

placing of concrete. Surplus coating on form surfaces and coating on reinforcement steel and construction joints shall be removed before placing concrete.

6. Removal of Forms shall be done in a manner as to prevent injury to the concrete and to insure complete safety of the structure after the following conditions have been met. Where the structure as a whole is supported on shores, forms for beam and girder sides, and similar vertical structural members may be removed before expiration of curing period. Care shall be taken to avoid spalling the concrete surface or damaging concrete edges. Wood forms shall be completely removed.

Minimum stripping and striking time shall be as follows unless otherwise approved by the Engineer.

Vertical sides of beams, walls, and columns, lift not 12 hours exceeding 1.2 m

Vertical sides of beams and walls, lift exceeding 1.2 m 36 hours Softlifts of main slabs and beams (props left under) 5 days

Removal of props from beams and mains slabs and other work 10 days

7. Control Test

If the Contractor proposes to remove forms earlier than the period stated above, he shall be required to submit the results of control tests showing evidence that concrete has attained sufficient strength to permit removal of supporting forms. Cylinders required for control tests shall be provided in addition to those otherwise required by this Specification. Test specimens shall be removed from molds at the end of 24 hours and stored in the structure as near the points as practicable, the same protection from the elements during curing as is given to those portions of the structure which they represent, and shall not be removed from the structure for transmittal to the laboratory prior to expiration of three fourths of the proposed period before removal of forms. Cylinders will be tested by and at the expense of the Contractor. Supporting forms or shoring shall not be removed until control test specimens have attained strength of at least 160 kg/sq cm. The newly unsupported portions of the structure shall not be subjected to heavy construction or material loading.

## REINFORCEMENT

1. Reinforcement

Fabricated to shapes and dimensions shown and shall be placed where indicated. Reinforcement shall be free of loose or flaky rust and mill scale, or coating, and any other substance that would reduce or destroy the bond. Reinforcing steel reduced in section shall not be used. After any substantial delay in the work, previously placed reinforcing steel for future bonding shall be inspected and cleaned. Reinforcing steel shall not be bent or straightened in a manner injurious to the steel or concrete. Bars with kinks or bends not shown in the drawings shall not be placed. The use of heat to bend or straighten reinforcing steel shall not be permitted. Bars shall be moved as necessary to avoid interference with other reinforcing steel, conduits, or embedded items. If bars are moved more than one bar diameter, the resulting arrangement of bars including additional bars necessary to meet structural requirements shall be approved before concrete is placed. In slabs, beams and girders, reinforcing steel shall not be spliced at points of maximum stress unless otherwise indicated. Unless otherwise shown in the drawings, laps or splices shall be 40 times the reinforcing bar diameter.

2. The nominal dimensions and unit weights of bars shall be in accordance with the following table:

| Nominal Diameter<br>(mm) | Nominal Perimeter<br>(mm) | Nominal Sectional<br>Area<br>(sq. mm) | Unit Weight<br>(kg/m) |
|--------------------------|---------------------------|---------------------------------------|-----------------------|
| 10                       | 31.4                      | 78.54                                 | 0.616                 |
| 12                       | 37.7                      | 113.10                                | 0.888                 |
| 16                       | 50.3                      | 201.10                                | 1.579                 |
| 20                       | 62.8                      | 314.20                                | 2.466                 |
| 25                       | 78.5                      | 490.90                                | 3.854                 |
| 28                       | 88.0                      | 615.70                                | 4.833                 |
| 32                       | 100.5                     | 804.20                                | 6.313                 |
| 36                       | 113.1                     | 1,017.60                              | 7.991                 |
| 40                       | 125.7                     | 1,256.60                              | 9.864                 |
| 50                       | 157.1                     | 1,963.50                              | 15.413                |

3. Welding of reinforcing bars shall only be permitted where shown; all welding shown shall be performed in accordance with AWS D 12.1.
4. Exposed reinforcement bars, dowels and plates intended for bonding with future extensions shall be protected from corrosion.
5. Supports shall be provided in conformance with ACI 315 and ACI 318, unless otherwise indicated or specified.
6. Concrete Protection for Reinforcement
- The minimum concrete cover of reinforcement shall be as shown below unless otherwise indicated in the drawings.
  - Tolerance for Concrete Cover of Reinforcing Steel other than Tendons.

**Minimum Cover**

7.5cm or more (marine structures and concrete cast against and permanently exposed to earth)

**DESIGN STRENGTH OF CONCRETE**

Concrete for structural parts or members such as beams, slabs, curtain wall, pile caps and fender/mooring blocks shall develop a minimum 28-day compressive cylinder strength of 24 MPa (3,500 psi) as indicated in the drawings. While for pre-stressed concrete piles a compressive strength of 35 MPa (5,000psi).

**TRIAL BATCH FOR CONCRETE**

Thirty (30) calendar days before the start of concreting works, the Contractor shall submit design mixes and the corresponding test result made on sample thereof. Sampling and testing shall be in

accordance with the ASTM Standard procedures for sampling and testing for the particular design strength(s) required.

The particulars of the mix such as the slump and the proportionate weights of cement, saturated surface dry aggregates and water used shall be stated.

The design mix for concrete to be used shall be submitted together with at least three (3) standard cylinder samples for approval at least one (1) month prior to the start of each concreting schedule. Such samples shall be prepared in the presence of the Engineer.

Standard laboratory strength tests for the 7, 14 and 28 days periods shall be taken to all concrete samples in addition to routine field tests, at cost to the Contractor. Only design mixes represented by test proving the required strength for 7, 14 and 28 days tests shall be allowed.

The cost of sampling, handling and transporting samples from jobsite to the laboratory and the cost of subsequent tests made until the desired mix is attained shall be for the account of the Contractor.

Slump Test shall be made in conformance with ASTM C143, and unless otherwise specified by the Engineer, slump shall be within the following limits:

| Structural Element | Slump for Vibrated Concrete |         |
|--------------------|-----------------------------|---------|
|                    | Minimum                     | Maximum |
| Pavement Concrete  | 25mm                        | 50mm    |
| Pre-cast Concrete  | 50mm                        | 70mm    |
| Lean Concrete      | 100mm                       | 200mm   |
| Sacked Concrete    | 25mm                        | 50mm    |
| All other Concrete | 50mm                        | 90mm    |

**Sampling :** Provide suitable facilities and labor for obtaining representative samples of concrete for the Contractor's quality control and the Engineer's quality assurance testing. All necessary platforms, tools and equipment for obtaining samples shall be furnished by the Contractor.

## MIXING CONCRETE

### 1. GENERAL

- a. Concrete shall be thoroughly mixed in a mixer of an approved size and type that will insure a uniform distribution of the materials throughout the mass.
- b. All concrete shall be mixed in mechanically operated mixers. Mixing plant and equipment for transporting and placing concrete shall be arranged with an ample auxiliary installation to provide a minimum supply of concrete in case of breakdown of machinery or in case the normal supply of concrete is disrupted. The auxiliary supply of concrete shall be sufficient to complete the casting of a section up to a construction joint that will meet the approval of the Engineer.
- c. Equipment having components made of aluminum or magnesium alloys, which would be in contact with plastic concrete during mixing, transporting or pumping of

Portland cement concrete, shall not be used.

- d. Concrete mixers shall be equipped with adequate water storage and a device for accurately measuring and automatically controlling the amount of water used.
- e. Materials shall be measured by weighing. The apparatus provided for weighing the aggregates and cement shall be suitably designed and constructed for this purpose. The accuracy of all weighing devices except that for water shall be such that successive quantities can be measured to within one percent of the desired amounts. The water measuring device shall be accurate to plus or minus 0.5 percent. All measuring devices shall be subject to the approval of the Engineer. Scales and measuring devices shall be tested at the expense of the Contractor as frequently as the Engineer may deem necessary to insure their accuracy.
- f. Weighing equipment shall be insulated against vibration or movement of other operating equipment in the plant. When the entire plant is running, the scale reading at cut-off shall not vary from the weight designated by the Engineer by more than one percent for cement, 1-½ percent for any size of aggregate, or one percent for the total aggregate in any batch.
- g. Manual mixing of concrete shall not be permitted unless approved by the Engineer.

## 2. MIXING CONCRETE AT SITE

- a. Concrete mixers may be of the revolving drum or the revolving blade type and the mixing drum or blades shall be operated uniformly at the mixing speed recommended by the manufacturer.

The pick-up and throw-over blades of mixers shall be restored or replaced when any part or section is worn 20 mm or more below the original height of the manufacturer's design. Mixers and agitators which have an accumulation of hard concrete or mortar shall not be used.

- b. When bulk cement is used and the volume of the batch is 0.5 m<sup>3</sup> or more, the scale and weigh hopper for Portland cement shall be separate and distinct from the aggregate hopper or hoppers.

The discharge mechanism of the bulk cement weigh hopper shall be interlocked against opening before the full amount of cement is in the hopper. The discharging mechanism shall be interlocked against opening when the amount of cement in the hopper is underweight by more than one percent or overweight by more than 3 percent of the amount specified.

- c. When the aggregates contain more water than the quantity necessary to produce a saturated surface dry condition, representative samples shall be taken and the moisture content determined for each kind of aggregate.
- d. The batch shall be so charged into the mixer that some water enter in advance of cement and aggregates. All water shall be in the drum by the end of the first quarter of the specified mixing time.
- e. Cement shall be batched and charged into the mixer by such means that it will not result in loss of cement due to the effect of wind, or in accumulation of cement on surfaces of conveyors or hoppers, or in other conditions which reduce or vary the required quantity of cement in the concrete mixture.

- f. Where required, synthetic fibrous reinforcement shall be added directly to the concrete mixer after placing the sufficient amount of mixing water, cement and aggregates.
- g. The entire contents of a batch mixer shall be removed from the drum before materials for a succeeding batch are placed therein. The materials composing a batch except water shall be deposited simultaneously into the mixer.
- h. All concrete shall be mixed for a period of not less than 3 minutes after all materials, including water, are in the mixer. During the period of mixing, the mixer shall operate at the speed for which it has been designed.
- i. Mixers shall be operated with an automatic timing device that can be locked by the Engineer. The time device and discharge mechanism shall be so interlocked that during normal operation no part of the batch will be discharged until the specified mixing time has elapsed.
- j. The first batch of concrete materials placed in the mixer shall contain a sufficient excess of cement, sand, and water to coat the inside of the drum without reducing the required mortar content of the mix. When mixing is to cease for a period of one hour or more, the mixer shall be thoroughly cleaned.
- k. In case of rubble concrete, proper mixture and placing of concrete and stones/rocks shall be in accordance to the approved plan. Methodology of work shall be approved by the Engineer.

### 3. MIXING CONCRETE IN TRUCKS

- a. Truck mixers, unless otherwise authorized by the Engineer, shall be of the revolving drum type, watertight, and so constructed that the concrete can be mixed to insure a uniform distribution of materials throughout the mass. All solid materials for the concrete shall be accurately measured and charged into the drum at the proportioning plant. Except as subsequently provided, the truck mixer shall be equipped with a device by which the quantity of water added can be readily verified. The mixing water may be added directly to the batch, in which case a tank is not required. Truck mixers may be required to be provided with a means by which the mixing time can be readily verified by the Engineer.
- b. The maximum size of batch in truck mixers shall not exceed the minimum rated capacity of the mixer as stated by the manufacture and stamped in metal on the mixer. Truck mixing shall, unless otherwise directed, be continued for not less than 100 revolutions after all ingredients, including water, are in the drum. The mixing speed shall not be less than 4 rpm, nor more than 6 rpm.
- c. Mixing shall begin within 30 minutes after the cement has been added either to the water or aggregate, but when cement is charged into a mixer drum containing water or surface-wet aggregate and when the temperature is above 32 °C, this limit shall be reduced to 15 minutes. The limitation in time between the introduction of the cement to the aggregate and the beginning of the mixing may be waived when, in the judgment of the Engineer, the aggregate is sufficiently free from moisture, so that there will be no harmful effects on the cement.
- d. When a truck mixer is used for transportation, the mixing time in stationary mixer may be reduced to 30 seconds and the mixing completed in a truck mixer. The mixing time in truck mixer shall be as specified for truck mixing.

## JOINTS

1. No reinforcement, corner protection angles or other fixed metal items shall be run continuously through joints containing expansion-joint filler, through crack-control joints in slabs on grade and vertical surfaces.

2. **Preformed Expansion Joint Filler**

- a. **Joints with Joint Sealant**

At expansion joints in concrete slabs to be exposed, and at other joints indicated to receive joint sealant, preformed expansion-joint filler strips shall be installed at the proper level below the elevation with a slightly tapered, dressed-and-oiled wood strip temporarily secured to the top thereof to form a groove. When surface dry, the groove shall be cleaned of foreign matter, loose particles, and concrete protrusions, then filled flush approximately with joint sealant so as to be slightly concave after drying.

- b. **Finish of concrete at joints**

Edges of exposed concrete slabs along expansion joints shall be neatly finished with a slightly rounded edging tool.

- c. **Construction Joints**

Unless otherwise specified herein, all construction joints shall be subject to approval of the Engineer. Concrete shall be placed continuously so that the unit will be monolithic in construction. Fresh concrete may be placed against adjoining units, provided the set concrete is sufficiently hard not to be injured thereby. Joints not indicated shall be made and located in a manner not to impair strength and appearance of the structure. Placement of concrete shall be at such rate that the surface of concrete not carried to joint levels will not have attained initial set before additional concrete is placed thereon. Lifts shall terminate at such levels as are indicated or as to conform to structural requirements as directed. If horizontal construction joints are required, a strip of 25mm square-edged lumber, beveled to facilitate removal shall be tacked to the inside of the forms at the construction joint. Concrete shall be placed to a point 25mm above the underside of the strip. The strip shall be removed one hour after the concrete has been placed. Any irregularities in the joint line shall be leveled off with a wood float, and all laitance removed. Prior to placing additional concrete, horizontal construction joints shall be prepared.

Construction Joint which is not indicated in the Drawings shall be located as to least affect the strength of the structure. Such locations will be pointed out by the Engineer.

## PREPARATION FOR PLACING

Hardened concrete, debris and foreign materials shall be removed from the interior of forms and from inner surfaces of mixing and conveying equipment. Reinforcement shall be secured in position, and shall be inspected, and approved before placing concrete. Runways shall be provided for wheeled concrete-handling equipment. Such equipment shall not be wheeled over reinforcement nor shall runways be supported on reinforcement.

Notice of any concreting operations shall be served to the Engineer at least three (3) days ahead of each schedule.

## PLACING CONCRETE

### 1. Handling Concrete

Concrete shall be handled from mixers and transported to place for final deposit in a continuous manner, as rapidly as practicable, and without segregation or loss of ingredients until the approved unit of work is completed. Placing will not be permitted when the sun, heat, wind or limitations of facilities furnished by the Contractor prevent proper finishing and curing of the concrete. Concrete shall be placed in the forms, as close as possible in final position, in uniform approximately horizontal layers not over 40cm deep. Forms splashed with concrete and reinforcement splashed with concrete or form coating shall be cleaned in advance of placing subsequent lifts. Concrete shall not be allowed to drop freely more than 1.5m in unexposed work nor more than 1.0 m in exposed work; where greater drops are required, tremie or other approved means shall be employed.

### 2. Time Interval between Mixing and Placing

Concrete mixed in stationary mixers and transported by non-agitating equipment shall be placed in the forms within 30 minutes from the time ingredients are charged into the mixing drum. Concrete transported in truck mixers or truck agitators shall be delivered to the site of work, discharged in the forms within 45 minutes from the time ingredients are discharged into the mixing drum. Concrete shall be placed in the forms within 15 minutes after discharged from the mixer at the jobsite.

### 3. Hot Weather Requirements

The temperature of concrete during the period of mixing while in transport and/or during placing shall not be permitted to rise above 36 °C. Any batch of concrete which had reached a temperature greater than 36 °C at any time in the aforesaid period shall not be placed but shall be rejected, and shall not thereafter be used in any part of the permanent works.

#### a. Control Procedures

Provide water cooler facilities and procedures to control or reduce the temperature of cement, aggregates and mixing handling equipment to such temperature that, at all times during mixing, transporting, handling and placing, the temperature of the concrete shall not be greater than 36 °C.

#### b. Cold Joints and Shrinkage

Where cold joints tend to form or where surfaces set and dry too rapidly or plastic shrinkage cracks tend to appear, concrete shall be kept moist by fog sprays, or other approved means, applied shortly after placement, and before finishing.

#### c. Supplementary Precautions

When the aforementioned precautions are not sufficient to satisfy the requirements herein above, they shall be supplemented by restricting work during evening or night. Procedure shall conform to American Concrete Institute Standard ACI 305.

4. Conveying Concrete by Chute, Conveyor or Pump

Concrete may be conveyed by chute, conveyor, or pump if approved in writing. In requesting approval, the Contractor shall submit his entire plan of operation from the time of discharge of concrete from the mixer to final placement in the forms, and the steps to be taken to prevent the formation of cold joints in case the transporting of concrete by chute, conveyor or pump is disrupted. Conveyors and pumps shall be capable of expeditiously placing concrete at the rate most advantageous to good workmanship. Approval will not be given for chutes or conveyors requiring changes in the concrete materials or design mix for efficient operation.

a. Chutes and Conveyors

Chutes shall be of steel or steel lined wood, rounded in cross section rigid in construction, and protected from overflow. Conveyors shall be designed and operated and chute sections shall be set, to assure a uniform flow of concrete from mixer to final place of deposit without segregation of ingredients, loss of mortar, or change in slump. The discharged portion of each chute or conveyor shall be provided with a device to prevent segregation. The chute and conveyor shall be thoroughly cleaned before and after each run. Waste material and flushing water shall be discharged outside the forms.

- b. Pumps shall be operated and maintained so that a continuous stream of concrete is delivered into the forms without air pockets, segregation or changes in slump. When pumping is completed, concrete remaining in the pipeline shall be ejected and wasted without contamination of concrete already placed. After each operation, equipment shall be thoroughly cleaned and the flushing water shall be splashed outside the forms.

5. Wall and Abutments

No load shall be placed upon finished walls, foundations or abutments until authorized by the Engineer. Minimum time before loading shall be 7 days.

6. Concrete Placing on Wharf

When placing concrete on wharf decks, the Contractor shall:

Ensure that rate of placing is sufficient to complete proposed placing, finishing and curing operations within the scheduled time; that experienced finishing machine operators and concrete finishers are provided to finish the deck; that curing equipment and finishing tools and equipment are at the site of work and in satisfactory condition for use.

Immediately prior to placing, the Contractor shall place scaffolding and wedges and make necessary adjustments. Care shall be taken to ensure that settlement and deflection due to added weight of concrete will be minimal. The Contractor shall provide suitable means to readily permit measurement of settlement deflection as it occurs.

Should any event occur which, in opinion of the Engineer, would prevent the concrete conforming to specified requirements, the Contractor shall discontinue placing of concrete until corrective measures are provided satisfactory to the Engineer. If satisfactory measures are not provided prior to initial set of concrete in affected areas, the Contractor shall discontinue placing concrete and install a bulkhead at a location determined by the Engineer. Concrete in place beyond bulkheads shall be removed. The Contractor shall limit the size of casting to that which can be



finished before beginning of initial set.

## COMPACTION

1. Immediately after placing, each layer of concrete shall be completed by internal concrete vibrators supplemented by hand-spading, rodding, and tamping. Tapping or other external vibration of forms will not be permitted unless specifically approved by the Engineer. Vibrators shall not be used to transport concrete inside the forms. Internal vibrators submerged in concrete shall maintain a speed of not less than 7,000 impulses per minute. The vibrating equipment shall at all times be adequate in number of units and power to properly consolidate all concrete.
2. Spare units shall be on hand as necessary to insure such adequacy. The duration of vibrating equipment shall be limited to the time necessary to produce satisfactory consolidation without causing objectionable segregation. The vibrator shall not be inserted into the lower courses that have begun to set. Vibrator shall be applied vertically at uniformly spaced points not further apart than the visible effectiveness of the machine.

## EPOXY BONDING COMPOUND

Before depositing new concrete on or against concrete that has set, the surfaces of the set concrete shall be thoroughly cleaned so as to expose the coarse aggregate and be free of laitance, coatings, foreign matter and loose particles. Forms shall be re-tightened. The cleaned surfaces shall be moistened, but shall be without free water when concrete is placed. ASTM C 881. Provide Type I for bonding hardened concrete to hardened concrete; Type II for bonding freshly mixed concrete to hardened concrete; and Type III as a binder in epoxy mortar or concrete, or for use in bonding skid-resistant materials to hardened concrete. Provide Class B if placement temperature is between 4 to 16 °C; or Class C if placement temperature is above 16°C.

## FINISHES OF CONCRETE

Within 12 hours after the forms are removed, surface defects shall be remedied as specified herein. The Temperature of the concrete, ambient air and mortar during remedial work including curing shall be above 10 °C. Fine and loose material shall be removed. Honeycomb, aggregate pockets, voids over 13mm in diameter, and holes left by the rods or bolts shall be cut out to solid concrete, reamed, thoroughly wetted, brush-coated with neat cement grout, and filled with mortar. Mortar shall be a stiff mix of one part Portland cement to not more than 2 parts fine aggregate passing the No. 16 mesh sieve, with a minimum amount of water. The color of the mortar shall match the adjoining concrete color. Mortar shall be thoroughly compacted in place. Holes passing entirely through walls shall be completely filled from the inside face by forcing mortar through the outside face. Holes which do not pass entirely through wall shall be packed full. Patchwork shall be finished flush and in the same plane as adjacent surfaces. Exposed patchwork shall be finished to match adjoining surfaces in texture and color. Patchwork shall be damp-cured for 72 hours. Dusting of finish surfaces with dry material or adding water to concrete surfaces will not be permitted.

## CONCRETE FINISHING DETAILS

1. Concrete Paving

After concrete is placed and consolidated, slabs shall be screeded or struck off. No further finish is required.

2. Smooth Finish

Required only where specified; screed concrete and float to required level with no coarse

aggregate visible. After surface moisture has disappeared and laitance has been removed, the surface shall be finished by float and steel trowel. Smooth finish shall consist of thoroughly wetting and then brush coating the surfaces with cement to not more than 2 parts fine aggregate passing the no. 30 mesh sieve and mixed with water to the consistency of thick paint.

3. Broom Finish

Required for paving; the concrete shall be screeded and floated to required finish level with no coarse aggregate visible. After the surface moisture has disappeared and laitance has been removed, surface shall be float-finished to an even, smooth finish. The floated surfaces shall be broomed with a fiber bristle brush in a direction transverse to the direction of the main traffic.

## ITEM 04 : GEOTEXTILE FABRIC

### SCOPE OF WORK

This work covers all the following requirements regarding the installation of geotextile (filter fabric) in accordance with the lines, grades, and dimensions shown in the drawings.

### MATERIAL REQUIREMENTS

The geotextile fabric shall meet the following requirements in full. If required, a sample of 1.0 sq.m. shall be supplied to the Engineer for approval and retention for purposes of comparative testing against materials randomly sampled from the site.

#### 1. PHYSICAL PROPERTIES

- a. The geotextile material shall be a nonwoven needle punched type comprising of needle punched polypropylene fibers or its equivalent.
- b. The geotextile material shall be UV stabilized to ensure retention of minimum 70% original tensile strength after 90 days exposure to sunlight. The manufacturer shall submit test results to the Engineer for approval.
- c. The geotextile must be highly resistant to long term contact with damp cementitious substances or acid or alkali solutions in the pH range 2-13. The manufacturer shall submit test data to ensure resistance of the polymer.

#### 2. MECHANICAL AND HYDRAULIC PROPERTIES

The geotextile supplier is required to certify that the materials delivered to site will be proven to meet or exceed the following properties:

| TECHNICAL PROPERTIES                                 | UNIT                | MINIMUM | TEST STANDARD |
|--|---------------------|---------|---------------|
| <b>A. Physical Characteristics:</b>                  |                     |         |               |
| Minimum Mass (per unit area)                         | (g/m <sup>2</sup> ) | 540     | ASTM D5281    |
| Thickness (F=2 kpa)                                  | mm                  | 4.5     | ASTM D5199    |
| <b>B. Mechanical Properties:</b>                     |                     |         |               |
| Tensile Strength (md/cd)                             | kN/m                | 13/22   | ASTM D4595    |
| Tensile elongation (md/cd)                           | %                   | 90/40   | ASTM D4595    |
| CBR Puncture Resistance                              | N                   | 3000    | ASTM D6241    |
| <b>C. Hydraulic Properties:</b>                      |                     |         |               |
| Effective Opening Size (O <sub>90</sub> Wet Sieving) | (mm)                | 0.08    | ASTM D4751    |
| Water Permeability: Permittivity                     | (s <sup>-1</sup> )  | 0.5     | ASTM D4491    |

## EXECUTION

1. The geotextile shall be delivered to site with an outer wrapper to protect it from exposure to the elements.
2. Prior to laying of geotextile filter, stone filler shall be placed between gaps or voids of armour / core rocks as likewise mentioned in the requirements of Item "Rock Works".
3. The non-woven geotextile filter shall be installed and lay manually at site as per design drawings. The filter shall be laid lengthwise down slopes and appropriately anchored along the top edge.
4. The Engineer reserves the right to sample geotextile delivered to site for individual quality control testing at the contractor's expense. A material not meeting the manufacturer's certified values will be rejected from the site.
5. The geotextile shall be proven to resist dynamic puncture damage when subject to impact stress from stone armour (200-400 kg.) dropped from a minimum height of 2.0 m. and should be laid on at least 1-foot sand and gravel bedding. Geotextile failing to resist puncture shall not be accepted.
6. To facilitate site Quality Assurance, each roll of geotextile delivered to site shall be clearly labeled with brand name, grade, and production batch number.
7. Geotextile overlaps shall be at least 1.0 m unless otherwise stated on the drawings. Alternatively, geotextile overlaps are to be heat-welded or sewn using appropriate polypropylene or other synthetic thread and portable hand sewing equipment.

**ITEM 05 : RECLAMATION AND FILL**

**SCOPE OF WORK**

This item shall consist of the construction of back-up area in accordance with the Specifications and in conformity with the lines, grades, and dimensions shown on the Plans or established by the Engineer.

The area to be upgraded shall be as indicated on the Drawings.

The works includes furnishing of all labor, materials and equipment required to complete/finish the upgrading of the area in accordance with the Drawings and the Specifications.

The following major items of works are included:

1. Supply and fill of suitable materials to places required to upgrade elevation of areas as shown in the drawings.
  - a. Compaction of fill materials
  - b. Supply and placing of filter fabric
2. The work may also include the construction of temporary dike or structure to enclose the reclamation material before the completion of a permanent waterfront containment structure.

**MATERIAL REQUIREMENTS**

1. Filling Materials

a. General

All sources of filling materials shall be approved by the Engineer.

Appropriate quantities of sample of all materials to be used in the Works shall be submitted for acceptance and approval by the Engineer thirty (30) days before the commencement of work.

General filling shall consist of approved material from approved sources of suitable grading obtained from excavation, quarries or borrow pits, without excess fines, clay or silt, free from vegetation and organic matter.

Sample of approved materials shall be kept/stored in the field for ready reference/comparison of the delivered materials.

The Contractor shall ensure that adequate quantities of required materials that comply with the specifications and quality approved by the engineer are available at all times.

b. Fill Materials other than Dredged/Excavated Materials

Fill materials for reclamation purposes other than dredged materials shall be pit sand, quarry run, gravel or mine tailings. The fill material shall be of the same quality or better as approved by the Engineer.

c. Type of Filling Materials

c.1 Selected Fill Materials

All materials used for fill shall be free of rock boulders, wood, scrap materials, organic matters and refuse.

The material shall not have high organic content and shall meet the following requirements:

- i. Not more than 10 percent by weight shall pass the No. 200 sieve (75 microns).
- ii. Maximum particles size shall not exceed 75 mm.
- iii. The fill materials shall be capable of being compacted in the manner and to the density of not less than 95%.
- iv. The material shall have a plasticity index of not more than 6 as determined by AASHTO T 90.
- v. The material shall have a soaked CBR value of not less than 25% as determined by AASHTO T 193.

c.2 Sand and Gravel Fill

The materials shall be composed of at least 50% sand and 50% gravel in terms of volume and shall be free from rock boulders, wood, scrap, vegetables, and refuse. The materials shall not have organic content and the maximum particle size shall not exceed 100mm diameter. Source of materials shall be river or mountain quarry or manufactured.

c.3 Excavated Materials

The excavated materials shall be used for backfilling as directed by the Engineer.

## EXECUTION

### Reclamation and Fill

a. General

The Contractor shall be responsible for all ancillary earthworks that are necessary for the reception of the fill material and including, all spout handling, temporary dike or shoring construction where necessary, temporary protection to dikes in the sea and drainage of excess water.

The arrangements of these ancillary earthworks shall be laid out in consultation with the Engineer and to the Engineer's satisfaction and care shall be taken to minimize the loss of fill.

- b. Replacement, backfilling and reclamation may be done by any method acceptable to the Engineer. Prior to start of Work, the Contractor shall submit his method and sequence of performing the works to the Engineer for approval. However, the Engineer's approval of the method and sequence of construction shall not release the Contractor from the responsibility for the adequacy of labor and equipment.

- c. The Engineer shall approve the type of material to be used as fill prior to its placement. If the material is rejected, such material shall be deposited into areas designated or as directed by the Engineer.
- d. Reclamation of fill material shall be placed in horizontal layers not exceeding 200mm (8 inches), loose measurement, and shall be compacted as specified before the next layer is placed. Effective spreading equipment shall be used on each lift to obtain uniform thickness prior to compacting. As the compaction of each layer progresses, continuous leveling and manipulating will be required to assure uniform density. Water shall be added or removed, if necessary, in order to obtain the required density. Removal of water shall be accomplished through aeration by plowing, blading, dicing, or other methods satisfactory to the Engineer.

Dumping and rolling areas shall be kept separate, and no lift shall be covered by another until the necessary compaction is obtained.

Hauling and leveling equipment shall be so routed and distributed over each layer of the fill in such a manner as to make use of compaction effort afforded thereby and to minimize rutting and uneven compaction.

#### TRIAL SECTION

Before finish grade construction is started, the Contractor shall spread and compact trial sections as directed by the Engineer. The purpose of the trial sections is to check the suitability of the materials and the efficiency of the equipment and construction method which is proposed to be used by the Contractor. Therefore, the Contractor must use the same material, equipment and procedures that he proposes to use for the main work. One trial section of about 500 m<sup>2</sup> shall be made for every type of material and/or construction equipment/procedure proposed for use.

After final compaction of each trial section, the Contractor shall carry out such field density tests and other tests required as directed by the Engineer.

If a trial section shows that the proposed materials, equipment or procedures in the Engineer's opinion are not suitable for sub-base, the material shall be removed at the Contractor's expense, and a new trial section shall be constructed.

If the basic conditions regarding the type of material or procedure change during the execution of the work, new trial sections shall be constructed.

#### CROSS-SECTIONS OF COMPLETED RECLAMATION

Cross-sections showing the elevations of the completed reclamation and the terrain of the existing seabed prior to construction shall go together with every progress report and request for progress or final payment.

#### FIELD COMPACTION TEST

Field Density tests to determine the percent of compaction of the material (selected fill, aggregate base course, etc) shall be conducted. Compaction of each layer thereafter shall continue until a field density of 95 percent of the maximum dry density in accordance with AASHTO T/180 Method D has been achieved. In place density determination shall be made in accordance with AASHTO T191/ ASTM D 1556.

#### TOLERANCE

Elevation : plus 5 cm.





## ITEM 06 : AGGREGATE BASE COURSE

### SCOPE OF WORK

This Item shall consist of furnishing, placing and compacting an aggregate base course on a prepared subgrade/subbase in accordance with this Specification and lines, grades, thickness and typical cross-sections shown on the Plans or as established by the Engineer.

### MATERIAL REQUIREMENTS

Aggregate base course shall consist of hard, durable particles or fragments of crushed stone, crushed slag or crushed or natural gravel and filler of natural or crushed sand or other finely divided mineral matter. The composite material shall be free from vegetable matters and lumps or balls of clay, and shall be of such nature that it can be compacted readily to form a firm, stable base.

In some areas where the conventional base course materials are scarce or non-available, the use of 40% weathered limestone blended with 60% crushed stones or gravel shall be allowed, provided that the blended materials meet the requirements of this Item.

The base material shall conform to the grading requirements of Table 3.1, whichever is called for in the Bill of Quantities.

**Table 3.1 Grading Requirements**

| Sieve Designation |                          | Mass Percent Passing |              |
|-------------------|--------------------------|----------------------|--------------|
| Standard<br>mm    | Alternate<br>US Standard | Grading<br>A         | Grading<br>B |
| 50                | 2"                       | 100                  |              |
| 37.5              | 1 - 1/2"                 | -                    | 100          |
| 25.0              | 1"                       | 60 - 85              | -            |
| 19.0              | 3/4"                     | -                    | 60 - 85      |
| 12.5              | 1/2"                     | 35 - 65              | -            |
| 4.75              | No. 4                    | 20 - 50              | 30 - 55      |
| 0.425             | No. 40                   | 5 - 20               | 8 - 25       |
| 0.075             | No. 200                  | 0 - 12               | 2 - 14       |

The portion of the material passing the 0.075mm (No. 200) sieve shall not be greater than 0.66 (two-thirds) of the fraction passing the 0.425mm (No. 40) sieve.

The portion of the material passing the 0.425mm (No. 40) sieve shall have a liquid limit of not greater than 25 and a plasticity index of not more than 6 as determined by AASHTO T89 and T90, respectively.

The coarse aggregate retained on a 2.00mm (No. 10) sieve shall have a mass percent of wear not exceeding 50 by the Los Angeles Abrasion Test as determined by AASHTO T 96.

The material passing the 19mm (3/4 inch) sieve shall have a minimum soaked CBR-value of 80% tested according to AASHTO T 193. The CBR-value shall be obtained at the maximum dry density determined according to AASHTO T 180, Method D.

If filler, in addition to that naturally present, is necessary for meeting the grading requirements or for satisfactory bonding, it shall be uniformly blended with the crushed base course material on the road or in a pugmill unless otherwise specified or approved. Filler shall be obtained from sources approved by the Engineer, free from hard lumps and shall not contain more than 15 percent of material retained on the 4.75mm (NO. 4) sieve.

## **EXECUTION**

### **PLACING**

The aggregate base material shall be placed at a uniform mixture on a prepared sub-base (selected fill) in a quantity which will provide the required compacted thickness. When more than one layer is required, each layer shall be shaped and compacted before the succeeding layer is placed.

The placing of material shall begin at the point designated by the Engineer. Placing shall be from vehicles especially equipped to distribute the material in a continuous uniform layer or windrow.

The layer or windrow shall be of such size that when spread and compacted the finished layer be in reasonably close conformity to the nominal thickness shown on the Plans.

When hauling is done over previously placed material, hauling equipment shall be dispersed uniformly over the entire surface of the previously constructed layer, to minimize rutting or uneven compaction.

### **SPREADING AND COMPACTING**

When uniformly mixed, the mixture shall be spread to the plan thickness, for compaction.

Where the required thickness is 150mm or less, the material may be spread and compacted in one layer. Where the required thickness is more than 150 mm, the aggregate base shall be spread and compacted in two or more layers of approximately equal thickness, and the maximum compacted thickness of any layer shall not exceed 150 mm. All subsequent layers shall be spread and compacted in a similar manner.

The moisture content of sub-base material shall, if necessary, be adjusted prior to compaction by watering with approved sprinklers mounted on trucks or by drying out, as required in order to obtain the required compaction.

Immediately following final spreading and smoothing, each layer shall be compacted to the full width by means of approved compaction equipment. Rolling shall progress gradually from the sides to the center, parallel to the centerline of the road and shall continue until the whole surface has been rolled. Any irregularities or depressions that develop shall be corrected by loosening the material at these places and adding or removing material until surface is smooth and uniform. Along curbs, headers, and walls, and at all places not accessible to the roller, the base material shall be compacted thoroughly with approved tampers or compactors.

If the layer of base material, or part thereof, does not conform to the required finish, the Contractor shall, at his own expense, make the necessary corrections.

Compaction of each layer shall continue until a field density of at least 100 percent of the maximum dry density determined in accordance with AASHTO T 180, Method D has been achieved. In-place density determination shall be made in accordance with AASHTO T 191/ASTM D 1556.

## **TRIAL SECTION**

Before finish grade construction is started, the Contractor shall spread and compact trial sections as directed by the Engineer. The purpose of the trial sections is to check the suitability of the materials and the efficiency of the equipment and construction method which is proposed to be used by the Contractor. Therefore, the Contractor must use the same material, equipment and procedures that he proposes to use for the main work. One trial section of about 500 m<sup>2</sup> shall be made for every type of material and/or construction equipment/procedure proposed for use.

After final compaction of each trial section, the Contractor shall carry out such field density tests and other tests required as directed by the Engineer.

If a trial section shows that the proposed materials, equipment or procedures in the Engineer's opinion are not suitable for subbase, the material shall be removed at the Contractor's expense, and a new trial section shall be constructed.

If the basic conditions regarding the type of material or procedure change during the execution of the work, new trial sections shall be constructed.

## **SURVEYS AND SETTING OUT WORKS**

Before the commencement of the pavement works, the Contractor together with the Engineer shall conduct topographic survey which will form the basis of quantity measurement.

The Contractor shall set out the works and shall be solely responsible for the accuracy of such setting-out.

Prior to placement of any material, the Contractor shall establish visible construction markers to clearly define horizontal limits of the Work.

## **TOLERANCES**

The aggregate base course shall be laid to the designed level and transverse slopes shown on the Plans. The allowable tolerances shall be in accordance with following:

|   |                  |
|---|------------------|
| Permitted variation from design<br><b>THICKNESS OF LAYER</b>                        | ± 10 mm          |
| Permitted variation from design<br><b>LEVEL OF SURFACE</b>                          | + 5 mm<br>-10 mm |
| Permitted <b>SURFACE IRREGULARITY</b><br>Measured by 3-m straight-edge              | 5 mm             |
| Permitted variation from design<br><b>CROSSFALL OR CAMBER</b>                       | ± 0.2%           |
| Permitted variation from design<br><b>LONGITUDINAL GRADE</b> over<br>25 m in length | ± 0.1%           |

## ITEM 07 : 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 than 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 betting, 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 08 : PILING WORKS (PSCSP)

### SCOPE OF WORK

This section covers the minimum requirements for the fabrication, hauling, spotting, driving and finishing of the containment structure.

The Contractor may however, adopt, in addition to this minimum requirements additional provisions as may be necessary to insure the successful prosecution of the piling works.

### MATERIAL REQUIREMENTS

#### PRE-STRESSED CONCRETE SHEET PILES

Pre-stressed concrete sheet piles shall be constructed in accordance with the standard practice employed for the particular system specified and as directed by the Engineer subject to the following clauses.

1. Pre-stressed concrete sheet piles shall be of readymade products of approved fabricator regularly engaged in the production of pre-stressed concrete piles.
2. If an alternative system of pre-stressing to that shown in the Drawings is proposed by the Contractor, full details, procedures and explanations shall be submitted in writing to the Engineer for his approval. When approved for the work, the provisions of this Specification and such other provisions as he may require shall be fully satisfied.
3. Concrete strength, wires/strands, bars to be used for pre-stressed concrete work shall be as specified in the Drawings.
4. The Contractor shall submit the casting method including pre-stressing, application of stress and casting schedule and shall obtain the approval of the Engineer before commencement of fabrication of the piles.
5. The Contractor shall arrange for the Engineer to have free access to the place of manufacture of the piles.
6. Casting of pre-stressed concrete piles shall be in a manner that there shall be no leakage of concrete or grout into the space to be occupied by the steel. The ducts shall be of the correct cross-section, the ends being formed out as shown on the Drawings or as required by the pre-stressing system in use. Adequate means, subject to the Engineer's approval, shall be employed to ensure that their location is maintained exactly throughout the concreting operations. Passage shall be provided in the locations indicated on the Drawings for the injection and escape of grout and the release of air.

Piles shall be cast on a horizontal platform in approved steel moulds and details of the formwork and methods of concreting shall be as specified. The concreting of each pile shall be completed on one continuous operation and no interruption shall be permitted.

The pile butt must be formed truly square to the axis of the pile. Provision for standard splicing shall be provided unless otherwise ordered by the Engineer.

7. Anchorages shall be made from steel of a suitable quality to withstand permanently the forces imposed upon them, and shall in general be in accordance with the normal practice of the proprietors of the pre-stressing system in use.

8. Application of stress, grouting of pre-stressing cables, protection of pre-stressing cable anchorages and other necessary steps to complete the pre-stressing process shall conform to the standard practice of the pre-stressing system in use or as directed by the Engineer.
9. When the stress has been transferred to the pile, the pile shall exhibit no curvature in its length on any face greater than 3 millimeters deviation along a chord of 15 meters (1 in 500).
10. Pre-cast pre-stressed units shall be lifted only by lifting holes as indicated in the Drawings, or when not provided can be lifted by slings placed securely at corresponding points. Units shall be kept in the upright position at all times and shock shall be avoided. Any unit considered by the Engineer to have become sub-standard in any way shall be rejected and replaced by an acceptable unit.
11. Each pre-stressed member is to be uniquely and permanently marked to show its type, date of casting, length of pile and any control markings as ordered by the Engineer
12. Forms shall conform to the geometry of the pile with the provision of chamfer as shown on the Drawings.
13. Not less than five (5) cylindrical specimens shall be made for each casting batch of which at least two (2) shall be reserved for 28-day test, one (1) for 7-day, one (1) for 14-day, and one (1) test prior to lifting of pre-stressed concrete piles from the casting bed. Lifting of piles shall only be done if the result of the compressive strength has reached at least 60% of the specified compressive strength.
14. The Contractor shall splice the pile as shown on the drawings or other methods approved by the Engineer.

#### **TIE – RODS and FITTINGS**

All components of tie-rod assemblies to be supplied, assembled and installed by the Contractor shall be in accordance with the applicable requirements of the ASTM standards. The tie-rods shall have upset treaded ends and the minimum yield point shall be as shown on the drawings.

Bolts for assembly of structural steel and for connections or special sections shall conform to ASTM A325 and ASTM A 307 or as specified on the Drawings.

#### **EXECUTION**

Uncapped pile heads shall be protected against damage by the use of appropriate pile driving caps and/or cushions to centralize the driving impact.

The pile headers shall be of sufficient rigidity and fixity to hold the pile firmly in position and true alignment during driving operations.

A diesel pile hammer shall be used for driving the pre-stressed concrete piles.

The required weight of ram for the diesel pile hammer is 2.5 tons or at least 25% (1/4) of the weight of sheet pile..

The fall of hammer shall not exceed 6m. (19.18 ft.) and shall be of uniform frequency to avoid injury to the piles.

Piles driven shall be held firmly in position in axial alignment with the hammer by means of leads of adequate length. Approved cushions shall be provided to the pile butts.

Piling shall commence from the interior outward as the lateral displacement of soil may influence driving and heaving of already driven piles.

Every effort shall be made to drive continuously without interruption.

The Contractor shall repair all damages to piles during driving. A minimum cut - off allowance, not less than 600 mm shall be provided for all corrections at in-place splices and at all the pile heads for removal after completion of the driving.

The piles which have been uplifted after being driven shall be re-driven to the required penetration after completing other activities in the nearby areas. As heaving is anticipated, survey benchmarks should be established and elevations must be taken of the driven piles adjoining the piles being driven to avoid pile displacement affected by the swell rise of sub-soil structures.

#### LENGTH OF PILES

The length of piles indicated in the drawings are predetermined lengths considering the actual soil classification and/or behavior based on geotechnical consultancy report.

#### INTERRUPTED DRIVING

When driving is stopped before final penetration is reached and/or refusal is attained, the record of pile penetration shall be taken only after a minimum of 30 cm. (12 in.) total penetration has been obtained on resumption of driving.

#### ALIGNMENT TOLERANCE

Piles driven shall be within the allowable tolerance in alignment of 10 cm. (4 in.) in any direction.

#### DAMAGED AND MISDRIVEN PILES

1. Piles shall not be more than 10 cm. (4 in.) out of place at cut-off level. All vertical piles shall not be more than 2% out of plumb.
2. Any pile damaged by improper driving or driven out of its proper location, or driven out of elevation fixed on the plans, shall be corrected correspondingly at the Contractor's expense by any of the following methods:
  - a. Withdrawal of the pile and replacement by a new pile.
  - b. Driving a second pile adjacent to the defective one.
  - c. Splicing an additional length.

The method to be adopted in each case shall be at the discretion of the Engineer.

#### OBSTRUCTION

Where boulders or other obstructions make it impossible to drive certain piles in the location shown and to the required bearing strata, the Engineer may order additional pile or piles driven at other suitable location.

## PILE DRIVING RECORDS

The Contractor shall keep records of each pile driven and shall furnish the Engineer two (2) signed typewritten/computerized copies. The records shall show the number of blows per 0.50 m. of initial penetration taken from the free fall elevation of the pile down to penetration depth of 5.0 m., the penetration under the last 10 blows, and the calculated safe load according to the Hiley's Formula as stated in bearing power of piles.

## TESTING OF MATERIALS

The requirements regarding testing of concrete and reinforcement used in reinforced concrete piles and sheet piles shall be in accordance with "Reinforced Concrete".

However, the Engineer may conduct the necessary testing at the approved fabricator's casting yard whenever he considers necessary. Tests shall be carried out at the Contractor's expense.

## STORAGE AND HANDLING OF PILES

When raising or transporting piles, the Contractor shall provide slings or other equipment to avoid any appreciable bending of the pile or cracking of the concrete. Pile materials damaged in handling or driving shall be removed from the site and replaced by the Contractor at his expense.

Concrete piles shall be so handled at all times as to avoid breaking or chipping of the edges.

## PILE CHIPPING

Each pile shall be chipped-off to required elevation as indicated in the drawing. The contractor shall ensure that no damaged/cracked on the main pile will occurred after each chipping. Reinforcement from driven piles (dowels and strand) shall not be cut and will be incorporated to the construction of deck. Splicing of dowels are allowed in case of pile cutting due to early refusal.

## ITEM 09 : PILING WORKS (RC CORNER SHEET PILE)

### SCOPE OF WORK

This section covers the minimum requirements for the fabrication, hauling, spotting, driving and finishing of the pier extension and back-up area.

The Contractor may however, adopt, in addition to this minimum requirements additional provisions as may be necessary to insure the successful prosecution of the piling works.

### MATERIAL REQUIREMENTS

#### PRE-CAST REINFORCED CONCRETE (CORNER SHEET PILES)

Pre-cast reinforced concrete (piles, sheet corner piles and sheet piles) shall be constructed in accordance with the standard practice employed for the particular system specified and as directed by the Engineer subject to the following clauses.

1. The Contractor shall submit the casting method including casting schedule and shall obtain the approval of the Engineer before commencement of fabrication of the piles.
2. Pre-cast reinforced concrete (corner sheet piles) shall be supplied in accordance with the details and sections shown in the drawings. The class of concrete and quality of reinforcing steel shall be in accordance with the provisions of the specification for "Reinforced Concrete" unless otherwise noted in the drawings.
3. Casting of RC (corner sheet piles) shall be done with the length lying horizontally. The pile yard must be reasonably level and the ground sufficiently compact or hard, stable and not subject to any settlement, scour or erosion.
4. Pre-cast units shall be lifted only by lifting bars as indicated in the drawings, or when not provided can be lifted by slings placed securely at corresponding points. Units shall be kept in the upright position at all times and shock shall be avoided. Any unit considered by the Engineer to have become sub-standard in any way shall be rejected and replaced by an acceptable unit.
5. Each pre-cast member is to be uniquely and permanently marked to show its type, date of casting and length of pile.
6. Forms shall conform to the geometry of the pile with the provision of chamfer as shown on the Drawings.

#### PRE-CAST REINFORCED CONCRETE

Precast concrete for R.C. corner sheet piles and its reinforcement shall conform to the requirement of "Reinforced Concrete".

1. Fabrication Yard and Equipment shall be products of approved manufacturers regularly engaged in pile production of the same size or larger for a period of three years or more. However, the Contractors may be allowed to manufacture R.C piles upon presentation to the Engineer of proof that they have past experienced in manufacturing RC piles from their previous contracts having the same or bigger requirements.

Before casting of piles is started, approval shall be obtained of casting method, the casting yard and storage site and equipment. The Contractor shall provide all equipment necessary

for the fabrication of piles. Special care shall be made for curing, handling and transport of piles.

## 2. Casting and Fabrication

Piles shall be cast separately. The formwork for the piles shall have an even and solid bed and be constructed so that the piles can be easily removed from the form. The formwork and its placing shall be approved before casting of concrete. The formwork shall not be removed from its bed until the concrete has attained a compressive strength of at least 70% of its required 28 day strength.

The pile shall not be removed from its casting bed until it has reached its full 28 day compressive strength. Piles shall be moist cured for a period of 28 days after casting.

The Contractor shall determine the points where the piles will be supported during handling, transportation and storage. Care shall be taken to prevent piles from any damage during transportation. If the piles are placed in stacks, the supporting points at each layer shall be vertically over one another and the location of the supporting points shall be approved by the Engineer.

## 3. Formwork

Forms shall conform to the applicable provisions in Section, "Reinforced Concrete" Chamfers shall be provided at each corner of piles as indicated on the Drawings.

## 4. Marking

After the concrete has hardened, the piles shall be marked in approved format in durable paint indicating:

- a. Serial Number, marked close to both ends
- b. Date of casting, marked as (a)
- c. Date of arrival, marked as (b)
- d. Length of pile, marked as (c)
- e. Position of lifting points as approved by the Engineer
- f. Meter marks in two faces, throughout the length

## TIE – RODS and FITTINGS

All components of tie-rod assemblies to be supplied, assembled and installed by the Contractor shall be in accordance with the applicable requirements of the ASTM standards. The tie-rods shall have upset treaded ends and the minimum yield point shall be as shown on the drawings.

Bolts for assembly of structural steel and for connections or special sections shall conform to ASTM A325 and ASTM A 307 or as specified on the Drawings.

## GENERAL REQUIREMENTS

### Pile Length

Pile lengths shown on the Drawings are for estimating purposes only and are based upon probable lengths remaining in place in the completed structure.

1. Test piles of length shown on the drawings shall be driven at such points as designated by the Engineer that they may be left in place, cut off, and become a part

of the permanent structure. From their performance under driving, the Engineer will determine the lengths of piles required.

This pile shall be longer than ordinary piles shown in the pile schedule to provide for contingencies due to variations in soil behavior. Pile penetration observed per blow of the hammer shall be recorded. If refusal is observed while the required penetration is not yet obtained, the Contractor shall continue driving the pile with the aid of water jets. Water jets shall be carried out in all respect with rigorous control and not to detriment the surrounding ground or any part of the Works.

If necessary, test pile/s shall be spliced and re-driven until the bearing power and penetration are acceptable to the Engineer.

2. Lengths of regular piles shall be computed by the Hiley's Formula or other formulas accepted by the Engineer.

The above shall not be construed to mean that driving may stop when such penetration as shown on the plans has been secured, but that driving shall continue in every case until the total penetration obtained is satisfactory to the Engineer, regardless of the fact that sufficient bearing capacity as determined by the formula may be obtained at a lesser depth.

## EXECUTION

Uncapped pile heads shall be protected against damage by the use of appropriate pile driving caps and/or cushions to centralize the driving impact.

The pile headers shall be of sufficient rigidity and fixity to hold the pile firmly in position and true alignment during driving operations.

A pile hammer shall be used for driving the pre-stressed concrete piles.

The required weight of ram for the diesel pile hammer is 2.5 tons.

The fall of hammer shall not exceed 6m. (19.18 ft.) and shall be of uniform frequency to avoid injury to the piles.

Piles driven shall be held firmly in position in axial alignment with the hammer by means of leads of adequate length. Approved cushions shall be provided to the pile butts.

Piling shall commence from the interior outward as the lateral displacement of soil may influence driving and heaving of already driven piles.

Every effort shall be made to drive continuously without interruption.

The Contractor shall repair all damages to piles during driving. A minimum cut - off allowance, not less than 600 mm shall be provided for all corrections at in-place splices and at all the pile heads for removal after completion of the driving.

The piles which have been uplifted after being driven shall be re-driven to the required penetration after completing other activities in the nearby areas. As heaving is anticipated, survey benchmarks should be established and elevations must be taken of the driven piles adjoining the piles being driven to avoid pile displacement affected by the swell rise of sub-soil structures.



## LENGTH OF PILES

The length of piles indicated in the drawings are predetermined lengths considering the actual soil classification and/or behavior based on geotechnical consultancy report. Pile driven to the required penetration but failed to develop the required bearing power shall be spliced and re-driven to attain at least the minimum required bearing power.

## INTERRUPTED DRIVING

When driving is stopped before final penetration is reached and/or refusal is attained, the record of pile penetration shall be taken only after a minimum of 30 cm. (12 in.) total penetration has been obtained on resumption of driving.

## ALIGNMENT TOLERANCE

Piles driven shall be within the allowable tolerance in alignment of 10 cm. (4 in.) in any direction.

## DAMAGED AND MISDRIVEN PILES

1. Piles shall not be more than 10 cm. (4 in.) out of place at cut-off level. All vertical piles shall not be more than 2% out of plumb.
2. Any pile damaged by improper driving or driven out of its proper location, or driven out of elevation fixed on the plans, shall be corrected correspondingly at the Contractor's expense by any of the following methods:
  - a. Withdrawal of the pile and replacement by a new pile.
  - b. Driving a second pile adjacent to the defective one.
  - c. Splicing an additional length.

The method to be adopted in each case shall be at the discretion of the Engineer.

## OBSTRUCTION

Where boulders or other obstructions make it impossible to drive certain piles in the location shown and to the required bearing strata, the Engineer may order additional pile or piles driven at other suitable location.

## PILE DRIVING RECORDS

The Contractor shall keep records of each pile driven and shall furnish the Engineer two (2) signed typewritten/computerized copies. The records shall show the number of blows per 0.50 m. of initial penetration taken from the free fall elevation of the pile down to penetration depth of 5.0 m., the penetration under the last 10 blows, and the calculated safe load according to the Hiley's Formula as stated in bearing power of piles.

## TESTING OF MATERIALS

The requirements regarding testing of concrete and reinforcement used in reinforced concrete piles and sheet piles shall be in accordance with "Reinforced Concrete".

However, the Engineer may conduct the necessary testing at the approved fabricator's casting yard whenever he considers necessary. Tests shall be carried out at the Contractor's expense.

## STORAGE AND HANDLING OF PILES

When raising or transporting piles, the Contractor shall provide slings or other equipment to avoid any appreciable bending of the pile or cracking of the concrete. Pile materials damaged in handling or driving shall be removed from the site and replaced by the Contractor at his expense.

Concrete piles shall be so handled at all times as to avoid breaking or chipping of the edges.

## PILE CHIPPING

Each pile shall be chipped-off to required elevation as indicated in the drawing. The contractor shall ensure that no damaged/cracked on the main pile will occurred after each chipping. Reinforcement from driven piles (dowels and strand) shall not be cut and will be incorporated to the construction of deck. Splicing of dowels are allowed in case of pile cutting due to early refusal.

## ITEM 10 : PILING WORKS (PRE-STRESSED CONCRETE PILES)

### SCOPE OF WORK

This section covers the minimum requirements for the fabrication, hauling, spotting, driving and finishing of all foundation piles to be used in wharves/piers/platforms.

The Contractor may however, adopt, in addition to this minimum requirements additional provisions as may be necessary to insure the successful prosecution of the work related to foundation piling.

### METHOD STATEMENT

Before the commencement of any piling works, the Contractor shall submit (allowing sufficient time for consideration) to the Engineer for approval a Safety Policy and a Method Statement which shall include the following information:

1. Program of Works detailing sequence and timing of individual portions of works.
2. Maximum proposed lead at any stage of driving between a pile and its neighbor and the limitations of same if hard driving is encountered.
3. Contingency plan in the event of encountering obstructions or reaching driving refusal to minimize disruption/delay especially when using pitch and drive methods.

### MATERIAL REQUIREMENTS

#### TYPE OF FOUNDATION PILES

Pre-stressed concrete foundation piles to be used shall be in accordance with the design as shown on the Drawings and called for in the proposal.

#### PRE-STRESSED CONCRETE PILES

Pre-stressed concrete piles shall be constructed in accordance with the standard practice employed for the particular system specified and as directed by the Engineer subject to the following clauses.

1. Pre-stressed concrete piles shall be of readymade products of approved fabricator regularly engaged in the production of pre-stressed concrete piles.
2. If an alternative system of pre-stressing to that shown in the Drawings is proposed by the Contractor, full details, procedures and explanations shall be submitted in writing to the Engineer for his approval. When approved for the work, the provisions of this Specification and such other provisions as he may require shall be fully satisfied.
3. Concrete strength, high tension wires/strands, reinforcing bars to be used for pre-stressed concrete work shall be as specified in the Drawings.
4. The Contractor shall submit the casting method including pre-stressing, application of stress and casting schedule and shall obtain the approval of the Engineer before commencement of fabrication of the piles.
5. The Contractor shall arrange for the Engineer to have free access to the place of manufacture of the piles.

6. Piles shall be cast on a horizontal platform in approved steel moulds and details of the formwork and methods of concreting shall be as specified. The concreting of each pile shall be completed on one continuous operation and no interruption shall be permitted.

The pile butt must be formed truly square to the axis of the pile. Provision for standard splicing shall be provided unless otherwise ordered by the Engineer.

7. Anchorages shall be made from steel of a suitable quality to withstand permanently the forces imposed upon them, and shall in general be in accordance with the normal practice of the proprietors of the pre-stressing system in use.
8. Application of stress, grouting of pre-stressing cables, protection of pre-stressing cable anchorages and other necessary steps to complete the pre-stressing process shall conform to the standard practice of the pre-stressing system in use or as directed by the Engineer.
9. When the stress has been transferred to the pile, the pile shall exhibit no curvature in its length on any face greater than 3 millimeters deviation along a chord of 15 meters (1 in 500).
10. Pre-cast pre-stressed units shall be lifted only by lifting holes/hook as indicated in the Drawings, or when not provided can be lifted by slings placed securely at corresponding points. Units shall be kept in the upright position at all times and shock shall be avoided. Any unit considered by the Engineer to have become sub-standard in any way shall be rejected and replaced by an acceptable unit.
11. Each pre-stressed member is to be uniquely and permanently marked to show its type, date of casting, length of pile and any control markings as ordered by the Engineer
12. Forms shall conform to the geometry of the pile with the provision of chamfer as shown on the Drawings.
13. Not less than five (5) cylindrical specimens shall be made for each casting batch of which at least two (2) shall be reserved for 28-day test, one (1) for 7-day, one (1) for 14-day, and one (1) test prior to lifting of pre-stressed concrete piles from the casting bed. Lifting of piles shall only be done if the result of the compressive strength has reached at least 60% of the specified compressive strength.
14. Wires/strands specifications shall be in accordance with ASTM A 416.

## EXECUTION

### HANDLING OF PILES

All piles shall be carefully lifted at the location of the lifting points as indicated in the Drawings. Other practical and convenient methods may be used subject to the approval of the Engineer.

### DRIVING OF PILES

A diesel pile hammer shall be used for driving the pre-stressed concrete piles.

The required weight of ram for the diesel pile hammer is 2.5 tons.

Piles driven shall be held firmly in position in axial alignment with the hammer by means of leads of adequate length. Approved cushions shall be provided to the pile butts.

## PILE SPLICING

### General Provision

1. The alignment of piles shall be plumb and the length of upper and lower segment shall be in accordance in the approved plans.
2. The splice shall be embedded at least 4m from the design depth elevation.

### Surface Preparation

Concrete piles to be bonded must be thoroughly cleaned, free of dirt, paint, grease, oil, curing compound and other contaminants. The concrete surface must be dry. Clean the dowels with steel brush to removed rust and other impurities. Blow compressed air to the dowel holes.

### Pile Splicing Epoxy

Piling splicing epoxy is a two components, low viscosity, rapid cure, chemical resistant epoxy with high physical strength.

### Preparation and Application of Epoxy Mortar

Mixing and ratio of pile splicing epoxy and dry silica sand, application and curing of epoxy mortar shall refer to product manual.

### Compressive Strength

The compressive strength of epoxy mortar (Pile Splicing Epoxy + Dry Silica Sand) shall be at least 1.2 times the design compressive strength of pile or 6,000psi.

### Mechanical Properties of Epoxy

Cured state at 27° C (80° F) for 24 hours

| Mechanical Properties                 | Specification (Test Methods) |
|---------------------------------------|------------------------------|
| Ultimate Tensile Strength             | ASTM D 638                   |
| Ultimate Flexural Strength            | ASTM D 790                   |
| Hardness                              | ASTM D 2240                  |
| Compressive Strength at 1 hour cure   | ASTM D 695                   |
| Compressive Strength with Silica Sand | ASTM D 695                   |

## PILE CHIPPING

Each pile shall be chipped-off to required elevation as indicated in the drawing. The contractor shall ensure that no damaged/cracked on the main pile will occurred after each chipping. Reinforcement from driven piles (dowels and strand) shall not be cut and will be incorporated to the construction of deck. Splicing of dowels are allowed in case of pile cutting due to early refusal.

## BEARING POWER OF PILES

Each pile shall be driven to attain not less than the required minimum bearing power shown in the pile schedule, as determined by the Hiley's Formula as follows:

For Diesel Pile Hammer :

$$R = \frac{1}{6} \times \frac{2WH}{S + 2.54}$$

#### INTERRUPTED DRIVING

When driving is stopped before final penetration is reached and/or refusal is attained, the record of pile penetration shall be taken only after a minimum of 30 cm. (12 in.) total penetration has been obtained on resumption of driving.

#### ALIGNMENT TOLERANCE

Piles driven shall be within the allowable tolerance in alignment of 10 cm. (4 in.) in any direction.

#### DAMAGED AND MISDRIVEN PILES

1. Piles shall not be more than 10 cm. (4 in.) out of place at cut-off level. All vertical piles shall not be more than 2% out of plumb.
2. Any pile damaged by improper driving or driven out of its proper location, or driven out of elevation fixed on the plans, shall be corrected correspondingly at the Contractor's expense by any of the following methods:
  - a. Withdrawal of the pile and replacement by a new pile.
  - b. Driving a second pile adjacent to the defective one.
  - c. Splicing an additional length.

The method to be adopted in each case shall be at the discretion of the Engineer.

#### OBSTRUCTION

Where boulders or other obstructions make it impossible to drive certain piles in the location shown and to the required bearing strata, the Engineer may order additional pile or piles driven at other suitable location.

#### RECORDS

The Contractor shall keep records of each pile driven and shall furnish the Engineer two (2) signed typewritten/computerized copies. The records shall show the number of blows per 0.50 m. of initial penetration taken from the free fall elevation of the pile down to penetration depth of 5.0 m., the penetration under the last 10 blows, and the calculated safe load according to the Hiley's Formula as stated in bearing power of piles.

## ITEM 11 : 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 | 160kg/sq.m minimum                  | Test piece:<br>Dumbell No. 3<br>ASTM D412          |
|               |                  | Elongation       | 350% minimum                        | ASTM D1456   |
|               |                  | Hardness         | 76Hs maximum                        | Spring Type hardness test (Type A)<br>ASTM D2240   |
|               | After Aging      | Tensile Strength | Not less than 80% of original value | ASTM D412  |
|               |                  | Elongation       |                                     | ASTM D1456   |
|               |                  | Hardness         |                                     | ASTM D2240   |
|               | Compression Test |                  | 30% maximum                         | Heat treatment:<br>70±1°C x 22 hours.<br>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.

Ten percent (10%) of the total number of fenders to be supplied and rounded to a unit 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 ≥ Specified E but not to exceed 10% |
| R = Reaction force,    | R ≤ Specified R but not less 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 12 : 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 connected to the existing supply of street light. The supply voltages shall be 220 volt, 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**

Specifications:

Rated: 100 watt LED or equivalent  
Color Temperature: warm white (ww)  
Driver: Meanwell  
LED Chip: Bridgelux  
IP grade: IP65  
Beam Angle: 120 degree  
Luminous flux: 9000-10000 lm  
CRI (Ra>): WW>>75; PW >70

## **PANEL BOARD**

Panel board shall conform to the schedule of panel board as shown on 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**

Lamp Post shall be 6.0 m ht. single angle bar steel tapered, 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 at the proposed construction of back up area.

Individual set of weatherproof toggle switch connected to lamp post.

Pole Setting:      Depth as shown on the approved plans.

Construction of reinforced concrete 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.

## **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 13 : 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.



2438 ( 8 ft.)

(Name of Project and Location)

1219 (4 ft.)

CONTRACTOR

EFFECTIVITY OF CONTRACT

CONTRACT COMPLETION DATE

CONTRACT COST

IMPLEMENTING OFFICE

SOURCE OF FUND

PHILIPPINE  
PORTS  
AUTHORITY

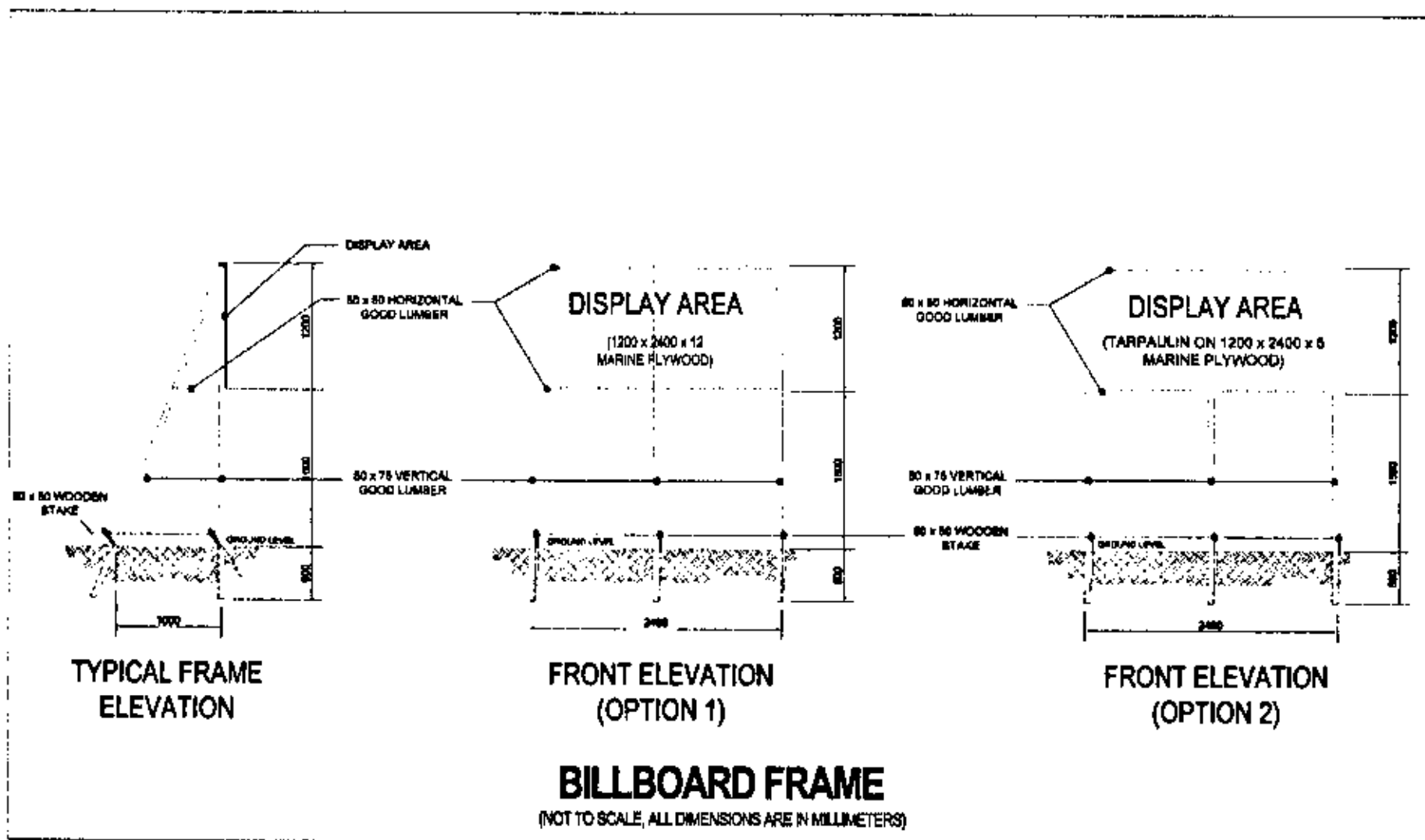
37mm YELLOW BORDER LINE

WHITE BACKGROUND

ARIAL BLACK TEXT

ARIAL DARK BLUE TEXT

STANDARD PROJECT BILLBOARD



## ITEM 14 : 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.

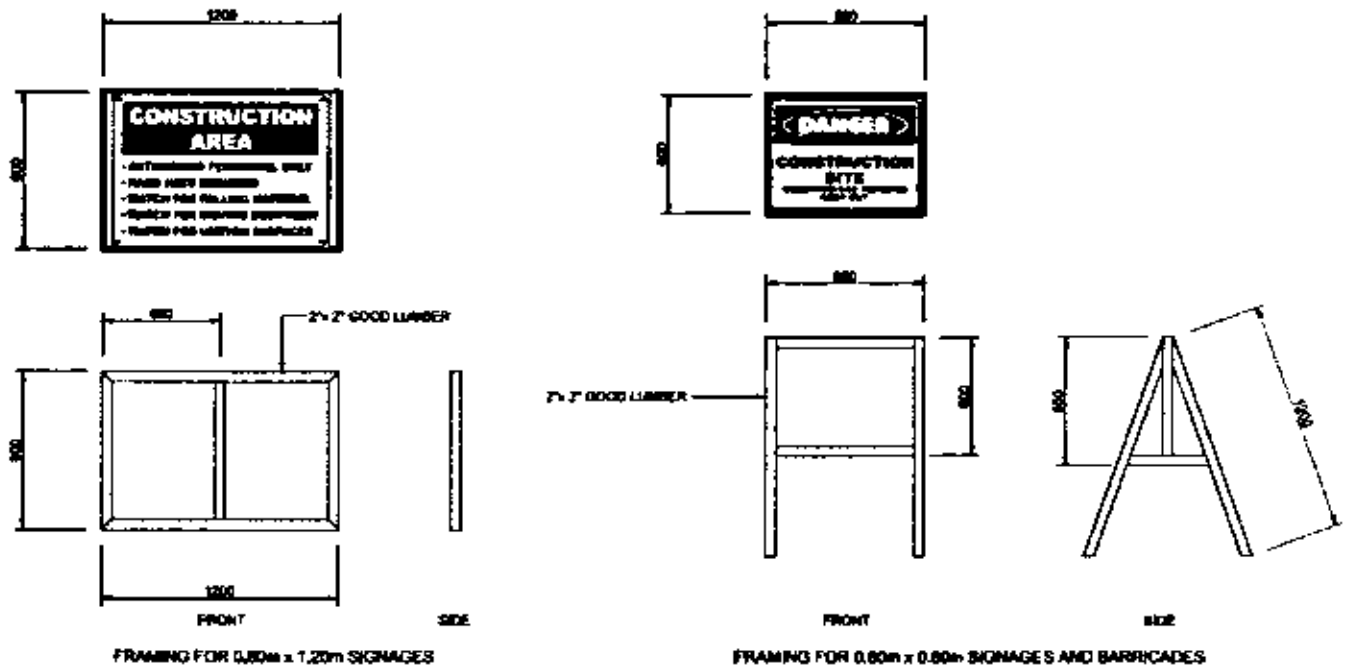
### SPECIFICATION

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**

**PROJECT DRAWINGS**

## SECTION VII

# PROJECT DRAWINGS (SEE ISSUED APPROVED PLANS)

### LIST OF DRAWINGS:

|          |  |
|----------|--|
| 01 of 14 | Vicinity Map, Development Plan, General Notes, List of Drawings  |
| 02 of 14 | General Plan   |
| 03 of 14 | Elevations   |
| 04 of 14 | Elevation, Section, Detail of 250mm. PCC Pavement  |
| 05 of 14 | Sections   |
| 06 of 14 | Key Plan (Containment Structure)   |
| 07 of 14 | Detail Elevation of Pre-Stressed Concrete Sheet Pile   |
| 08 of 14 | Detail Elevation of Corner Sheet Piles   |
| 09 of 14 | Detail Attachment of Mooring Tee Head and Fendering System, Detail of Retaining Wall, Detail of Anchor Wall, Detail of Concrete Blocks         |
| 10 of 14 | Detail of Mooring Block Anchor, Detail of Tie Rod  |
| 11 of 14 | Detail of V500h X 1500l Rubber Dock Fender And 35 Tons Mooring Tee Head  |
| 12 of 14 | Detail of 400mm X 400 Pre-stressed Concrete Piles  |
| 13 of 14 | Port Lighting Lay-Out Plan, General Notes (Electrical), Legend   |
| 14 of 14 | Detail of Floodlight Connection, Schedule of Load, Single Angle Bar Floodlight Steel Tapered Lamp Post, Led Floodlight Fixture, Specifications |

**SECTION VIII**

**BILL OF QUANTITIES**  
**and**  
**ATTACHMENTS**

**BILL OF QUANTITIES**  
**CONSTRUCTION OF BACK-UP AREA**  
**Port of Esperanza, Esperanza, Masbate**

| NO.<br>(1)           | DESCRIPTION OF WORK<br>(2)   | UNIT<br>(3) | QTY.<br>(4) | UNIT PRICE<br>(Pesos)<br>(5) | AMOUNT<br>(Pesos)<br>(4) x (5) |
|----------------------|--|-------------|-------------|------------------------------|--------------------------------|
| BILL NO. 1           | <b>GENERAL EXPENSES</b>  |             |             |                              |                                |
| 1.01                 | Mobilization, demobilization and cleaning                                      | lot         | 1           |                              |                                |
| 1.02                 | Rental of temporary site office and residence for the Engineer and staff       | mo.         | 14          |                              |                                |
| 1.03                 | Maintain temporary site office and residence for the Engineer and staff        | mo.         | 14          |                              |                                |
| 1.04                 | Provide Construction Safety and Health Program in the execution of the project | mo.         | 14          |                              |                                |
| TOTAL FOR BILL NO. 1 |  |             |             |                              | -                              |

**BILL OF QUANTITIES**  
**CONSTRUCTION OF BACK-UP AREA**  
**Port of Esperanza, Esperanza, Masbate**

| NO.<br>(1)        | DESCRIPTION OF WORK<br>(2)   | UNIT<br>(3) | QTY.<br>(4) | UNIT PRICE<br>(Pesos)<br>(5) | AMOUNT<br>(Pesos)<br>(4) x (5) |
|-------------------|--|-------------|-------------|------------------------------|--------------------------------|
| <b>BILL NO. 2</b> | <b>CONSTRUCTION OF BACK-UP AREA</b>  |             |             |                              |                                |
| 2.01              | Chipoff existing rc curb, flush to deck level and smoothened with mortar                           | l.m.        | 13          |                              |                                |
| 2.02              | Demolish and dispose existing deflector wall   | cu.m.       | 9           |                              |                                |
| 2.03              | Supply and place 50-100 kg rocks   | cu.m.       | 3,365       |                              |                                |
| 2.04              | Supply and place 3,500 psi concrete for retaining walls, anchor wall, mooring block and rc curb    | cu.m.       | 577         |                              |                                |
| 2.05              | Supply and install steel reinforcement for retaining walls, anchor wall, mooring block and rc curb | kg          | 60,657      |                              |                                |
| 2.06              | Supply and install geotextile fabric   | sq.m.       | 2,350       |                              |                                |
| 2.07              | Supply and place sand and gravel fill  | cu.m.       | 26,895      |                              |                                |
| 2.08              | Supply, spread and compact selected fill materials   | cu.m.       | 8,396       |                              |                                |
| 2.09              | Supply, spread and compact aggregate base course   | cu.m.       | 1,414       |                              |                                |
| 2.10              | Supply and place gravel bedding  | cu.m.       | 5           |                              |                                |
| 2.11              | Construct portland cement concrete pavement, 250mm thk.  | sq.m.       | 7,070       |                              |                                |
| 2.12              | Supply and install 32mm $\phi$ x 12.00m tie-rod including accessories                              | set         | 12          |                              |                                |
| 2.13              | Supply and install 60mm $\phi$ x 2.50m tie-rod including accessories                               | set         | 1           |                              |                                |
| 2.14              | Supply and install 60mm $\phi$ x 14.00m tie-rod including accessories                              | set         | 68          |                              |                                |



**BILL OF QUANTITIES**  
**CONSTRUCTION OF BACK-UP AREA**  
**Port of Esperanza, Esperanza, Masbate**

| NO.<br>(1)                  | DESCRIPTION OF WORK<br>(2)   | UNIT<br>(3) | QTY.<br>(4) | UNIT PRICE<br>(Pesos)<br>(5) | AMOUNT<br>(Pesos)<br>(4) x (5) |
|-----------------------------|--|-------------|-------------|------------------------------|--------------------------------|
| 2.15                        | Supply and deliver to site 0.35m x 0.600m PSC sheet piles  | l.m.        | 4,240       |                              |                                |
| 2.16                        | Supply and deliver to site RC corner sheet piles   |             |             |                              |                                |
|                             | a. RC sheet corner pile no.1   | l.m.        | 16          |                              |                                |
|                             | b. RC sheet corner pile no.2   | l.m.        | 16          |                              |                                |
| 2.17                        | Handle, pitch and drive 0.35m x 0.600m PSC sheet piles and RC corner sheet piles                   | l.m.        | 4,272       |                              |                                |
| 2.18                        | Supply and deliver to site 0.40m x 0.40m PSC anchor piles  | l.m.        | 630         |                              |                                |
| 2.19                        | Handle, pitch and drive 0.40m x 0.40m PSC anchor piles   | l.m.        | 630         |                              |                                |
| 2.20                        | Chipping and cutting of driven concrete piles up to cut-off elevation including disposal of debris | no.         | 302         |                              |                                |
| 2.21                        | Supply and deliver to site rubber dock fender (V-type 500H x 1500L) including accessories          | set         | 8           |                              |                                |
| 2.22                        | Install rubber dock fender including accessories   | set         | 8           |                              |                                |
| 2.23                        | Supply and deliver to site mooring bollard (35T, T-head) including accessories.                    | set         | 8           |                              |                                |
| 2.24                        | Install mooring bollard including accessories  | set         | 8           |                              |                                |
| 2.25                        | Supply and place anchor blocks.  | set         | 12          |                              |                                |
| 2.26                        | Supply and place concrete blocks.  | cu.m.       | 163         |                              |                                |
| <b>TOTAL FOR BILL NO. 3</b> |  |             |             |                              | -                              |

**BILL OF QUANTITIES**  
**CONSTRUCTION OF BACK-UP AREA**  
Port of Esperanza, Esperanza, Maabato

| NO.<br>(1)                  | DESCRIPTION OF WORK<br>(2)   | UNIT<br>(3) | QTY.<br>(4) | UNIT PRICE<br>(Pesos)<br>(5) | AMOUNT<br>(Pesos)<br>(4) x (5) |
|-----------------------------|--|-------------|-------------|------------------------------|--------------------------------|
| <b>BILL NO. 3</b>           | <b>PORT LIGHTING SYSTEM</b>  |             |             |                              |                                |
| 3.01                        | Supply, deliver and install electrical works for port lighting system as shown in the plan | lot         | 1           |                              |                                |
| 3.02                        | Construct lamp post foundation   | no.         | 3           |                              |                                |
| 3.03                        | Construct RC Ductbank  | l.m.        | 1           |                              |                                |
| <b>TOTAL FOR BILL NO. 3</b> |  |             |             |                              | -                              |

**BILL OF QUANTITIES**  
**CONSTRUCTION OF BACK-UP AREA**  
**Port of Esperanza, Esperanza, Masbate**

| NO.<br>(1)                  | DESCRIPTION OF WORK<br>(2)   | UNIT<br>(3) | QTY.<br>(4) | UNIT PRICE<br>(Pesos)<br>(5) | AMOUNT<br>(Pesos)<br>(4) x (5) |
|-----------------------------|--|-------------|-------------|------------------------------|--------------------------------|
| <b>BILL NO. 4</b>           | <b>REIMBURSABLE ITEMS</b>  |             |             |                              |                                |
| 4.01                        | Provide reimbursable items necessary in the implementation of the project as determined by the Authority | lot         | 1           | 1,939,333.85                 | 1,939,333.85                   |
| <b>TOTAL FOR BILL NO. 4</b> |  |             |             |                              | <b>1,939,333.85</b>            |

## **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      Rental of temporary site office and residence for the Engineer and staff**

The quantity to be paid for shall be the actual rental for temporary site office and residence 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 at least 48.00 m<sup>2</sup>

**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**

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 BACK-UP AREA AND WIDENING OF ROCK CAUSEWAY

- Item 2.01      Chip-off portion of existing R.C. Curb, flush to deck level and smoothen with mortar**
- The quantity to be paid for shall be the actual length in linear meter of portion of existing R.C. Curb to be chipped off, flushed to deck level and smoothened with mortar 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      Demolish and dispose existing deflector wall**
- The quantity to be paid for shall be the actual volume in cubic meter of existing deflector wall, demolished and disposed 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 50-100 kg. rocks**
- The quantity to be paid for shall be the actual volume in cubic meter of 50-100 kg. 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 2.04      Supply and place 3,500 psi concrete for retaining walls, anchor wall, mooring block and rc curb**
- The quantity to be paid for shall be the actual volume in cubic meter of 3,500 psi concrete for retaining walls, anchor wall, mooring block and rc curb, 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 2.05      Supply and install steel reinforcement for retaining walls, anchor wall, mooring block and rc curb**
- The quantity to be paid for shall be the actual weight in kilogram of steel reinforcements for retaining walls, anchor wall, mooring block and rc curb, 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 2.06      Supply and install geotextile fabric**
- The quantity to be paid for shall be the actual area in square meter of geotextile filter 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 2.07      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 2.08      Supply, spread and compact selected fill materials**

The quantity to be paid for shall be the actual volume in cubic meter of selected fill materials 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 2.09      Supply, spread and compact aggregate base course**

The quantity to be paid for shall be the actual volume in cubic meter of gravel 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 2.10      Supply, place gravel bedding**

The quantity to be paid for shall be the actual volume in cubic meter of gravel bedding 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      Construct Portland Cement Concrete pavement (250mm thk.)**

The quantity to be paid for shall be the actual area in square meter of portland cement concrete pavement (250mm thk), 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 2.12      Supply and install 32mmØ x 12.00m tie-rod including accessories**

The quantity to be paid for shall be the actual number in set of 32mmØ x 12.00m tie-rod including accessories, 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 60mmØ x 2.50m tie-rod including accessories**

The quantity to be paid for shall be the actual number in set of 60mmØ x 2.50m tie-rod including accessories, 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 install 60mmØ x 14.00m tie-rod including accessories**

The quantity to be paid for shall be the actual number in set of 60mmØ x 14.00m tie-rod including accessories, 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 2.15      Supply and deliver to site 0.35m x 0.600m PSC sheet piles**

The quantity to be paid for shall be the actual length in linear meter of 0.35m x 0.600m PSC sheet piles, 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 2.16      Supply and deliver to site RC corner sheet piles**

- a) RC sheet corner pile no. 1
- b) RC sheet corner pile no. 2

The quantity to be paid for shall be the actual length in linear meter of RC corner sheet piles of various sizes, 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 2.17      Handle, pitch and drive 0.35m x 0.600m PSC sheet piles and RC corner sheet piles**

The quantity to be paid for shall be the actual length in linear meter of 0.35m x 0.525m PSC sheet piles and RC corner sheet piles to be handled, pitched and driven 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      Supply and deliver to site .40m x 0.40m PSC anchor piles**

The quantity to be paid for shall be the actual length in linear meter of .40m x 0.40m PSC anchor piles, 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 2.19      Handle, pitch and drive 0.40m x 0.40m PSC anchor piles**

The quantity to be paid for shall be the actual length in linear meter of .40m x 0.40m PSC anchor piles to be handled, pitched and driven 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      Chipping and cutting of driven concrete piles up to cut off elevation including disposal of debris**

The quantity to be paid for shall be the actual length in linear meter of driven PSC sheet piles to be chipped/cut off up to required elevation including disposal of debris 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 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 fender (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 2.22      Install rubber dock fender including accessories**

The quantity to be paid for shall be the actual set of rubber dock fender 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 2.23      Supply and deliver mooring bollard (35 Tons, T-head) including accessories**

The quantity to be paid for shall be the actual set of mooring bollard (35 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 2.24      Install mooring bollard 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.

**Item 2.25      Supply and place anchor blocks**

The quantity to be paid for shall be the actual set of anchor 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 2.26      Supply and place concrete blocks**

The quantity to be paid for shall be the actual volume in cubic meter of concrete 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.



**BILL NO. 3**

**PORT LIGHTING SYSTEM**

- Item 3.01**      **Supply, deliver and install electrical works for Port Lighting System as shown in the plan**

The quantity to be paid for shall be the actual quantity in lot of electrical works for Port Lighting System as shown in the plan, 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 3.02**      **Construct lamp post foundation**

The quantity to be paid for shall be the actual number of lamp post foundation 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 3.03**      **Construct Reinforced Concrete Ductbank**

The quantity to be paid for shall be the actual length in linear meter of reinforced concrete duct bank, 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.

**BILL NO. 4**

**REIMBURSABLE ITEMS**

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

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. The amount of bid should be fixed as indicated in the amount stated in the Bid Data Sheet [ITB Clause 13.1(a)] and as provided in the Bill of Quantities (BOQ). 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.

## **FACILITIES TO BE PROVIDED FOR THE ENGINEER & HIS STAFF**

### **TEMPORARY FACILITIES OF THE CONTRACTOR**

The Contractor shall provide and maintain such temporary offices, stores, workshops, latrines, housing and messing accommodations as are necessary. The location, dimension and layout of such buildings and places shall be subject to the approval in writing of the Engineer. By the end of the contract, the Contractor shall remove all buildings and the area shall be cleared and graded as required by the Engineer.

### **SITE OFFICE AND RESIDENCE FOR THE ENGINEER & STAFF**

The Contractor shall provide (Rental) and maintain a temporary site office and residence with an area of at least 48 square meters for use of the Engineer and staff, including all the necessary electricity, water, communication services and consumables.

**MINIMUM EQUIPMENT REQUIREMENTS**

|   |       |  |
|---|-------|--|
| 1 | unit  | Crane Barge (319 GW, minimum), with 60T Crane, owned ✓   |
| 1 | unit  | Crawler Crane (30T, minimum), owned ✓                    |
| 1 | unit  | Pile Hammer (Diesel, 7,500 kg.m.), owned/leased ✓        |
| 1 | unit  | Drop Hammer (2T, minimum), owned/leased ✓                |
| 1 | unit  | Clamshell, owned ✓                                       |
| 2 | units | Concrete Mixer (1-bagger, minimum), owned ✓              |
| 2 | units | Concrete Vibrator (3.5 hp, minimum), owned ✓             |
| 1 | unit  | Concrete Cutter (5hp, minimum), owned ✓                  |
| 2 | units | Bar Cutter (electric, 25mm dia min.), owned ✓            |
| 2 | units | Bar Bender (electric, 25mm dia min.), owned ✓            |
| 1 | unit  | Dump Truck (8 cu.m., minimum), owned ✓                   |
| 1 | unit  | Water Truck with pump, (1,000 gal.) owned ✓              |
| 1 | unit  | Concrete Screader, owned ✓                               |
| 2 | units | Jackhammer, owned ✓                                      |
| 1 | unit  | Air-Compressor (250 cfm, minimum), owned ✓               |
| 4 | units | Diving Equipment (complete), owned/leased ✓              |
| 1 | unit  | Welding Machine (400 amp., minimum), owned ✓             |
| 2 | units | Oxy/Acetylene Cutting Outfit, owned ✓                    |
| 1 | unit  | Tugboat (500hp, minimum), owned/leased ✓                 |
| 1 | unit  | Road Roller (12.05T, vibratory, minimum), owned/leased ✓ |
| 1 | unit  | Road Grader (125 hp, minimum), owned/leased ✓            |
| 1 | unit  | Payloader (93 hp, minimum), owned/leased ✓               |
| 1 | unit  | Backhoe (0.40 cu.m., 94.30 hp), owned/leased ✓           |
| 2 | units | Transit Mixer (5 cu.m. cap., minimum), owned/leased ✓    |
| 2 | units | Plate Compactor (5 hp, 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).

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**

- |    |      |              |
|----|------|--------------|
| 55 | pcs. | Hard Hats    |
| 55 | pcs. | Gloves       |
| 4  | pcs. | Goggles      |
| 2  | pcs. | Aprons       |
| 4  | pcs. | Safety Belts |
| 55 | pcs. | Safety Shoes |
| 4  | pcs. | Life Lines   |

#### **Safety Devices**

- |   |       |                   |
|---|-------|-------------------|
| 1 | lot   | Barricades        |
| 1 | lot   | Warning signs     |
| 2 | units | Fire extinguisher |

Medical and First Aid System                      -                      For fourteen (14) mos.

### **NOTE:**

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

**SECTION IX**  
**BIDDING FORMS**

## Bid Form

Date: \_\_\_\_\_

ITB No: \_\_\_\_\_

To: **Philippine Ports Authority**  
Bonifacio Drive, South Harbor,  
Port Area, Manila

We, the undersigned, declare that:

- (a) We have examined and have no reservation to the Bidding Documents, including Addenda, for the Contract **Construction of Back-Up Area, Port of Esperanza, Esperanza, Masbate**;
- (b) We offer to execute the Works for this Contract in accordance with the Bid and Bid Data Sheet, General and Special Conditions of Contract accompanying this Bid;

The total price of our Bid, excluding any discounts offered below is:

| BILL NO | DESCRIPTION                                | TOTAL AMOUNT |
|---------|--|--------------|
| 1       | General Expenses                           | ₱            |
| 2       | Construction of Back-up Area               |              |
| 3       | Port Lighting System                       |              |
| 4       | Reimbursable Items                         |              |
|         |  |              |
|         | <b>TOTAL AMOUNT OF BID (including VAT)</b> | <b>₱</b>     |

The discounts offered and the methodology for their application are: insert information;

- (c) Our Bid shall be valid for a period of 120 days from the date fixed for the Bid submission deadline in accordance with the Bidding Documents, and it shall remain binding upon us and may be accepted at any time before the expiration of that period;
- (d) If our Bid is accepted, we commit to obtain a Performance Security in the amount of insert percentage amount percent of the Contract Price for the due performance of the Contract;
- (e) Our firm, including any subcontractors or suppliers for any part of the Contract, have nationalities from the following eligible countries: insert information;

- (f) We are not participating, as Bidders, in more than one Bid in this bidding process, other than alternative offers in accordance with the Bidding Documents;
- (g) Our firm, its affiliates or subsidiaries, including any subcontractors or suppliers for any part of the Contract, has not been declared ineligible by the Funding Source;
- (h) We understand that this Bid, together with your written acceptance thereof included in your notification of award, shall constitute a binding contract between us, until a formal Contract is prepared and executed; and
- (i) We understand that you are not bound to accept the Lowest Calculated Bid or any other Bid that you may receive.
- (j) We likewise certify/confirm that the undersigned, is the duly authorized representative of the bidder, and granted full power and authority to do, execute and perform any and all acts necessary to participate, submit the bid, and to sign and execute the ensuing contract for the **Contract Construction of Back-Up Area, Port of Esperanza, Esperanza, Masbate of the Philippine Ports Authority.**
- (k) We acknowledge that failure to sign each and every page of this Bid Form, including the Bill of Quantities, shall be a ground for the rejection of our bid.

Name: \_\_\_\_\_

In the capacity of: \_\_\_\_\_

Signed: \_\_\_\_\_

Duly authorized to sign the Bid for and on behalf of: \_\_\_\_\_

Date: \_\_\_\_\_

**STATEMENT OF ALL ON-GOING GOVERNMENT AND PRIVATE CONTRACTS,  
INCLUDING CONTRACTS AWARDED BUT NOT YET STARTED, WHETHER SIMILAR OR NOT SIMILAR IN NATURE**

| Name of the Contract or Title Of the Project<br>1]                        | Owner's Name and Address | Nature/ Scope of Work<br>2] | Contractor's Role (in percentage)<br>3] | Total Contract Value At |                         |   | Date of Award<br>5] | Value of Outstanding Works | Estimated Time of Completion | % of Accomplishment |        | Contract Duration<br>5] |           |
|---|--------------------------|-----------------------------|---|-------------------------|-------------------------|---|---------------------|----------------------------|------------------------------|---------------------|--------|-------------------------|-----------|
|   |                          |                             |   | Award                   | Project Completion Date | Escalated Value to Present Prices<br>4] |                     |                            |                              | Planned             | Actual | Start                   | Completed |
| A) Government Contracts<br>i. On-going<br>ii. Awarded but not yet started |                          |                             |   |                         |                         |   |                     |                            |                              |                     |        |                         |           |
|   |                          |                             |   |                         |                         |   |                     |                            |                              |                     |        |                         |           |
| B) Private Contracts<br>i. On-going<br>ii. Awarded but not yet started    |                          |                             |   |                         |                         |   |                     |                            |                              |                     |        |                         |           |
|   |                          |                             |   |                         |                         |   |                     |                            |                              |                     |        |                         |           |

**NOTE:**

- 1] As appearing or defined in the contract entered/executed by the parties
- 2] With special reference to the Scope of Works as described/enumerated in the advertised Invitation To Bid.
- 3] Indicate whether as Sole Contractor, Sub-Contractor or Member in a Joint Venture / Consortium
- 4] Indicate the FOREX used if Contract Value is expressed in a currency other than the Philippine Peso. Specify the "Escalation Factor" used to escalate the Contract Value from completion date to the advertisement date of the Invitation to Bid per section 23.11.2 (3) of R.A. 9184.
- 5] State Month and Year.

This Statement shall be supported by:

- a) Notice of Award and/or Contract
- b) Notice to Proceed

\_\_\_\_\_  
Name of Firm/Applicant

\_\_\_\_\_  
Authorized Signing Official

\_\_\_\_\_  
Date



**STATEMENT OF THE BIDDER'S SINGLE LARGEST COMPLETED CONTRACT (SLCC) SIMILAR TO THE CONTRACT TO BE BID**

| Name of the Contract or Title Of the Project | Owner's Name and Address | Nature/Scope of Work | Contractor's Role and Percentage Of Participation | Total Contract Value At |            |                                   | Date of Award | Value of Outstanding Works | Contract Duration |           |
|--|--------------------------|----------------------|---|-------------------------|------------|-----------------------------------|---------------|----------------------------|-------------------|-----------|
|  |                          |                      |   | Award                   | Completion | Escalated Value to Present Prices |               |                            | Start             | Completed |
|  |                          |                      |   |                         |            |                                   |               |                            |                   |           |

**NOTE :**

1. The prospective bidder must have completed an SLCC that is similar to the contract to be bid, and whose value, adjusted to current prices using the PSA consumer price indices, must be at least fifty percent (50%) of the ABC to be bid.
2. This Statement shall be supported by:
  - a. Notice of Award and / or Notice to Proceed.
  - b. Project Owner's Certificate of Final acceptance issued by the owner other than the Contractor or Constructors Performance Evaluation System (CPES) Final Rating, which must be at least satisfactory.

\_\_\_\_\_  
Name of Firm/Applicant

\_\_\_\_\_  
Authorized Signing Official

\_\_\_\_\_  
Date

## EXPERIENCE RECORD ON SIMILARLY COMPLETED PROJECTS

| Similar Major Operations of Work<br>1]                      | Unit of<br>Measure | Quantity |                            |                            |                            |                            | Unit of<br>Measure | Quantity |
|---|--------------------|----------|----------------------------|----------------------------|----------------------------|----------------------------|--------------------|----------|
|   |                    |          | Title of<br>the<br>Project | Title of<br>the<br>Project | Title of<br>the<br>Project | Title of<br>the<br>Project |                    |          |
| 1. Off-shore Pile Driving of Concrete Piles                 | l.m.               | 2,435    |                            |                            |                            |                            |                    |          |
| 2. Reinforced Concrete Works                                | cu.m.              | 289      |                            |                            |                            |                            |                    |          |
| 3. Rock Works (50-100 kg./pc)                               | cu.m.              | 1,683    |                            |                            |                            |                            |                    |          |
| 4. Fill Materials   | cu.m.              | 17,646   |                            |                            |                            |                            |                    |          |
| 5. Construction of Portland Cement Concrete Pavement (PCCP) | sq.m.              | 3,535    |                            |                            |                            |                            |                    |          |

**NOTE:** 1] Submit the Certificate of Completion/Certificate of Acceptance by the project owner, Final Receptitulation/Bill of Quantities and/or Constructor Performance Evaluation System (CPES) ratings, 1<sup>st</sup>, 2<sup>nd</sup> & Final visit (if applicable). Projects with no Certificate of Completion/Acceptance and Receptitulation/Bill of Quantities shall not be considered.

2] The Owner's Certificate of Final Acceptance; or the Constructors Performance Evaluation Summary (CPES) Final Rating and/or the Certificate of Completion, must be satisfactory.

\_\_\_\_\_  
Name of Firm/Applicant

\_\_\_\_\_  
Authorized Signing Official

\_\_\_\_\_  
Date

(Revised Form : September 2012)

## FINANCIAL DATA

- A. The prospective bidder's audited Financial Statements, showing, among others, the prospective bidder's total and current assets and liabilities, stamped "RECEIVED" by the Bureau of Internal Revenue (BIR), or its duly accredited and authorized institutions, for the preceding calendar year which should not be earlier than two (2) years from the date of bid submission.

|                              | Year |
|------------------------------|------|
| 1. Total Assets              |      |
| 2. Current Assets            |      |
| 3. Total Liabilities         |      |
| 4. Current Liabilities       |      |
| 5. Net worth (1-3)           |      |
| 6. Net Working Capital (2-4) |      |

- B. The computation of the bidders Net Financial Contracting Capacity (NFCC) must be at least equal to the ABC to be bid, as follows:

NFCC = [ (Current assets minus current liabilities) (15) ] minus the value of all outstanding or uncompleted portions of the projects under ongoing contracts, including awarded contracts yet to be started coinciding with the contract to be bid.

NFCC = \_\_\_\_\_

Attached herewith are certified true copies of the audited financial statements stamped received by the BIR or BIR authorized collecting agent for the latest/immediately preceding calendar year.

\_\_\_\_\_  
Name of Firm/Applicant

\_\_\_\_\_  
Authorized Signing Official

Date: \_\_\_\_\_

### NOTES:

If Partnership or Joint Venture, each Partner or Member Firm of Joint venture shall submit separate financial statements.

## LIST OF CONTRACTOR'S PERSONNEL

I hereby declare that the following key personnel enumerated below, with attached resume/bio-data, including valid PRC License, for the various positions / functions, are available for the project applied for:

| Position of Key Personnel              | Name | No. of Key Personnel | Similar Experience in the Position (Years)<br>1] | Total Experience in the Position (Years) | Attachment(s)   | Annex(es)   |
|--|------|----------------------|--|--|---|-------------|
| Project Manager                        |      |                      |  |  | PRC License (CE Preferred)<br>Complete Qualification and Experience Data<br>Certificate of Commitment   | Annex " _ " |
| Project Engineer                       |      |                      |  |  | PRC License (CE Preferred)<br>Complete Qualification and Experience Data<br>Certificate of Commitment   | Annex " _ " |
| Materials Engineer                     |      |                      |  |  | PRC License (CE Preferred)<br>Submit Valid and Renewed DPWH Certificate of Accreditation<br>Submit Accreditation Identification Card as Materials Engineer<br>Complete Qualification and Experience Data<br>Certificate of Commitment | Annex " _ " |
| Construction Safety and Health Officer |      |                      |  |  | Certificate of Safety and Health Construction Related Course issued by DOLE Accredited Trainings<br>Complete Qualification and Experience Data<br>Certificate of Commitment   | Annex " _ " |
| Foreman                                |      |                      |  |  | Complete Qualification and Experience Data<br>Certificate of Commitment   | Annex " _ " |
| Other Position(s)                      |      |                      |  |  | Complete Qualification and Experience Data<br>Certificate of Commitment   | Annex " _ " |

NOTE: 1. Minimum qualification requirements: (work experience is similar in nature and complexity to the project to be bid with regard to Registration Particulars of the Contractor's License)

Project Manager - Five (5) years  
Project Engineer - Three (3) years  
Foreman - Five (5) years

Materials Engineer - One (1) year  
Materials Engineer I - for projects costing up to 100M  
Materials Engineer II - for projects costing more than 100M

\_\_\_\_\_  
Name of Firm/Applicant

\_\_\_\_\_  
Authorized Signing Official

\_\_\_\_\_  
Date

REVISED FORM (September 2012)

## LIST OF CONTRACTOR'S EQUIPMENT UNITS

I hereby declare that the following equipment listed below which are owned, leased or under purchase agreement are in good operating condition and are available for the duration of the project:

| DESCRIPTION<br>(Type, Model,<br>Make) | No. of<br>Unit(s) | Capacity<br>Output<br>2] | Owned, Leased<br>and/or under<br>purchase<br>agreement<br>1] | Submitted Proof of<br>Ownership/Leased/<br>Purchase Agreement<br>(Mark as Annex<br>"A.....Z") | OTHER INFORMATION<br>(As Applicable) |                      |                                |          |        |
|---------------------------------------|-------------------|--------------------------|--|---|--------------------------------------|----------------------|--------------------------------|----------|--------|
|                                       |                   |                          |  |   | Manufacturer                         | Engine<br>Serial No. | Chassis No./<br>Name of Vessel | Location | Status |
|                                       |                   |                          |  |   |                                      |                      |                                |          |        |
|                                       |                   |                          |  |   |                                      |                      |                                |          |        |
|                                       |                   |                          |  |   |                                      |                      |                                |          |        |
|                                       |                   |                          |  |   |                                      |                      |                                |          |        |
|                                       |                   |                          |  |   |                                      |                      |                                |          |        |
|                                       |                   |                          |  |   |                                      |                      |                                |          |        |

1] Indicate if owned or leased as listed in the Checklist/Bidding Documents. For owned equipment, as required, submit proof of ownership (i.e. deed of sale, sales invoice, official receipt). For Water Truck, Dump Truck and Transit Mixer submit LTO Certificate of Registration and valid Official Receipt. For owned barge/tugboat, submit Marina Certificate of Ownership and valid Cargo Ship Safety Certificate. For newly purchased barge/tugboat, submit Deed of Sale together with an application for Marina Certificate of Ownership duly received/authenticated by Marina with corresponding valid Cargo Ship Safety Certificate. For leased equipment, submit duly notarized copy of lease contract together with a copy of the Marina Owner's (Lessor's) Certificate and valid Cargo Ship Safety Certificate.

2] The unit of each equipment shall be as indicated in the Checklist/Bidding Documents, i.e GW (for crane barge), DWT (for deck barge and hopper barge), TON (for crane, road roller and drop hammer), kg.-m/blow (for diesel hammer), cu.m (for dump truck), hp. (for tugboat, road grader, bulldozer and concrete vibrator), cfm (for compressor), gal. (for water truck with pump), amp. (for welding machine), bagger (for concrete mixer).

\_\_\_\_\_  
Name of Firm/Applicant

\_\_\_\_\_  
Authorized Signing Official

\_\_\_\_\_  
Date

REVISED FORM (January 2011)

## OMNIBUS SWORN STATEMENT FOR SOLE PROPRIETORSHIP

REPUBLIC OF THE PHILIPPINES)  
CITY OF \_\_\_\_\_)SS

### AFFIDAVIT

I (Name), of legal age, (Civil Status), (Nationality), and residing at (Address), after having been duly sworn in accordance with law, do hereby depose and state that:

1. I am the sole proprietor or authorized representative of (Name of Bidder) with office address at \_\_\_\_\_;
2. As the owner and sole proprietor or authorized representative of (Name of Bidder), I have full power and authority to do, execute and perform any and all acts necessary to participate, submit the bid, and to sign and execute the ensuing contract for (Name of Project) of the Philippine Ports Authority, (as shown in the attached duly notarized "Special Power of Attorney" for the authorized representative);
3. (Name of Bidder) is not "blacklisted" or barred from bidding by the Government of the Philippines or any of its agencies, offices, corporations, or Local Government Units, foreign government / foreign or international financing institution whose blacklisting rules have been recognized by the Government Procurement Policy Board;
4. Each of the documents submitted in satisfaction of the bidding requirements is an authentic copy of the original, complete, and all statements and information provided therein are true and correct;
5. (Name of Bidder) is authorizing the Head of the Procuring Entity or its duly authorized representative(s) to verify all the documents submitted;
6. The owner or sole proprietor is not related to the Head of Procuring Entity, members of the Bids and Awards Committee (BAC), the Technical Working Group, and the BAC Secretariat, the head of the Project Management office or the end – user unit, and the project consultants by consanguinity or affinity up to the third civil degree;
7. (Name of Bidder) complies with existing labor laws and standards; and
8. (Name of Bidder) is aware of and has undertaken the following responsibilities as a Bidder:
  - a) Carefully examine all of the Bidding Document;
  - b) Acknowledge all conditions, local or otherwise, affecting the implementation of the contract;
  - c) Made an estimate of the facilities available and needed for the contract to be bid, if any; and
  - d) Inquire or secure Supplemental / Bid Bulletin(s) issued for the *Construction of Back-Up Area, Port of Esperanza, Esperanza, Masbate*.

9. (Name of Bidder) did not give or pay directly or indirectly, any commission, amount, fee, or any form of consideration, pecuniary or otherwise, to any person or official, personnel or representative of the government in relation to any procurement project or activity.

IN WITNESS WHEREOF, I have hereunto set my hand this \_\_\_\_ day of \_\_\_\_ 20\_\_ at \_\_\_\_\_, Philippines.

\_\_\_\_\_  
Bidder's Representative / Authorized Signatory

**SUBSCRIBED AND SWORN** to before me this \_\_\_\_ day of [month] [year] at [place of execution], Philippines. Affiant/s is/are personally known to me and was/were identified by me through competent evidence of identity as defined in the 2004 Rules on Notarial Practice (A.M. No. 02-8-13-SC). Affiant/s exhibited to me his/her [insert type of government identification card used], with his/her photograph and signature appearing thereon, with no. \_\_\_\_\_ and his/her Community Tax Certificate No. \_\_\_\_\_ issued on \_\_\_\_ at \_\_\_\_\_.

Witness my hand and seal this \_\_\_\_ day of [month] [year].

**NAME OF NOTARY PUBLIC**

Serial No. of Commission \_\_\_\_\_

Notary Public for \_\_\_\_\_ until \_\_\_\_\_

Roll of Attorneys No. \_\_\_\_\_

PTR No. \_\_\_\_\_ [date issued], [place issued]

IBP No. \_\_\_\_\_ [date issued], [place issued]

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## OMNIBUS SWORN STATEMENT FOR PARTNERSHIP OR COOPERATIVE

REPUBLIC OF THE PHILIPPINES)  
CITY OF \_\_\_\_\_)SS

### AFFIDAVIT

I (Name), of legal age, (Civil Status), (Nationality), and residing at (Address), after having been duly sworn in accordance with law, do hereby depose and state that:

1. I am the duly authorized and designated representative of (Name of Bidder) with office address at (Address);
2. I am granted full power and authority to do, execute and perform any and all acts necessary to participate, submit the bid, and to sign and execute the ensuing contract for (Name of Project) of the Philippine Ports Authority, accompanied by the duly notarized Special Power of Attorney, Board/Partnership Resolution or Secretary's Certificate (whichever is applicable);
3. (Name of Bidder) is not "blacklisted" or barred from bidding by the Government of the Philippines or any of its agencies, offices, corporations, or Local Government Units, foreign government / foreign or international financing institution whose blacklisting rules have been recognized by the Government Procurement Policy Board;
4. Each of the documents submitted in satisfaction of the bidding requirements is an authentic copy of the original, complete, and all statements and information provided therein are true and correct;
5. (Name of Bidder) is authorizing the PPA General Manager or its duly authorized representative(s) to verify all the documents submitted;
6. None of the officers and members of (Name of Bidder) is related to the PPA General Manager, members of the Bids and Awards Committee (BAC), the Technical Working Group, and the BAC Secretariat, the head of the Project Management office or the end-user unit, and the project consultants by consanguinity or affinity up to the third civil degree;
7. (Name of Bidder) complies with existing labor laws and standards; and
8. (Bidder) is aware of and has undertaken the following responsibilities as a Bidder:
  - a) Carefully examine all of the Bidding Document;
  - b) Acknowledge all conditions, local or otherwise, affecting the implementation of the contract;
  - c) Made an estimate of the facilities available and needed for the contract to be bid, if any; and
  - d) Inquire or secure Supplemental / Bid Bulletin(s) issued for the *Construction of Back-Up Area, Port of Esperanza, Esperanza, Masbate*.



9. (Name of Bidder) did not give or pay directly or indirectly, any commission, amount, fee, or any form of consideration, pecuniary or otherwise, to any person or official, personnel or representative of the government in relation to any procurement project or activity.

IN WITNESS WHEREOF, I have hereunto set my hand this \_\_\_\_ day of \_\_\_\_ 20\_\_ at \_\_\_\_\_, Philippines.

\_\_\_\_\_  
Bidder's Representative / Authorized Signatory

**SUBSCRIBED AND SWORN** to before me this \_\_\_\_ day of [month] [year] at [place of execution], Philippines. Affiant/s is/are personally known to me and was/were identified by me through competent evidence of identity as defined in the 2004 Rules on Notarial Practice (A.M. No. 02-8-13-SC). Affiant/s exhibited to me his/her [insert type of government identification card used], with his/her photograph and signature appearing thereon, with no. \_\_\_\_\_ and his/her Community Tax Certificate No. \_\_\_\_\_ issued on \_\_\_\_ at \_\_\_\_\_.

Witness my hand and seal this \_\_\_\_ day of [month] [year].

**NAME OF NOTARY PUBLIC**

Serial No. of Commission \_\_\_\_\_

Notary Public for \_\_\_\_\_ until \_\_\_\_\_

Roll of Attorneys No. \_\_\_\_\_

PTR No. \_\_\_\_\_ [date issued], [place issued]

IBP No. \_\_\_\_\_ [date issued], [place issued]

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## OMNIBUS SWORN STATEMENT FOR CORPORATION OR JOINT VENTURE

REPUBLIC OF THE PHILIPPINES)  
CITY OF \_\_\_\_\_)SS

### AFFIDAVIT

I ( Name ), of legal age, ( Civil Status ), ( Nationality ), and residing at ( Address ), after having been duly sworn in accordance with law, do hereby depose and state that:

1. I am the duly authorized and designated representative of (Name of Bidder) with office address at \_\_\_\_\_;
2. I am granted full power and authority to do, execute and perform any and all acts necessary to participate, submit the bid, and to sign and execute the ensuing contract for (Name of Project) of the Philippine Ports Authority, accompanied by the duly notarized Special Power of Attorney, Board Resolution or Secretary's Certificate;
3. (Name of Bidder) is not "blacklisted" or barred from bidding by the Government of the Philippines or any of its agencies, offices, corporations, or Local Government Units, foreign government / foreign or international financing institution whose blacklisting rules have been recognized by the Government Procurement Policy Board;
4. Each of the documents submitted in satisfaction of the bidding requirements is an authentic copy of the original, complete, and all statements and information provided therein are true and correct;
5. (Name of Bidder) is authorizing the PPA General Manager or its duly authorized representative(s) to verify all the documents submitted;
6. None of the officers, directors, and controlling stockholders of (Name of Bidder) is related to the PPA General Manager, members of the Bids and Awards Committee (BAC), the Technical Working Group, and the BAC Secretariat, the head of the Project Management office or the or end- user unit, and the project consultants by consanguinity or affinity up to the third civil degree;
7. (Name of Bidder) complies with existing labor laws and standards; and
8. (Name of Bidder) is aware of and has undertaken the following responsibilities as a Bidder:
  - a) Carefully examine all of the Bidding Document;
  - b) Acknowledge all conditions, local or otherwise, affecting the implementation of the contract;
  - c) Made an estimate of the facilities available and needed for the contract to be bid, if any; and
  - d) Inquire or secure Supplemental / Bid Bulletin(s) issued for the *Construction of Back-Up Area, Port of Esperanza, Esperanza, Masbate*.

9. (Name of Bidder) did not give or pay directly or indirectly, any commission, amount, fee, or any form of consideration, pecuniary or otherwise, to any person or official, personnel or representative of the government in relation to any procurement project or activity.

IN WITNESS WHEREOF, I have hereunto set my hand this \_\_\_\_ day of \_\_\_\_ 20\_\_ at \_\_\_\_\_, Philippines.

\_\_\_\_\_  
Bidder's Representative / Authorized Signatory

**SUBSCRIBED AND SWORN** to before me this \_\_\_\_ day of [month] [year] at [place of execution], Philippines. Affiant/s is/are personally known to me and was/were identified by me through competent evidence of identity as defined in the 2004 Rules on Notarial Practice (A.M. No. 02-8-13-SC). Affiant/s exhibited to me his/her [insert type of government identification card used], with his/her photograph and signature appearing thereon, with no. \_\_\_\_\_ and his/her Community Tax Certificate No. \_\_\_\_\_ issued on \_\_\_\_ at \_\_\_\_\_.

Witness my hand and seal this \_\_\_\_ day of [month] [year].

**NAME OF NOTARY PUBLIC**

Serial No. of Commission \_\_\_\_\_

Notary Public for \_\_\_\_\_ until \_\_\_\_\_

Roll of Attorneys No. \_\_\_\_\_

PTR No. \_\_\_\_\_ [date issued], [place issued]

IBP No. \_\_\_\_\_ [date issued], [place issued]

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REPUBLIC OF THE PHILIPPINES)  
CITY OF \_\_\_\_\_)S.S.

**BID-SECURING DECLARATION**  
Invitation to Bid No. \_\_\_\_\_

To : Philippine Ports Authority  
Bonifacio Drive, South Harbor,  
Port Area, Manila

I, the undersigned, declare that:

1. I understand that, according to your conditions, bids must be supported by a Bid Security, which may be in the form of a Bid-Securing Declaration.
2. I/We accept that: (a) I/we will be automatically disqualified from bidding for any contract with any procuring entity for a period of two (2) years upon receipt of your Blacklisting Order; and, (b) I/we will pay the applicable fine provided under Section 6 of the Guidelines on the Use of Bid Securing Declaration, within fifteen (15) days from receipt of the written demand by procuring entity for the commission of acts resulting to the enforcement of the bid securing declaration under Sections 23.1 (b), 34.2, 40.1 and 69.1, except 69.1(f), of the IRR of RA 9184; without prejudice to other legal action the government may undertake:
3. I understand that this Bid-Securing Declaration shall cease to be valid on the following circumstances:
  - (a) Upon expiration of the bid validity period, or any extension thereof pursuant to your request;
  - (b) I am declared ineligible or post-disqualified upon receipt of your notice to such effect, and (i) I failed to timely file a request for reconsideration or (ii) I filed a waiver to avail of said right;
  - (c) I am declared as the bidder with the Lowest Calculated Responsive Bid, and I have furnished the performance security and signed the Contract.

IN WITNESS WHEREOF, I have hereunto set my hand this \_\_\_\_\_ day of \_\_\_\_\_ 20 \_\_\_\_ at \_\_\_\_\_, Philippines.

\_\_\_\_\_  
Name of Bidder's Authorized Representative  
(Signatory's Legal Capacity)  
AFFIANT

**SUBSCRIBED AND SWORN** to before me this \_\_\_\_ day of *[month]* *[year]* at *[place of execution]*, Philippines. Affiant/s is/are personally known to me and was/were identified by me through competent evidence of identity as defined in the 2004 Rules on Notarial Practice (A.M. No. 02-8-13-SC). Affiant/s exhibited to me his/her *[insert type of government identification card used]*, with his/her photograph and signature appearing thereon, with no. \_\_\_\_\_.

Witness my hand and seal this \_\_\_\_ day of *[month]* *[year]*.

**NAME OF NOTARY PUBLIC**

Serial No. of Commission \_\_\_\_\_  
Notary Public for \_\_\_\_\_ until \_\_\_\_\_  
Roll of Attorneys No. \_\_\_\_\_  
PTR No. \_\_, *[date issued]*, *[place issued]*  
IBP No. \_\_, *[date issued]*, *[place issued]*  
Doc. No. \_\_\_\_  
Page No. \_\_\_\_  
Book No. \_\_\_\_  
Series of \_\_\_\_.

## CONSTRUCTION METHODOLOGY

Name of Project : \_\_\_\_\_  
Proposed Project Description : \_\_\_\_\_  
Location : \_\_\_\_\_

### MINIMUM SCOPE OF CONSTRUCTION METHODOLOGY

#### A. CONSTRUCTION OF RC BACK-UP AREA (Area = 7,159.50 sq.m)

1. Chipping of existing rc curb, flush to deck level and smoothened with mortar (13 l.m.) and existing deflector wall (9 cu.m.)
2. Construction of rock bulkhead (3,365 cu.m.), fill materials (35,291 cu.m.), reinforced concrete retaining walls, anchor wall, mooring block and rc curb (577 cu.m. of concrete and 60,657 kgs of reinforcing bars of various sizes)
3. Construction of Portland Cement Concrete Pavement (PCCP, 250mm thk. – 7,070 sq.m.), including aggregate base course (1,414 cu.m.)
4. Supply and install geotextile fabric (2,350 sq.m.)
5. Supply and drive of concrete piles (0.35m x 0.60m PSC sheet pile – 4,240 l.m., 0.40m x 0.40m anchor piles – 630 l.m. and rc corner sheet piles – 32 l.m.), including chipping and cutting of newly driven piles up to required elevation (302 pcs)
6. Supply and place of anchor blocks (12 pcs) and concrete blocks (163 cu.m.), including gravel bedding (5 cu.m.)
7. Supply and install tie-rod of various sizes (12 sets – 32mmØ x 12m, 68 sets – 60mmØ x 14m and 1 set – 60mmØ x 2.5m)
8. Supply and install rubber dock fenders, V-type, 500H x 1,500L (6 sets) and mooring bollards, 35 tons, T-head (6 sets)

#### B. PORT LIGHTING SYSTEM

1. Supply and installation of single angle bar steel tapered lamp post, 6.00m ht., hot dipped galvanized (3 sets) with 100 watt LED floodlight fixture (6 sets)

#### NOTES:

The narrative construction method will guide and familiarize the contractor and the PPA on how the project shall be carried out in accordance with the highest standard of workmanship.

The construction method shall be consistent with the Bar Chart / S-Curve Schedule, Equipment Schedule and Manpower Schedule.

\_\_\_\_\_  
Signature  
(Authorized Signing Official)

**MANPOWER SCHEDULE**

Name of Project : \_\_\_\_\_

Proposed Project Description : \_\_\_\_\_

Location : \_\_\_\_\_

| MANPOWER<br>(Minimum)                    | CONTRACT DURATION (_____ Calendar Days) |   |   |   |   |   |   |   |   |    |    |    |    |    |
|--|---|---|---|---|---|---|---|---|---|----|----|----|----|----|
|  | M O N T H L Y                           |   |   |   |   |   |   |   |   |    |    |    |    |    |
|  | 1                                       | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 11 | 12 | 13 | 14 |
| Project Manager                          |   |   |   |   |   |   |   |   |   |    |    |    |    |    |
| Project Engineer                         |   |   |   |   |   |   |   |   |   |    |    |    |    |    |
| Materials Engineer                       |   |   |   |   |   |   |   |   |   |    |    |    |    |    |
| Construction Safety and Health Officer   |   |   |   |   |   |   |   |   |   |    |    |    |    |    |
| Foreman                                  |   |   |   |   |   |   |   |   |   |    |    |    |    |    |
| Specify other applicable positions, ie.: |   |   |   |   |   |   |   |   |   |    |    |    |    |    |
| - Carpenter                              |   |   |   |   |   |   |   |   |   |    |    |    |    |    |
| - Steelman                               |   |   |   |   |   |   |   |   |   |    |    |    |    |    |
| - Mason                                  |   |   |   |   |   |   |   |   |   |    |    |    |    |    |
| - Electrician                            |   |   |   |   |   |   |   |   |   |    |    |    |    |    |
| - Rigger                                 |   |   |   |   |   |   |   |   |   |    |    |    |    |    |
| - Others                                 |   |   |   |   |   |   |   |   |   |    |    |    |    |    |

\_\_\_\_\_  
Signature  
(Authorized Signing Official)





## CASHFLOW BY QUARTER AND PAYMENT SCHEDULE

Name of Project: \_\_\_\_\_

Proposed Project Description: \_\_\_\_\_

Location: \_\_\_\_\_

| Project Duration<br>(days or months) | Payment Schedule<br>(Monthly, in Pesos) | Cash flow<br>(Quarterly, In Pesos) |
|--------------------------------------|---|------------------------------------|
|                                      |   |                                    |
|                                      |   |                                    |
|                                      |   |                                    |
|                                      |   |                                    |
|                                      |   |                                    |
|                                      |   |                                    |
|                                      |   |                                    |
|                                      |   |                                    |
|                                      |   |                                    |
|                                      |   |                                    |
|                                      |   |                                    |
|                                      |   |                                    |
|                                      |   |                                    |
|                                      |   |                                    |
|                                      |   |                                    |
| <b>TOTAL</b>                         |   |                                    |

### NOTES

- The cash flow by quarter and payment schedule should be consistent with the Bar Chart and S-curb.
- Payment schedule shall not be more than once a month.

\_\_\_\_\_  
Signature  
(Authorized Signing Official)

**SECTION X**  
**CONTRACT FORM**

Republic of the Philippines  
**PHILIPPINE PORTS AUTHORITY**  
PPA Building, Bonifacio Drive, South Harbor,  
Port Area, Manila, Philippines

**C O N T R A C T**  
**FOR THE CONSTRUCTION OF BACK-UP AREA**  
**PORT OF ESPERANZA, ESPERANZA, MASBATE**

KNOW ALL MEN BY THESE PRESENTS:

This Contract, made and entered into this \_\_\_\_\_ day of \_\_\_\_\_, 20\_\_\_\_, in Manila, Philippines, by and between:

**PHILIPPINE PORTS AUTHORITY**, a government instrumentality created under Presidential Decree No. 857, as amended, with principal office at PPA Building, Bonifacio Drive, South Harbor, Port Area, Manila, represented herein by its duly authorized General Manager, **JAY DANIEL R. SANTIAGO**, and hereinafter referred to as "**PPA**";

- and -

\_\_\_\_\_, a corporation duly organized and existing in accordance with Philippine laws, with office and business address \_\_\_\_\_, represented in this act by \_\_\_\_\_, duly authorized for this purpose, as evidenced by Secretary's Certificate \_\_\_\_\_, a copy of which is hereto attached and made an integral part hereof as Annex "A", and hereinafter referred to as "**CONTRACTOR**"

**W I T N E S S E T H:**

WHEREAS, in accordance with Republic Act No. 9184 and its Implementing Rules and Regulations, PPA advertised and published in a newspaper of general circulation and posted on the PPA website and G-EPS as well as in its bulletin board, an Invitation to Bid for the *Construction of Back-Up Area, Port of Esperanza, Esperanza, Masbate*;

WHEREAS, the **CONTRACTOR** and other prospective bidders submitted their respective bids for the foregoing project;

WHEREAS, after the opening of bids on \_\_\_\_\_, and the conduct of bid evaluation and required post-qualification, the bid submitted by the **CONTRACTOR** at its unit and lump sum prices set forth in its proposal was found to be the Lowest Calculated Responsive Bid in the amount of \_\_\_\_\_ (P \_\_\_\_\_), Philippine Currency;

WHEREAS, pursuant to Head Office BAC Resolution No. \_\_\_\_\_ Series of \_\_\_\_\_, award of the contract was made to the **CONTRACTOR** in a Notice of Award dated \_\_\_\_\_, in the amount of \_\_\_\_\_ (P \_\_\_\_\_), after submission of the required documents within the prescribed period and compliance to the conditions stipulated in the IRR;

WHEREAS, the **CONTRACTOR** duly accepted the award by signing its Conforme on the said Notice of Award;

NOW, THEREFORE, for and in consideration of the foregoing premises and the mutual covenants, stipulations and agreements herein contained, the PPA and the **CONTRACTOR** have agreed, as they do hereby agree, and contract as follows:

## ARTICLE I

### CONTRACT DOCUMENTS

1.01 The following documents shall constitute integral parts of this Contract, as fully as if the contents of the said documents are reproduced, incorporated and set forth herein, and shall govern and control in full force and effect the rights and obligations of the Parties, except as otherwise modified by the terms and conditions of this Contract, or by mutual agreement in writing of both parties, to wit:

- a. Contract Agreement
- b. Bidding Documents
- c. Winning bidder's bid, including the Eligibility requirements, Technical and Financial Proposals and all other documents / statements submitted
- d. Performance Security
- e. Notice of Award of Contract; and
- f. Other contract documents that may be required by existing laws and the PPA such as:
  - (1) Construction Schedule and S-Curve
  - (2) Manpower Schedule
  - (3) Construction Methods
  - (4) Equipment Utilization Schedule
  - (5) Construction Safety and Health Program approved by the DOLE
  - (6) Pert / CPM
  - (7) Duty Approved Program of Work and Cost Estimates
  - (8) Certificate of Availability of Funds
  - (9) Abstract of Bids
  - (10) Resolution of Award

1.02 All Contract documents are and shall remain as the property of the PPA.

1.03 The words and expressions in this Contract shall have the same meanings respectively assigned to them in the Contract Documents referred to above.

## ARTICLE II

### CONTRACTOR'S UNDERTAKING SCOPE OF WORK

2.01 The CONTRACTOR, in consideration of the payment to be made by the PPA to the CONTRACTOR, as stated in the Contract Documents and this Contract, the latter hereby covenants to execute and complete the *Construction of Back-Up Area, Port of Esperanza, Esperanza, Masbate*; in conformity in all respects with the provisions of this Contract, as follows:

| ITEMS                           | TOTAL AMOUNT |
|---------------------------------|--------------|
| 1. General Expenses             | P            |
| 2. Construction of Back-up Area | P            |
| 3. Port Lighting System         | P            |
| 4. Reimbursable Items           | P            |
| <b>TOTAL AMOUNT</b>             | <hr/> P      |

2.02 The CONTRACTOR agrees to commence, perform and complete the work called for and defined in this Contract at its sole cost and expense, and to fully and faithfully furnish all materials, tools, labor supplies, equipment, services and superintendence for the implementation of this Contract in accordance with the schedule in the Contract Documents forming integral parts of this Contract.

2.03 The CONTRACTOR guarantees, among others, that all tools, equipment, machineries, instruments, accessories and materials it will supply or deliver or install and/or use in the construction and workmanship of all his work under the Contract, shall be brand new and in accordance with the Contract Documents.

2.04 The CONTRACTOR recognizes the position of trust and confidence reposed in it under this Contract, and agrees to perform its obligations hereunder in the most efficient and competent manner, use its skill and good judgment, always set in good faith, and carry out the execution of this Contract in the most sound, expeditious and economical manner consistent with the interest of the PPA.

### ARTICLE III

#### CONSIDERATION

3.01 For and in consideration of the full, satisfactory and faithful performance by the CONTRACTOR of all its undertakings defined in and provided for under this Contract and Contract Documents, the PPA agrees to pay the CONTRACTOR the total amount not exceeding (P \_\_\_\_\_),

Philippine Currency, inclusive of the 12% value added tax, payment to be made and computed on the basis of final quantities at the unit bid price for each item of work actually performed and finished for each pay item as determined and accepted by PPA and in the manner set forth in the Contract Documents, as full compensation for everything furnished and done by the CONTRACTOR under this Contract, including all works required but not specifically mentioned, and also for all losses and damages to the CONTRACTOR arising out of the work aforesaid, from the action of the elements, or from any obstruction or difficulty encountered in the prosecution of this Contract, for all expenses incurred by or in consequence of the suspension or discontinuance of the contract herein specified and for faithfully completing the contract and the whole thereof, at the time and in the manner provided in the Contract Documents.

It is agreed and understood that all bid prices specified in this contract shall be considered as fixed prices, and therefore not subject to price adjustment and escalation during the contract implementation, except under extraordinary circumstances and upon prior approval of the Government Procurement Policy Board (GPPB) or when a Treaty or International or Executive Agreement Expressly allows it. Any request for price escalation under extraordinary circumstances shall be submitted by PPA to the National Economic and Development Authority (NEDA). Extraordinary circumstances shall refer to events that may be determined by the NEDA in accordance with the Civil Code of the Philippines and upon recommendation of the PPA.

3.02 Final and full payment of the consideration herein above-mentioned shall be upon full completion of the project and fulfillment by the CONTRACTOR of all the terms and conditions set forth in this Contract.

However, it is agreed that no payment or payments made under this Contract, except the final payment upon issuance of Certificate of Completion and Acceptance, shall be understood as performance of this Contract, either wholly or in part, and no payment shall be construed to be an acceptance of defective work or improper implementation thereof.

3.03 Any payment due and payable to the CONTRACTOR may be set off against liquidated damages payable to the PPA by the CONTRACTOR under this Contract.

3.04 It is likewise understood that the CONTRACTOR shall show proof evidencing payments by the CONTRACTOR of labor, materials, supplies, insurance premiums, etc., used in the work, before any payment is made to it.

For this purpose, the CONTRACTOR shall, before payment is made on the works accomplished, submit an affidavit certifying to the fact of payments of said labor, materials, supplies, equipment, insurance premiums, etc.

3.05 All payments shall be subject to existing government accounting and auditing rules and regulations.

3.06 Progress payments are subject to retention of ten percent (10%) referred to as the "retention money". Such retention shall be based on the total amount due to the contractor prior to any deduction and shall be retained from every progress payment until fifty percent (50%) of the value of works, as determined by the PPA are completed. If, after fifty percent (50%) completion, the work is satisfactorily done and on schedule, no additional retention shall be made; otherwise, the ten percent (10%) retention shall be imposed.

3.07 The total "retention money" shall be due for release upon final acceptance of the works. The CONTRACTOR may, however, request for the substitution of the retention money for each progress billing with irrevocable standby letters of credit from a Universal or Commercial Bank, of amounts equivalent to the retention money substituted for and acceptable to PPA, provided that the project is on schedule and is satisfactorily undertaken. Otherwise, the ten percent (10%) retention shall be made. Said irrevocable standby letters of credit to be posted in favor of PPA shall be valid for a duration to be determined by PPA and will answer for the purpose for which the ten percent (10%) retention is intended, i.e., to cover uncorrected discovered defects and third party liabilities.

#### ARTICLE IV

#### PERFORMANCE SECURITY

4.01 To guarantee the faithful performance of the CONTRACTOR of its obligations under this Contract, it shall post prior to the signing of the Contract a performance security in the form of irrevocable letter of credit issued by a Universal or Commercial Bank, and acceptable to PPA or a combination thereof as may be required by PPA, in accordance with the following schedule:

- |    |  |   |
|----|--|---|
| a. | Irrevocable, letter of credit issued by a Universal or Commercial Bank | - Ten Percent (10%) of the total contract price                           |
| b. | any combination of the foregoing                                       | - Proportionate to share of form with respect to total amount of security |

4.02 This performance security shall be denominated in Philippine Pesos and posted in favor of PPA, and shall be forfeited in favor of PPA in the event it is established that the CONTRACTOR is in default in any of its obligations under this Contract.

4.03 Subject to the conditions of the Contract, the performance security may be released by PPA after the issuance of the Certificate of Acceptance of the project, provided that PPA has no claims filed against the CONTRACTOR or the surety company and there are no claims for labor and materials filed against the contractor.

4.04 The CONTRACTOR shall post an additional performance security following the schedule above to cover any cumulative increase of more than ten percent (10%) over the original value of the contract as a result of amendments to order or change orders, extra work orders and supplemental agreements as the case may be. The CONTRACTOR shall cause the extension of the validity of the performance security to cover approved contract time extensions.

4.05 In case of a reduction in the contract value or for partially completed works under this contract which are usable and accepted by PPA, and the use of which in the judgment of PPA shall not affect the structural integrity of the entire project, PPA may allow a proportional reduction in the original performance security, provided that any such reduction is more than ten percent (10%) and that the aggregate of such reductions is not more than fifty percent (50%) of the original performance security.

## ARTICLE V

### COMPLETION TIME: LIQUIDATED DAMAGES

5.01 The CONTRACTOR agrees and obligates itself to perform and complete all works provided for in this Contract within \_\_\_\_\_ calendar days (including Sundays and Holidays), reckoned not later than seven (7) calendar days from issuance of the Notice to Proceed. Notice to Proceed shall be issued after this Contract has been signed by the Parties hereof.

5.02 Time is of the essence of this Contract. Should the CONTRACTOR refuse or fail to satisfactorily complete the work within the specified contract time, plus any time extension duly granted and is hereby in default under the contract, the CONTRACTOR shall pay the PPA for liquidated damages, and not by way of penalty, an amount as provided in the conditions of contract, equal to at least one-tenth (1/10) of one (1) percent of the cost of the unperformed portion of the works for everyday of delay.

5.03 The project or a portion thereof may be deemed usable when it starts to provide the desired benefits as certified by the Facilities Construction and Maintenance Department of PPA.

5.04 It is understood that the damages herein provided are fixed and agreed liquidated damages and to be entitled to such damages, PPA does not have to prove that it has incurred actual damages. Such amount shall be deducted from any money due or which may become due the CONTRACTOR under the contract and/or collect such liquidated damages from the retention money or other securities posted by the CONTRACTOR, whichever is convenient to PPA.

5.05 In case that the delay in the completion of the work exceed a time duration equivalent to ten percent (10%) of the specified contract time plus any time extension duly granted to the CONTRACTOR, PPA may rescind the contract, forfeit the CONTRACTOR's performance security and take over the prosecution of the project or award the same to a qualified contractor through negotiated contract.

5.06 In no case, however, shall the total sum of liquidated damages exceed ten percent (10%) of the total contract price, in which event the contract shall automatically be taken over by PPA or award the same to a qualified contractor through negotiation and the erring CONTRACTOR's performance security shall be forfeited. The amount of the forfeited performance security shall be aside from the amount of the liquidated damages that the CONTRACTOR shall pay PPA under Section 5.02 hereof and impose other appropriate sanctions.

## ARTICLE VI

### EXTENSION OF CONTRACT TIME

6.01 Should the amount of additional work of any kind or other special circumstances of any kind whatsoever occur such as to fairly entitle the CONTRACTOR to an extension of contract time, PPA shall determine the amount of such extension; provided that PPA is not bound to take into account any claim for an extension of time unless the contractor has prior to the expiration of the contract time and within thirty (30) calendar days after such work has been commenced or after the circumstances leading to such claim have arisen, delivered to PPA notices in order that it could have investigated them at that time. Failure to provide such notice shall constitute a waiver by the CONTRACTOR of any claim. Upon receipt of full and detailed particulars, PPA shall examine the facts and extent of the delay and

shall extend the contract time for completing the contract work when, in PPA's opinion, the findings of facts justify an extension.

6.02 No extension of contract time shall be granted the CONTRACTOR due to (a) ordinary unfavorable weather conditions; and (b) inexcusable failure or negligence of CONTRACTOR to provide the required equipment, supplies or materials.

6.03 Extension of contract time may be granted only when the affected activities fall within the critical path of the PERT/CPM network.

6.04 No extension of contract time shall be granted when the reason given to support the request for extension was already considered in the determination of the original contract time during the conduct of detailed engineering and in the preparation of the contract documents as agreed upon by the parties before contract perfection.

6.05 Extension of contract time shall be granted for rainy/unworkable days considered unfavorable for the prosecution of the works at the site, based on the actual conditions obtained at the site, in excess of the number of rainy/unworkable days predetermined by the PPA in relation to the original contract time during the conduct of detailed engineering and in the preparation of the contract documents as agreed upon by the parties before contract perfection and/or for the equivalent period of delay due to major calamities such as exceptionally destructive typhoons, floods and earthquakes, and epidemics, and for causes such as non-delivery on time of materials, working drawings, or written information to be furnished by the PPA, non-acquisition of permit to enter private properties within the right-of-way resulting in complete paralization of construction activities, and other meritorious causes as determined by the PPA's authorized Engineer and approved by the PPA. Shortage of construction materials, general labor strikes, and peace and order problems that disrupt construction operations through no fault of the CONTRACTOR may be considered as additional grounds for extension of contract time provided they are publicly felt and certified by appropriate government agencies such as DTI, DOLE, DILG and DND, among others. The written consent of bondsmen must be attached to any request of the CONTRACTOR for extension of contract time and submitted to the PPA for consideration and that the validity of the performance security shall be correspondingly extended.

## ARTICLE VII

### ENTIRE CONTRACT

7.01 Provisions to the contrary notwithstanding, it is agreed that this is an entire contract for one whole complete work and that partial payments on account by the PPA or the use of parts of the work or equivalent shall not constitute an acceptance of any part of the work before its entire completion and final acceptance in writing by the PPA.

## ARTICLE VIII

### CONTRACTOR'S LIABILITY

8.01 The Parties, likewise, hereby agree that the employees of the CONTRACTOR are not employees of the PPA; hence, the PPA shall not in any way be liable or responsible for any personal injury or damages including death sustained or caused by any of the employees of the CONTRACTOR and/or his sub-contractor or agent or supplier whether or not occurring during the performance of their duties. The CONTRACTOR agrees and binds itself to indemnify the PPA for whatever injuries or damages caused or occasioned or contributed to by the failure, negligence or conduct of the CONTRACTOR and/or its employees, sub-contractors, agent and supplier or consultants arising out of or in connection with or on the occasion of the performance of this Contract. The CONTRACTOR shall, at all times, stand solely liable and/or responsible for the enforcement of, and compliance with all existing laws, rules and regulations and binds itself to save and hold the PPA free and harmless from



any and all liability in respect thereof and/or arising therefrom and/or by reason of this Contract and its implementation.

## ARTICLE IX

### RESPONSIBILITY OF THE CONTRACTOR

9.01 The CONTRACTOR shall assume full responsibility for the entire contract work until its final acceptance by the PPA and shall be held responsible for any damage or destruction of works until such final acceptance.

9.02 The CONTRACTOR shall be fully responsible for the safety, protection, security and convenience of its personnel, third parties and the public at large, as well as the works, equipment, installation and the like to be affected by the construction work.

9.03 Any actionable act or acts of \_\_\_\_\_ arising out of or in the course of this Contract shall be understood and binding as an act of \_\_\_\_\_ and vice-versa.

## ARTICLE X

### INSPECTION AND CONSTRUCTION OF CONTRACT WORK

10.01 Inspection of the contract work shall be made by the PPA while such contract work is in progress to ascertain that the completed works or stages comply in all respects, with the standards and requirements set forth in the Contract Documents. Notwithstanding such inspection, the CONTRACTOR shall be held responsible for the acceptability of the finished works. The CONTRACTOR shall promptly correct all works determined by the PPA as failing to meet requirements, at CONTRACTOR's own expense.

## ARTICLE XI

### NON-ASSIGNMENT AND NO SUBCONTRACT

11.01 The CONTRACTOR shall not, without the written approval of the PPA, assign, transfer, pledge, sub-contract, or make any other disposition of interest in this Contract. Any unapproved assignment, transfer, pledge, sub-contract or any other disposition, shall be sufficient ground for the PPA to terminate or cancel this Contract motu proprio without need of judicial action pursuant to Section 19.04 hereof. Should the PPA give its written approval, such consent shall not relieve the CONTRACTOR of its responsibilities under the Contract. The CONTRACTOR shall ensure that the terms and conditions of any such sub-contract shall comply and conform with the terms and conditions of the Contract. The CONTRACTOR shall be responsible for the observance by any such sub-contractor of the terms and conditions of the Contract.

11.02 If any portion of the project sub-contracted is not prosecuted faithfully in accordance with the Contract, the sub-contractor shall be removed or replaced immediately upon the written request of the PPA, provided, however, that any failure of PPA to make such a request shall not relieve the CONTRACTOR of its obligations under the contract. PPA shall not be responsible for the delays or costs incurred by the CONTRACTOR because of the disapproval or removal of the sub-contractor or because of the late submittal of its or his approval.

## ARTICLE XII

### INSURANCE

12.01 The CONTRACTOR shall, prior to the commencement of work, secure the standard CONTRACTOR's all risk insurance (CARI) from the Government Service Insurance System (GSIS) or

any insurance company duly certified by the Insurance Commission as authorized to issue such insurance, to insure the works against all losses or damages arising from whatever cause for which the CONTRACTOR is responsible under the Contract.

### ARTICLE XIII

#### WARRANTY

13.01 The CONTRACTOR shall assume full responsibility for the contract work from the time project construction commenced up to final acceptance thereof by the PPA and shall be held responsible for any damage or destruction of the works, except those occasioned by force majeure. The CONTRACTOR shall be responsible for the safety, protection, security, and convenience of its personnel, third parties, and the public at large, as well as the works, equipment, installation and the like to be affected by the construction work.

13.02 The defect liability period for the project covered by this Contract shall be one (1) year from project completion up to final acceptance thereof by the PPA. During this period, the CONTRACTOR shall undertake and complete the repair works, at its own expense, of any damage to the said project within NINETY (90) DAYS from the time the PPA General Manager or his duly authorized representative has issued an order to undertake repair. In case of failure or refusal to comply with this order, PPA shall undertake such repair works and the CONTRACTOR shall fully reimburse the former for all the expenses incurred therein upon demand.

13.03 After final acceptance of the project by the PPA, the CONTRACTOR shall be responsible for structural defects and/or failure of the said project within the period of FIFTEEN (15) YEARS from the date of final acceptance thereof by the PPA. For this purpose, the CONTRACTOR shall put up a warranty security in the form of letter of credit issued by a Universal or Commercial Bank or Bank guarantee confirmed by a Universal or Commercial Bank and acceptable to PPA in accordance with the following schedule:

- |  |   |
|--|---|
| a. Letter of Credit issued by a<br>Universal or Commercial Bank  | - Five percent (5%) of the total contract price |
| b. Bank guarantee confirmed by a<br>Universal or Commercial Bank | - Ten percent (10%) of the total contract price |

The warranty security shall be denominated in Philippine Pesos, remain effective for one (1) year from the date of issuance of the Certificate of Final Acceptance by PPA and be returned only after the lapse of the said one (1) year period.

### ARTICLE XIV

#### TAXES, LICENSES, PERMITS AND FEES

14.01 The CONTRACTOR's tax, licenses, permits, fees and all other taxes, fees or charges of whatever form, kind or nature due or which may be due to the national and/or local government units and/or its instrumentalities/agencies on account of the performance and completion of the work stipulated herein, fees for the testing of materials and samples and fees for the testing and inspection of the installation by all agencies having jurisdiction and all necessary and incidental expenses relative thereto including preparation of documents and notarial fees shall be paid for and obtained by the CONTRACTOR on its own account. Should the PPA be compelled to advance the same, PPA is hereby authorized to deduct the amount advanced from whatever amount due the CONTRACTOR from PPA.

14.02 The CONTRACTOR shall pay taxes in full and on time and that failure to do so shall entitle PPA to suspend payment to the CONTRACTOR. Further, the CONTRACTOR shall during the term of this Contract regularly present to PPA a tax clearance from the Bureau of Internal Revenue (BIR) as well as a copy of its income and business tax returns duly stamped and received by the BIR and duly validated with the tax payments made thereon.

## ARTICLE XV

### AGREEMENT MODIFICATION

15.01 No modification, alteration or waiver of any provision herein contained shall be binding on the Parties hereto unless evidenced by a written amendment signed by the parties hereof.

15.02 A variation order (change order/extra work order) may be issued by PPA under the conditions set forth in the applicable provisions of Republic Act No. 9184 and its Implementing Rules and Regulations.

15.03 The PPA may, at any time by written order and without notice to the Sureties, direct the CONTRACTOR to perform additional/extra work necessary to and within the General Scope of the project as bid and awarded. The CONTRACTOR shall be paid for additional/extra work items whose unit prices shall be derived based on the following:

- a. For additional/extra works duly covered by change orders involving work items which are exactly the same or similar to those in the original contract, the applicable unit prices of work items in the original contract shall be used.
- b. For additional/extra works duly covered by Extra Work Orders involving new work items that are not in the original contract, the unit prices of the new work items shall be based on the direct unit costs used in the original contract (e.g. unit cost of cement, rebars, form lumber, labor rate, equipment rental, etc.). All new components of the new work item shall be fixed prices, provided the same is acceptable to both PPA and the CONTRACTOR, and provided further that the direct unit costs of new components shall be based on the CONTRACTORS's estimate as validated by PPA via documented canvass in accordance with existing rules and regulations. The direct cost of the new work item shall then be combined with the mark-up factor (i.e., taxes and profit) used by the contractor in his bid to determine the unit price of the new work item.

15.04 Request for payment by the CONTRACTOR for any extra work shall be accompanied by a statement, with the approved supporting forms, giving a detailed accounting and record of amount for which he claims payment. Said request for payment shall be included with the CONTRACTOR's statement of progress payment.

## ARTICLE XVI

### SUSPENSION OF WORK

16.01 The PPA or its duly authorized representative shall have the authority to suspend the work wholly or partly by written order for such period as may be deemed necessary, due to force majeure or any fortuitous events or for failure on the part of the CONTRACTOR to correct bad conditions which are unsafe for workers or for the general public to carry out valid orders given by PPA or to perform any provisions of the Contract, or due to adjustment of plans to suit field conditions as found necessary during construction. The CONTRACTOR shall immediately comply with such order to suspend the work wholly or partly.

In case of total suspension, or suspension of activities along the critical path, which is not due to any fault of the CONTRACTOR, the elapsed time between the effective order of suspending operation and the order to resume work shall be allowed the CONTRACTOR by adjusting the contract time accordingly.

## ARTICLE XVII

### INDIVISIBILITY OF OBLIGATION

17.01 It is the intent of the Contract that all the documents, annexes and addenda forming part hereof, shall be read together and that each and every provision or stipulation hereof be given full force, effect and applicability. However, in the event that one or more provisions or stipulations herein be declared null and void by the courts, or otherwise rendered ineffective, the remaining provisions and stipulations shall not be affected thereby.

## ARTICLE XVIII

### ARBITRATION/REMEDY AND RELIEF

18.01 Should there be any dispute or difference of any kind whatsoever which shall arise between the parties in connection with the implementation of this Contract, the Parties hereto shall make every effort to resolve amicably such dispute or difference by mutual consultation. In the event that such dispute or disagreement be not resolved to their mutual satisfaction, the matter shall be submitted to arbitration in the Philippines according to the provisions of Republic Act No. 876, otherwise known as the "Arbitration Laws" and Republic Act No. 9285; otherwise known as the "Alternative Dispute Resolution Act of 2004". Provided, however, that disputes that are within the competence of the Construction Industry Arbitration Commission to resolve shall be submitted thereto. Provided, further, that, by mutual agreement, the parties hereto may agree in writing to resort to other alternative modes of dispute resolution. Provided, finally, that the arbitration proceeding shall be without prejudice to the right of PPA to rescind or terminate this contract in accordance with Article XIX, Section 19.04 hereof.

18.02 Should the PPA be constrained to resort to court action to enforce or safeguard its rights and interests under this Contract, the CONTRACTOR shall be liable to the PPA for attorney's fees in an amount equivalent to Twenty Percent (20%) of the total sum claimed in the complaint, exclusive of other damages and the expenses of litigation. Venue of all court actions in connection with or arising out of this contract shall be laid exclusively in the proper court of the City of Manila.

18.03 It is clearly understood that in case a dispute or disagreement arises between the PPA and the CONTRACTOR regarding the manner by which the latter is performing works, the CONTRACTOR shall follow the instruction of the PPA relative thereto, otherwise, it shall have no right to ask for arbitration or go to court for relief.

## ARTICLE XIX

### OTHER COVENANTS

19.01 It is expressly agreed and understood that in case of irreconcilable conflict between the provisions of this Contract and the provisions of any of the contract documents, the former shall be controlling.

19.02 It should also be clearly understood that any payment or failure of the PPA to demand compliance with any of the terms and conditions of this Contract or any act of liberality on the part of the PPA shall not be construed or considered as a waiver on the part of the PPA for the enforcement of this Contract, nor shall it relieve the CONTRACTOR of any of its obligations provided thereunder.

19.03 Under no circumstances shall the PPA be held liable for the payment of any extra work, or extra cost of work, change of work, or change order undertaken without the prior written approval of the PPA to perform said work.

19.04 Notwithstanding any provision to the contrary, the PPA has the right to terminate, cancel and/or rescind this Contract *motu proprio*, in case of breach thereof by the CONTRACTOR, without need of judicial action by giving at least TEN (10) Days written Notice to that effect to the CONTRACTOR, which Notice shall be final and binding on all the parties. In such event, the PPA may take over and continue the project, and the contracts and agreements entered into by the CONTRACTOR with third parties, which the PPA in its discretion, may want to assume are hereby conclusively deemed assigned to the PPA. For this purpose, the CONTRACTOR here agrees and obligates itself to incorporate or cause to be incorporated in any contract or agreement with third parties, as same is connected with or related to the performance of any or all of the CONTRACTOR's obligations and undertakings hereunder, a stipulation providing for its assignability to and assumption by the PPA, at the option of the PPA. It is further agreed and understood that upon receipt of the Notice mentioned above, the CONTRACTOR cannot remove, withdraw or pull-out any of the equipment, machineries, tools, materials, and/or supplies brought to the project site without the written approval of the PPA.

Within thirty (30) days after termination, cancellation or rescission of this Contract, the Parties shall settle their respective accountabilities as of the date of termination, cancellation or rescission, including the refund of any and all advances made plus legal interest from date of receipt of the amount or amounts advanced.

19.05 It is expressly agreed that whenever the CONTRACTOR is behind schedule in its contract work and incurs ten (10%) percent or more negative slippage based on its approved PERT/CPM, the PPA may undertake the whole or portion of the unfinished work by administration or by negotiation through another qualified CONTRACTOR.

Whenever a work activity in the project is not being done on schedule per approved PERT/CPM, the PPA shall notify and direct the CONTRACTOR to immediately undertake such work activity. If within fifteen (15) days from receipt of such notice, the CONTRACTOR fails to start work and to show a satisfactory performance, PPA may take over the whole or portion of such work and have such work done by administration or award the same to another qualified contractor through negotiated contract at the current valuation price.

19.06 The PPA has the right to require the CONTRACTOR to supply and provide the required tools, materials, supplies, equipment, facilities, and to increase the number of workers assigned to the work when exigencies of the service so require. Should the CONTRACTOR fail, refuse or neglect to comply with the same, PPA shall have the option to take over the project in whole or in part or award the same to another CONTRACTOR through negotiated contract at the current valuation price. Any increase in cost which the PPA may incur as a result of its take-over of the project pursuant to Sections 19.04, 19.05 and 19.06 shall be borne by and charged to the CONTRACTOR.

19.07 The CONTRACTOR shall provide and do everything necessary to perform its obligations under this Contract according to the true intent and meaning of all the Contract Documents taken together, whether the same may or may not be shown or described particularly in the drawings, plans and specifications provided that the same can be inferred therefrom. Should the CONTRACTOR find discrepancy in the drawings, plans and specifications, it shall immediately refer the same to the PPA, whose decision shall be followed.

19.08 The CONTRACTOR agrees and obligates itself to restore to its original condition, on its own account, any public road, pavement, streets or open space and/or public or private property which are excavated or in any manner used by the CONTRACTOR in connection with the performance of its obligations under this Contract.

19.09 The CONTRACTOR agrees and binds itself to hold and save PPA free and harmless from any damage, claims and rights of action by third parties arising out of or by reason of this Contract and all injuries that may be suffered by PPA due to the failure, negligence, delay or conduct on the part of the CONTRACTOR and/or its employees in the performance of their obligations under this Contract.

19.10 No final payment of the contract shall be made to the CONTRACTOR without the Certificate of Completion and/or Acceptance from the Office of the Municipal Engineer of the Municipality concerned of the local works to be restored mentioned in Section 19.08 hereof, otherwise the cost of restoration shall be made available out of any collectible/receivable by the CONTRACTOR from the PPA.

19.11 Notwithstanding any extra work, change of work or orders made, if any, by the PPA, it is agreed that the same shall be completed within the period herein fixed and provided.

19.12 The CONTRACTOR shall hold the PPA free and harmless from whatever suit and hereby binds and obligates itself to indemnify the PPA for any and all liabilities, losses, damages, judgment, awards, fines, penalties and all expenses, legal or otherwise, of whatever kind and nature, arising from and by reason of this Contract, due to the fault, negligence, act, omission, delay, conduct, breach of trust or non-observance or violation of this Contract or any stipulation and warranty by the CONTRACTOR and/or any of its employees, agents, representatives or sub-contractors.

## ARTICLE XX

### SPECIAL REPRESENTATION

20.01 The CONTRACTOR hereby represents that all documents it submitted which form integral parts hereof are authentic and duly executed with all the required formalities for the same, and that the facts and/or date contained therein are true and correct. A breach of this representation including all misrepresentation in the documents or suppression of material facts therein, which if known, could have disqualified the CONTRACTOR such that this contract would not have been made and entered into, gives the PPA the immediate right or recourse to *motu proprio* rescind, abrogate or otherwise terminate the contract without need of judicial action, in accordance with Section 19.04 hereof.

20.02 The CONTRACTOR hereby warrants that it has not given nor promised to give any money, gift or any material favor/consideration to any official or employee of the PPA to secure this Contract; that any violation of this warranty shall be sufficient ground for the PPA to revoke or cancel this Contract extrajudicially or without need of judicial intervention.

## ARTICLE XXI

### BUDGETARY REQUIREMENT

21.01 The parties hereto hereby adopt and incorporate herein by reference, Letter of Instruction No. 767 dated 16 November 1978, issued by the Office of the President, as implemented by the Letter Circular, dated 7 December 1978, of the Department of Budget and Management.

## ARTICLE XXII

### EFFECTIVITY

22.01 This Contract shall become effective after the same shall have been signed by the Parties hereof.

IN WITNESS WHEREOF, the Parties have hereunto signed this Contract on the date and place first hereinabove written.

PHILIPPINE PORTS AUTHORITY

By:

Jay Daniel R. Santiago  
General Manager

By:

WITNESSES:

Mark Jon S. Palomar  
Chairperson Head Office Bids and Awards Committee

ACKNOWLEDGMENT

REPUBLIC OF THE PHILIPPINES)  
City of \_\_\_\_\_ ) S.S.

BEFORE ME, a Notary Public for and in the City of \_\_\_\_\_, this \_\_\_\_ day of \_\_\_\_\_, 20\_\_\_\_, personally appeared the following:

| NAME                   | Proof of Identity | DATE  | PLACE |
|------------------------|-------------------|-------|-------|
| Jay Daniel R. Santiago | _____             | _____ | _____ |

Known to me and to me known to be the same persons who executed the foregoing instrument as:

| POSITION        | COMPANY                    | CTC No. | DATE  | PLACE |
|-----------------|----------------------------|---------|-------|-------|
| General Manager | Philippine Ports Authority | _____   | _____ | _____ |

and they acknowledged to me that the same is their own free act and deed as well as the free and voluntary act of the corporation they represent.

This foregoing instrument is a Contract for *Construction of Back-Up Area, Port of Esperanza, Esperanza, Masbate*; consisting of 13 pages, including this page on which this acknowledgment is written, signed by the parties and their instrumental witnesses on each and every page thereof.

IN WITNESS WHEREOF, I have hereunto affixed my hand and notarial seal on these presents at the place and on the date first above written

Doc. No. \_\_\_\_\_;  
Page No. \_\_\_\_\_;  
Book No. \_\_\_\_\_;  
Series of 20 \_\_\_\_\_;