

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

REPAIR OF PORT FACILITIES DAMAGED BY TYPHOON TISOY
PORT OF LUBANG, OCCIDENTAL 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 Facilities Damaged by Typhoon Tisoy, Port of Lubang, Occidental 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 and Demobilization

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>
Gas Torch	Two (2) Unit
Gas Tank w/ Gas	Two (2) Unit
One Bagger Mixer	Two (2) Unit
Electric Drill	Two (2) Unit
Pick-up Truck	One (1) Unit

Manlift Crane	One (1) Unit
Road Roller (6.35T vibratory)	One (1) Unit
Vibratory Plate Compactor (300-400mm width)	One (1) Unit
Payloader (1.06 cu.m.,93hp)	One (1) Unit
Backhoe (0.40cu.m., 91hp)	One (1) Unit
Concrete Transit Mixer (5.0 cu.m.)	One (1) Unit
Concrete Vibrator, 3.5hp	One (1) Unit
Welding Machine	One (1) Unit
Bar Cutter (25mm bar dia. max)	One (1) Unit
Bar Bender (25mm bar dia. max)	One (1) Unit
Chipping Gun	One (1) Unit
Electric Grinder	One (1) Unit
Jackhammer w/ compressor, 350cfm	One (1) Unit
Concrete Cutter, 5hp	One (1) Unit
Scaffoldings	One (1) Unit

2.00 Re-waterproofing of Roof Deck

2.01 Clearing, surface preparation and filling up of cracked surfaces.

The work includes the furnishing of all labor and equipment required to carry out the clearing, surface preparation and filling up of cracked surfaces.

PREPARATION OF SURFACES

All surfaces shall be free from dirt, dust, oil grease, efflorescence, loose cement, chalk, and other deleterious matter shall be removed and surface roughened when necessary to insure good paint adhesion. The method of surface preparation shall be left to the discretion of the Contractor, but results obtained shall be satisfactory to the Engineer.

All holes, cracks and depression shall be neatly filled with patching plaster, mixed, and applied to match existing plaster. Patches shall be sanded flush and smooth and properly sealed before applying prime coat.

For metal, dirt, weld splatter, rust, scale and other contaminants shall be removed by scraping, wire brushing and sanding as required. Oil and grease shall be removed with mineral spirits or appropriate solvent.

2.02 Supply and Place 5mm thk. Waterproofing Membrane

The work shall include but not limited to the furnishing of all labor, materials, equipment, and incidentals necessary to complete the supply and place 5mm thk. waterproofing membrane as indicated on the drawings and in accordance with the approved manufacturer's recommendations and as directed by the PPA Engineer.

Surface should be clean, free from oil, grease, dirt, any loose grit or mortar. Masonry surfaces should be wet first with water before applying mix to avoid abrupt drying and cracking of the applied modified cement, especially under hot and sunny conditions.

Apply 5 coats by brush.

The Contractor shall submit the procedure of waterproofing application for approval of the PPA Engineer

Waterproofing materials shall be applied only by an experienced applicator and shall be applied in accordance with the approved manufacturer's application procedures or methods, approved by the Engineer.

FLOODTESTING

Flood test for a duration of 48 hours shall be undertaken upon completion of waterproofing installation to determine any leakage or defect on the materials and/or workmanship.

2.03 Supply and Place 50mm Thk. Concrete Topping including Cement Waterproofing Compound

The work shall include but not limited to the furnishing of all labor, materials, equipment, and incidentals necessary to complete the supply and place 50mm thk concrete topping including cement waterproofing compound

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.

Early strength chemical for 3500 psi concrete strength at 4 days shall be mixed.

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 consisting of three concrete cylinder samples shall be taken from each day's pouring and to represent not more than 75 cu.m. of concrete or fraction thereof. 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.

Slump test for every mix of concrete is required.

Quality test for admixture and concrete curing materials per shipment is required

2.04 Supply and Place Cementitious Waterproofing

Refer to Item 2.02 for specifications

3.00 PICO Building

3.01 Dismantling of Old Ceiling and Dilapidated Electrical Fixtures, Cabinets and Doors and Old Tinted Flexiglass Skylight and Canopy Including Turn-over & Disposal of Items

The work includes the furnishing of all labor and equipment required to carry out the dismantling of old ceiling and dilapidated electrical fixtures, cabinets, and doors and old tinted flexiglass skylight and canopy including

turn-over & disposal of items as shown on the Drawings and as instructed by the PPA Engineer.

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.

3.02 Installation of Perforated Panel Ceiling Bone, Aluminum Framing and Tinted Flexiglass

The work shall include furnishing of all labor, materials, and equipment necessary to complete the installation of perforated panel ceiling bone, aluminum framing and tinted flexiglass as shown on the drawings and/or as directed by the PPA Engineer.

Materials to be used

1. 60 x 60cm Perforated Ceiling Bone (white) including Aluminum Clip-in and framing
2. 12mm THK. Tinted Flexiglass

Shop drawings for all finishing works for the building shall be submitted in advance review and approval. Shop drawings shall indicate materials and details of finishing works. The Contractor shall be responsible for all errors of detailing and fabrication, and for the correct finishing work items shown on the shop drawings.

The Contractor, before placing order for the finishing materials shall submit to the Engineer for approval representative samples of finishing materials. No placing of orders for material for finishing works shall be made without his approval.

3.03 Supply and Install Doors and Windows

The work shall include furnishing of all labor, materials, and equipment necessary to complete the supply and install door and windows as shown on the drawings and/or as directed by the PPA Engineer.

Materials to be used

1. Aluminum Sliding Window (5.00x1.80mm)
2. Aluminum Sliding Window (3.50x1.80mm)
3. Aluminum Sliding Window (1.35x1.80mm)
4. Aluminum Awning Window (0.70x0.50mm)
5. Aluminum Sliding Window (1.40x1.35mm)
6. Aluminum Sliding Window (3.50x1.50mm)
7. Aluminum Sliding Window (2.40x1.50mm)
8. Aluminum Sliding Window (0.76x1.50mm)
9. Aluminum Sliding Window (1.50x1.50mm)
10. Aluminum Awning Window (1.25x0.50mm)
11. Flush Door (0.85x2.10mm)
12. Flush Door (0.80x2.10mm)
13. Flush Door (0.75x2.10mm)
14. PVC Varifold (2.80x2.10mm)
15. PVC Louvered Door (0.60x1.60mm)
16. PVC Door (0.8x2.10mm)
17. Grille Door (0.90x1.80mm)

Shop drawings for all finishing works for the building shall be submitted in advance review and approval. Shop drawings shall indicate materials and details of finishing works. The Contractor shall be responsible for all errors of detailing and fabrication, and for the correct finishing work items shown on the shop drawings.

The Contractor, before placing order for the finishing materials shall submit to the Engineer for approval representative samples of finishing materials. No placing of orders for material for finishing works shall be made without his approval.

3.04 Supply and Place 3500psi of Concrete including Reinforcing Steel Bars

The work shall include but not limited to the furnishing of all labor, materials, equipment, and incidentals necessary to complete the supply and placing of 3500psi concrete including

Refer to Item 2.03 for specifications of concrete

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 rusts 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.

3.05 Remove and Dispose of Floor and Wall Tiles

The work includes the furnishing of all labor and equipment required to carry out the remove and dispose of floor and wall tiles as shown on the Drawings and as instructed by the PPA Engineer.

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.

3.06 Supply and Install of Glazed Floor and Wall Tiles and Unglazed Floor Tiles

The work shall include but not limited to the furnishing of all labor, materials, equipment, and incidentals necessary to complete the supply and install of glazed floor, wall tiles and unglazed floor tiles as indicated on the drawings and in accordance with the approved manufacturer's recommendations and as directed by the PPA Engineer.

Tiles shall be firmly laid on 1:2 cement mortars and the joint shall be filled with white cement paste. It shall be thoroughly soaked to water before using and shall be laid to the correct levels and grade upon installation and drying. It shall be carefully wiped and cleaned. The kind of tiles to be used shall be ceramic tiles on walling and flooring.

Tiles to be installed shall conform to the following requirements and approved by the PPA Engineer.

1. 60cm x 60cm glaze floor tiles
2. 60cm x 30cm glaze wall tiles
3. 60cm x 60cm unglazed floor tiles

3.07 Dismantling of Old & Damaged Plumbing Fixtures and Partitions Including Declogging of Drainage and Repair of Waterlines

The work includes the furnishing of all labor and equipment required to carry out the dismantling of old and damaged plumbing fixtures and partitions including declogging of drainage and repair of waterlines as shown on the Drawings and as instructed by the PPA Engineer.

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.

3.08 Supply and Install Plumbing Fixtures, Fittings, Water Pump, Aluminum Partitions, Cabinet and Super Black Granite Solid Panel Including Repair of Water Lines and Water Tank Siphoning.

The work shall include the furnishing of all labor, materials, equipment and other incidentals necessary to complete the supply and install plumbing fixtures, fittings, water pump, aluminum partitions, cabinet and super black granite solid panel including repair of water lines and water tank siphoning as indicated on the drawings and/or as directed by the PPA Engineer.

The contractor shall submit for approval of the PPA Engineer, brochures/manuals of plumbing materials, fixtures, and its accessories 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 should pass prior to their delivery at site.

The newly acquired Materials and Fixtures to be used shall be brand new and shall conform to the following requirements:

1. Waterless Urinal
2. Tabletop Basin Lavatory w/ heavy duty pop-up faucet
3. Water Closet including acc. (L745 x W380 x L825mm)
4. Minimalistic in wall bath shower fitting
5. Stainless Wall Mounted Clothes Rack (heavy duty)
6. Bidet Spray
7. 3-Way T Shape Diverter Shut Off Valve
8. Stainless Floor drain (heavy duty)
9. Stainless Kitchen Sink w/ stainer and accessories
10. Swivel Spout 360° High-Arc Kitchen sink Faucet and accessories
11. Bathroom Mirror (1.65x0.80m)
12. Water Pump (1.5 HP)
13. 1"Ø x 3m PVC Blue CWL
14. Aluminum Partition
15. Aluminum Urinal Partition (0.43x0.75)
16. Super Black Granite Solid Panel
17. Cabinet (including hardware accessories)

Upon delivery at site but before installation, all plumbing fixtures and its 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. Fixtures not conforming to PPA requirements shall be rejected and replaced.

The Contractor shall guarantee fixtures and its 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.

All plumbing and declogging works shall be done and supervised by experienced plumber and in accordance with its requirements.

3.09 Supply and Replace Dilapidated Electrical Fixtures and Lightings Including Switches and other Outlets & Cover

The work shall include the furnishing of all labor, materials, and equipment necessary to complete the electrical works 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 Materials and Fixtures should pass prior to their delivery at site.

The newly acquired Electrical Materials and Fixtures to be used shall be brand new and shall conform to the following requirements:

1. LED Double Downlight (Warm White 18W)
2. LED Ceiling Recessed Type Downlight (Round Daylight 15W)
3. LED Ceiling Recessed Type Downlight (Square Daylight 15W)
4. Window Type Inverter Aircon (1.5HP)
5. THHN Wire, 3.50 sq.mm.
6. THHN Wire, 8.00 sq.mm.
7. Electrical Panel Board w/ main 100A & 12-20A Circuit Breaker & Cabinet

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 systems 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.

3.10 Surface Preparation and Painting of Walls and Ceiling up to Second Coating

The work shall include furnishing of all labor, materials and equipment necessary to complete the surface preparation and painting of walls and

ceiling up to second coating as shown on the drawings and/or as directed by the PPA Engineer.

Materials to be used

1. Elastomeric Paint (Ready mixed) for perimeter fence and concrete gutter.

All painting works shall be done under conditions which shall not jeopardize the appearance or quality of the painting in any way. The Engineer shall have the right to reject all material such as high solid modified epoxy paint and polyurethane finish paint or work that is unsatisfactory and require the replacement of either or both at the expense of the Contractor.

The Contractor shall endeavor to protect the work of others during the time repainting work is in progress. The Contractor shall be responsible for all damage to any other work in the course of his painting job. Protective coverings shall be used to protect floors, fixtures, and equipment while painting; care shall be exercised to prevent paint from being spattered onto surfaces that are not painted.

WORKMANSHIP

All painting work shall be first class and in accordance with the best standard and practices of the trade.

The Contractor shall carefully examine all surfaces to be painted and before beginning any of his work shall make sure that the work of other trades has been installed in a workman like condition ready to receive paint. Metal surfaces shall be clean, dry, and free from mill scale, rust, grease, oil, or any other substance which could affect the quality of the painting.

Paint shall be applied at proper consistency and each coat shall be brushed evenly free of brush marks, sags, and runs. Care shall be exercised to avoid lapping of paint on glass or hardware. Paint shall be sharply applied to require lines. Finish paint surfaces shall be free from defects or blemishes. Surfaces from which such paint cannot be removed satisfactorily shall be painted or repainted as required to produce a finish satisfactorily to the Engineer.

Succeeding paint coatings shall be applied only when the previous coat is hard and dry.

All painting materials shall be used in strict accordance with manufacturers' directions, spread or flowed on smoothly with proper film thickness and without runs, sags, skips or other defects.

PREPARATION OF PAINT

Paint containers shall be delivered to the job site in manufacturer's unopened containers and shall be opened only required for use. Paint shall be mixed only in the designated room or space in the presence of the Engineer or his representative. Paint shall be thoroughly stirred or agitated to uniformly smooth consistency suitable for proper application. Unless otherwise specified or approved, no materials shall be reduced, changed, or use except in accordance with manufacturer's label or tag on container.

In all cases, paint shall be prepared and handled in a manner to prevent deterioration and inclusion of foreign matter.

PREPARATION OF SURFACES

All surfaces shall be free from dirt, dust, oil grease, efflorescence, loose cement, chalk, and other deleterious matter shall be removed and surface roughened when necessary to insure good paint adhesion. The method of surface preparation shall be left to the discretion of the Contractor, but results obtained shall be satisfactory to the Engineer.

All holes, cracks and depression shall be neatly filled with patching plaster, mixed, and applied to match existing plaster. Patches shall be sanded flush and smooth and properly sealed before applying prime coat.

For metal, dirt, weld splatter, rust, scale, and other contaminants shall be removed by scraping, wire brushing and sanding as required. Oil and grease shall be removed with mineral spirits or appropriate solvent.

4.00 Pavement

4.01 Remove and Dispose Existing Concrete Pavement

The work includes the furnishing of all labor and equipment required to carry out the remove and dispose existing concrete pavement as shown on the Drawings and as instructed by the PPA Engineer.

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.

4.02 Supply and Place 300mm Thk., 3500psi Concrete including Reinforcing Steel Bars

Refer to Item 2.03 for specifications of concrete

4.03 Supply, Spread and Compact 200mm Thk Gravel Base Course Materials

The work includes the furnishing of all labor and equipment required to carry out the supply, spread and compact 200mm thk. gravel base course material as instructed by the PPA Engineer.

Aggregate base course materials shall be natural gravel or crushed stone of maximum size of 19 mm. It shall be clean and free from vegetable matters lumps or balls of clay and other deleterious substances. The material shall be of such nature that it can be compacted readily to form a firm and stable base.

Required Test

Quality test for grading and plasticity for every 300 cubic meters of fraction thereof.

Quality test for grading, plasticity, abrasion, and laboratory compaction test for every 1,500 cubic meter or fraction thereof.

Laboratory California Bearing Ratio (CBR) for every 2,500 cubic meter or fraction thereof.

Field density test for every layer of 150mm of compacted depth at least one group of three In-situ density test for every 500 sq.m. or fraction thereof.

The base course bedding shall be laid according to its prescribed thickness and width as indicated on the Drawings and/or as directed by the PPA Engineer.

Placing of concrete shall not be allowed unless compaction requirements have been complied with as directed by the PPA Engineer

5.00 Solar Lighting

5.01 Supply and Place Reinforcing Steel Bars

Refer to Item 3.04 for specifications of reinforcing steel bars

5.02 Supply and Place 3500psi Concrete

Refer to Item 2.03 for specifications of concrete

5.03 Supply and Fabricate Battery Casing Cover

The work shall include furnishing of all labor, materials, and equipment necessary to complete the supply and fabricate battery casing cover as shown on the drawings and/or as directed by the PPA Engineer.

Materials to be used

1. Stainless Steel Sheet (4' x 8' gauge #25)
2. Stainless Handle with Screw
3. Stainless Steel Angle Bar (50 x 50 x 3mm)
4. Stainless Steel Flat Bar (1/8" x 1")
5. Stainless Screw #10 with Tox
6. Stainless Welding Rod

5.04 Supply and Install 112W LED Solar Streetlight, 200AH/12V Gel Battery, 225W/36V Solar Panel, Solar Charger and Battery Box including accessories

The work shall include furnishing of all labor, materials, and equipment necessary to complete the supply and installation 112W LED solar streetlight, 200AH/12V gel battery, 225W/36V solar panel, solar charger and battery box including accessories 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:

1. 112W LED Solar Streetlight (Cool White) including wires
2. 200AH/12V Gel Battery (52.2x24x21.6cm) 56kg
3. 225W/36V Solar Panel (158x99x4cm) with hot-dipped galvanized frame
4. Solar Charger / Inverter (12V/30A)
5. 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 systems 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.

6.00 Perimeter Fence

6.01 Remove and Dispose Damaged Perimeter Fence

The work includes the furnishing of all labor and equipment required to carry out the remove and dispose damaged perimeter fence as shown on the Drawings and as instructed by the PPA Engineer.

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.

6.02 Supply and Place 3500 psi Concrete including Reinforcing Steel Bars

Refer to Item 2.03 for specifications of concrete

Refer to Item 3.04 for specifications of reinforcing steel bars

6.03 Supply and Place Paint

Refer to Item 3.10 for specifications of painting

7.00 Mooring System

7.01 Supply and Install Mooring Cleat including Accessories

The work shall include furnishing of all labor, materials, equipment and other incidentals necessary to complete the supply and install Mooring Cleats including supply and installation of bolts and other accessories in accordance with the sizes, distances and design shown on the Drawings and as directed by the PPA Engineer.

The size of the bolts, nuts and washer shall be in accordance with the specification provided in the plan/drawings. The anchor plate shall be connected to the holding down bolt as shown in the drawings. All bolts, nuts, washers, etc. that are exposed shall be galvanized to the satisfaction of the Engineer.

Samples of the bolts, nuts, washers, and anchor plates shall be submitted to the Engineer for approval before being used in the works.

Concrete Foundation

Concrete foundation for mooring bollard shall conform to the requirements of Section 2.07 "Reinforced Concrete"

Visual Inspection

All mooring delivered to site shall be inspected by the Engineer for any sign of flaws or defect inimical to usage.

Mill Test Certificates

Two (2) copies of mill test reports shall be submitted certifying that materials meet the specified standards.

Test Inspection

Inspection of all materials and methods of fabrication shall be carried out by the contractor. However, the Engineer reserves the right to inspect all facilities at any time during the manufacture to ensure that the materials and workmanship are in accordance with Specifications and the best of workmanship.

Refer to Item 2.03 for specifications of concrete

Refer to Item 3.04 for specifications of reinforcing steel bars

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