

Philippine Ports Authority
PORT MANAGEMENT OFFICE – MINDORO
Engineering Services Division
San Antonio, Port Area, Calapan City
Oriental Mindoro

**REPAIR OF PORT LIGHTING SYSTEM
PORT OF MANSALAY, ORIENTAL MINDORO**

Technical Specifications

I. GENERAL CONDITION

The Work generally consist of furnishing of all labor, materials and equipment required to carry out and complete the ***Repair of Port Lighting System, Port of Mansalay, Oriental Mindoro***, in accordance with the contract drawings and in conformity with these specifications.

PLANS AND SPECIFICATIONS

All drawings, whether in small scale or detailed, are intended to correspond with specifications to form part thereof and the contract documents. Where figures are given, they are to be followed in preference to measurement by scale. Anything shown on the drawings but not indicated in the specifications or vice-versa or anything not expressly set forth in either but which is reasonably implied, shall be furnish and installed as though specifically shown and mentioned in both, without extra cost to PPA.

II. PROJECT SIGNBOARD

The Contractor shall prior to start of physical activities, install two project billboards consisting of the Project Name and Location, Contractor, Contract Cost, Date Started, Contract Completion Date, Implementing Office, and Source of Fund. The Contractor shall coordinate with the PPA Project Engineer in fixing the location of said billboards including its contents, make and dimensions. The dimension and/or area of each billboard shall, however, not be less than 1.22m x 2.44m (2.88 sq.m.) or tarpaulin posted on 1/4 inch marine plywood.

III. SCOPE OF WORKS

1.00 General Expenses

1.01 Mobilization, Demobilization and Cleaning Up

The Contractor shall mobilize and put into work all personnel, plant, and equipment required to undertake the works. The minimum equipment required to be mobilized at site are the following:

	<u>Equipment Description</u>	<u>Quantity</u>
1	Manlift Crane	One (1) Unit
2	Cargo/Elf Truck (2-5Tcapacity)	One (1) Unit
3	Concrete Saw (Cutting Depth=1' 1/16")	One (1) Unit
4	Jackhammer w/ compressor, 350cfm	One (1) Unit
5	Truck Mounted Crane, 35T	One (1) Unit

6 Welding Machine (400A)

One (1) Unit

2.00 Removal / Dismantling and Turnover Works**2.01 Removal/Dismantling and Turnover of Defected and Damaged Solar Lightings including Demolition/chip-off of R.C. Curb for Additional Pedestals and Battery Box.**

The work includes the furnishing of all labor and equipment required to carry out the removal/dismantling and turnover of defected and damaged solar lightings including demolition/chip-off of R.C. Curb for additional pedestals and battery box.

Waste materials shall be hauled and dumped in the area designated by the engineer/PPA representative while salvaged materials shall be turned over to the Authority.

3.00 112W LED Solar Floodlight**3.01 Supply and Install Tapered Steel Post including Pedestals and Battery Box**

The work shall include but not limited to the furnishing of all labor, materials, equipment and incidentals necessary to complete the supply and Installation of tapered steel post including pedestals and battery box as instructed by the PPA Engineer.

Materials to be used shall be brand new and shall conform to the following requirements:

- Single Bracket Type, Tapered Steel Post including accessories
3" Top dia x 7" Base dia x 25 feet x 4.5 mm

Concrete

The work shall include but not limited to the supply and placing of concrete inclusive of transport in accordance with these specifications and where shown on the Drawings.

Specifications of the materials comprising the concrete mixture shall conform to the following:

Cement – the cement to be used shall be ordinary Portland cement, ASTM Type 1 designation C150. Quality test for every 2,000 bags (40kg) or fraction thereof is required.

Fine Aggregate – for concrete and mortar shall be clean and complying with ASTM C33 specifications for concrete aggregates. The sand shall come from approved sources and sand which in the opinion of the PPA Engineer has become contaminated shall be rejected and removed from site. Quality test for grading, elutriation (wash), bulk specific gravity, absorption, mortar strength, soundness, organic impurities, unit weight, % clay lumps and shale for every 1,500 cubic meter or fraction thereof is required.

Coarse Aggregate – shall comply with ASTM C33 specification. It may either be natural gravel or stone crushed to the desired size and shall only be obtained from approved quarries. Quality test for grading, bulk specific gravity, absorption and abrasion for every 1,500 cubic meter or fraction thereof is required.

Water – clean fresh potable water shall be used for the mixing of all concrete and mortar mixtures. Sea water shall not be used at any time. Certificate from the Engineer or quality test for density and chloride content per source is required.

Concrete mixer shall be stationary mixer i.e. one bagger mixer. The mixer must be capable of combining the materials into a uniform mixture and of discharging this mixture without segregation.

Concrete shall be handled from one bagger mixer, placed to final deposit in a continuous manner, as rapidly as practicable and without segregation or loss of ingredients until the activity of placing concrete is completed.

Prior to placing of concrete, debris, dirt and other foreign materials shall be removed from the interior of the forms and from inner surface of mixing equipment. Temperature steel reinforcing bars shall be secured in position and shall be inspected and approved by the PPA Engineer before placing the concrete.

Ideally, the temperature of concrete during the period of mixing, transport and placing should not be more than 32° C. Where cold joints tend to form or where surfaces set and dry too rapidly or plastic shrinkage cracks tend to appear, concrete shall be kept moist by fog sprays, or other approved means, applied shortly after placement and before finishing.

Where applicable, immediately after placing, each layer of concrete shall be compacted by internal concrete vibrators supplemented by hand spading, rodding and tamping as necessary.

Concrete shall be protected adequately from injurious action by sun, rain, flowing water and mechanical injury and shall not be allowed to dry out from the time it is placed until the expiration of the minimum curing periods specified herein. Curing shall be accomplished by moist curing or by application of liquid membrane forming compound.

As the work progresses, cylinder samples shall be taken and tested in accordance with standards for testing of concrete cylinder samples. One set of three cylinders shall be sampled for every 50 cu.m. of concrete placed or at least one set shall be made for each day of concrete pouring. Tests will be made at 7 and 28 days from time of sampling. The average of the strengths of the three cylinders tested shall not be lower than the specified compressive strength of 3,500 psi.

Reinforcing Steel Bar (RSB)

Steel reinforcement used shall have deformed surfaces and shall conform to ASTM as follows:

16 mm Ø and above – ASTM 305, Min. Yield Strength of 414 MPa

12 mm Ø and below – ASTM A615-74a, Min. Yield Strength of 275 Mpa

Reinforcement shall be free of loose or flaky rust and mill scale, or coating and any other substance that would reduce or destroy the bond with concrete. Wire brushing of the concrete may be required before fixing in order to achieve the required condition. Reinforcement shall not be bent or straightened in a manner injurious to the steel or concrete. The use of heat to bend or straighten reinforcement shall not be permitted. Bars with developed cracks or splits shall be rejected and replaced.

Splices and overlapping in reinforcement where applicable shall conform to current standards and accepted engineering practice. Lap lengths shall not be less than 40 times the reinforcing bar diameter or as shown on the drawings or otherwise directed by the PPA Engineer. All laps shall be staggered or made at points where steel stress has fallen to less than half the allowable stress. Where lap shall not be staggered or be made at points of reduced stress, lap length shall be increased by 30%.

Mill Certificate and quality test for chemical composition and mechanical properties for every 10,000 kilograms or fraction thereof.

3.02 Supply and Install LED Solar Streetlight including Accessories including commissioning.

The work shall include furnishing of all labor, materials and equipment necessary to complete the supply and installation LED solar streetlight including accessories including commissioning as shown on the drawings and/or as directed by the PPA Engineer.

The contractor shall submit for approval of the PPA Engineer, brochures/manuals of the following materials listed below to be installed which shall be reviewed by the PPA Engineer. If found satisfactory and in accordance with the standard requirements of PPA, approval shall be given, subject however, to the standard tests as deemed necessary which the proposed Electrical Fixtures should pass prior to their delivery at site.

The newly acquired electrical fixtures and accessories to be used shall be brand new and shall conform to the following requirements:

- a) 112W LED Solar Streetlight (Cool White)
- b) 200AH/12V Gel Battery (52.2x24x21.6cm) 56kg
- c) 225W/36V Solar Panel (158x99x4cm) 18.2kg
- d) Solar Charger / Inverter (12V/30A)
- e) Battery Box (Double 200AH box)

Upon delivery at site but before installation, all Electrical accessories shall be inspected by the PPA Engineer to determine their physical conformance with PPA requirements as to dimensions, type, make, markings and acceptance tolerances. Electrical Fixtures not conforming to PPA requirements shall be rejected and replaced.

The Contractor shall guarantee all Electrical accessories against any defects that are attributable to faulty design and manufacture and shall also guarantee their performance under normal working conditions. The guarantee shall be for a minimum period of 12 months from the date of the issuance of the Taking-Over Certificate of the Works. During the period of guarantee, repairs and replacement of defective fixtures and/or material shall be carried by the Contractor at his own expense.

Testing and Commissioning

All feeder and branch circuit wiring shall be tested for circuit continuity and shall be tested to assure that the wiring system is free from short circuits, accidental grounding of other defects prior to energizing at normal system operating voltage.

After the contractor has assured himself that the wiring system are free of faults, the contractor shall then energize the system from their normal power source and confirm that all system are operational as required by the contract documents, prior to final inspection.

At a specific time which shall be determined by the Electrical Engineer, the contractor shall demonstrate that the entire electrical system is operational and will function as required prior to final project acceptance.

Guarantee and Certificates

Upon completion and before final acceptance of the work, the contractor shall furnish the Engineer a written guarantee stating that all works executed are free from defects on all materials, equipment, fixtures devices and workmanship for a period of one year from the date of written acceptance of the project. Any works of major materials that becomes defective during the period shall be replaced by the contractor at its own expense in manner satisfactory to the Engineer.

The work shall consist of testing and commissioning of electrical works.

III. MEASUREMENT FOR PAYMENT

In accordance with Section II Scope of Works of this Technical Specifications, the pertinent items of work described therein and to be executed by the contractor shall be measured and paid for according to the following terms:

- All scope of works, activities shall be paid in accordance with the unit price for said item of works done/completed indicated in the Bill of Quantities (BOQ), plan and certified by the PPA Engineer.

IV. As-Built Drawings and Photographs

- 1.00 Photographs taken before, during and after completion of the project shall be submitted as part of the documentary requirements for the progress billing.
- 2.00 At the completion of the Project, the Contractor shall prepare four (4) sets of "As-built" Drawings which shall be submitted to the PPA, PMO-Mindoro as part of the documentary requirements for the formers final billing. The as-built drawings shall indicate therein all the original items of work, changes, deviations and additional work items (if any), undertaken by the contractor to complete the project. The as-built drawings shall bear the title block prescribed by the PPA and shall be signed by the contractor's authorized representative prior to submission to PPA, PMO-Mindoro.

Section VII.

Drawings

Section VIII.

Bill of Quantities