel angles; surface tamping and trawling to produce wearing surface where required by the engineer. The color, texture, material and pattern according to the engineer approval.	m2	150		
5	Tiling & Marble Works The Prices of tiling and marble works shall include the following: 1- Submit samples and shop drawings to the engineer for approval before starting the work. 2- Supplying all required material. 3- Testing all material to be used in the project. 4- Supplying & spreading 5-10cm at least clean sand under tiles & where is necessary. 5- All tilling works must be filled with approved material and mechanically chamfered & polished. 6- All ceramic tiles to be used should be Spanish or equivalent European made (Class A). 7- All tiles & colored (Ceramic , Granite , marble....etc.) must be according to the engineer instructions. 8- All tiling work must include supplying and installing skirting as the same type and color. 9- All floors of wet areas (kitchen, bathrooms, toilets &...etc.) must be isolated /painted by one coat of prime, then at least three coats of hot bitumen (25/75) and two coats of Canvas between.				
5.1	Supply and install 40x40x0.8 cm full body EU made Grade A porcelain tiles Spanish or equivalent. Rate includes the supply and installation of 3 cm white cement mortar, white cement sand fill blew tiles(1:4), 8cm height skirting from same tiles, grouting and polishing all as per drawings, specifications and Engineer's instructions.	m2	50		
5.2	Supply and install best quality , non-slipping , And color as determined by the supervising engineer ceramic floor tiles (grade A) Spanish or equivalent with size 300 mm x 300 mm x 8mm or any other dimensions needed for : bathrooms , toilets & buffet , laid on 25mm mortar .The price includes decoration works	m2	3		
5.3	Supply and install white glazed ceramic wall tiles, or any color approved by the engineer, size 25cm x 40cm x 6mm thick laid on mortar backing (Spanish or equivalent) for toilets & buffet. The price includes decoration works, aluminum angles at corners , also includes ; surface preparation to receive tiles which shall include two coats of cement plaster (scratch and float coat) and approved adhesive materials , accessories and grouting.	m2	33		



Construction of Solar Energy System
For
Khan Younis Waste Water Treatment Plant
(KY WWTP)



5.4	Supply and install basalt terrazzo floor tiles (grade A) size	m2	8		
5.5	Supply and lay marble (Local Marble type or equivalent / class A / free of defects) chamfered & polished, 3cm thick for windows sills and others laid on 2.5cm thick mortar bed, the width of marble is variable according to engineer instructions, the work includes making all needed grooves.	m2	5		
5.6	Supply and lay Granite stair treads first class (Rozabeita type) 33cm wide 3cm thick, laid on 2.5cm thick mortar bed for the internal main stairs and where it needed	l.m	5		
5.7	Supply and lay Granite first class (Rozabeita) for riser case 2cm thick for internal sides with average height of 16cm from the finishing floor level including the pasting materials for <u>internal & external main stairs</u>	l.m	5		
5.8	Supply and install high quality Granite first class (Rozabeita) for cabinet case 2cm thick top cover of with over all width 60cm. The price includes aluminum doors for cabinet, Rozabitta type for two direction supporting/dividers (3cm thick) , skirting Rozabitta type, 2cm thick , 10cm height) and shelves (2cm thick) and all accessories, fitting and making holes for sinks and water and gas supply as per specification and drawings and to be approved by the engineer.	l.m	1.5		
6	PAINTING WORKS The Prices of the Painting Works shall include the following: 1- Supplying all the required material (paints, putty,....,) approved from Authorized institutions. 2- workmanship. 3- All walls , ceilings and other elements to be painted should be cleaned & dry , smooth. 4- The colors must be computer mix according to the Engineer approval. 5- Submit the catalogue & samples before starting the works & approved it. 6- All material to be used must have a valid quality certification from the Palestinian Institute for Standards & specifications. 7- Testing all of the material. 8- Repair all defects & cracks in the plastering by suitable material (Sika-Flex) before starting painting works. 9- All works must be according to specifications, drawings, and the engineer instructions.				
6.1	For internal walls, Supply and Apply at least 3 coats of different colored oil paint including one primer coat (super Pandrole) , two coats of putty , one primer coat of oil (undercoat) to internal surfaces as specified in the drawings.	m2	63		
6.2	To Ceilings , Walls & Others , Supply and Apply High acrylic emulsion paint (Supercryel Paint) and shall be applied on smooth and well finished surfaces in minimum of three coats over one coat of primer (super Pandrole) as specified in the drawings	m2	75		



7	CARPENTRY & JOINERY The Prices of (Carpentry & Joinery) work shall include the following : 1- Supplying and testing all carpentry material. 2- The leaf should be surrounded by edge of hard wood zan (Beech) as shown in the drawings , and covered by plywood 4mm thick , including frame cover mold, architrave. 3- Hardware locked type VERO (SWITCH) or equivalent , accessories, fittings, ironmongery , Stainless steel hinges , heavy S.S handles (Doganlar or equivalent) , bolts and all necessary parts needed to complete the works. 4- Painting all elements of the door (Frame , leaves..etc.) with oil paints as specified in the specification. 5- The width of door frames must be suitable for the finishing works (according to the engineer instructions) & galvanized steel frame 2mm thick. 6- Making wooden salience around the leaves (between plywood layer & main frame of the leaves to avoid any cracks later (size & shape of salience determine by engineer). 7- All works must be according to specifications, drawings, and the engineer instructions				
7.1	Supply, fix & paint flushed wooden internal door type WD01 overall size 800x230cm thick , The items include supplying carpentry works from soft white (Swedish wood) include galvanized steel frame 2mm thick, architrave, hard ware locked type Vero switch or equivalent and stainless steel hinges 10 cm height, handle, stopper and the price include painting one primer, undercoat and two coats of approved colored paint and all according to specification, approved drawings and Eng. instructions.	No.	1		
7.2	Ditto but size 90x230cm thick type ; WD02	No.	3		
8	Aluminum Works The items below (Aluminum works) include supplying and fixing anodized coated colored aluminum windows with min. thick 15 micron, (type 7000 for sliding windows 3 streams) Jordanian Type or Approved Equivalent with minimum thickness 1.4 mm for the frame and 1.25 mm for leaves and 4500 with minimum thickness 1.7 mm for hinged windows local, Turkish, Jordanian Type or Approved European Equivalent and all needed fittings with all its requirements as frame, color glass (Belgium) 4mm thick for windows sliding fly screen leaves (FOR EXTERNAL SLIDING WINDOWS ONLY), ironmongery, accessories and hardware as per specifications, drawings and Engineer's instructions. The contractor should submit sample and shop drawing for approval by the Engineer before starting. The material used must have a valid quality certification from the Palestinian Institute for Standards and Measurements and must be tested. The works include maintain all damaged walls, all Works According to Drawing and Specifications.				
8.1	Type-1; profile 7000	m2	11		
8.2	Type-2; profile, 4500	m2	0.5		



Construction of Solar Energy System
For
Khan Younis Waste Water Treatment Plant
(KY WWTP)



9	METAL WORKS The works shall be include: 1- Painting all the steel elements with one coat primer, under coat and two coats of oil paint (anti rusted paint) (type hummerton) 2- Colors: Two or Three colors for the door leaves and one color for the frames. 3- Installation between the wall and throat Using concrete (B				
9.1	Supply and fix mild steel protection for windows, the price includes mild by welding to the frame and tow vertical steel stiffeners. Fixed on walls by steel angle ties painting with oil paint ,all according to drawing specification and engineer instructions	m2	12		
9.2	Supply and fix flush galvanized steel door , Type (SD01) with overall size (100x230cm) double sheets(2mm thick) complete with frame ironmongery , hardware (hinges , handles, locks ...etc) and oil painting and the price include locked type Wally switch according to drawings and specifications.	No.	3		
10	ROOFING WORKS				
10.1	Supply and cast Light weight insulation concrete (70mm Average Thickness) as specified laid to falls and Cross falls including 50mm thick (minimum) cement and sand (1:4) angle fillet 50x50 mm. , As specified and shown on drawings.	m2	75		
10.2	Supply and lay Bitumen Membrane Waterproofing (polybid) to roofs as specified, one layer; 4mm thick including prime coat and priming of concrete surfaces, dressing into walls and rain water outlets to form waterproof seal, including all accessories the price include verticals parts skirting as specified and shown on approved drawings .	m2	75		
11	Mechanical Works All Sanitary fixtures shall be approved by the Engineer.				
11.1	Supply, install, test and commission Vitrous China wash basin (58x44cm), First Class, completed with chrome plated mixer, bottle trap, soap tray, chrome plated angle valves, flexible tubes, wall fixed mirror size (60 X 40) and all accessories, supports and hangers. upon completing the work.	No.	1		
11.2	Supply and fix stainless steel kitchenette sink size60cmx40c (foster) or equivalent, complete with waste, fitting, trap, chain, chrome mixer, First class, steel brackets supports and the drainage line 2" to floor trap as per specifications and engineering instructions	No.	1		
11.3	Supply, and install Vitreous China, European type W.C. First Class, completed with 2.5 Gallon Vitrous China flush reservoir, roll holder, chrome plated angle valves and flexible connections, supports, hand spray with flexible chrome connection and all necessary fittings	No.	1		



Construction of Solar Energy System
For
Khan Younis Waste Water Treatment Plant
(KY WWTP)



11.4	Supply, install and test UPVC pipes Diam. 6" thickness 4.7mm, SN-8 for drainage, rain water and sleeves according to Palestinian Institute for Standards and Measurements, fixed in walls, floors, exposed or in shafts including all exposed elbows and turns provided with perforated caps on roof, clean outs. Including excavation and backfilling completed with all necessary finishing and cover. Prices to include all concrete encasement with columns, Walls,...etc.	l.m.	10		
------	--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------	------	----	--	--



Construction of Solar Energy System
For
Khan Younis Waste Water Treatment Plant
(KY WWTP)



11.5	Ditto but Diam. 4" thickness 3.2mm	l.m.	15		
11.6	Ditto but Diam. pvc pipe , thickness 2.2mm	l.m.	3		
11.7	Supply, install and test floor gully trap with stainless steel cover (15X15)cm with all connection asw per specification and engineering instructions .	No.	2		
11.8	Ditto but for roof rain water	No.	1		
11.9	Supply, install & test HDPE pipe for water system, Diam. 1", including excavation & backfilling with clean sand, jointing using all necessary air vents, fittings, valves and fixing with brackets screwed to concert	l.m.	10		
11.10	Supply and fix cold water storage plastic tank,1.5 m3 capacity, approved type, complete with vent, over flow, drain valve, float switch, gate valve, galvanized steel base(50x50x5mm) 50cm height and all related works, as specification, drawings and engineer instruct	No.	1		
11.11	Supply, install & test PEX pipes.(16mm Dia. & 25mm. Dia.) complete with water distribution box, 5 outlets for cold and 3 outlets for hot,supports, valves, vents, headers, closet with aluminum leaves, sleeves and all the related work, as specification, drawings and engineer instruction.	No.	1		
11.12	Supply, install & test Electrical water heater 40 liter capacity complete with all necessary valves ,air vent ,fittings, all electrical connection and all the related work, as specification, drawings and engineer instruction.	No.	1		
11.13	Supply, install & test Manholes with cast iron cover,Size d 60cm , 8 ton bearing capacity ,according to I.S, prices to include external bitumen painting, excavation, construction plastering proper benching backfilling and all required as per drawings specifications and Engineer satisfaction	No.	1		
11.14	Supply, construct & test of circular solid blocks & reinforced concrete absorption bit related works, With a reinforced concrete ring, 20x40cm and cast iron covers 60cm diameter, 15cm thick reinforced concrete slab, 25ton bearing capacity according to detailed drawings, price includes all necessary civil, mechanical, external & internal works as specification, drawings and engineer instruction. The absorption bit is 2.70m dia. & 3m depth	No.	1		
11.15	Supply, install, test and commission water pump, completed with all necessary isolating valves, check valves, fittings, strainers, flexible connections, dry run protection and supports with electrical control panel and all required cable connections as required by specifications, drawings and Engineer satisfaction.	No.	1		
11.16	Supply, install, test & commission a (5kg) powder fire extinguisher, complete with all related works	No.	3		
11.17	Supply, install, test & commission a (5kg) (BCF) gas fire extinguisher, complete with all related works	No.	3		



12	ELECTRICAL WORK Supplying, installing, testing and commission all of the electrical works as per drawings, specifications, and engineer's instructions. The prices of the following items include all necessary junction boxes, wires, conduits, labeling of all sockets and switches, clamps, bolts, connectors and connecting all cables to switch boards. The price includes all required Reinforced concrete works B250 to all items in this Bill. All installation shall be in accordance with : · The drawings, specifications and instructions and demands of the engineer. · The electricity law and electrical code requirements of the BRITISH standards. · The contractor should refer to the drawings, specifications and other Contract Documents. All roof electrical items should be waterproofed and sun proofed · Contractor shall submit shop drawings for all Electrical installations to be approved by the Supervisor Engineer before executing the work. As-made drawings shall be submitted after completing the work · The prices will be deemed to include for the full cost as described in all Documents · Detailed shop drawings showing the internal				
12.1	Lighting Fittings Supply, install, connect, clamps, conduits, wires and/or cables of not less than 3x1.5mm ² , and all accessories to provide complete fitting with all terminal, fixtures, works and allrelated parts. The price shall include the lighting fixture, c/w all related parts. The price shall include the lighting fixture, c/w required accessories , materials and/or works that may needed to make the system functional acc. to the drawing general specs and all other relevant prevailing engineering standards for the successful completion of work to the satisfaction of the engineer. All works and materials shall be approved by the engineer prior to placing orders.The Lighting fixture types shall include the followings:				
12.1.1	Supply, install, connect and test LED lighting fixture 43w,6200 Lm,4000 k complete with rigid PVC conduits, J.bboxes, fixing screws (Galv.) and wiring. (Type is GEWISS model GWS 3236T DISANO or equivalent)	No.	9		
12.1.2	Ditto,LED Spot downlight 14W LED LIGHTING FOR RECESSED MOUNTING(150mm DIA , 14watt,4000K, 1360 Lm). WARM complete with Driver, rigid PVC conduits, J.bboxes, fixing screws (Galv.) and wiring (Type is LEDVANCE OSRAM or equivalent)	No.	3		
12.1.3	Supply, install, connect and test circular luminaire LED lighting fixture with LED lamp 10W Osram type ,wires, conduits, j. boxes and fixing screws for ceiling mounted its use for ceiling WC, stairs & balcony IP65 . (Type is GEWISS model GW80761 DISANO or equivalent)	No.	3		



Construction of Solar Energy System
For
Khan Younis Waste Water Treatment Plant
(KY WWTP)



12.1.4	Ditto, but wall mounted.IP65(Type is GEWISS ,PHILIPS,DISANO or equivalent)	No.	4		
12.2	Switches & sockets:				
12.2.1	Supply, install connect and test single pole one way switch, 220v, 13A, complete with PVC conduits, J.bboxes, wiring, cover and all necessary accessories. (Type is GEWISS Chorus no. GW 10 001 or equivalent)	No.	1		
12.2.2	Ditto, but water proof.	No.	1		
12.2.3	Supply, install connect and test one way, two pole switch, complete with PVC conduits, J.bboxes, wiring, cover and all necessary accessories. (Type is GEWISS Chorus no. GW 10 001 or equivalent)	No.	3		
12.2.4	Supply, install connect and test one way, three pole switch, complete with PVC conduits, J.bboxes, wiring, cover and all necessary accessories. (Type is GEWISS Chorus no. GW 10 001 or equivalent)	No.	4		
12.2.5	supply, install connect and, testing single socket outlet 16A, 220v, 2p+E for flush or surface mounting, complete with PVC conduits, J.bboxes, wiring, and all necessary accessories. (Type is GEWISS Chorus no. GW 10 281 or equivalent)	No.	15		
12.2.6	Ditto, but water proof (Type is GEWISS Chorus GW 10 281 or equivalent)	No.	3		
12.2.7	supply, install connect and, testing Double socket outlet 16A, 220v, 2p+E for flush or surface mounting, complete with PVC conduits, J.bboxes, wiring, and all necessary accessories. (Type is GEWISS Chorus GW 10 281 or equivalent)	No.	6		
12.2.8	supply, install connect and, testing water heater switch 16A, 220v for with indication lamp flush or surface mounting, complete with xlpe cable 3x4mm ² , PVC conduits, J.bboxes, wiring, and all necessary accessories. (Type is GEWISS Chorus no. GW10002 or equivalent)	No.	2		
12.3	Telephone, SAT & Computer System				
12.3.1	Supply, install telephone socket outlet 6 pin for surface/flush mounting, complete with 3px0.5 cables from socket outlet to sub-telephone box and all necessary accessories. (Type is GEWISS Chorus or equivalent).	No.	4		
12.3.2	Supply, install sub-telephone box made from pvc ,30x40 cm complete with all connection strips (1 krone), termination, complete with all necessary accessories according to drawing	No.	1		
12.3.3	Satellite socket outlet, the item shall include SAT socket outlet, coaxial cables to related switch, PVC conduits minimum Ø20mm, boxes and all needed accessories to complete the job as specified and as shown on the drawings (Type is GEWISS Chorus No.GW10 372 or equivalent).	No.	3		
12.3.4	Complete satellite system with all required coaxial cables, to sockets complete with Dish and fixing base (diameter is 0.5 m), LNB (4 output) and all required accessories to complete and test the work successfully	set	1		
12.3.5	Network Socket : supply and Install internal Brand Name Computer Socket outlet with cat 6A, female 8 pin RJ 45 including data cable Cat 6A, S/SFTP from computer socket outlet to rack Patch Panel (Type is premuim line or equ.)	NO	4		



Construction of Solar Energy System
For
Khan Younis Waste Water Treatment Plant
(KY WWTP)



12.4	Distribution panel board. Supply, install, test and commission Electrical panel board DB-GR as specified and as shown on related drawings, factory assembled wired and tested in accordance with international standards, including 2mm Galv. Steel frame with anti-static paint including circuit breakers, bus bar, neutral and earthing bus bar, terminal and all necessary materials to hand over clean and tested in operating conditions, 30% empty spare area. (Type is Eaton or equivalent).	No	1		
12.5	Earthing system: Supply, install and commission earthing system according to drawing to obtain 2 ohm max resistance including : Concrete manholes Dia. 60cm with 5 ton ring cover including copper electrodes driven into ground and connection to MDB .	L.S	1		
Total Admin Building Works (\$)					



GRAND SUMMARY

DESCRIPTION	TOTAL AMOUNT (USD)
BILL NO.1 - Civil Works	
BILL NO.2 - Lighting & Medium Voltage Works	
BILL NO.3 - PV PLANT	
BILL NO.4 - MicroGrid	
BILL NO.5 - Admin Building	
GRAND TOTAL(USD)	

Note: All Prices to Exclude VAT

The sum of :

Contractor: -----

Signature: -----

Date: -----