

ITEM 10 : PORTLAND CEMENT CONCRETE PAVEMENT

SCOPE OF WORK

The works include the furnishing of all labor, materials and equipment required for the construction of gravel base course and concrete pavement. The works shall be in accordance with the lines and grades shown on the Drawings and in conformity with the Specifications.

MATERIAL REQUIREMENTS

Cement

Portland cement shall conform to the requirements of the Section "Reinforced Concrete".

Fine Aggregate

The fine aggregate shall be well-graded from coarse to fine and shall conform to the requirements of the Section "Reinforced Concrete".

Coarse Aggregate

Coarse aggregate shall conform to the requirements of the Section "Reinforced Concrete".

Water

Clean, fresh, potable water shall be used for the mixing of all concrete and mortar and shall be from a source approved by the Engineer. Sea water or brackish water shall not be used.

Admixture

Admixture shall only be used with the written permission of the Engineer. If air-entraining agents, water reducing agents, set retarders or strength accelerators are permitted to be used, they shall not be used in greater dosages than those recommended by the manufacturer, or as permitted by the Engineer. The cost shall be considered as already in the Contractor's unit cost bid for concrete.

TIE BARS AND SLIP BARS

Tie bars shall be deformed bars conforming to the requirements specified in AASHTO M 31 or M 42, except that rail steel shall not be used for tie bars that are to be bent and re-straightened during construction, sizes as indicated on the Drawings. The deformed bars shall be Grade 40 and shall be shipped in standard bundles, tagged and marked in accordance with the Code of Standard practice of the Concrete Reinforcement Steel Institute.

Slip bars shall be smooth round steel bars conforming to the requirements specified in AASHTO M 31 or plain M 42.

Joint Filler

Poured filler for joint shall conform to the requirements of AASHTO M173.

EXECUTION

Concrete Class

The concrete for pavement shall satisfy the following requirements:

Minimum 28-day comprehensive strength	:	24 MPa
Minimum Flexural Strength	:	3.8 MPa
Maximum Aggregate size	:	25 mm
Maximum water cement ratio	:	0.52

Proportioning, Consistency and Mixing of Concrete

The proportioning, consistency and mixing of concrete shall conform to the requirements of the Section "Reinforced Concrete".

Preparation

The base shall be watered and thoroughly moistened prior to placing of the concrete.

Formwork Construction

Formwork shall comply with the requirements of the Section "Reinforced Concrete". Forms shall be of steel, of an approved section and shall be straight and of a depth equal to thickness of the pavement at the edge. The base of the forms shall be of sufficient width to provide necessary stability in all directions. The flange braces must extend outward on the base not less than 2/3 the height of the form.

All forms shall be rigidly supported on a bed of thoroughly compacted material during the entire operation of placing and finishing the concrete. They shall be set with their faces vertical so as to produce a surface complying with the required tolerance.

Adjacent lanes may be used in lieu of forms for supporting finishing equipment provided that proper protection is afforded to the concrete of the adjacent lanes to prevent damage, and provided further that the surface of the concrete carrying the finishing equipment does not vary by more than 3mm in each meter length. Adjacent lanes in lieu of forms may not be used until the concrete is at least seven (7) days old. Flanged wheels of the finishing equipment shall not be operated on the concrete surface. The inside edge of supporting wheels of the finishing machine shall not operate closer than 100mm from the edge of the concrete lane.

Alternative to placing forms, slip-forming may be used. Slip-form paving equipment shall be equipped with the traveling side forms of sufficient dimensions, shape and strength to support the concrete laterally for a sufficient length of time during placement to produce pavement of the required cross section. No abrupt changes in longitudinal alignment of the pavement will be permitted. The horizontal deviation shall not exceed 20mm from the proper alignment established by the Engineer.

Joints

All joints, longitudinal, transverse, etc., shall be constructed as shown on the Drawings and shall be clean and free of all foreign material after completion of shoulder work prior to acceptance of the work and in accordance with the following provisions:

Longitudinal and Transverse Contact Joints:

Longitudinal contact joints are joints formed between lanes that are poured separately. Transverse contact joints are joints formed between segments of a lane that are poured separately. Transverse contact joints shall be formed perpendicular to pavement centerline at the end of each day of concrete placing, or where concreting has been stopped for 30 minutes or longer but not nearer than 1.5 meters from sawed contraction joints. All contact joints shall have faces perpendicular to the surface of the pavement. Tie bars of the size, length and spacing shown on the Drawings shall be placed across longitudinal and transverse contact joints.

Placing Concrete

The concrete shall be deposited and spread in order that segregation will not occur and place a uniform layer of concrete whose thickness is approximately 20 mm greater than that required for the finished pavement is placed. Rakes shall not be used for handling concrete.

In order to prevent the introduction into the concrete of earth and other foreign materials, the men whose duties require them to work in the concrete, shall in general, confine their movements to the area already covered with fresh concrete. Whenever it becomes necessary for these men to step out of the concrete, their footwear shall be washed or otherwise thoroughly cleaned before returning to the concrete. Repeated carelessness with regard to this detail will be deemed sufficient cause for removing and replacing such worker.

During the operation of striking off the concrete, a uniform ridge of concrete at least 70 mm in height shall be maintained ahead of the strike-off screed for its entire length. Except when making a construction joint, the finishing machine shall at no time be operated beyond that point where this surplus can be maintained in front of the strike-off screed.

After the first operation of the finishing machine, additional concrete shall be added to all low places and honeycombed spots and the concrete rescreeded. In any rescreeding, a uniform head of concrete shall be maintained ahead of the strike-off for its entire length. Honeycombed spots shall not be eliminated by tamping or grouting.

Workers on the job shall have mobile footbridges at their disposal so that they need not walk on the wet concrete.

In conjunction with the placing and spreading, the concrete shall be thoroughly spaded and vibrated along the forms, bulkhead, and joints.

The internal vibrators shall be of pneumatic, gas-driven, or electric type, and shall operate at a frequency of not less than 3,200 pulsations per minute.

Whenever the placing of the concrete is stopped or suspended for any reason, for a period of 30 minutes or longer, a suitable bulkhead shall be placed so as to produce a vertical transverse joint. If an emergency stop occurs within 2.5 meters of the contraction or an expansion joint the concrete shall be removed back to the joint. When the placing of the concrete is resumed, the bulkhead shall be removed and a new concrete placed and

vibrated evenly and solidly against the face of previously deposited concrete. Any concrete in excess of the amount needed to complete a given section or that has been deposited outside the forms shall not be used in the work.

The Contractor shall provide suitable equipment for protecting the fresh concrete in case of rain, such as screens which will cause the rain water to run off beyond the edges of the paving, rain proof tarpaulins or other methods approved by the Engineer. The equipment shall be sufficient to shelter from rain all areas equal to that paved in two hours of work.

Finishing Concrete

The concrete shall be compacted and finished by a mechanical, self-propelled finishing machine of approved type, having two independently operated screeds. If a machine possessing only one screed is approved, the screed will not be less than 450 mm wide and shall be equipped with compensating springs to minimize the effect of the momentum of the screed on the side forms. The number of driving wheels, the weight of the machine and the power of the motor shall be so coordinated as to prevent slippage. The top of the forms and the surface of the finishing machine wheels shall be kept free from concrete or dirt.

The machine shall at all times be in first-class mechanical condition and shall be capable of compacting and finishing the concrete as herein described. Any machine which causes displacement of the side forms from the line or grade to which they have been properly set, or causes undue delay due to mechanical difficulties, shall be removed from the work and replaced by a machine meeting the Specifications.

The finishing machine shall be operated over each section of pavement two or more times and at such intervals as will produce the desired results. Generally, two passes of the finishing machine are considered the maximum desirable.

The concrete shall be vibrated, compacted, and finished by a vibratory finishing machine. The vibratory machine shall meet the requirements for ordinary finishing, and shall be one of the following type:

1. The machine shall have two independently operated screeds; the front screed shall be equipped with vibratory units with a frequency of not less than 3,500 pulsations per minute. There shall be not less than one vibratory unit for each 2.5 meters length or portion thereof, of vibratory screed surface. The front screed shall not be less than 300mm wide and shall be equipped with a "bull nose" front edge built on a radius of not less than 50mm. This type of vibratory finishing machine shall be operated in such manner that each section of pavement will receive at least one vibratory pass, but not more than two passes, unless otherwise directed, or ;
2. The machine shall be equipped with an independently operated vibratory "pan" (or pans) and two (2) independently operated screeds, the "pan" shall be mounted in a manner that will permit it to come in contact with the forms and will permit vibration of the full width of lane simultaneously.

There shall be not less than one vibratory unit for each 2 m. length or portion thereof, of vibrating pan surface. The vibratory units in any individual pan shall be synchronized and have a frequency of not less than 3,500 pulsations per minute. The front screed shall be capable of operating in a position that will strike off the concrete at a sufficient height above the top of the forms to allow for proper compaction with the vibrating pan. This type of vibratory finishing machine shall be operated in such manner that each section of pavement will receive at least one vibratory pass but not more than two passes, unless otherwise directed.

After the final pass of the finishing machine and when the concrete has started to dry, the surface of the pavement shall be finished with an approved longitudinal float. The float may be operated either manually or by mechanical means. The float may be either of wood or metal shall be straight and smooth and light in weight so as not to displace or sink into the concrete surface.

To be effective, the float shall be at least 300mm wide and 3m long. When manually operated, the float shall be moved from edge to edge with a wiping motion and advance one (1) meter or more.

The succeeding trip shall overlap the previous trip. A light smoothing lute at least 3 meters long may be used provided approved by the Engineer.

The surface of the pavement shall be tested by the Contractor, before the final belting, with an approved standard straightedge 3 meter in length. Irregularities so detected shall be corrected immediately. Special attention shall be given to the concrete adjacent to transverse joints to insure that the edges thereof are not above the grade specified or the adjacent concrete below grade. All depressions or projections shall be corrected before any initial set has developed in the concrete.

After the concrete has been brought to the required grade, contour and smoothness, it shall be finished by passing over the concrete a drag of one or two burlap clothes, which give the surface the required roughness. The vehicles used to carry these cloths may be independent of the concrete-laying machine or may be incorporated with it and may be operated either by hand or mechanically.

Hand finishing will be permitted only on variable width sections of the pavement and other places where the use of the finishing machine would be impractical. Hand finishing shall be accomplished by means of the hand-operated strike-off template of either steel or steel-shod wood construction. The striking template shall be operated forward with a combined longitudinal and transverse motion and shall be so manipulated that neither end will be raised off the side forms. A similar tamper shall be used for tamping the concrete.

As soon as the concrete has attained its initial set, the edges of the pavement, the longitudinal joints, the construction dummy and expansion joints not sawn shall be carefully finished with an edging tool having radius of at least 5mm. The tools, the special accessories for cutting impressed joints and methods of workmanship shall be such as will produce a joint whose edges are of the same quality of concrete as the other portion of the pavement. Methods and workmanship which make use of excess mortar or grout in this area shall be eliminated. Unnecessary tool marks shall be eliminated during work, and the edges left smooth and true to line.

Striking Forms

Forms shall remain in place at least 12 hours after the concrete has been placed. When working conditions are such that the early strength gain of the concrete is delayed, the forms shall remain in place for a longer period, as directed by the Engineer. Bars or heavy load shall not be used against the concrete when still in the forms. Any damage to concrete resulting from form removal shall be repaired promptly by the Contractor as directed by the Engineer without any additional payment to the Contractor.

Curing Concrete

Unless otherwise ordered by the Engineer, curing of concrete shall be done by any method specified in the Section "Reinforced Concrete".

Cleaning and Sealing Joints

After completion of the required curing and before opening of the pavement to traffic, all joints shall be thoroughly cleaned of all concrete aggregate fragments or other materials.

After removal of side forms, the ends at transverse expansion joints at the edges of the pavement shall be carefully cleaned of any concrete within the expansion spaces for the entire depth of slab, care being taken not to injure the ends of the joints. Expansion and contraction joints shall then be poured with a hot joint sealer to the depth as indicated on the Drawings. Joint sealer shall be poured using approved hand pouring pots, with liquid at a temperature not less than that recommended by the approved manufacturer.

Opening to Traffic

The pavement shall be closed to traffic, including the vehicles of the Contractor, for a period of 10 days after the concrete is placed or longer if in the opinion of the Engineer, the weather conditions make it necessary to extend this time. The Contractor shall furnish, place and maintain satisfactory barricades and lights as directed, to exclude all traffic from the pavement.

Any damage to the pavement due to traffic shall be repaired or replaced at the expense of the Contractor. Paving mixers, mechanical concrete spreaders and finishers and other heavy paving equipment shall not be operated on completed concrete lanes in order to construct alternate lanes until after the regular curing period is completed. Even then, planks shall be laid on the finished pavement or other precautions taken to prevent damage to the concrete pavement.

Pavement Smoothness, Thickness and Tolerance

Portland cement concrete pavement shall be constructed to the designed level and transverse slope shown on the Drawing. The allowable tolerance shall be as listed hereunder:

- | | | |
|----|--|---------|
| 1. | Permitted variation from design thickness of layer | + - 5mm |
| 2. | Permitted variation from design level of surface | + - 5mm |

The thickness of the pavement will be determined by measurement of cores from the completed pavement in accordance with AASHTO T 148.

The completed pavement shall be accepted on a lot basis. A lot shall be considered as 2,500 sq.m of pavement. The last unit in each slab constitutes a lot in itself when its length is at least $\frac{1}{2}$ of the normal lot length. If the length of the last unit is shorter than $\frac{1}{2}$ of the normal lot length, it shall be included in the previous lot.

Other areas such as intersections, entrances, crossovers, ramp, etc., will be grouped together to form a lot. Small irregular areas may be included with other unit areas to form a lot.

ITEM 11 : SECURITY FENCE

DESCRIPTION

This item shall consist of furnishing, construction and installation of security fence components in any combinations in accordance with this specification, lines, grades and cross-sections shown on the Plans, or as directed by the Engineer.

MATERIALS REQUIREMENT

Materials shall conform to the respective specifications and other requirements specified below

CONCRETE HOLLOW BLOCKS (CHB)

CHB shall be of standard manufacture, machine vibrated with fine and even texture and well-defined edges and conforming to the requirements of ASTM C 129. Unless otherwise specified on the Drawings, It shall have a minimum compressive strength of 4.14 MPa (600 psi). CHB shall be non-load bearing uniform and essentially smooth as normally achieves by standard molding methods and shall be free from any cracks, flaws or other defects.

BEDDING MORTAR

Mortar shall be composed of 1 part of Portland cement, 3 parts of sand and ½ part of lime. It shall have a compressive strength of [14 MPa (2,000 psi)] at 28 days and shall comply with property specifications for type N mortar set forth in ASTM Specification C 270 and as modified herein, proportioned and tested in an approved laboratory at the expense of the Contractor. When tested for water retention, the mortar shall have a flow after suction, of 75 percent or more when mixed to an initial flow of 125 to 140 percent. When tested for compressive strength, mortar shall be mixed to a flow of 100 to 115 percent. Aggregate for mortar shall conform to ASTM C 144.

PLASTER

Plaster shall comply with the same specification as those for bedding mortar and will include the use of synthetic fibrous reinforcement of type and dosage recommended by the manufacturer.

REINFORCING STEEL BARS AND RODS

Minimum yield strength of reinforcement shall conform to the specifications in Section of Reinforced Concrete.

CONCRETE

Minimum compressive strength of concrete shall conform to the specifications in Section of Reinforced Concrete.

BARBED WIRE AND STEEL/GI PIPE POST

The materials to be used shall conform to the specifications indicated on the drawings and shall be approved by the Engineer prior to installation.

CYCLONE WIRE MESH

Cyclone Wire Mesh shall conform to the requirements of ASTM A 121, Class I.

CONSTRUCTION REQUIREMENT

The Contractor shall perform such clearing and grubbing as may be necessary to construct the fence to required grade and alignment. Fence shall generally follow the contour of the ground. Grading shall be performed where necessary to provide a neat appearance.

The post shall be erected vertically in position inside the formwork of the foundation block prior to the placing of concrete shall be adequately supported by bracing to prevent movement of the post during the placing and setting of the concrete. The post shall be erected to the height and location shown on the Plans, or as ordered by the Engineer.

Masonry shall be laid plumb, true to line, with level courses accurately spaced. Bond pattern shall be kept plumb throughout. Corners and reveals shall be plumb and true. Vertical joints shall be shoved tight. Each unit shall be adjusted to final position while mortar is still soft and plastic. Any unit that is disturbed after mortar has stiffened shall be removed and relaid with fresh mortar. Courses shall be so spaced that backing masonry will level off, flush with the face work at all joints where ties occur. Chases and rake-out joints shall be kept free from mortar or other debris.

Anchorage to concrete. Anchorage to abutting columns shall be provided only where indicated. Details shall be as indicated including anchorage to underside of beams and slabs

Cutting and fitting, including that required to accommodate the work of others shall be done by masonry mechanics. Wherever possible, full units of the proper size shall be used in lieu of cut units. Cut edges shall be clean, true and sharp. Openings shall be carefully cut, formed or otherwise neatly made for recessed items and for electrical, plumbing, or other mechanical installations so that wall plates, cover plates, or escutcheons required by the installation will completely conceal the openings and will have bottoms in alignment with lower edge of masonry joints. Webs of hollow masonry units shall be cut to the minimum required for the installation. Reinforced masonry lintels shall be provided as indicated above openings over 300mm wide, for pipes, ducts and cable trays, unless steel sleeves are used.

Spaces around built-in items shall be filled with mortar. Openings around flush-mounted electrical outlet boxes in wet locations shall be pointed flush with mortar including flush joints above the boxes. Anchors, ties, accessories, flashing, pipe sleeves and other items required to be built-in shall be built-in as the masonry work progresses. Anchors, ties, and joint reinforcement shall be fully embedded in mortar.

Unfinished work shall be stepped back for jointing with new work. Toothing may be resorted to only when specifically approved. Before laying new work, loose mortar shall be removed and the exposed joint shall be thoroughly cleaned.

Mortar shall be accurately measured in laboratory-established proportions and mixed with as much water as may be necessary to produce the wettest workable consistency possible. Mortar shall be placed in final position within one hour after mixing. Mortar not used or that has started to set within this time interval shall be discarded.

Joints in exposed-to-view except control joints, joints to be pointed or caulked or sealed, and openings around flush-mounted electrical outlet boxes in wet locations shall be tooled slightly concave with the mortar thoroughly compacted and pressed against the edges of the units. Tooling shall be done when the mortar has been thumbprint hard. The tooled joint shall be finished to uniformly straight and true lines and surfaces, smooth and free of tool marks.

Details of reinforcement shall be as indicated in the drawings. Reinforcing shall not be bent or straightened in a manner injurious to the steel. Bars with kinks or bends not shown on the drawings shall not be used. Placement of reinforcement shall be inspected and approved prior to placing

grout. One piece vertical bars extending from floor to floor or roof above shall be provided. Vertical bars shall be spliced only where indicated.

a. Positioning Bars

Vertical bars shall be positioned accurately at the centerline of the wall. A minimum clearance between the bars and masonry units of 12mm and between parallel bars of one diameter of the reinforcement shall be maintained. Vertical reinforcing shall be held in place using metal supports, centering clips, spacers, ties or caging devices located near the ends of each bar and at intermediate intervals of not more than 192 diameters of the reinforcement.

b. Splices

Splices shall be located only as indicated. Splices shall be staggered in adjacent bars at least 600mm. Bars shall be lapped a minimum of 40 diameters of the reinforcement.

Welding shall be done in accordance with Standard Code and under supervision of Engineer.

PAINTING AND CLEANING

If required in the contract, paint shall be in accordance to the specification indicated in the plans and coordinated with the end user.

Mortar daubs or splashing, before setting or hardening, shall be completely removed from masonry unit surfaces that will be exposed or painted. Before completion of the work, all defects in joints or masonry to be exposed or painted shall be raked out as necessary, filled with mortar, and tooled to match existing joints. Masonry surfaces shall not be cleaned, other than removing excess surface mortar until mortar in joints has hardened. Masonry hardened surfaces shall be left clean, free of mortar daubs, dirt, stain and discoloration, including scum from cleaning operations and with tight mortar joints throughout. Metal tools and metal brushes shall not be used for cleaning.

ITEM 12 : MOORING AND FENDERING SYSTEM

SCOPE OF WORK

1. The work includes furnishing of all labor, materials and equipment to complete the installation of mooring bollards and fenders in piers/wharves.
2. The work shall include the supply, transport, handling, storage and installation of fenders systems in the newly constructed piers.
3. The Contractor shall furnish and install the necessary fittings as shown on the drawings and/or specified.

Supplementary parts necessary to complete and install each item of works shall be included whether or not shown or specified. The Contractor shall furnish to relevant trades all anchors, fastenings, inserts, fittings, fixtures or the like to be installed on or required for securing the works.

The Contractor shall submit shop drawings of all fitting works prior to placing orders and commencement of any fabrication.

MATERIAL REQUIREMENTS

MOORING SYSTEM

Designated load capacity of mooring bollards shall be as shown in the drawings, and shall be referred to as the maximum load capacity. The mooring bollards shall be at rupture stage upon reaching the maximum load capacity.

Mooring bollards shall be of the dimensions, weights, capacities and designs as shown in the drawings and shall be fabricated by approved manufacturer with cast steel conforming to the requirements indicated in the plan/drawings, or approved equivalent.

The size of the bolts, nuts and washers shall be in accordance with the specifications provided in the plans/drawings. The anchor plate shall be connected to the holding down bolt as shown in the plans/drawings. All bolts, nuts, washers etc., that are exposed shall be hot-dip galvanized.

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

The upper part of bollards and base plates which are not embedded in concrete shall be painted. The surface of bollards shall be cleaned thoroughly by wire brush or other means prior to painting to remove rust or any other contamination which may interfere with bond of paint to metal.

The exposed surface shall be coated with rust proof paint and finishing paint, which shall be coal-tar epoxy of 120m micron thickness in accordance with JIS K5623 or the approved standard.

Base Steel:

Chemical composition and mechanical properties of base metal to be used for fabrication of mooring bollard and its accessories shall comply with ASTM A36 and other required standard stated therein.

Concrete Foundation :

Concrete foundation for mooring bollards shall conform to the requirements of the Section concerning "Reinforced Concrete".

Visual Inspection :

All mooring bollards delivered to Site shall be inspected by the Engineer for any signs 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.

FENDER SYSTEM

The rubber fenders should comply with the performance requirements specified in the table provided on the plan/drawings of RDF.

PHYSICAL PROPERTIES OF MATERIALS

The rubber for the fenders shall be of high quality natural rubber, synthetic rubber or mixed rubber blended with carbon black used in the rubber industry and shall have sufficient resilience and anti-ageing, weathering, abrasion, wear and oil resistant properties. The rubber dock fenders shall be free from bubbles, cracks and other harmful defects.

The physical properties of the rubber compound used for the fenders shall comply with the following requirements:

Physical Properties and Test Method

Test Item		Properties	Test Method	
Physical Test	Before Aging	Tensile Strength	Test piece: Dumbell No. 3	ASTM D412
		Elongation		ASTM D1456
		Hardness	Spring Type hardness test (Type A)	ASTM D2240
	After Aging	Tensile Strength	Aging by air heating: 70±1°C x 96 hours.	ASTM D412
		Elongation		ASTM D1456
		Hardness		ASTM D2240
	Compression Test		Heat treatment: 70±1°C x 22 hours.	ASTM D395

Note: Equivalent Standards are acceptable.

FITTINGS AND ANCHORAGE

Anchor bolts and connecting hardware shall be fabricated using type of steel specified (ASTM A36) and to the required shapes and sizes shown on the approved plan/drawings.

TESTING, SAMPLING, INSPECTION, ACCEPTANCE, MARKING AND PACKAGING

Testing

Sample rubber dock fenders that shall be incorporated in the project shall be subjected to tests. It shall pass the required energy absorption and reaction force at a certain deflection as indicated in the plan.

The Contractor shall be required to submit test certificates showing compliance to the above requirements. The test certificates shall be certified by an independent testing institute / organization recognized by the Authority.

All units shall be tested for performance. The fender shall be compressed repeatedly three (3) times to the maximum deflection at the speed from 2 to 8 cm. per minute. The load and deflection values shall be recorded with the precision of 0.1tf and 0.5mm respectively. The results shall be plotted in the form of load-deflection-energy absorption curves. The average data obtained in the second and third test loading shall be considered as performance values.

Inspection

All fenders of each type shall be inspected for compliance to specified dimensions and all fenders shall be inspected for any sign of flaw or defect inimical to its use.

All anchor bolts and fittings shall be inspected. The material used for the fabrication of bolts and fittings shall be covered by the manufacturer's certified mill certificate and shall be verified by the Authority.

Acceptance Tolerance

The acceptance tolerance shall be based on the following:

1. Fender Dimension

Length	:	-2% to +4%
Width	:	-2% to +4%
Height	:	-2% to +4%
Thickness	:	-2% to +8%

2. Anchor Bolt Holes in Fender

Diameter of the Hole	:	+2.0mm
Pitch of the Hole	:	+4.0mm

3. Acceptance tolerance for all fenders supplied shall be as follows:

E = Energy absorption, $E \geq$ Specified E but not more than 10%

R = Reaction force, $R \leq$ Specified R but not more than 10%

Marking

All fender units shall be clearly numbered and marked. Each fender shall have the following markings.

1. Fender type and manufacturer's name or trade mark
2. Production serial number
3. Date of manufacture or its abbreviation
4. Main dimensions
5. Project identification as follows:

Name of Port/Project : _____

Year supplied : _____

Packaging

The fenders shall be packaged on wooden crate or wrapped individually with Polypropylene sheets except when shipped containerized. The bolts and fittings should be placed in crates and suitably treated for protection when transported by sea and stored in port areas.

EXECUTION

MOORING / FENDERING SYSTEM

All units shall be installed at the locations shown on the drawings and as directed by the Engineer.

ITEM 13 : PONTOON BARGE

1. SCOPE OF WORK

The work to be undertaken under this section shall comprise of the ship design and engineering, acquisition of necessary Certificates and Permits from MARINA and other government agencies, furnishing of all labor, equipment, materials, and satisfactory performance necessary to complete the construction/fabrication works of a pontoon barge indicated on the drawings and specified herein.

The scope of work shall include the following:

- 1.1. The design and engineering as well as the construction/fabrication of the pontoon barge including the gang plank for pedestrian access, shall be the responsibility of the Contractor. All related design plans and technical documents shall be submitted to PPA.
- 1.2. The pontoon barge deck shall support its design total carrying capacity and appropriate anchorage system shall be compliant with stability and buoyancy requirements to keep the pontoon barge afloat on its assigned location.
- 1.3. The dimensions of the vessel shall have a minimum overall length of 36.00m, a minimum moulded breadth and depth of 36.00m and 3.00m, respectively.
- 1.4. The pontoon barge shall have a minimum of two (2) sets of gang planks complete with accessories for passenger access, twenty-two (22) sets of rubber fenders and ten (10) TP Bollards as shown on the attached General Arrangement Plan.
- 1.5. The Contractor shall provision a minimum of two (2) tugboats for the towing services required to place the pontoon barge in the assigned location.
- 1.6. The Contractor shall secure all necessary Certificates and Permits from the government agencies such as MARINA, PCG, and etc.

2. MATERIAL

- 2.1. **Structural Steel:** All structural steel plates, shapes, bars, and rivets intended primarily for use in ship construction shall conform to the "STANDARD SPECIFICATIONS FOR STRUCTURAL STEEL FOR SHIPS (ASTM A131/A131M-01)"
 - a. The bottom, side and bulkhead plate shall have a minimum thickness of 8 mm.
 - b. The deck plate shall have a minimum thickness of 9 mm.
- 2.2. **Painting/Coating:** All painting/coating shall conform to the standards prescribed by the World Association for Waterborne Transport Infrastructure (PIANC) and other relevant International Standards.
 - a. All painting/coating shall be done as per paint manufacturer's specifications.
 - b. All structural steel shall be sand blasted both sides and painted with a minimum of one coat of Shop Primer.
 - c. Anti-fouling paint shall be applied for hull preservation, conforming to the rules and regulations prescribed by Maritime Industry Authority (MARINA) through Memorandum Circular No. SR-2020-04.

- 2.3. Deck Outfitting & Equipment: Drainage for the deck such as manholes closed with gasket covers shall be provided together with connectors (See attached General Arrangement Plan for designated locations).

3. SUPERVISION OF WORK

- 3.1. The Contractor shall assign an official representative who will be permanently coordinating with the PPA designated Project Manager/Engineer in the execution of work until its completion.
- 3.2. The PPA, through its duly authorized representative, shall closely monitor the progress of work.

ITEM 14 : ELECTRICAL WORKS

SCOPE OF WORK

The work to be done shall consist of fabricating, trenching, furnishing, delivering and installing electrical materials/fixtures completed in accordance with all the details of the electrical works as shown on the drawings including materials, labor, tools and equipment and all incidental works as found necessary.

Refer to electrical plans/drawings for location and extent of work involved.

GENERAL REQUIREMENTS

- a) All works shall be done in accordance with the requirements of the publications and agencies having jurisdiction, as well as the requirements of the approved standards.
 1. National Fire Protection Association - (NFPA)
 2. National Electrical Manufacturer Association - (NEMA)
 3. Underwriter Laboratories, Inc. - (UL)
 4. Philippine Electrical Code - (PEC)
Philippine National Standard - (PNS)
 5. Federation Specification:
Circuit Breaker, Molded Case, Branch
Circuit and Service
 6. American National Standard Institute - (ANSI)
 7. American Society for Testing and Materials - (ASTM)
 8. Illuminating Engineering Society - (IES)
 9. Light Emitting Diode - (LED)
- b) The electrical power will be tapped into concrete pedestal post with supply voltages of 220 volts, single phase (1Ø), and 60 hertz.
- c) The Contractor shall employ a licensed Registered Electrical Engineer or Master electrician to perform or to supervise and to conduct the continuous inspection of all electrical work.
- d) The Contractor shall first obtain approval from the Authority before procurement, fabrication or delivery of electrical materials to the site. Partial submittals will not be acceptable and will be returned without review. Submittals shall include the Manufacturer's Name, Trade Name, Place of Manufacture, Catalog Model or Number, Nameplate Data, Size, Layout Dimensions, Capacity, Project Specification and Paragraph Reference, Technical Society Publication References and other information necessary to establish contract compliance of each item to be furnished.
- e) All excavations fill and backfill and concrete works involved herein, shall be carried to the required elevations and shall conform to the provisions of specification under Earthwork and Concrete Construction of this tender document.

- f) The materials and equipment to be furnished shall be standard products of reputable manufacturer engaged in the reproduction of such materials and equipment.
- g) All permits and electrical fees required for this work shall be obtained at the expense of the Contractor. The Contractor shall furnish the Engineer-in-Charge, the final Certificates of Inspections and approval from the proper government authorities after the completion of work. The Contractor shall prepare all as- built plans and all other paper works as required by the enforcing authorities.
- h) The Contractor shall furnish and install electrical materials as shown in the drawings. A licensed Electrical Engineer or Master Electrician is required to implement the installation of the electrical system. A licensed electrical contractor shall oversee/conduct the installation of the main circuit breaker.
- i) Electrical installation shall conform to the requirements of Philippine Electrical Code (PEC) and the other approved standards.
- j) The contractor shall install all electrical works with the supervision of the qualified Registered Electrical Engineer (REE) or Master Electrician. All electrical installation applications regardless of capacity and voltage whether new, addition or revision shall be accompanied by electrical plans signed and sealed by a duly licensed Professional Electrical Engineer (PEE).

MATERIAL REQUIREMENTS

All materials shall be brand new and shall be of the approved type meeting all the requirements of the Philippine Electrical Code and bearing the Philippine Standard Agency (PSA) mark.

PRODUCTS

WIRES AND CABLES

The conductor material to be furnished and installed shall be copper wire Heat-Resistant Thermoplastic (THHN/THWN-2). All conductors shall be rated 600 volts insulation and shall be standard for all sizes.

CONDUIT AND FITTINGS

Underground PVC conduit shall be polyvinyl chloride with concrete covered. It shall be manufactured to schedule 40 outside diameter. All fittings and bends shall be solvent bonded using manufacturers recommended product.

LED FLOODLIGHT FIXTURE 200 WATT

Specifications:

Rated	: 200 Watt or equivalent
Input Voltage	: AC 100-277 / 50-60 HZ
Lumens	: 26000-28000 LM
Color Temperature	: Warm white / Daylight
Optional	
CRI	: Ra>70
PF	: > 0.95
Beam Angle	: 120 degrees
IP Grade	: IP 66 / 65
Driver Brand	: Meanwell
Lead Chip Brand	: Philips

LED ROADWAY FIXTURE 150 WATT

Specifications:

Rated 150 watt or equivalent
Color Temperature: warm white (ww)
Luminous (Flux) Lumens: 15800
Luminous Efficacy: 105 Lumens / Watt
Beam Angle: 85° 140 degrees
Surge Protection: 6KV (Line to Line); 10 KV Line to Earth)
Voltage: 100-305VAC
IP Grade: IP 65
LED Chips: Bridgelux
Color: 2700-6500K
Material: Die Cast Aluminum

Switches:

Weatherproof die cast aluminum toggle switch (NEMA-3R) attached to Single Angle Bar Steel Tapered Lamp Post.

PANEL BOARD

The Panel board is attached to concrete pedestal post and in accordance with the schedule as shown in the approved plans with respect to supply characteristics, rating of main lugs or main circuit breaker, number and ratings and capacities of branch circuit breakers.

Panel board shall consist of a factory completed dead front assembly mounted in an enclosing NEMA-3R cabinet consisting of code gauge galvanized sheet steel box with trim and door.

Main and branch circuit breakers for panel board shall have the rating, capacity and number of poles as shown on the approved plans. Breakers shall be thermal magnetic type solid state-type with interrupting capacity of 10,000 amperes symmetrical minimum. Breaker terminal shall be UL listed as suitable for type of conductor provided. Breaker shall be the bolt-in type (that is, bolted to the current carrying bus). Plug-in circuit breakers are not acceptable

SINGLE ANGLE BAR FLOODLIGHT STEEL TAPERED LAMP POST and SINGLE ARM STEEL TAPERED LAMP POST

Lamp Post shall be 10.0 m ht. Single Angle Bar steel tapered and 10m.ht. Single Arm lamp post, furnished installed and tested as shown on the approved plans. The post/s shall be dimensioned for a wind velocity of 185 km/hr. It shall be locally fabricated or manufactured. The post shall be Hot -Dipped Galvanized, prime-coated with red lead and shall be painted at site with the final coating preferably aluminum paint to be approved by the Engineer.

EXECUTION

INSTALLATION

Lamp Post shall be installed as shown on the approved plans.

Pole Setting: Depth as shown on the approved plans.

Construction of lamp post foundation shall be in accordance with the shape and dimensions as shown on the approved plans.

Excavations / backfilling required before /after installation of lamp post with the trench shall conform to the provisions of Earthwork and Concrete construction.

Concrete Pedestal shall be reinforced concrete with appropriate weatherproof fittings as constructed as shown in the approved plan. Reinforced concrete materials shall conform to the requirements of concrete. Concrete shall be of 21 Mpa (3000 psi) compressive strength.

Metering: the local utility company in Coron Port, Palawan is responsible for the supply and installation of metering equipment, and its accessories, but it is part of the contractor's responsibility and expense to contact them about this.

WORKMANSHIP

The work throughout shall be executed in the best and most thorough manner under the direction of and at the satisfaction of the Registered Electrical Engineer or Master Electrician, who will interpret the intent meaning of the drawings and specification and shall have the power to reject any work and materials which in his judgment, are not in full accordance therewith.

TESTING OPERATIONS

When the electrical installation is completed, the Contractor shall test the installed electrical materials and equipment in the presence of Registered Electrical Engineer or Master Electrician. The system shall be free from any defects, shorts or grounds. The Contractor at no extra cost shall furnish all necessary instruments and personnel required for the testing.

GUARANTEE

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 materials and workmanship. The guarantee shall be for a period of one year from the date of the final acceptance. Any work that becomes defective during the said period shall be corrected / replaced by the Contractor at his own expense in a manner satisfactory to the Authority.

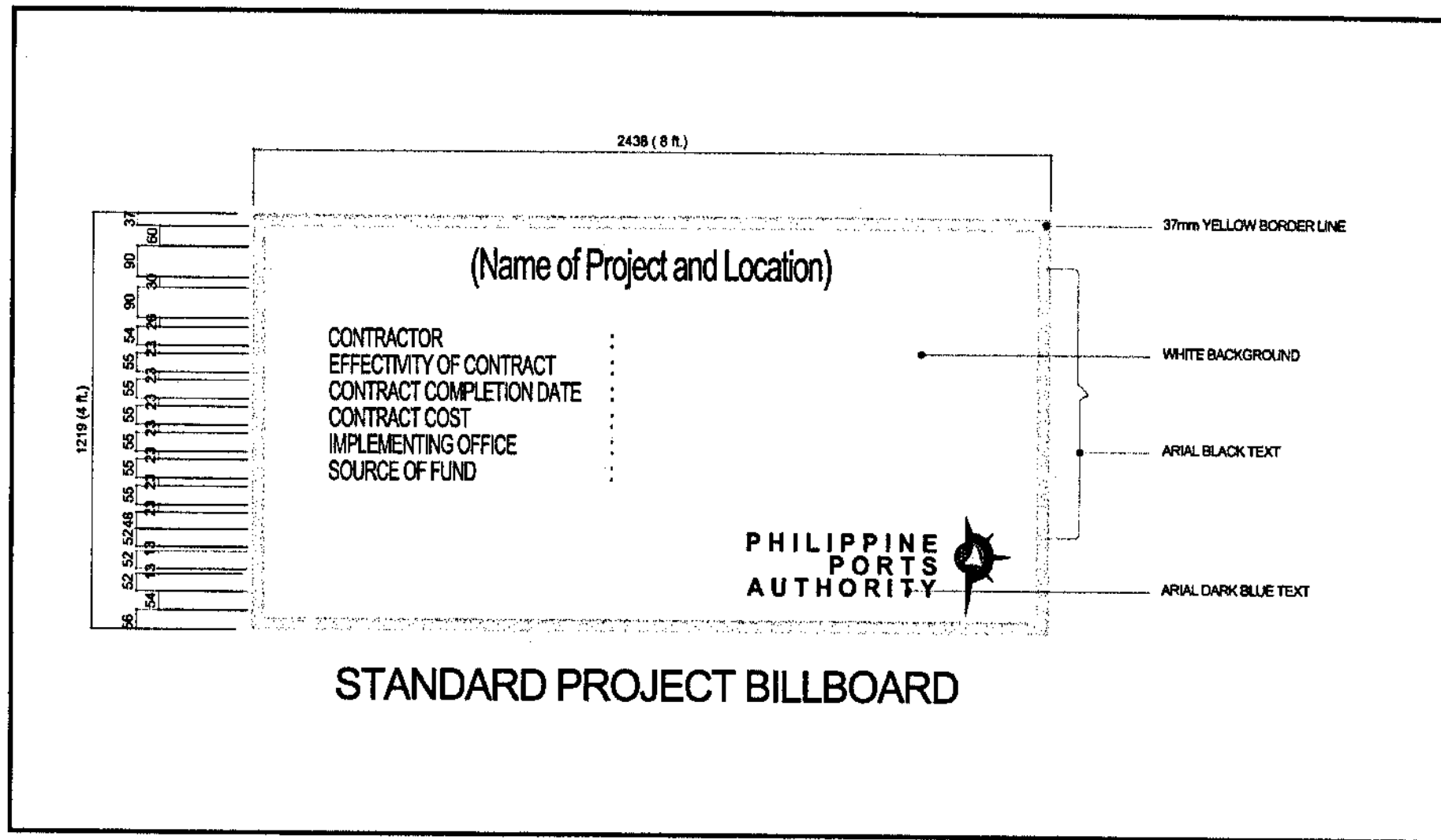
ITEM 15 : PROJECT BILLBOARD**SPECIFICATION**

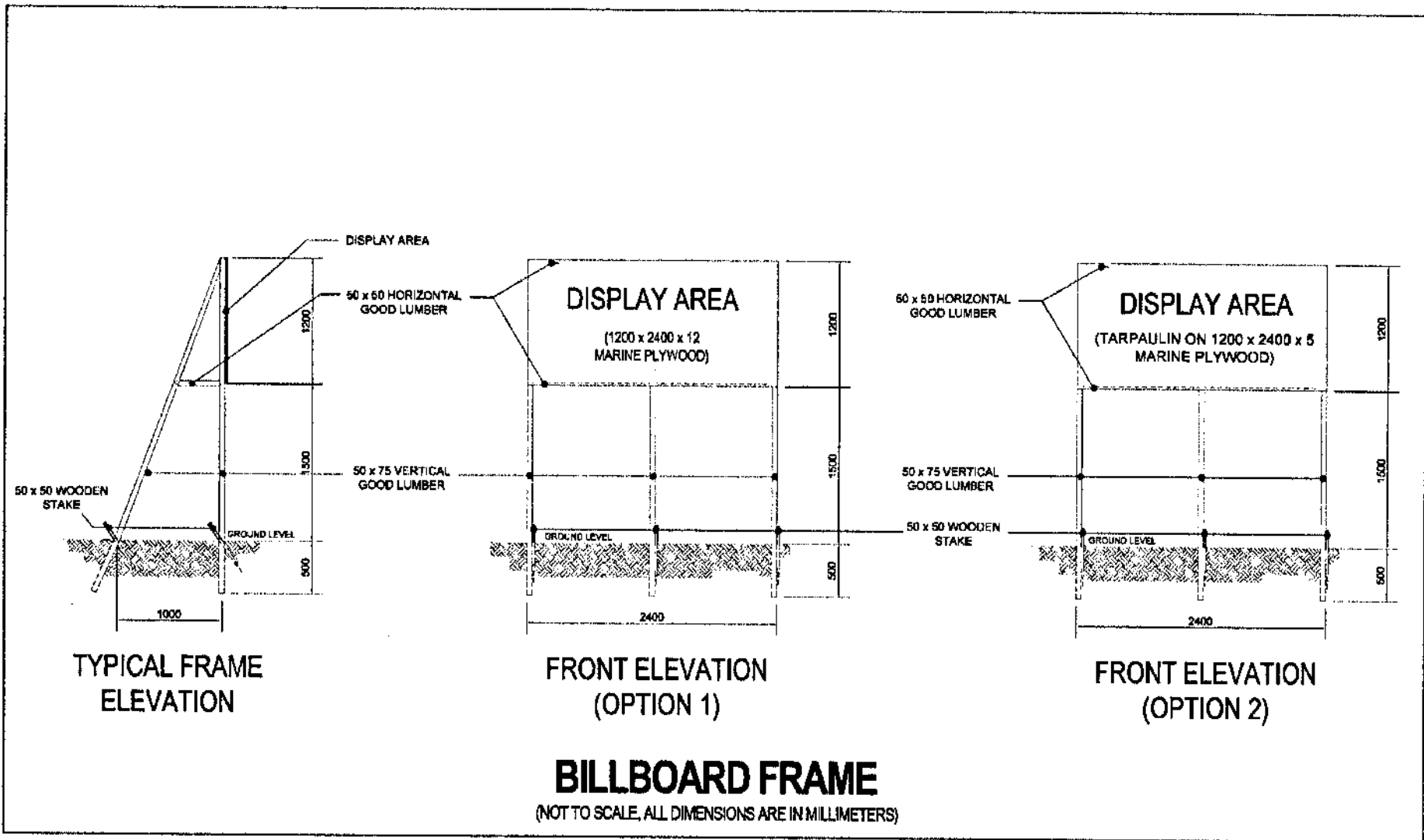
The Project Billboard shall be installed at location(s) designated by the Engineer.

The size and specifications of materials for the standard billboard shall be 4ft. x 8ft. (1,200mm x 2,400mm) using ½ inch (12mm) marine plywood or tarpaulin poster on 3/16 inch (5mm) marine plywood.

Project billboards shall not contain Name(s) and/or picture(s) of any personages.

See attached drawings for further details of the standard billboard.





“To all our contractors, suppliers, and service providers, all we ask is for you to

SPEED UP

your contracts and **FINISH**

AHEAD of schedule,

WITHOUT SACRIFICING

QUALITY

of work, and **REASONABLENESS OF COST** agreed upon. Gawin niyo ‘yan at hindi tayo maghihiwalay ng landas (Do that and we will not part ways).”

A Message from
DOTr Secretary Arthur Tugade



@DOTrPH

@DOTrPH

www.dotr.gov.ph

ITEM 16 : SAFETY SIGNAGES AND BARRICADES

DESCRIPTION

This work includes the furnishing and installing of safety signages and barricades in accordance with the specifications and to the details shown below in the drawings, or as directed by the Engineer.

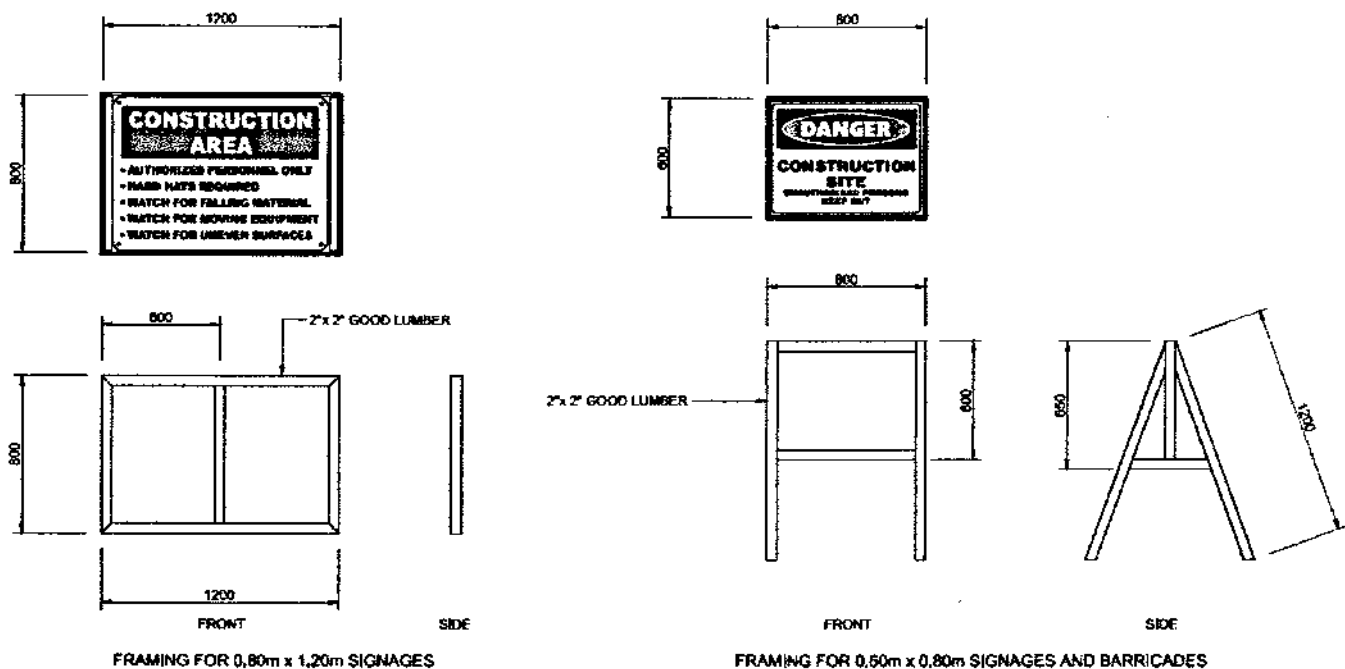
SPECIFICATION

The Signage's and Barricades shall be installed at location(s) designated by the Engineer.

The sizes of the standard signages shall be 2-2/3ft x 4ft (800mm X 1,200mm) for fixed type and 2ft x 2-2/3ft (600mm x 800mm) for mobile type. For barricade standard 2ft x 2-2/3ft (600mm x 800mm) shall be provided.

The materials to be used for signages and barricades are ½ inch (12mm) marine plywood or tarpaulin poster on 2" x 2" (50mm x 50mm) good lumber frame (see drawing below).

The printing or painting shall be the discretion of the Engineer.



STANDARD PLAN FOR SIGNAGES AND BARRICADES

SECTION VII

DRAWINGS
(APPROVED PLANS)

SECTION VII

DRAWINGS AND APPROVED PLANS

(SEE ISSUED APPROVED PLANS)

LIST OF DRAWINGS:

1 OF 30	DEVELOPMENT PLAN, DESIGN PARAMETERS, LOCATION MAP, GENERAL NOTES, LIST OF DRAWINGS AND LEGEND.
2 OF 30	GENERAL PLAN.
3 OF 30	GRAVITY TYPE WALL (CONCRETE BLOCKS) LAYOUT.
4 OF 30	SECTIONS AT LINE A.
5 OF 30	SECTIONS AT LINE A.
6 OF 30	SECTIONS AT LINE A.
7 OF 30	SECTIONS AT LINE A.
8 OF 30	SECTIONS AT LINE A.
9 OF 30	SECTIONS AT LINE B.
10 OF 30	SECTIONS AT LINE B.
11 OF 30	SECTIONS AT LINE B.
12 OF 30	SECTIONS AT LINE B AND SECTIONS AT LINE C.
13 OF 30	SECTIONS AT LINE C AND SECTIONS AT LINE D.
14 OF 30	SECTIONS AT LINE D.
15 OF 30	DETAILED SCHEDULE OF CONCRETE BLOCKS AND DETAIL OF RETAINING WALL
16 OF 30	DETAIL OF PONTOON BLOCK, DETAIL OF RAMP EDGE WALL, DETAIL OF RAMP WING WALL, TYPICAL RORO RAMP PAVEMENT, TYPICAL DETAIL OF RC DITCH, DETAIL OF SLOTTED R.C. CURB AND TYPICAL PORTLAND CEMENT CONCRETE PAVEMENT DETAILS.
17 OF 30	DETAIL OF GRAVITY TYPE MOORING BLOCK.
18 OF 30	REINFORCEMENT DETAIL GRAVITY TYPE MOORING BLOCK AND REINFORCEMENT DETAIL OF CAISSON.
19 OF 30	DETAIL OF ANCHORED MOORING BLOCK - 1 AND DETAIL OF ANCHOR BLOCK - 1.
20 OF 30	DETAIL OF 150 TON SINGLE PILLAR MOORING BOLLARD.

21 OF 30	DETAIL OF ANCHORED MOORING BLOCK - 2 AND TYPICAL DETAILS OF TIE-ROD ASSEMBLY AND DETAIL OF ANCHOR BLOCK - 2.
22 OF 30	DETAIL OF V-TYPE RUBBER DOCK FENDER (V-500H x 1500L), DETAIL OF 25 TON MOORING TEE - HEAD AND DETAIL OF D-TYPE FENDER (500H x 500W x 2000L).
23 OF 30	GATE AND PERIMETER FENCE AND PPA LOGO INSTALLATION AND FRAMING DETAIL.
24 OF 30	GATE AND PERIMETER FENCE.
25 OF 30	PORT LIGHTING LAYOUT, GENERAL NOTES AND LEGEND.
26 OF 30	DETAIL OF LAMP POST FOUNDATION, FLOODLIGHT POST CONNECTION DETAIL, DETAIL OF CONCRETE PEDESTAL POST, SINGLE ANGLE BAR FLOODLIGHT STEEL TAPERED LAMP POST AND SPECIFICATIONS.
27 OF 30	DET. OF 12 M.HT. FLOODLIGHT STEEL POLE, PLATFORM PLAN OF FLOODLIGHT, DET. OF FLOODLIGHT MOUNTING PLATFORM, PLATFORM MOUNTING DETAIL, STEP BAR DETAIL, LOWER/UPPER PLATE, UPPER / LOWER POST, BASE PLATE AND SPECIFICATION OF FLOODLIGHT.
28 OF 30	DETAIL OF FLOODLIGHT FOUNDATION.
29 OF 30	SINGLE ARM STEEL TAPERED LAMP POST, LAMP POST PEDESTAL DETAIL AND LAMP POST FOUNDATION DETAIL.
30 OF 30	DETAIL OF FLOODLIGHT FOUNDATION, DETAIL OF HAND HOLE, DETAIL OF DUCT BANK, SCHEDULE OF LOAD AND RISER DIAGRAM.
ANNEX-1	APPROVED DSD HYDROGRAPHICAL AND TOPOGRAPHICAL SURVEY PLAN.

SECTION VIII

BILL OF QUANTITIES
and
ATTACHMENTS

BID SUMMARY
CONSTRUCTION OF CRUISE SHIP PORT
 Coron, Palawan



NO.	DESCRIPTION OF WORK	AMOUNT (Pesos)
BILL NO. 1	GENERAL EXPENSES	
BILL NO. 2	PORT OPERATIONAL AREA	
BILL NO. 3	PROVISION OF PONTOON BARGE	
BILL NO. 4	REIMBURSABLE ITEMS	
	BID PRICE	

 Name of Firm

 Name of Bidder/Authorized Representative
 (Signatory's Legal Capacity)

 Date

APPROVED BUDGET FOR THE CONTRACT
CONSTRUCTION OF CRUISE SHIP PORT
 Coron, Palawan



NO. (1)	DESCRIPTION OF WORK (2)	UNIT (3)	QTY. (4)	UNIT PRICE (Pesos) (5)	AMOUNT (Pesos) (4) x (5)
BILL NO. 1	GENERAL EXPENSES				
1.01	Mobilization, demobilization and cleaning	lot	1		
1.02	Provide site office and residence for the Engineer and staff	sq.m.	48		
1.03	Maintain temporary site office and residence for the Engineer and staff	mo.	18		
1.04	Provide Construction Safety and Health Program in the execution of the project including stringent Covid-19 protocols per Engineering circular No. 01-2020, and Construction Guidelines for Project Implementation during the period of Public Health Emergency, approved by PDCB and CIAP (as indicated in the Bid Documents)	mo.	18		
TOTAL FOR BILL NO. 1					

Name of Bidder/Authorized Representative
 Signatory's Legal Capacity

**APPROVED BUDGET FOR THE CONTRACT
CONSTRUCTION OF CRUISE SHIP PORT
Coron, Palawan**



NO. (1)	DESCRIPTION OF WORK (2)	UNIT (3)	QTY. (4)	UNIT PRICE (Pesos) (5)	AMOUNT (Pesos) (4) x (5)
BILL NO.	2 PORT OPERATIONAL AREA				
2.01	Excavate existing seabed up to required elevation	cu.m.	5,343		
2.02	Excavate and backfill existing fill materials	cu.m.	672		
2.03	Supply and place 3,500psi concrete for retaining wall, ramp edge wall, ramp wing wall, slotted rc curb, rc ditch, anchor block, anchor mooring block, cast-in-place concrete block, lamp post foundation, floodlight foundation, pedestal post, handhole and ductbank.	cu.m.	1,241		
2.04	Supply and install steel reinforcement for retaining wall, ramp edge wall, ramp wing wall, slotted rc curb, rc ditch, anchor block, anchor mooring block, cast-in-place concrete block, lamp post foundation, floodlight foundation, pedestal post, handhole and ductbank.	kg.	42,273		
2.05	Supply and place lean concrete for anchored mooring blocks	cu.m.	10		
2.06	Supply and place 50-100 kg core rocks	cu.m.	7,570		
2.07	Supply and place 1,000 kg armour rocks	cu.m.	4,863		
2.08	Supply and install pre-cast concrete blocks including lifting handle a.) Concrete Block -1 b.) Concrete Block -2	no. no.	142 171		
2.09	Supply and install pre-cast concrete caisson including reinforcement	no.	2		
2.10	Supply and place gravity type mooring concrete block including reinforcement	no.	2		

Name of Bidder/Authorized Representative
Signatory's Legal Capacity

APPROVED BUDGET FOR THE CONTRACT
CONSTRUCTION OF CRUISE SHIP PORT
Coron, Palawan



NO. (1)	DESCRIPTION OF WORK (2)	UNIT (3)	QTY. (4)	UNIT PRICE (Pesos) (5)	AMOUNT (Pesos) (4) x (5)
2.11	Place and compact excavated seabed materials for concrete caisson	cu.m.	124		
2.12	Supply and install geotextile fabric	sq.m.	6,300		
2.13	Supply and install tie-rod of various sizes including accessories: a) 60mm Ø x 16.00m b) 60mm Ø x 14.00m c) 42mm Ø x 12.00m	no. no. no.	9 9 14		
2.14	Supply and place sand & gravel fill	cu.m.	45,688		
2.15	Supply, spread and compact aggregate sub-base course	cu.m.	16,786		
2.16	Supply, spread and compact aggregate base course	cu.m.	4,062		
2.17	Supply, spread and compact gravel bedding	cu.m.	51		
2.18	Construct portland cement concrete pavement for port operational area (300mm thk.) including dowel bars	sq.m.	19,094		
2.19	Construct reinforced concrete pavement for ro-ro ramp on fill (300mm thk.) including reinforcement	cu.m.	323		
2.20	Construct Security Fence and gate including accessories	lot	1		
2.21	Supply, fabricate and install signages including accessories	lot	1		
2.22	Supply, deliver and install Port Lighting System including accessories	lot	1		

Name of Bidder/Authorized Representative
Signatory's Legal Capacity

APPROVED BUDGET FOR THE CONTRACT
CONSTRUCTION OF CRUISE SHIP PORT
 Coron, Palawan



NO. (1)	DESCRIPTION OF WORK (2)	UNIT (3)	QTY. (4)	UNIT PRICE (Pesos) (5)	AMOUNT (Pesos) (4) x (5)
2.23	Supply and deliver to site rubber dock fender (D-type, 500H x 500W x 2000L) including accessories	set.	10		
2.24	Supply and deliver to site rubber dock fender (V-type, 500H x 1500L) including accessories	set.	25		
2.25	Install rubber dock fender and accessories	set.	35		
2.26	Supply and deliver to site mooring bollard (150 Tons, Single pillar) including accessories	set.	5		
2.27	Supply and deliver to site mooring bollard (25 Tons, T-head) including accessories	set.	7		
2.28	Install mooring bollards and accessories	set.	12		
TOTAL FOR BILL NO. 2					

Name of Bidder/Authorized Representative
 Signatory's Legal Capacity

APPROVED BUDGET FOR THE CONTRACT
CONSTRUCTION OF CRUISE SHIP PORT
 Coron, Palawan



NO. (1)	DESCRIPTION OF WORK (2)	UNIT (3)	QTY. (4)	UNIT PRICE (Pesos) (5)	AMOUNT (Pesos) (4) x (5)
BILL NO. 3	PROVISION OF PONTOON BARGE				
3.01	Design, fabrication and delivery of 36m x 36m steel pontoon barge including processing of required documents for the construction of the vessel, insurances and MARINA Certificates.	lot	1		
TOTAL FOR BILL NO. 3					

Name of Bidder/Authorized Representative
 Signatory's Legal Capacity

APPROVED BUDGET FOR THE CONTRACT
CONSTRUCTION OF CRUISE SHIP PORT
 Coron, Palawan



NO. (1)	DESCRIPTION OF WORK (2)	UNIT (3)	QTY. (4)	UNIT PRICE (Pesos) (5)	AMOUNT (Pesos) (4) x (5)
BILL NO. 4	REIMBURSABLE ITEMS				
4.01	Provide reimbursable items necessary in the implementation of the project as determined by the Authority				
	a) Office furnitures and appliances	lot	1		
	b) Computers and Accessories	lot	1		
TOTAL FOR BILL NO. 4					

Name of Bidder/Authorized Representative
 Signatory's Legal Capacity

BASIS OF PAYMENT FOR WORK ITEMS INCLUDED IN THE PROPOSAL

The work items included in the proposal and the basis of payments are as follows:

BILL NO. 1

GENERAL EXPENSES

Item 1.01 Mobilization, demobilization and cleaning

The quantity to be paid for shall be the minimum equipment requirement enumerated in the bid documents mobilized, demobilized and cleaning of the site and accepted by the Engineer. The contract lump sum price shall be full compensation for furnishing all materials, labor, equipment, tools and incidentals necessary to mobilize and demobilize all the minimum equipment requirement enumerated in the bid documents including cleaning of the site. Fifty percent (50%) of the total amount shall be payable after the mobilization activity while the remaining (50%) payable after demobilization and cleaning.

Item 1.02 Provide site office and residence for the Engineer and staff

The quantity to be paid for shall be the actual area in square meter of site office and residence provided for the engineer and staff and accepted by the Engineer. The contract unit price shall be full compensation for furnishing all materials, labor, equipment, tools and incidentals necessary for the provision of temporary site office and residence for the engineer and staff.

Item 1.03 Maintain temporary site office and residence for the Engineer and staff

The quantity to be paid for shall be the actual services rendered in maintaining the site office and accepted by the Engineer. The contract unit price shall be full compensation for furnishing all materials, labor, equipment, tools and incidentals necessary to complete the maintenance of the temporary site office and residence as well as other expenses such as provision for electric power, telephone bill, potable water supply, janitorial and security services.

Item 1.04 Provide construction safety and Health Program in the execution of the project including stringent Covid-19 protocols per PPA Engineering Circular No. 01-2020 and, construction guidelines for the project implementation during the period of public health emergency approved by PDCB and CIAP (as indicated in the bid documents)

The quantity to be paid for shall be the actual implementation of construction safety and health program and accepted by the Engineer. The contract unit price shall be full compensation for furnishing all materials, labor, equipment, tools and incidentals necessary to complete the implementation of the Construction Safety and Health Program, as required and approved by the Department of Labor and Employment (DOLE).

BILL NO. 2

CONSTRUCTION OF PORT OPERATIONAL AREA

Item 2.01 Excavate existing seabed up to required elevation

The quantity to be paid for shall be the actual volume in cubic meters of existing seabed to be excavated up to required elevation in accordance with the plans and specifications and accepted by the Engineer. The contract unit price shall be full compensation for furnishing all materials, labor, equipment, tools and incidentals necessary to complete the work.

Item 2.02 Excavate and backfill existing fill materials

The quantity to be paid for shall be the actual volume in cubic meters of existing fill materials to be excavated up to required elevation then backfilled thereafter in accordance with the plans and specifications and accepted by the Engineer. The contract unit price shall be full compensation for furnishing all materials, labor, equipment, tools and incidentals necessary to complete the work.

Item 2.03 Supply and place 3,500 psi concrete for retaining wall, ramp edge wall, ramp wing wall, slotted rc curb, rc ditch, anchor block, anchor mooring block, cast-in-place concrete block, lamp post foundation, floodlight foundation, pedestal post, handhole and ductbank

The quantity to be paid for shall be the actual volume in cubic meter of 3,500 psi concrete for retaining wall, ramp edge wall, ramp wing wall, slotted rc curb, rc ditch, anchor block, anchor mooring block, cast-in-place concrete block, lamp post foundation, floodlight foundation, pedestal post, handhole and ductbank, supplied and set-in-place in accordance with the plans and specifications and accepted by the Engineer. The contract unit price shall be full compensation for furnishing all materials, labor, equipment, tools and incidentals necessary to complete the work.

Item 2.04 Supply and install steel reinforcement for retaining wall, ramp edge wall, ramp wing wall, slotted rc curb, rc ditch, anchor block, anchor mooring block, cast-in-place concrete block, lamp post foundation, floodlight foundation, pedestal post, handhole and ductbank

The quantity to be paid for shall be the actual weight in kilogram of reinforcing steel bars for retaining wall, ramp edge wall, ramp wing wall, slotted rc curb, rc ditch, anchor block, anchor mooring block, cast-in-place concrete block, lamp post foundation, floodlight foundation, pedestal post, handhole and ductbank, supplied and installed in accordance with the plans and specifications and accepted by the Engineer. The contract unit price shall be full compensation for furnishing all materials, labor, equipment, tools and incidentals necessary to complete the work.

Item 2.05 Supply and place lean concrete for anchored mooring blocks

The quantity to be paid for shall be the actual volume in cubic meter of lean concrete for anchored mooring blocks, supplied and set-in-place in accordance with the plans and specifications and accepted by the Engineer. The contract unit price shall be full compensation for furnishing all materials, labor, equipment, tools and incidentals necessary to complete the work.

Item 2.06 Supply and place 50-100 kg core rocks

The quantity to be paid for shall be the actual volume in cubic meter of 50-100 kg core rocks, supplied and set-in-place in accordance with the plans and specifications and accepted by the Engineer. The contract unit price shall be full compensation for furnishing all materials, labor, equipment, tools and incidentals necessary to complete the work.

Item 2.07 Supply and place 1,000 kg armour rocks

The quantity to be paid for shall be the actual volume in cubic meter of 1,000 kg armour rocks, supplied and set-in-place in accordance with the plans and specifications and accepted by the Engineer. The contract unit price shall be full compensation for furnishing all materials, labor, equipment, tools and incidentals necessary to complete the work.

Item 2.08 Supply and install pre-cast concrete blocks including lifting handle:

- a.) Concrete Block-1
- b.) Concrete Block-2

The quantity to be paid for shall be the actual number of pre-cast concrete blocks of various sizes including lifting handle to be supplied and installed in accordance with the plans and specifications and accepted by the Engineer. The contract unit price shall be full compensation for furnishing all materials, labor, equipment, tools and incidentals necessary to complete the work.

Item 2.09 Supply and install pre-cast concrete caisson including reinforcement

The quantity to be paid for shall be the actual number of pre-cast concrete caisson including reinforcement to be supplied and installed in accordance with the plans and specifications and accepted by the Engineer. The contract unit price shall be full compensation for furnishing all materials, labor, equipment, tools and incidentals necessary to complete the work.

Item 2.10 Supply and place gravity type mooring concrete block including reinforcement

The quantity to be paid for shall be the actual number of gravity type mooring concrete block including reinforcement to be supplied and set-in-place in accordance with the plans and specifications and accepted by the Engineer. The contract unit price shall be full compensation for furnishing all materials, labor, equipment, tools and incidentals necessary to complete the work.

Item 2.11 Place and compact excavated seabed materials for concrete caisson

The quantity to be paid for shall be the actual volume in cubic meter of excavated seabed materials for concrete caisson, set-in-place and compacted in accordance with the plans and specifications and accepted by the Engineer. The contract unit price shall be full compensation for furnishing all materials, labor, equipment, tools and incidentals necessary to complete the work.

Item 2.12 Supply and install geotextile fabric

The quantity to be paid for shall be the actual area in square meter of geotextile fabric, supplied and installed in accordance with the plans and specifications and accepted by the Engineer. The contract unit price shall be full compensation for furnishing all materials, labor, equipment, tools and incidentals necessary to complete the work.

Item 2.13 Supply and install tie-rod of various sizes including accessories:

- a.) 60mmø x 16.0 meters
- b.) 60mmø x 14.0 meters
- c.) 42mmø x 12.0 meters

The quantity to be paid for shall be the actual number of tie rod of various length and size including accessories to be supplied and installed in accordance with the plans and specifications and accepted by the Engineer. The contract unit price shall be full compensation for furnishing all materials, labor, equipment, tools and incidentals necessary to complete the work.

Item 2.14 Supply and place sand and gravel fill

The quantity to be paid for shall be the actual volume in cubic meter of sand and gravel fill, supplied and set-in-place in accordance with the plans and specifications and accepted by the Engineer. Hydrographic/Topographic Surveys before and after placing of sand and gravel fill shall be made to determine the actual elevations along the cross sections and the actual quantities for payment. Volume due to settlement as established using settlement plates shall also be considered for payment. The contract unit price shall be full compensation for furnishing all materials, labor, equipment, tools and incidentals necessary to complete the work.

Item 2.15 Supply, spread and compact aggregate subbase course

The quantity to be paid for shall be the actual volume in cubic meter of aggregate subbase course to be supplied, spread and compacted in accordance with the plans and specifications and accepted by the Engineer. The contract unit price shall be full compensation for furnishing all materials, labor, equipment, tools and incidentals necessary to complete the work.

Item 2.16 Supply, spread and compact aggregate base course

The quantity to be paid for shall be the actual volume in cubic meter of aggregate base course to be supplied, spread and compacted in accordance with the plans and specifications and accepted by the Engineer. The contract unit price shall be full compensation for furnishing all materials, labor, equipment, tools and incidentals necessary to complete the work.

Item 2.17 Supply, spread and compact gravel bedding

The quantity to be paid for shall be the actual volume in cubic meter of gravel bedding, supplied, spread and compacted for in accordance with the plans and specifications and accepted by the Engineer. The contract unit price shall be full compensation for furnishing all materials, labor, equipment, tools and incidentals necessary to complete the work.

Item 2.18 Construct Portland cement concrete pavement for port operational area (300mm thick) including dowel bars

The quantity to be paid for shall be the actual area in square meter of Portland cement concrete pavement for port operational area (300mm thick) including dowel bars to be constructed in accordance with the plans and specifications and accepted by the Engineer. The contract unit price shall be full compensation for furnishing all materials, labor, equipment, tools and incidentals necessary to complete the work.

Item 2.19 Construct reinforced concrete pavement for ro-ro ramp on fill (300mm thick) including reinforcement

The quantity to be paid for shall be the actual volume in cubic meter of reinforced concrete pavement for ro-ro ramp on fill (300mm thick) including reinforcement to be constructed in accordance with the plans and specifications and accepted by the Engineer. The contract unit price shall be full compensation for furnishing all materials, labor, equipment, tools and incidentals necessary to complete the work.

Item 2.20 Construct security fence and gate including accessories

The quantity to be paid for shall be the actual lot of security fence and gate, including accessories, constructed in accordance with the plans and specifications and accepted by the Engineer. The contract unit price shall be full compensation for furnishing all materials, labor, equipment, tools and incidentals necessary to complete the work.

Item 2.21 Supply, fabricate and install signages including accessories

The quantity to be paid for shall be the actual lot of signages including accessories to be supplied, fabricated and installed in accordance with the plans and specifications, measured from the tip of piles to cut-off elevation and accepted by the Engineers. The contract unit price shall be full compensation for furnishing all materials, labor, equipment, tools and incidentals necessary to complete the work.

Item 2.22 Supply, deliver and install port lighting system including accessories

The quantity to be paid for shall be the actual lot of port lighting system including accessories, to be supplied, delivered and installed in accordance with the plans and specifications and accepted by the Engineer. The contract unit price shall be full compensation for furnishing all materials, labor, equipment, tools and incidentals necessary to complete the work.

Item 2.23 Supply and deliver to site rubber dock fender (D-type, 500H x 500W x 2000L) including accessories

The quantity to be paid for shall be the actual set of rubber dock fenders (D-type, 500H x 500W x 2000L) including accessories, supplied and delivered to site in accordance with the plans and specifications and accepted by the Engineer. The contract unit price shall be full compensation for furnishing all materials, labor, equipment, tools and incidentals necessary to complete the work.

Item 2.24 Supply and deliver to site rubber dock fender (V-type, 500H x 1500L) including accessories

The quantity to be paid for shall be the actual set of rubber dock fenders (V-type, 500H x 1500L) including accessories, supplied and delivered to site in accordance with the plans and specifications and accepted by the Engineer. The contract unit price shall be full compensation for furnishing all materials, labor, equipment, tools and incidentals necessary to complete the work.

Item 2.25 Install rubber dock fenders including accessories

The quantity to be paid for shall be the actual set of rubber dock fenders including accessories, installed in accordance with the plans and specifications and accepted by the Engineer. The contract unit price shall be full compensation for furnishing all materials, labor, equipment, tools and incidentals necessary to complete the work.

Item 2.26 Supply and deliver to site mooring bollard (150 Tons, Single pillar) including accessories

The quantity to be paid for shall be the actual set of mooring bollard (150 Tons, Single pillar) including accessories, supplied and delivered to site in accordance with the plans and specifications and accepted by the Engineer. The contract unit price shall be full compensation for furnishing all materials, labor, equipment, tools and incidentals necessary to complete the work.

Item 2.27 Supply and deliver to site mooring bollard (25 Tons, T-head) including accessories

The quantity to be paid for shall be the actual set of mooring bollard (25 Tons, T-head) including accessories, supplied and delivered to site in accordance with the plans and specifications and accepted by the Engineer. The contract unit price shall be full compensation for furnishing all materials, labor, equipment, tools and incidentals necessary to complete the work.

Item 2.28 Install mooring bollards including accessories

The quantity to be paid for shall be the actual set of mooring bollard including accessories, installed in accordance with the plans and specifications and accepted by the Engineer. The contract unit price shall be full compensation for furnishing all materials, labor, equipment, tools and incidentals necessary to complete the work.

BILL NO. 3

PROVISION OF PONTOON BARGE

Item 3.01 Design, fabrication and delivery of 36m x 36m steel pontoon barge including processing of required documents for the construction of the vessel, insurances and MARINA Certificates

The quantity to be paid for shall be the actual lot of 36m x 36m steel pontoon barge, designed, fabricated and delivered including processing of required documents for the construction of the vessel, insurances and MARINA Certificates in accordance with the plans and specifications and accepted by the Engineer. The contract unit price shall be full compensation for furnishing all materials, labor, equipment, tools and incidentals necessary to complete the work.

BILL NO. 4

REIMBURSABLE ITEMS

Item 4.01 Provide reimbursable items necessary in the implementation of the project as determined by the Authority.

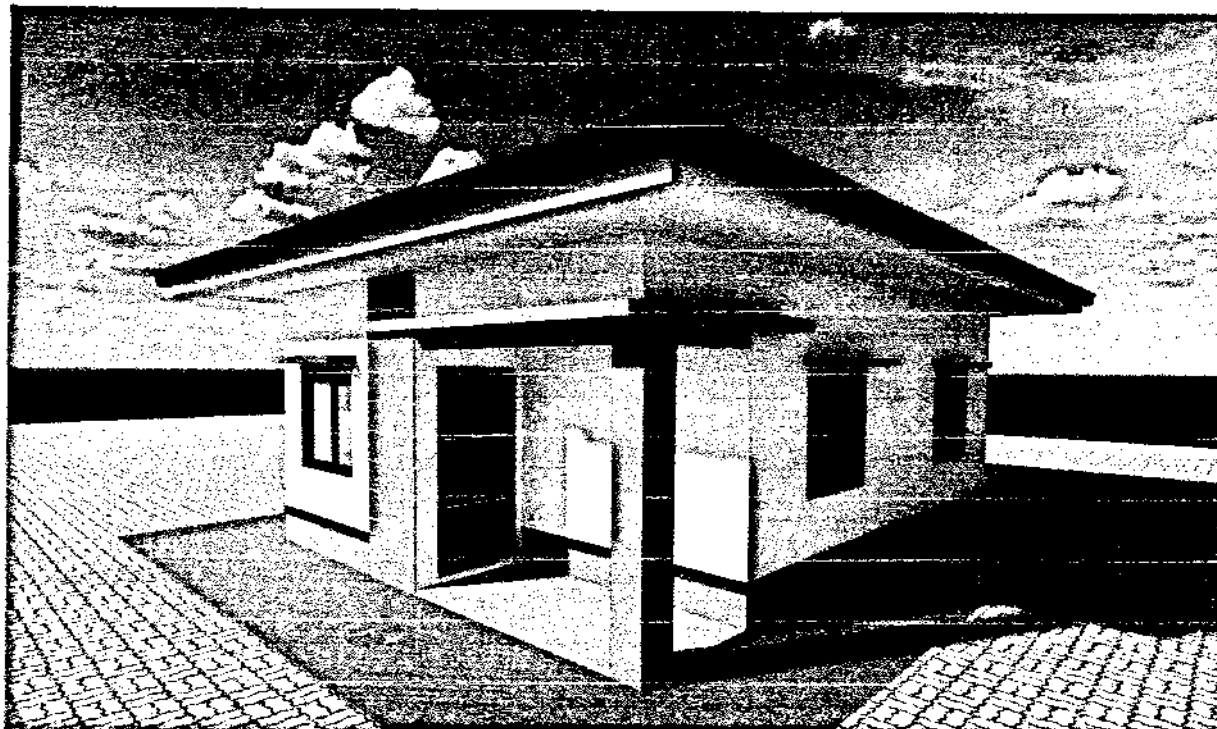
- a. Office Furniture and Appliances**
- b. Computers and Accessories**

The quantity to be paid for shall be the actual quantity of determined items by the Authority deemed necessary in the implementation of the project, supplied, delivered and accepted by the Authority. Payment for said items shall be made only upon complete delivery/acceptance of such. The contract lump sum price shall be full compensation for providing all determined items. The Contractor's Profit and Overhead, Contingencies and Miscellaneous (OCM) should not be included in the cost of said items. Claims for payment shall be supported by Official Receipt(s) (OR) and at least three (3) canvasses. The amount to be paid for shall be the price indicated in the OR but should not exceed the contract lump sum price. The determined items shall be the property of PPA. Operation and maintenance shall be borne by PPA.

PHILIPPINE
PORTS
AUTHORITY



PROPOSED FIELD OFFICE



PERSPECTIVE

SCALE

NTS

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ARCHITECTURAL

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A - 03 of 04	<ul style="list-style-type: none"> FRONT ELEVATION SIDE ELEVATION REAR ELEVATION LONGITUDINAL SECTION CROSS SECTION 	
A - 04 of 04	<ul style="list-style-type: none"> SCHEDULE OF DOORS AND WINDOWS TOILET DETAILS KITCHEN CABINET DETAILS 	

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S - 02 of 02	<ul style="list-style-type: none"> FTB/GIRDER/BEAM SCHEDULE TYPICAL DETAIL OF SECTION OF BEAM 	<ul style="list-style-type: none"> TRUSS DIAGRAM CANOPY DETAILS

ELECTRICAL

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PLUMBING

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P - 02 of 03	<ul style="list-style-type: none"> CATCH BASIN DETAILS CLEAN-OUT DETAIL PIPE TRENCH BEDDING 	<ul style="list-style-type: none"> SANITARY SEWAGE LAYOUT ISOMETRIC SANITARY SEWAGE LAYOUT LEGENDS
P - 03 of 03	<ul style="list-style-type: none"> WATER LINE LAYOUT ISOMETRIC WATER LINE LAYOUT SCHEDULE AND LEGEND OF PIPE (WATER LINE) DETAILS OF AIR CHAMBER 	<ul style="list-style-type: none"> GROUND FLOOR STORM DRAINAGE LAYOUT ROOF STORM DRAINAGE LAYOUT ISOMETRIC STORM DRAINAGE LAYOUT LEGENDS

PHILIPPINE
PORTS
AUTHORITY



PROJECT TITLE:

PROPOSED FIELD OFFICE

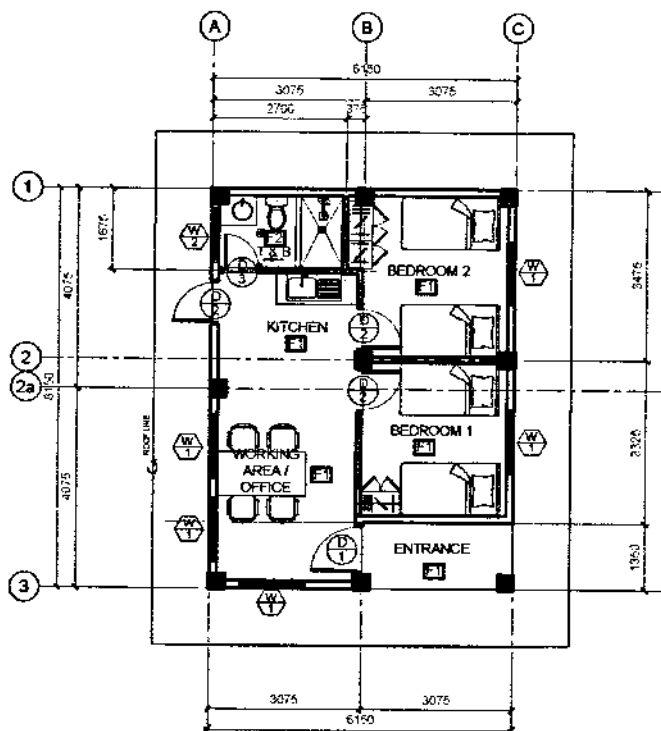
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- PERSPECTIVE
- TABLE OF CONTENTS

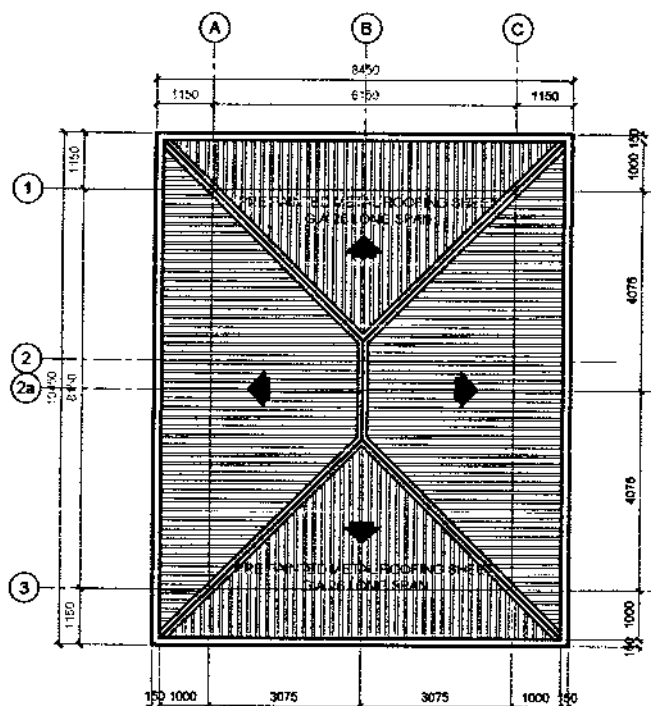
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SHEET NO.
A-01 of 04

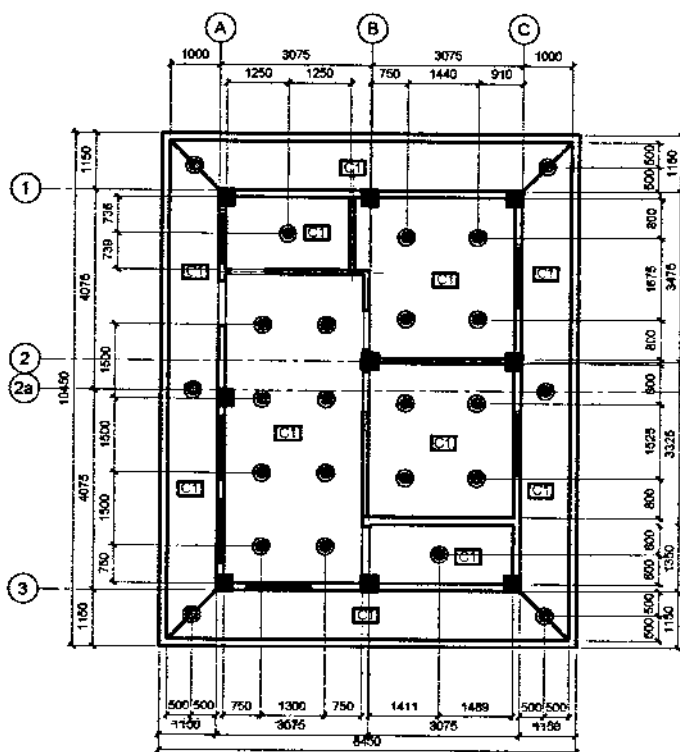
DATE
APRIL 2021



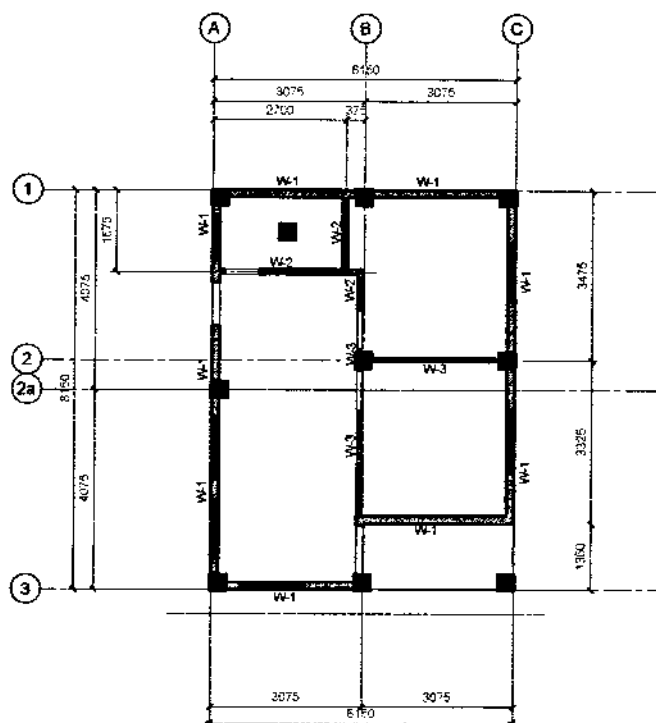
1 FLOOR PLAN
SCALE 1:150 M



2 ROOF PLAN
SCALE 1:150 M



3 REFLECTED CEILING PLAN
SCALE 1:150 M



4 WALL PARTITION LAYOUT
SCALE 1:150 M

LEGEND:		
FLOOR FINISHES	CEILING	WALL PARTITION
PLAIN CEMENT FLOOR FINISH	12mm THICK MARINE PLYWOOD, FLAT ENAMEL PAINT FINISH OR METAL PLUGGING	100mm THICK DRY WALL
300mm x 300mm ACOUSTIC TILE	VERTICAL DOWNLIGHT RECESSED INTO THE CEILING	100mm THICK DRY WALL
	VERTICAL DOWNLIGHT RECESSED INTO THE CEILING WITHOUT GLASS COVER 220V, E27, 11 WATT	100mm THICK DRY WALL

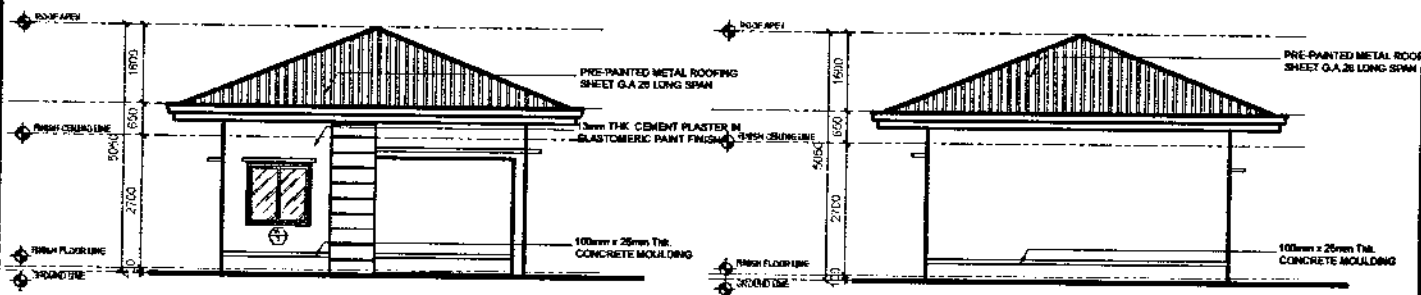


PROJECT TITLE:

PROPOSED FIELD OFFICE

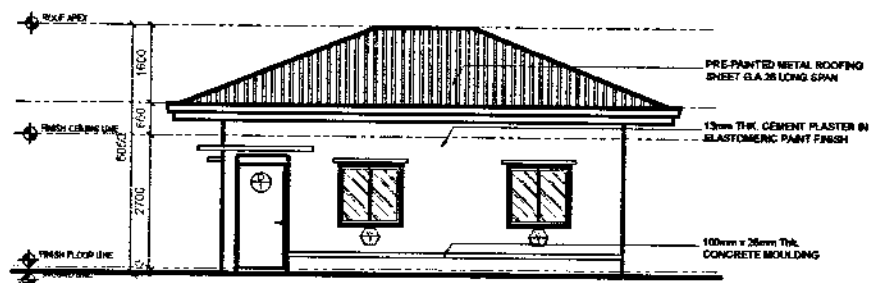
SHEET CONTENTS:
• FLOOR PLAN
• ROOF PLAN
• REFLECTED CEILING PLAN
• WALL PARTITION LAYOUT
• LEGEND

SCALE:
AS SHOWN
SHEET NO.
A-02 of 04
DATE
APRIL 2021

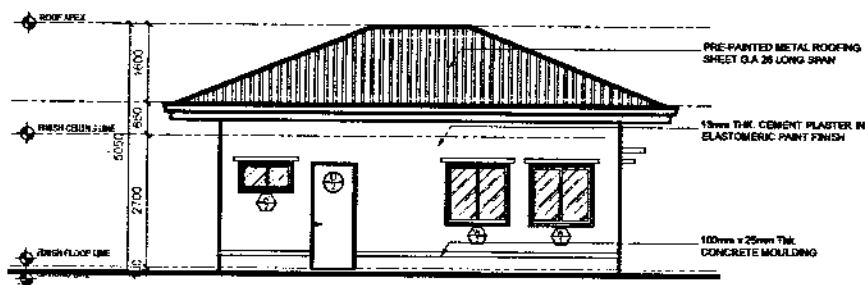


1 FRONT ELEVATION
SCALE 1:150 M

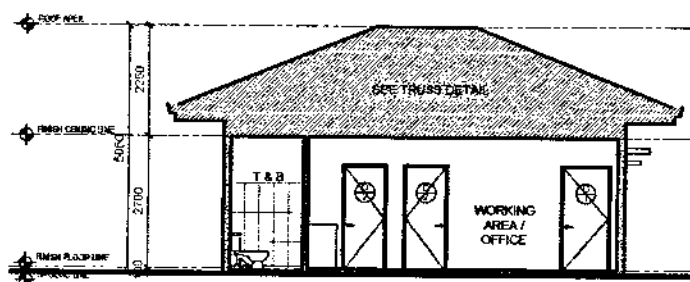
2 REAR ELEVATION
SCALE 1:150 M



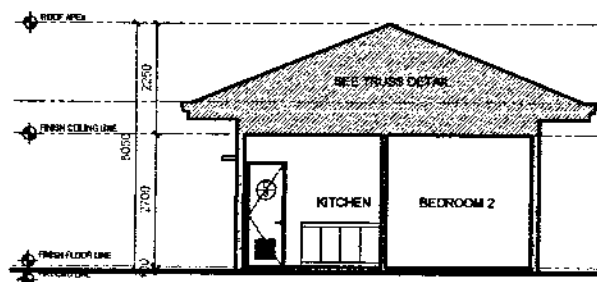
3 RIGHT SIDE ELEVATION
SCALE 1:150 M



4 LEFT SIDE ELEVATION
SCALE 1:150 M



5 LONGITUDINAL SECTION
SCALE 1:150 M



6 CROSS SECTION
SCALE 1:150 M

PHILIPPINE
PORTS
AUTHORITY



PROJECT TITLE:

PROPOSED FIELD OFFICE

SHEET CONTENTS:

- FRONT ELEVATION
- RIGHT SIDE ELEVATION
- LEFT SIDE ELEVATION
- REAR ELEVATION
- LONGITUDINAL SECTION
- CROSS SECTION
- LEGEND

SCALE:

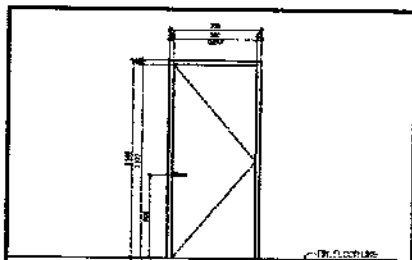
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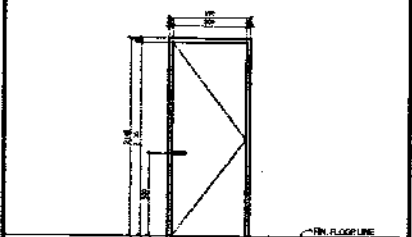
A-03 of 04

DATE

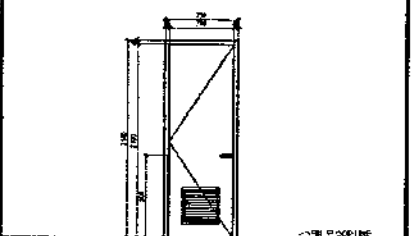
APRIL 2021



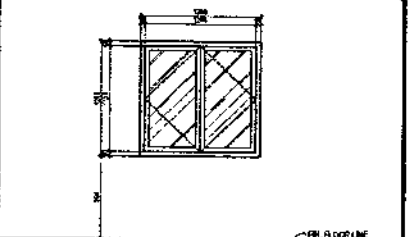
D1
TYPE: WOODEN FLOOR DOOR WITH FLUSH DOOR IN DUCT SYSTEM PLANT ROOM
LOCATION: MAIN ENTRY
SETS: ONE (1)



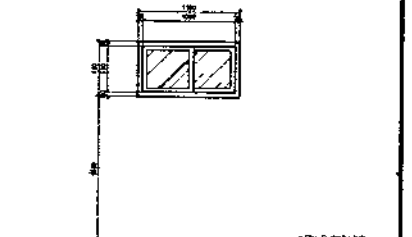
D2
TYPE: WOODEN FLOOR DOOR WITH FLUSH DOOR IN DUCT SYSTEM PLANT ROOM
LOCATION: RECEPTION
SETS: THREE (3)



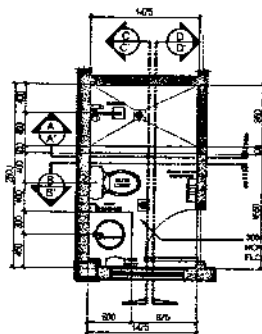
D3
TYPE: WOODEN FLOOR DOOR WITH FLUSH DOOR IN DUCT SYSTEM PLANT ROOM
LOCATION: TOILET
SETS: ONE (1)



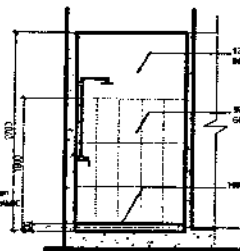
W1
TYPE: 1500mm x 1000mm WINDOW WITH POWER VENTILATED WINDOW TYPE WINDOW
LOCATION: WORKING AREA, BED ROOM
SETS: FIVE (5)



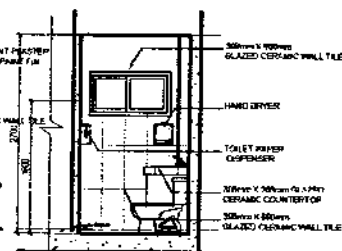
W2
TYPE: 1500mm x 1000mm WINDOW WITH POWER VENTILATED WINDOW TYPE WINDOW
LOCATION: TOILET
SETS: ONE (1)



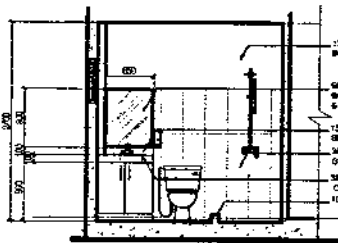
BLOW-UP PLAN



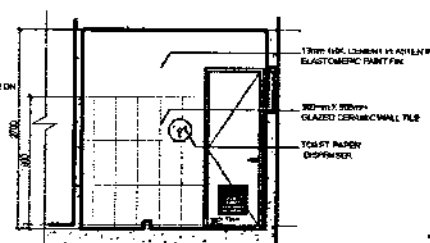
SECTION THRU A-A'



SECTION THRU B-B'



SECTION THRU C-C'



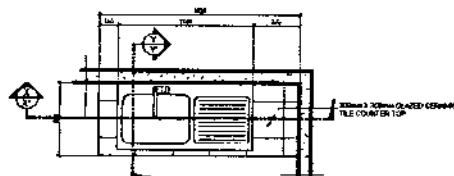
SECTION THRU D-D'



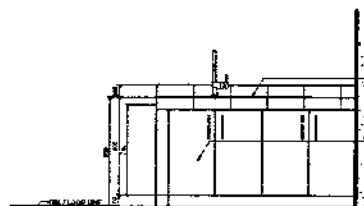
TOILET DETAILS

SCALE

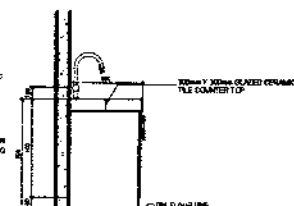
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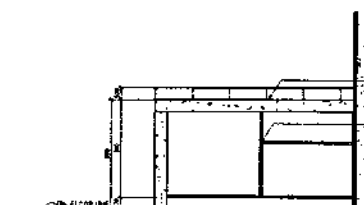
BLOW-UP PLAN



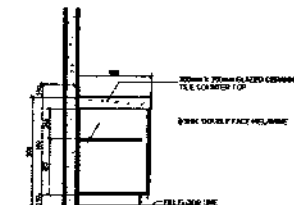
FRONT ELEVATION



SIDE ELEVATION



SECTION THRU X-X'



SECTION THRU Y-Y'



KITCHEN CABINET DETAILS

SCALE

1:100 M



SCHEDULE OF DOORS AND WINDOWS

SCALE

1:80 M



PROJECT TITLE:

PROPOSED FIELD OFFICE

SHEET CONTENTS:

- SCHEDULE OF DOORS AND WINDOWS
- TOILET DETAILS
- KITCHEN CABINET DETAILS

SCALE:

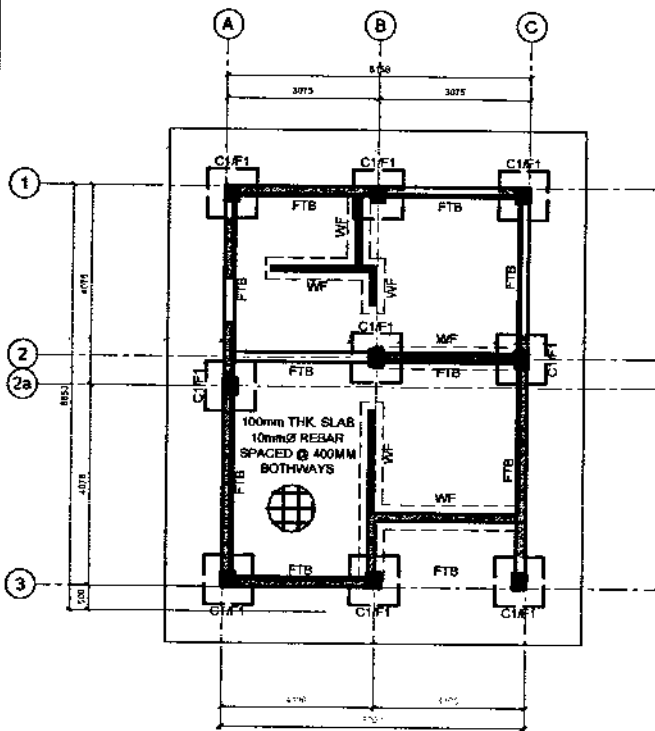
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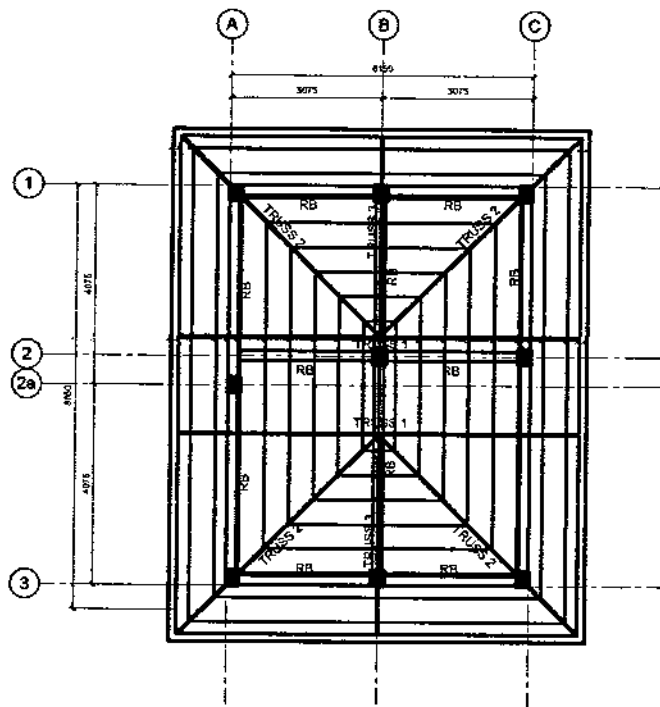
A-04 of 04

DATE

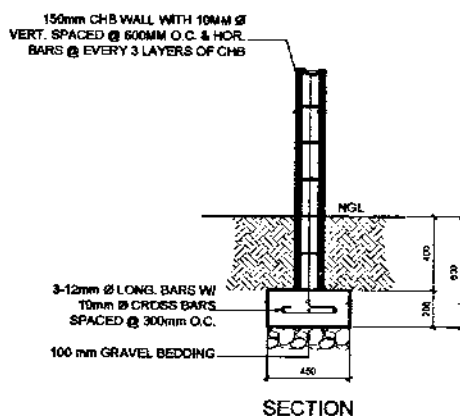
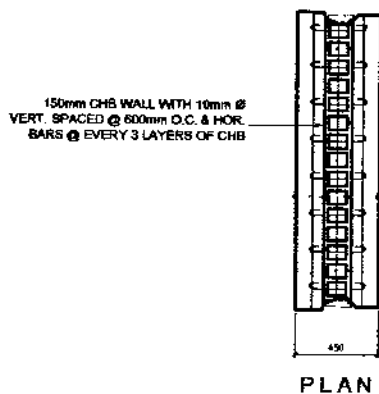
APRIL 2021



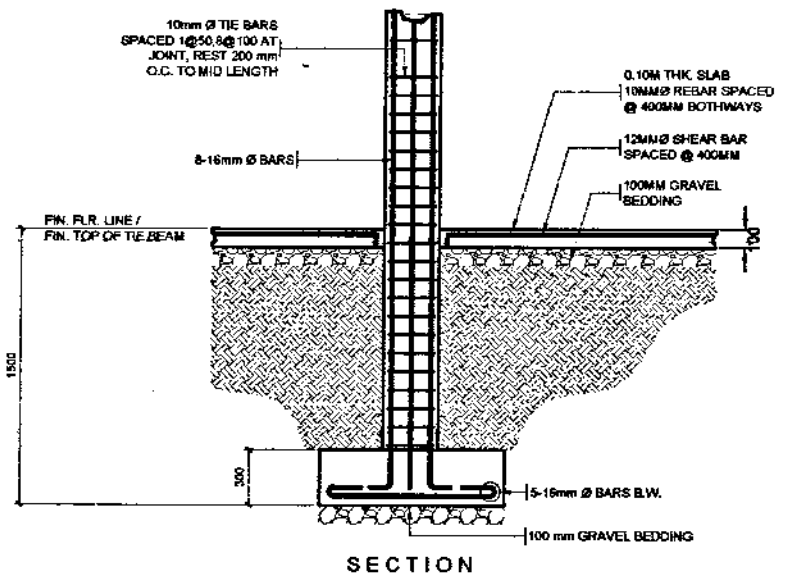
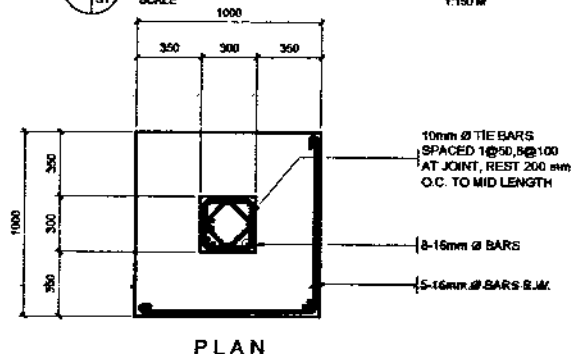
1 FOUNDATION PLAN
SCALE 1:150 M



2 ROOF FRAMING PLAN
SCALE 1:150 M









3 WALL FOOTING DETAIL
SCALE 1:50 M

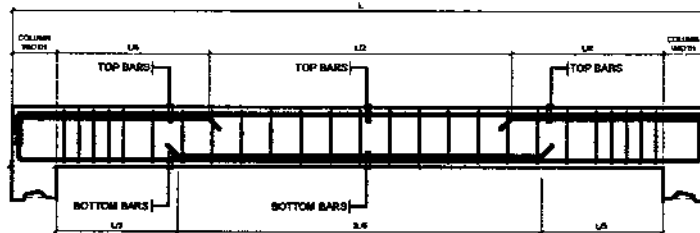


4 DETAIL OF COLUMN/CORNER FOOTING
SCALE 1:50 M

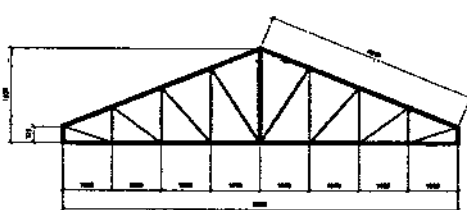


MARK	FTB			RB		
SIZE (MM)	250 x 400			350 x 550		
LOCATION	NS CONC. SUPPORT	MIDSPAN	CONT. SUPPORT	NS CONC. SUPPORT	MIDSPAN	CONT. SUPPORT
SECTION						
TOP BAR	3 - D16	3 - D16	3 - D16	4 - D16	2 - D16	4 - D16
BOTTOM BAR	2 - D16	3 - D16	2 - D16	2 - D16	4 - D16	2 - D16
STIRRUPS	D16mm - 1 @ 40mm, 4 @ 100mm, REST @ 200mm			D16mm - 1 @ 50mm, 4 @ 100mm, REST @ 200mm		
WEB BARS						
REB						

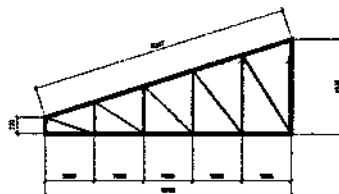
1 FTB/GIRDER/BREAM SCHEDULE
SCALE 1:50 M



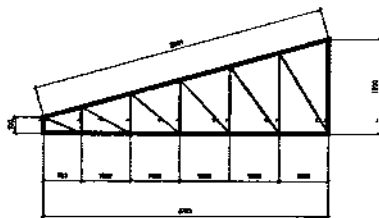
2 TYPICAL DETAIL OF SECTION OF BEAM
SCALE NTS



TRUSS 1



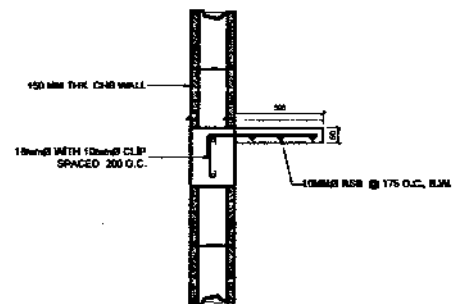
TRUSS 2



TRUSS 3

SPACING	RE	DESCRIPTION	MARKING
1	1	TOP CHORD	100 x 100
2	2	BOTTOM CHORD	100 x 100
3	3	WEB POST	100 x 100
4	4	WEB MEMBER	100 x 100
5	5	BRACING MEMBER	100 x 100

NOTE: VERIFY THE ACTUAL DIMENSIONS OF BEAMS GIVEN APPROXIMATELY
FOR ALPHAS - TYPICAL PLAN AREA IS NOT TO BE USED FOR FABRIC SUPPORTS
CONCRETE - 100 x 100 x 100 mm (4" x 4" x 4")



4 CANOPY DETAILS
SCALE 1:50 M

3 TRUSS DIAGRAM
SCALE 1:100 M

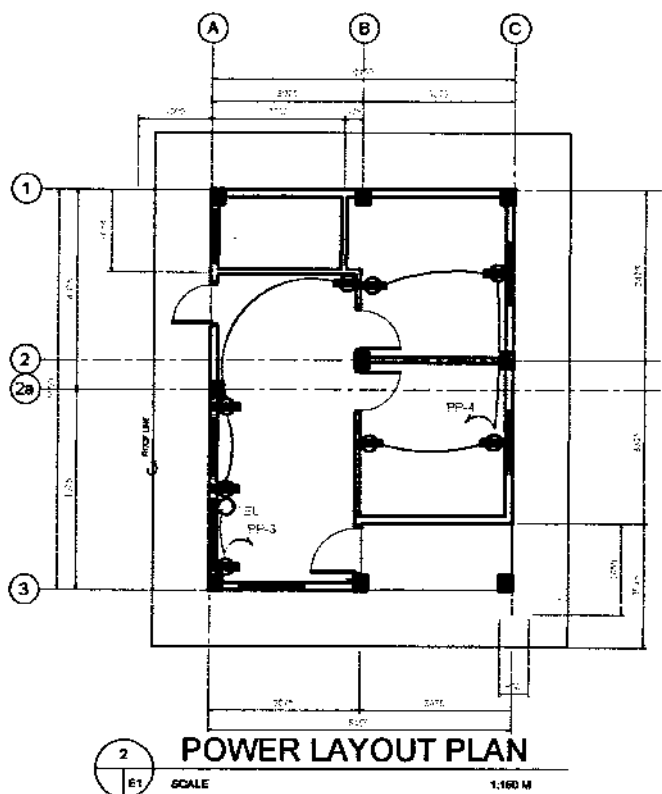
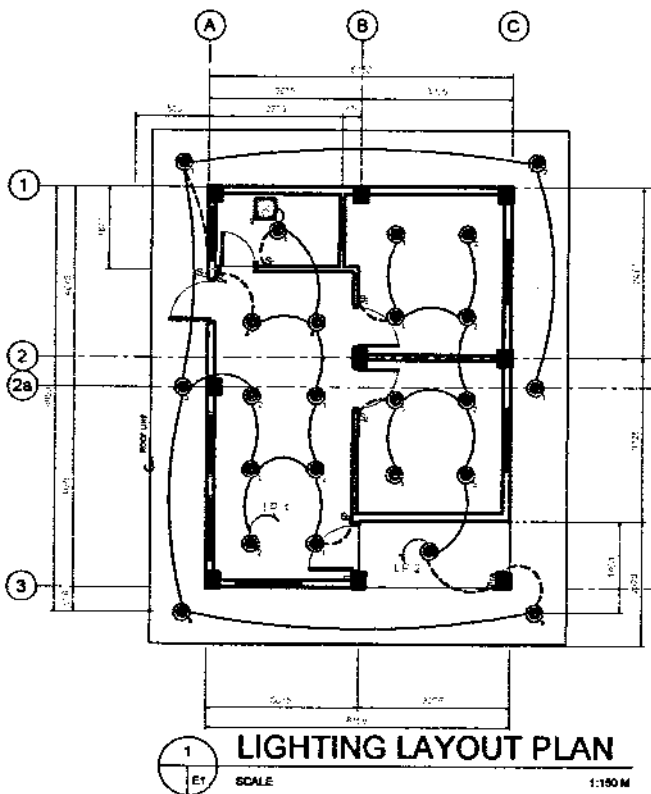


PROJECT TITLE

PROPOSED FIELD OFFICE

SHEET CONTENTS:
• FTB/GIRDER/BREAM SCHEDULE
• TYPICAL DETAIL OF SECTION OF BEAM
• TRUSS DIAGRAM
• REINFORCEMENT DETAIL OF STEPS
• CANOPY DETAILS

SCALE: AS SHOWN
SHEET NO. S-02 of 02
DATE APRIL 2021

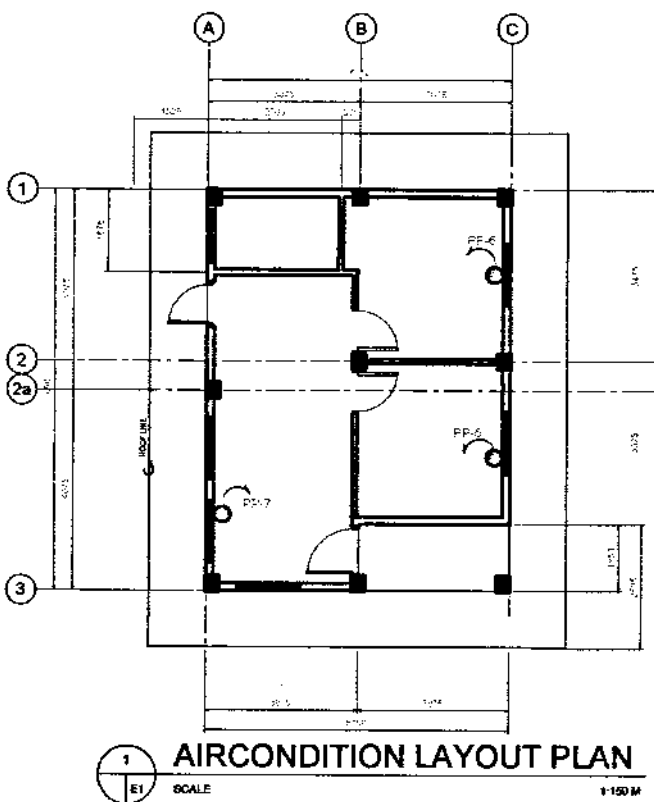


LEGEND:

- VERTICAL DOWNLIGHT RECESSED MTD TYPE WITHOUT GLASS COVER LAMP HOLDER, 220V, E27, 11 WATT LED BULB, DAYLIGHT
- BATHROOM RECESSED CEILING EXHAUST FAN 26 WATT, 220 VOLT 60 HZ
- ⬢ 3-PRONG DUPLEX CONVENIENCE OUTLET WITH GROUNDING
- S ONE GANG SWITCH, 15A
- S₂ TWO GANG SWITCH, 15A, SUBSCRIPT DENOTES LIGHT CONTROL
- S₃ THREE GANG SWITCH, 15A, SUBSCRIPT DENOTES LIGHT CONTROL
- ⬢ SPLIT TYPE AIR CONDITION
- PANEL BOARD (LIGHT / POWER)
- CIRCUIT HOMERUN
- TELEPHONE/INTERNET CONNECTION PROVIDED BY TELEPHONE COMPANY

LP/PP SCHEDULE OF LOAD

LOAD NO.	LT. NO.	LOAD DESCRIPTION	VOLT	CURRENT	WIRE (MCM)	WIRE (MMB)	WIRE (MMB)	WIRE (MMB)	WIRE (MMB)	WIRE (MMB)
1	1	LIGHTING	220	4.10	2" 1/2	30 (100' 1.3m)	30 (100' 1.3m)	30 (100' 1.3m)	30 (100' 1.3m)	30 (100' 1.3m)
2	2	LIGHTING	220	2.45	2" 1/2	30 (100' 1.3m)	30 (100' 1.3m)	30 (100' 1.3m)	30 (100' 1.3m)	30 (100' 1.3m)
3	3	DUPLEX CONVENIENCE OUTLET	220	3.27	2" 1/2	30 (100' 1.3m)	30 (100' 1.3m)	30 (100' 1.3m)	30 (100' 1.3m)	30 (100' 1.3m)
4	4	DUPLEX CONVENIENCE OUTLET	220	3.27	2" 1/2	30 (100' 1.3m)	30 (100' 1.3m)	30 (100' 1.3m)	30 (100' 1.3m)	30 (100' 1.3m)
5	5	WINDOW TYPE ACU - HP	220	4.17	2" 1/2	30 (100' 1.3m)	30 (100' 1.3m)	30 (100' 1.3m)	30 (100' 1.3m)	30 (100' 1.3m)
6	6	WINDOW TYPE ACU - HP	220	4.17	2" 1/2	30 (100' 1.3m)	30 (100' 1.3m)	30 (100' 1.3m)	30 (100' 1.3m)	30 (100' 1.3m)
7	7	WINDOW TYPE ACU - HP	220	4.17	2" 1/2	30 (100' 1.3m)	30 (100' 1.3m)	30 (100' 1.3m)	30 (100' 1.3m)	30 (100' 1.3m)
8	8	SPARE	220	5.00	2" 1/2	30 (100' 1.3m)	30 (100' 1.3m)	30 (100' 1.3m)	30 (100' 1.3m)	30 (100' 1.3m)
9	9	SPARE	220	5.00	2" 1/2	30 (100' 1.3m)	30 (100' 1.3m)	30 (100' 1.3m)	30 (100' 1.3m)	30 (100' 1.3m)
10	10	MAIN DISCONNECTED PANEL (MCP)	220	25.00	2" 1/2	30 (100' 1.3m)	30 (100' 1.3m)	30 (100' 1.3m)	30 (100' 1.3m)	30 (100' 1.3m)



PROJECT TITLE:

PROPOSED FIELD OFFICE

SHEET CONTENTS:
• LIGHTING LAYOUT PLAN
• POWER LAYOUT PLAN
• LEGEND
• SCHEDULE OF LOAD
• MECHANICAL EQUIPMENT SCHEDULE

SCALE:
AS SHOWN
SHEET NO.
E-01 of 01
DATE
APRIL 2021

GENERAL NOTES AND SPECIFICATIONS:

- IT IS NOT INTENDED THAT THE DRAWINGS SHALL SHOW EVERY PIPE FITTING, VALVE AND APPURTENANCE. ALL SUCH ITEMS WHETHER SPECIFICALLY MENTIONED OR NOT, OR INDICATED ON THE DRAWINGS SHALL BE FURNISHED AND INSTALLED IF NECESSARY TO COMPLETE THE SYSTEM TO THE SATISFACTION OF THE OWNER.
- ALL PLUMBING WORKS SHALL BE INSTALLED IN ACCORDANCE WITH THE PROVISIONS OF THE NATIONAL PLUMBING CODE OF THE PHILIPPINES, THE REQUIREMENTS OF THE LOCAL PLUMBING INSPECTION OFFICE, PERTINENT PROVISIONS OF THE UNIFORM BUILDING CODE AND THE NATIONAL BUILDING CODE OF THE PHILIPPINES.
- COORDINATE THE DRAWING WITH OTHER RELATED DRAWINGS AND SPECIFICATION. THE ARCHITECT SHALL BE NOTIFIED IMMEDIATELY OF ANY DISCREPANCY FOUND THEREIN.
- ALL PIPES SHALL BE INSTALLED AS INDICATED ON PLANS. ANY RELOCATIONS REQUIRED FOR PROPER EXECUTION OF OTHER TRADE SHALL BE WITH PRIOR APPROVAL OF THE ARCHITECT OR ENGINEER.
- PROPOSED SANITARY UTILITIES SHALL CONFORM TO THE ACTUAL LOCATION, DEPTH AND INVERT ELEVATION OF ALL EXISTING PIPES AND STRUCTURES AS VERIFIED BY THE CONTRACTOR.
- ALL SLOPES FOR HORIZONTAL DRAINAGE SHALL MAINTAIN 1% UNLESS OTHERWISE SPECIFIED.
- SIZE OF WATER SUPPLY PIPES TO FIXTURES SHALL BE IN ACCORDANCE WITH MANUFACTURER'S INSTRUCTIONS.
- THE CONTRACTOR SHALL VERIFY ALL EXISTING UTILITIES AT THE SITE, COORDINATE THE WORKS WITH THE SEWER LINE EFFLUENT DISPOSAL POINT AND WATER LINE SERVICE CONNECTING POINT, UNLESS OTHERWISE POINT AND WATER LINE SERVICE CONNECTING POINT, UNLESS OTHERWISE SPECIFIED.
- ALL FIXTURES SHALL BE INDIVIDUALLY VENTED.
- THE INVERT OF THE INLET PIPE OF A SEPTIC TANK SHALL BE AT A LEVEL NOT LESS THAN 50.8mm (2") ABOVE THE INVERT OF THE OUTLET PIPE.
- TO PREVENT CONTAMINATION OF UNDERGROUND WATER SOURCE NO SEPTIC TANK SHALL BE CONSTRUCTED LESS THAN 1.20m ABOVE THE WATER TABLE LEVEL.
- ALL PIPE SIZE ARE IN MILLIMETERS AND ALL DIMENSIONS ARE IN METERS UNLESS OTHERWISE SPECIFIED.
- ALL PLUMBING INSTALLATION INCLUDED HEREIN SHALL BE UNDER THE DIRECT SUPERVISION OF A DULY REGISTERED AND LICENSED MASTER PLUMBER.
- ALL PIPE SIZES AND OTHER DIMENSIONS ARE IN MILLIMETER (MM) UNLESS OTHERWISE SPECIFIED.
- ALL PIPE SIZES INDICATED ARE NOMINAL SIZES.

SCHEDULE OF PIPE (WATER LINE)

	ABV.	SIZE OF PIPE (MM)	TYPE OF PIPE
WATER CLOSET	WC	15	PPR
LAVATORY	LAV	15	PPR
URINAL	UR	15	PPR
KITCHEN SINK	KS	15	PPR

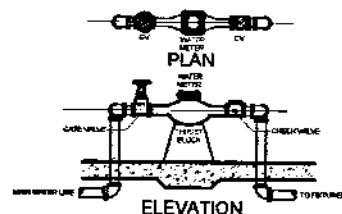
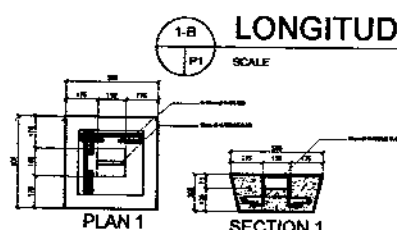
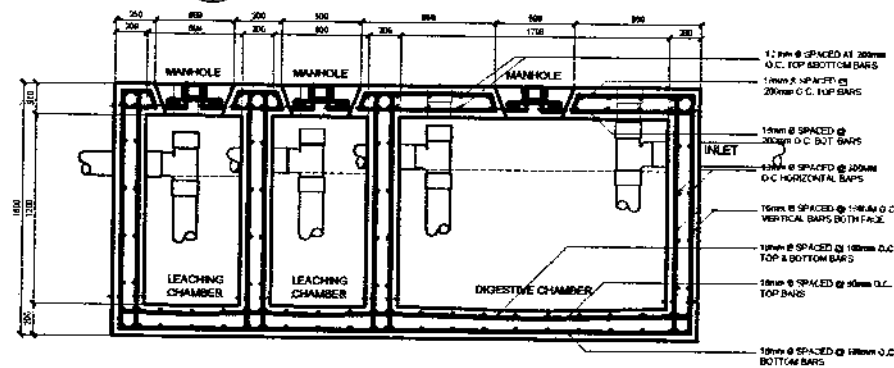
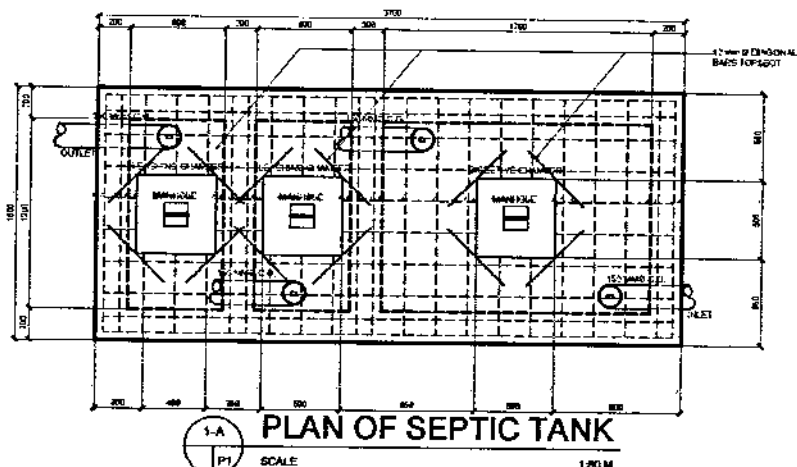
MATERIAL SPECIFICATIONS:

COLD WATER LINE-	SHALL BE POLYPROPYLENE RANDOM (PPR) TYPE 3 PIPE, "WAVIN EXOFLASTIK" BRAND OR APPROVED EQUAL.
VENT PIPES-	SHALL BE POLYVINYL CHLORIDE (PVC) PIPE SERIES 1000, "NELTEX", "ATLANTA" BRAND OR APPROVED EQUAL.
FITTING-	SHALL BE SOLVENT CEMENT JOINT TO ASTM D2564.
SEWER LINES-	SHALL BE POLYVINYL CHLORIDE (PVC) PIPE SERIES 1000, "NELTEX", "ATLANTA" BRAND OR APPROVED EQUAL.
SOTRM DRAINAGE LINES- DOWNSPOUT	SHALL BE POLYVINYL CHLORIDE (PVC) SERIES 1000, "ATLANTA" BRAND OR APPROVED EQUAL. FITTING SHALL BE SOLVENT CEMENT JOINT TO ASTM D 2564. 250MM Ø & ABOVE MATERIAL SHALL BE CONCRETE DRAIN PIPE (CDP) TONGUE FOR 300MM Ø & LARGER.
ARUFU LINES-	SHALL BE POLYVINYL CHLORIDE (PVC) PIPE SERIES 800 II, "NELTEX", "ATLANTA" BRAND OR APPROVED EQUAL.
CHECK VALVES-	"GREAT VOLUME", "CRANE", "KITS", OR APPROVED EQUAL.
GATE VALVES-	"GREAT VOLUME", "CRANE", "KITS", OR APPROVED EQUAL.
WATER METER-	"ARAD", "ASAHI" BRAND OR APPROVED EQUAL.

SCHEDULE OF PIPE (SEWER LINE)

	ABV.	SIZE OF PIPE (MM)	TYPE OF PIPE
WATER CLOSET	WC	100	PVC (SERIES 1000)
LAVATORY	LAV	50	PVC (SERIES 1000)
URINAL	UR	50	PVC (SERIES 1000)
KITCHEN SINK	KS	50	PVC (SERIES 1000)
FLOOR DRAIN	FD	50	PVC (SERIES 1000)
FLOOR CLEAN-OUT	FCO	SEE PLAN	PVC (SERIES 1000)
DOWNSPOUT	DS	SEE PLAN	PVC (SERIES 1000)
CLEAN-OUT	CO	SEE PLAN	PVC (SERIES 1000)
VENT STACK THRU ROOF	VSTR	100	PVC (SERIES 1000)
SEWER LINE (SOL. PIPE)	SP	SEE PLAN	PVC (SERIES 1000)

SEPTIC TANK DETAILS



PHILIPPINE
PORTS
AUTHORITY

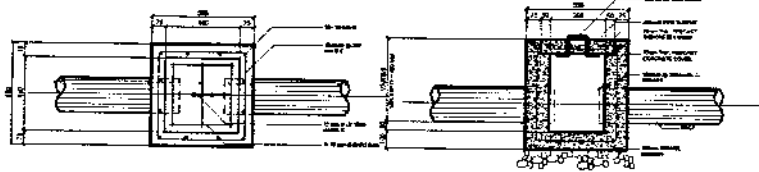


PROJECT TITLE

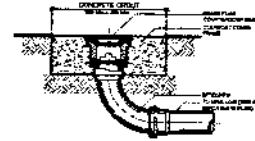
PROPOSED FIELD OFFICE

SHEET CONTENTS:
 • DETAILS OF SEPTIC TANK
 • SEPTIC TANK MANHOLE DETAILS
 • DETAILS OF WATER METER
 • GENERAL NOTES AND SPECIFICATIONS
 • MATERIALS SPECIFICATIONS
 • SCHEDULE OF PIPE (WATER LINE)
 • SCHEDULE OF PIPE (SEWER LINE)

SCALE:
 AS SHOWN
 SHEET NO.
 P-01 of 03
 DATE
 APRIL 2021



1 CATCH BASIN DETAILS
SCALE 1:40 M



2 CLEAN-OUT DETAIL
SCALE NTS



3 PIPE TRENCH BEDDING
SCALE NTS

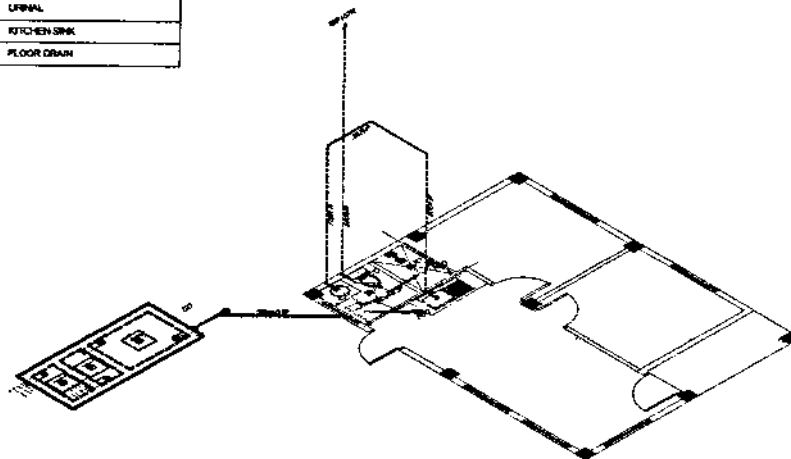
SCHEDULE OF PIPE (SEWER LINE)

	ABV.	SIZE OF PIPE (mm)	TYPE OF PIPE
WATER CLOSET	WC	100	PVC (SERIES 1000)
LAVATORY	LAV	80	PVC (SERIES 1000)
URINAL	UR	50	PVC (SERIES 1000)
KITCHEN SINK	KS	50	PVC (SERIES 1000)
BLOF SINK	BS	50	PVC (SERIES 1000)
FLOOR DRAIN	FD	50	PVC (SERIES 1000)
FLOOR CLEANOUT	FCD	SEE PLAN	PVC (SERIES 1000)
DOWN SPOUT	DS	SEE PLAN	PVC (SERIES 1000)
CLEAN-OUT	CO	SEE PLAN	PVC (SERIES 1000)
VENT STACK THRU ROOF	VSTR	150	PVC (SERIES 1000)
SEWER LINE (SOL PIPE)	SP	SEE PLAN	PVC (SERIES 1000)

LEGENDS

100mm Ø	100mm Ø PVC SANITARY PIPE
150mm Ø	150mm Ø PVC SANITARY PIPE
50mm Ø	50mm Ø PVC VENT PIPE
FCD	FLOOR CLEANOUT
CO	CLEANOUT
WC	WATER CLOSET
LAV	LAVATORY
UR	URINAL
KS	KITCHEN SINK
BS	BLOF SINK
FD	FLOOR DRAIN

4 SANITARY SEWAGE LAYOUT
SCALE 1:150 M



5 ISOMETRIC SANITARY SEWAGE LAYOUT
SCALE 1:150 M

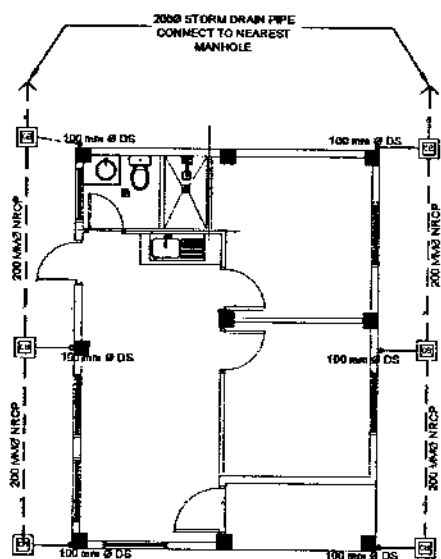
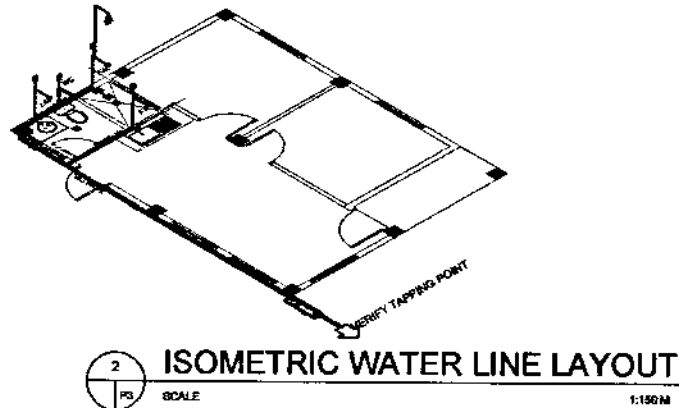
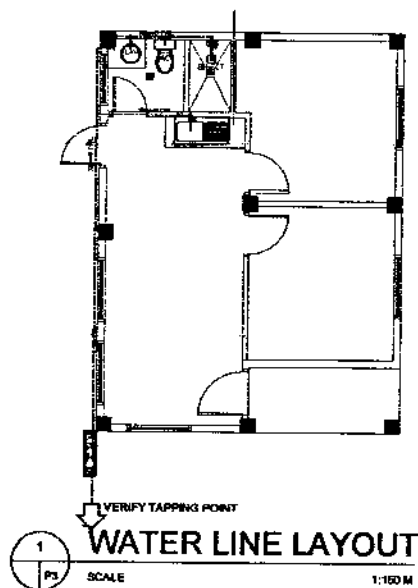


PROJECT TITLE:

PROPOSED FIELD OFFICE

SHEET CONTENTS:
• DETAILS OF CATCH BASIN
• CLEAN-OUT DETAIL
• PIPE TRENCH BEDDING
• SANITARY SEWAGE LAYOUT
• ISOMETRIC SANITARY SEWAGE LAYOUT
• SCHEDULE OF PIPE (SEWER LINE)
• LEGENDS

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SCHEDULE OF PIPE (WATER LINE)

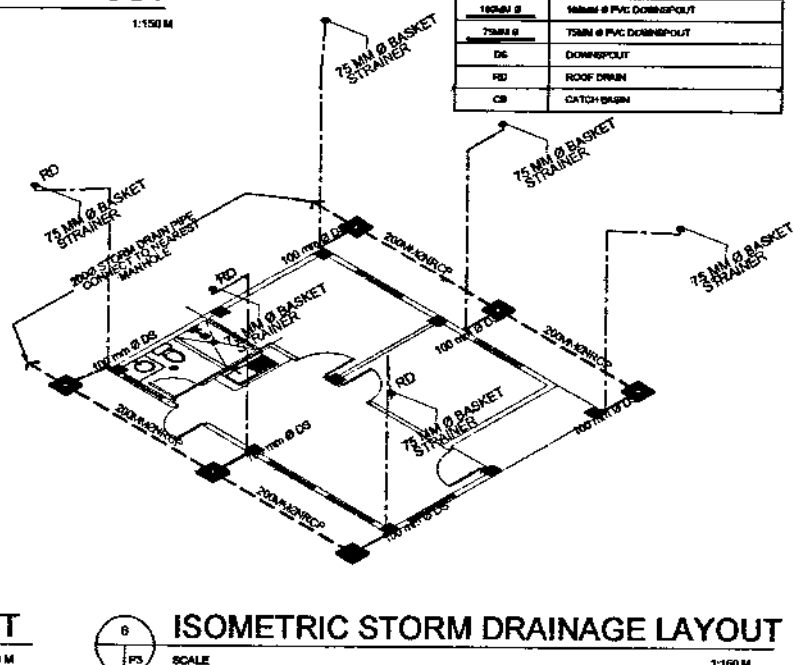
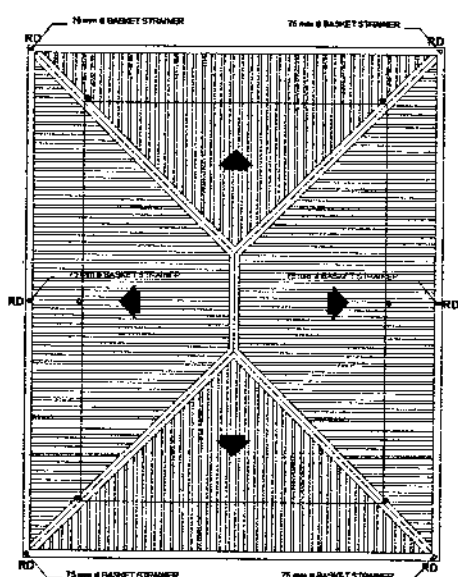
	ABV.	SIZE OF PIPE (mm)	TYPE OF PIPE
WATER CLOSET	WC	25	PVC
LAVATORY	LAV	25	PVC
SHOWER WITH PALQUET	SHO-WET	25	PVC
KITCHEN SINK	KS	25	PVC

LEGENDS NTG

25MM Ø	25MM Ø PVC FEATURE SUPPLY
25MM Ø	25MM Ø PVC FEATURE SUPPLY
Ø	GATE VALVE
+	CHECK VALVE
⊗	WATER METER
1	AIR CHAMBER
WC	WATER CLOSET
LAV	LAVATORY
SH	SHOWER
KS	KITCHEN SINK

LEGENDS

200MM Ø	200MM Ø NON REINFORCED CONCRETE PIPE
100MM Ø	100MM Ø PVC DOWNSPOUT
75MM Ø	75MM Ø PVC DOWNSPOUT
DS	DOWNSPOUT
RD	ROOF DRAIN
CB	CATCH BASIN



PROJECT TITLE:

PROPOSED FIELD OFFICE

SHEET CONTENTS:
• WATER LINE LAYOUT
• ISOMETRIC WATER LINE LAYOUT
• SCHEDULE AND LEGENDS OF PIPE (PARTIAL LINE)
• DETAILS OF AIR CHAMBER
• GROUND FLOOR STORM DRAINAGE LAYOUT
• ROOF STORM DRAINAGE LAYOUT
• ISOMETRIC STORM DRAINAGE LAYOUT
• LEGEND

SCALE:
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FACILITIES TO BE PROVIDED FOR THE ENGINEER & HIS STAFF

CONSTRUCTION OF SITE OFFICE AND RESIDENCE FOR THE ENGINEER & STAFF

The Contractor shall construct a site office and residence for the Engineer and his staff in accordance with the plans and specifications as indicated hereafter.

Upon completion of the project, the said office will be turned-over to the PMO.

OFFICE EQUIPMENT FOR USE OF THE PPA ENGINEER AND STAFF

The Contractor shall provide within thirty (30) days after notice to commence work, the following main items of brand new office equipment for use of the Engineer and his staff. The Contractor shall make available for use of the Engineer other equipment as may be necessary for the proper functioning of the office. The equipment shall be the property of PPA. Operation and maintenance shall be borne by PPA.

2	sets	Office table, 1.5 x 0.70m with chair
1	set	Conference table w/ chair (6-str.)
2	pcs.	Single bunk beds w/ mattress & beddings
2	pcs.	Waste paper basket
1	pc.	Calculator (Scientific, 12 digit capacity)
1	pc.	Communication system, Cell phone
1	pc.	Filing Steel Cabinet, 4-drawers
2	units	Air-conditioned unit (1.0 hp., wdo type)
1	unit	Refrigerator (6 cu.ft.)
1	set	Gas stove (2 burner with tank)
1	unit	Hot and cold water dispenser (5 gal. Cap.)
1	pc.	White board with eraser and marker
1	unit	Stand fan (16" dia.)
b) Computers and Accessories		
2	sets	Desktop Unit & Accessories
2	units	Microsoft Office (latest version)
2	units	Uninterrupted Power Supply (UPS)
2	units	External Hard Drive (USB 3.0, 4TB)
1	unit	Computer Table
1	unit	Computer Chair

COMPUTER AND ACCESSORIES

The Contractor shall provide within thirty (30) days after notice to commence work, **two (2) "Brand New Desktop"**, complete with accessories and licensed software for the use of the PPA Engineer and his Staff at the start of the project. The items shall be the property of PPA. Operation and maintenance shall be borne by PPA.

Description / Specifications:	DESK TOP UNIT
Brand/Model	<i>Asus, Apple, Lenovo, ACER, HP or Equivalent Branded</i>
Processor	<i>Intel® Core™ i7-9700K CPU</i>
System Memory	<i>8GB DDR4 Ram at 2666MHZ up to 32GB, 2DIMM slots</i>
Chipset	<i>Intel B360</i>
CD-ROM	<i>Tray load DVD Drive (Reads and Writes to DVD/CD)</i>
Graphics	<i>NVIDIA GeForce RTX 2060 6GDS</i>
SATA	<i>4 x SATA 6.0 Gbps</i>
HDD/SSD	<i>128GB SSD (M.2 PCIe 128GB) + 1TB HDD (3.5" 7200rpm)</i>
WIFI/ Bluetooth	<i>802.11ac 2x2/ Bluetooth 5.0</i>
LAN	<i>Realtek RTL8111H 10/ 100/ 1000Mbps</i>
Audio	<i>Realtek ALC887, DTS Headphone X</i>
Accessories	<i>Wireless Keyboard and Mouse</i>
Ports	<i>4 x USB 3.2, 2 X USB 2.0, HDMI, Audio Jack, RJ45 and Mic in/ headphone out</i>
Display (Monitor)	<i>27" inch. FHD (1920 x 1080 Display) with speaker, display ports, USB hub, earphone jack and PC audio inputs.</i>
OS Bundled (Certification/License)	<i>Windows 10 PRO for business</i>
External Hard Drive	<i>Portable (USB 3.0 Interface, at least 4TB Capacity)</i>

SOFTWARE

The Contractor shall provide within thirty (30) days after commence work, the specified **"License softwares"** latest version for the use of the PPA Engineer and staff. The software shall be the property of PPA. Operation and maintenance shall be borne by PPA.

MINIMUM MAJOR EQUIPMENT REQUIREMENTS

1	unit/s	Backhoe (0.40 cu.m., 94.30hp, minimum), owned	-
1	unit/s	Clamshell, owned	-
1	unit/s	Concrete Cutter, owned	✓
2	unit/s	Concrete Mixer (1 bagger, minimum), owned	✓
1	unit/s	Concrete Bucket, owned	✓
1	unit/s	Concrete Screeder, owned	✓
2	unit/s	Concrete Vibrator (3.50 hp, minimum), owned	✓
1	unit/s	Crane Barge (319 GW, minimum) with 60T crane, owned	✓
1	unit/s	Crawler Crane (30T, minimum), owned	✓
4	unit/s	Diving Equipment (complete), owned/leased	✓
1	unit/s	Dump Truck (8 cu.m., minimum), owned	✓
2	unit/s	Bar Bender (electric, 25mm dia min.), owned	✓
2	unit/s	Bar Cutter (electric, 25mm dia min.), owned	✓
1	unit/s	Payloader (80 hp, minimum), owned	✓
1	unit/s	Plate Compactor (5 hp, minimum), owned	✓
1	unit/s	Road Grader (125hp, minimum), owned/leased	✓
1	unit/s	Road Roller (12.05T, vibratory, minimum), owned/leased	✓
2	unit/s	Transit Mixer (5-6 cu.m. cap., minimum), owned/leased	✓
1	unit/s	Tugboat (500hp, minimum), owned/leased	✓
1	unit/s	Water Truck (1,000 gal., minimum) with pump, owned	✓
2	unit/s	Welding Machine (400 amp., minimum), owned	✓
1	unit/s	Cargo Truck (5T, minimum), owned	✓

CONSTRUCTION SAFETY AND HEALTH REQUIREMENT

The Contractor shall implement the construction safety and health program in accordance with the applicable provisions of the Occupational Safety and Health Standards (OSHS) of the Department of Labor and Employment (DOLE) including stringent covid-19 protocols per PPA Engineering Circular No. 01-2020 and Construction Guidelines for Project Implementation during the period of public health emergency approved by PDCB and CIAP.

The Contractor, subject to the approval of the Engineer shall provide and maintain throughout the duration of the contract a medical room with at least 15 square meters together with all necessary supplies to be sited in the Contractor's main area.

The Contractor shall provide the following minimum requirements:

LABOR

1	no.	Safety Engineer / Officer
1	no.	Nurse / Health Officer

EQUIPMENT / MATERIALS

Personnel Protective Equipment

37	pcs.	Hard Hats
37	pcs.	Gloves (rubberized)
37	pcs.	Safety Glasses/Goggles (clear)
74	pcs.	Long sleeve T-shirt
4	pcs.	Safety Belts
37	pcs.	Safety Shoes
4	pcs.	Life Lines

Safety Devices

1	lot	Barricades
1	lot	Warning signs
2	unit/s	Fire extinguisher
1	lot	Disinfection Booth with Footbath
37	no.	PCR Test for Covid-19 (Initial Testing)
37	no.	PCR Test for Covid-19 (Confirmatory Testing)

Medical and First Aid System	-	Eighteen (18) mos.
Temporary shelter for workers	-	1 lot

NOTE:

The Contractor shall provide the above-cited minimum construction safety and health requirements or as required by the Engineer.

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No. 02
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REVISED SCHEDULE OF MINIMUM TEST REQUIREMENTS OF CONSTRUCTION MATERIALS FOR PPA INFRASTRUCTURE PROJECTS

Materials/Items of Work	Required Tests	Minimum Incremental Frequency of Tests
I. Construction of Pier/Wharf, Platform and Ramp		
Structural Concrete (SC)		
A Portland Cement	Quality Test	For every 2,000 bags (40kg) or fraction thereof
B Fine Aggregate	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
C Coarse Aggregate	Quality Test for Grading, Bulk Specific Gravity, Absorption and Abrasion	For every 1,500 cubic meter or fraction thereof
D Water	Certificate from the Engineer or Quality Test for Density and Chloride Content	One per source
E Steel Bars	Mill Certificate and Quality Test for Chemical Composition and Mechanical Properties	For every 10,000 kg or fraction thereof
F Concrete	Compressive Strength on cylinder samples	1 set consisting of 3 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
	Slump Test	For every mix
G Admixture and Concrete Curing Materials	Quality Test	One per shipment
Piling (P)		
A Concrete Piles	Fabrication Report	One per fabrication
1 Concrete	Same test as for SC (F)	Same frequency as SC (F)
2 Steel Bars	Same test as for SC (E)	Same frequency as SC (E)
3 High Tension Strand	Test for Chemical Composition and Mechanical Properties	For every 20000kg or fraction thereof

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Materials/Items of Work	Required Tests	Minimum Incremental Frequency of Tests
4 Coarse Aggregates	Same Test as for SC (C)	Same frequency as SC (C)
5 Fine Aggregates	Same Test as for SC (B)	Same frequency as SC (B)
B Steel Pipe Piles	Fabrication Report, Mill Certificate and Quality Test for Chemical and Mechanical properties	One per fabrication
1 Steel	Chemical Composition (refer below) <ul style="list-style-type: none"> Under 14" (355.60mm) Outside Diameter 14" to 36" (355.6 to 914mm) Outside Dia Over 36" (914mm) Outside Diameter Mechanical/Tensile	2 from 200 pipe or fraction thereof 2 from 100 pipe or fraction thereof 2 from 3000ft (914m) or fraction thereof One (1) tension test shall be made on one length or fraction thereof of each size, or one piece of skelp representing each lot of 200 lengths or fraction thereof of each size
2 Polyurethane Coating	Mill Certificate and Quality Test	One per fabrication
3 Concrete	Same test as for SC (F)	Same frequency as SC (F)
4 Fine Aggregate	Same test as for SC (B)	Same frequency as SC (B)
5 Coarse Aggregate	Same test as for SC (C)	Same frequency as SC (C)
6 Steel Bars	Same Test as SC (E)	Same frequency as SC (E)
7 Water	Same Test as SC (D)	Same frequency as SC (D)
Rubber Dock Fenders (RDF)	Physical Test Performance Test for Energy Absorption and Reaction Force	All units All units
Accessories Washer and Fixing Bolt, Anchor Bolt	Physical Test Quality Test for Chemical Composition and Mechanical Properties	All units One per fabrication

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Materials/Items of Work	Required Tests	Minimum Incremental Frequency of Tests
Mooring Bollard (MB) and Accessories (Hexagon Nuts, Plain Washer, Anchor Ring and Anchor Bolt)	Physical Test Quality Test for Chemical Composition and Mechanical Properties	All Units One per fabrication
II. Construction of Back-Up Area, Causeway and Pavement		
Sheet Piling (SP)		
A Concrete Sheet Piles		
1 Concrete	Same test as for SC (F)	Same frequency as SC (F)
2 Steel Bars	Same test as for SC (E)	Same frequency as SC (E)
3 High Tension Strands	Same test as for P (A 3)	Same frequency as P (A 3)
4 Fine Aggregates	Same test as for SC (B)	Same frequency as SC (B)
5 Coarse Aggregates	Same Test as for SC (C)	Same frequency as SC (C)
B Steel Pipe Piles		
1 Steel	Same test as for P (B1)	Same frequency as P (B1)
2 Concrete	Same test as for SC (F)	Same frequency as SC (F)
3 Fine Aggregate	Same test as for SC (B)	Same frequency as SC (B)
4 Steel Bars	Same test as for SC (E)	Same frequency as SC (E)

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Materials/Items of Work	Required Tests	Minimum Incremental Frequency of Tests
Rocks	Test for Apparent Specific Gravity and Abrasion	For every 1,500 cubic meter or fraction thereof
Geotextile Filter	Physical and Mechanical Test Mill Certificate	One per batch One per batch
Sand and Gravel Fill	Quality Test for Organic Impurities and Grading	For every 1,500 cubic meter or fraction thereof
Selected Fill	Quality Test for Grading, Plasticity and Laboratory Compaction Test Laboratory California Bearing Ratio (CBR) Field Density Test	For every 1,500 cubic meter or fraction thereof For every 2,500 cubic meter or fraction thereof 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
Aggregate Base Course	Quality Test for Grading and Plasticity Quality Test for Grading, Plasticity, Abrasion and Laboratory Compaction Test Laboratory California Bearing Ratio (CBR) Field Density Test	For every 300 cubic meter or fraction thereof For every 1,500 cubic meter or fraction thereof Same frequency as Selected Fill Same frequency as Selected Fill
Portland Cement Concrete Pavement (PCCP)		
A Portland Cement	Same test as for SC (A)	Same frequency as SC (A)
B Fine Aggregate	Same test as for SC (B)	Same frequency as SC (B)
C Coarse Aggregate	Same test as for SC (C)	Same frequency as SC (C)
D Water	Same test as for SC (D)	Same frequency as SC (D)
E Steel Bars (Dowels)	Same test as for SC (E)	Same frequency as SC (E)
F Joint Filler	Quality Test	One (1) per shipment

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Materials/Items of Work	Required Tests	Minimum Incremental Frequency of Tests
G Admixture and Concrete Curing Material	Same test as for SC (G)	Same frequency as SC (G)
H Concrete	Same test as for SC (F) Flexural Test	Same frequency as SC (F) 3 beam samples for every 330 sq m or fraction thereof
I Completed Pavement	Core Test	1 set (3 specimen) for every 2,500 sq m and fraction thereof
Interlocking Concrete Blocks		
A Cement	Same test as for SC (A)	Same frequency as SC (A)
B Fine Aggregate	Same test as for SC (B)	Same frequency as SC (B)
C Coarse Aggregate	Same test as for SC (C)	Same frequency as SC (C)
D Water	Same test as for SC (D)	Same frequency as SC (D)
E Admixture & Concrete Curing Materials	Same test as for SC (G)	Same frequency as SC (G)
F Completed Blocks	Physical Test and Compressive Strength	6 blocks per day of fabrication
Cement Treated Base Course (CTB)		
A Portland Cement	Same test as for SC (A)	Same frequency as SC (A)
B Fine & Coarse Aggregates	Quality Test for Grading, Abrasion and Soundness	For every 1,500 cubic meter or fraction thereof
C Water	Same test as for SC (D)	Same frequency as SC (D)
D Completed CTB	Field Density Test	For every layer of 150mm of compacted depth at least one group of three in-situ density test every 500 sq m or fraction thereof
Retaining Wall/Coping Wall/RC Curb/RC Ditch/Shear Key/Concrete Blocks/Lean Concrete		
A Portland Cement	Same test as for SC (A)	Same frequency as SC (A)
B Fine Aggregate	Same test as for SC (B)	Same frequency as SC (B)

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Materials/Items of Work	Required Tests	Minimum Incremental Frequency of Tests
C Coarse Aggregates	Same test as for SC (C)	Same frequency as SC (C)
D Water	Same test as for SC (D)	Same frequency as SC (D)
E Steel Bars	Same test as for SC (E)	Same frequency as SC (E)
F Admixture and Concrete Curing	Same test as for SC (G)	Same frequency as SC (G)
G Concrete	Same test as for SC (F)	Same frequency as SC (F)
Tie Rod		
A Steel	Same test as for SC (E)	One per batch
B Assembly	Performance Test (Tension)	One per batch
Tie Bars and Dowels	Same test as for SC (E)	For every 10,000 kg or fraction thereof per Tie bars and Dowels
Pipe Culverts and Storm Drains		
A Pipes	Test for Strength, Absorption and Physical	For every 50 pieces
B Mortar or Joint	Same Test as for SC (A, B and D) Alternative Test Same test as for SC (F) and Inspection Report	For every 25 pieces
Concrete Hollow Blocks		
A Portland Cement	Same test as for SC (A)	Same frequency as SC (A)
B Fine Aggregates	Same test as for SC (B)	Same frequency as SC (B)
C Water	Same test as for SC (D)	Same frequency as SC (C)
D Concrete	Same test as for SC (F)	Same frequency as SC (F)
E Completed CHB	Quality Test	One for every 500 pieces or fraction thereof
Construction Joints (C-J)		
A Angle Bars	Test for Physical and Mechanical Properties	One per batch
B Steel Bars	Same test as for SC (E)	One per batch
C Zinc (Hot Dip Galvanizing) Coatings	Physical Test for Appearance, Stripping, Weighing, Adherence and Adhesion Coating Thickness Magnetic Thickness Measurement	All units 1 set (3 specimen) for every 100,000 sq mm or fraction thereof

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Materials/Items of Work	Required Tests	Minimum Incremental Frequency of Tests
Sacked Concrete		
A Cement	Same test as for SC (A)	Same frequency as SC (A)
B Fine Aggregates	Same test as for SC (B)	Same frequency as SC (B)
C Coarse Aggregates	Same test as for SC (C)	Same frequency as SC (C)
D Water	Same test as for SC (D)	Same frequency as SC (D)
E Concrete	Same test as for SC (F)	Same frequency as SC (F)
F Sack (jute)	Physical Test	One for every 50 pieces
Rubble Concrete		
A Cement	Same test as for SC (A)	Same frequency as SC (A)
B Fine Aggregates	Same test as for SC (B)	Same frequency as SC (B)
C Coarse Aggregates	Same test as for SC (C)	Same frequency as SC (C)
D Water	Same test as for SC (D)	Same frequency as SC (D)
E Concrete	Same test as for SC (F)	Same frequency as SC (F)
F Rocks	Same test as for ROCKS	Same frequency as ROCKS
Earthworks		
A Sub-grade preparation	Grading Test Plasticity Test (LL, PL, PI) Laboratory Compaction Test Density Test	For every 1,500 cubic meter or fraction thereof For every layer of 150mm of compacted depth at least one group of three In-situ density test every 500 sq m or fraction thereof
B Structure Excavation	If excavated materials shall be used as Backfill Grading Test Plasticity Test (LL, PL, PI) Laboratory Compaction Test Density Test	For every 1,500 cubic meter or fraction thereof For every layer of 150mm of compacted depth at least one group of three In-situ density test every 500 sq m or fraction thereof