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^2 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.

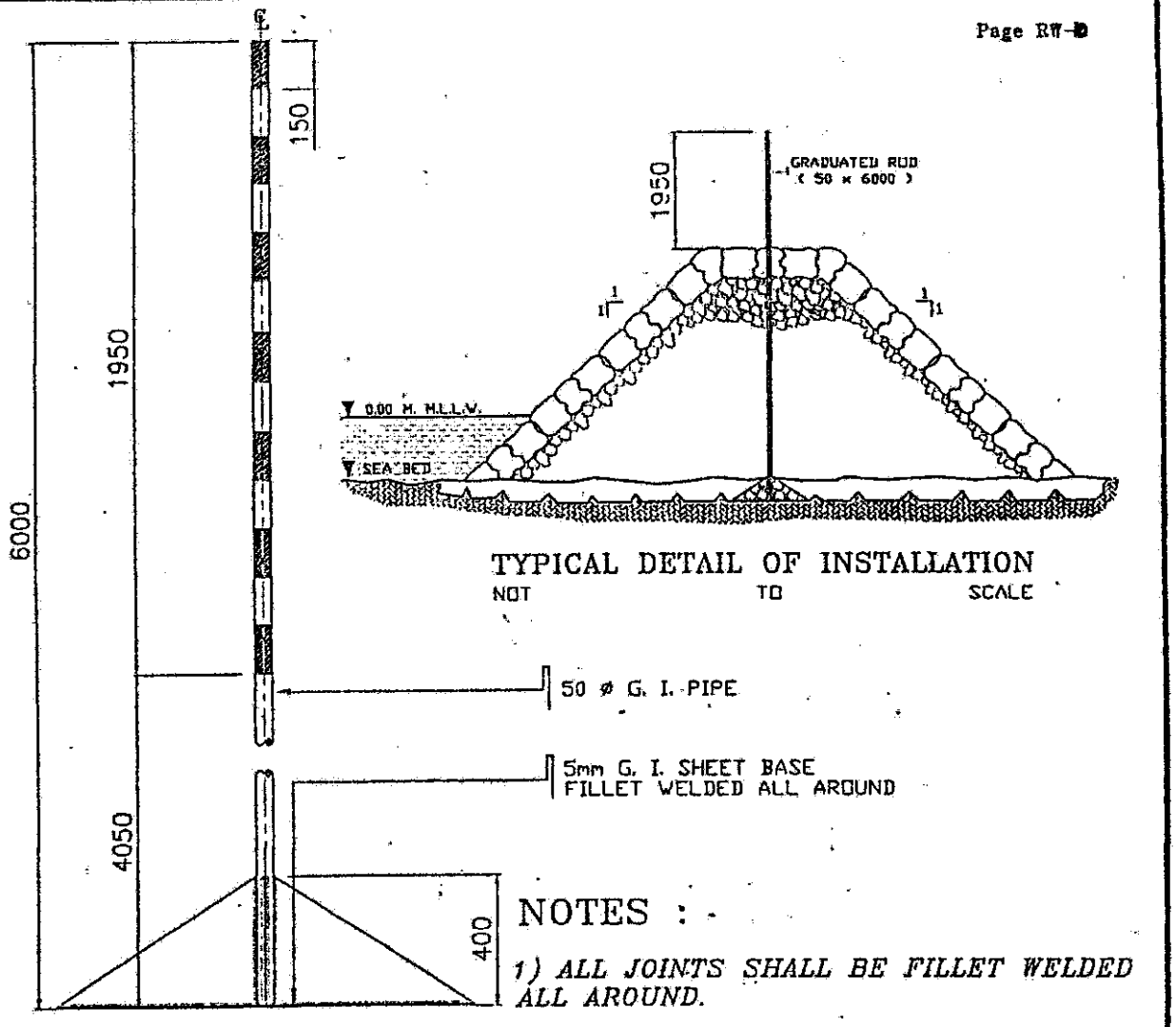
FIELD COMPACTION TEST

Field Density tests to determine the percent of compaction of the compactable material shall be conducted. Compaction of each layer thereafter shall continue until the required field 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.

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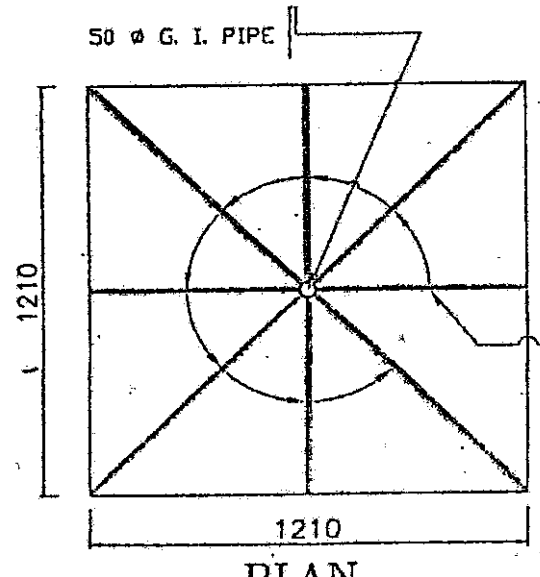
TYPICAL DETAIL OF INSTALLATION
NOT TO SCALE

ELEVATION
SCALE 1:20

NOTES : -

1) ALL JOINTS SHALL BE FILLET WELDED ALL AROUND.

2) THE GRADUATED SETTLEMENT ROD INCLUDING THE BASE SHALL BE PAINTED WITH TWO (2) COATS OF ANTI-RUST PAINT AND THE 1.95 M. PAINTED WITH ALTERNATIVE BANDS OF RED AND WHITE ENAMEL, 0.15 M. LONG ALL AROUND.



PLAN
SCALE 1:20

DETAILS OF STANDARD GRADUATED SETTLEMENT ROD

ITEM 10 : AGGREGATE SUB BASE COURSE

DESCRIPTION

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

MATERIAL REQUIREMENTS

Aggregate for subbase 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 matter and lumps or balls of clay, and shall be of such nature that it can be compacted readily to form a firm, stable subbase.

The subbase material shall conform to the following Grading Requirements

Grading Requirements

Sieve Designation		Mass Percent Passing
Standard, mm	Alternate US Standard	
50	2"	100
25	1"	55 – 85
9.5	3/8"	40 – 75
0.075	No. 200	0 - 12

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

The fraction passing the 0.425 mm (No. 40) sieve shall have a liquid limit not greater than 35 and plasticity index not greater than 12 as determined by AASHTO T 89 and T 90, respectively.

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

The material shall have a soaked **CBR value of not less than 25%** as determined by AASHTO T 193. The CBR value shall be obtained at the maximum dry density and determined by AASHTO T 180, Method D.

CONSTRUCTION REQUIREMENTS

PLACING

The aggregate subbase material shall be placed at a uniform mixture on a prepared subgrade 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 smoothening, 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 subbase 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^2 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 THICKNESS OF LAYER	± 20 mm
Permitted variation from design LEVEL OF SURFACE	+ 10 mm -20 mm
Permitted SURFACE IRREGULARITY Measured by 3-m straight-edge	20 mm
Permitted variation from design CROSSFALL OR CAMBER	± 0.3%
Permitted variation from design LONGITUDINAL GRADE over 25 m in length	± 0.1%

METHOD OF MEASUREMENT

Aggregate Subbase Course will be measured by the cubic meter (m3). The quantity to be paid for shall be the design volume compacted in-place as shown on the Plans, and accepted in the completed course. No allowance will be given for materials placed outside the design limits shown on the cross-sections. Trial sections shall not be measured separately but shall be included in the quantity of subbase herein measured.

ITEM 11 : AGGREGATE BASE COURSE

DESCRIPTION

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

MATERIAL REQUIREMENTS

Aggregate for 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 matter 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 course material shall conform to the following Grading Requirements

Grading Requirements

Sieve Designation		Mass Percent Passing	
Standard mm	Alternate US Standard	Grading A	Grading 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 fraction passing the 0.075 mm (No. 200) sieve shall not be greater than 0.66 (two thirds) of the fraction passing the 0.425 mm (No. 40) sieve.

The fraction passing the 0.425 mm (No. 40) sieve shall have a liquid limit not greater than 25 and plasticity index not greater than 6 as determined by AASHTO T 89 and T 90, respectively.

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

The material passing the 19 mm (3/4 inch) sieve shall have a soaked **CBR value** of not less than **80%** as determined by AASHTO T 193. The CBR value shall be obtained at the maximum dry density (MDD) as determined by 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 base course material on the road or in a pug mill unless otherwise specified or approved. Filler shall be taken from sources approved by the Engineer, shall be free from hard lumps and shall not contain more than 15 percent of material retained on the 4.75 mm (No. 4) sieve.

CONSTRUCTION REQUIREMENTS

PLACING

The aggregate base material shall be placed at a uniform mixture on a prepared sub-base/ subgrade 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 smoothening, 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 base 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^2 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 THICKNESS OF LAYER	± 10 mm
Permitted variation from design LEVEL OF SURFACE	+ 5 mm -10 mm
Permitted SURFACE IRREGULARITY Measured by 3-m straight-edge	5 mm
Permitted variation from design CROSSFALL OR CAMBER	± 0.2%
Permitted variation from design LONGITUDINAL GRADE over 25 m in length	± 0.1%

METHOD OF MEASUREMENT

Aggregate Base Course will be measured by the cubic meter (m3). The quantity to be paid for shall be the design volume compacted in-place as shown on the Plans, and accepted in the completed base course. No allowance shall be given for materials placed outside the design limits shown on the cross-sections. Trial sections shall not be measured separately but shall be included in the quantity of aggregate base course.

ITEM 12 : CEMENT TREATED BASE COURSE

1.0 SCOPE OF WORK

1.1. The work under this Section to be carried out by the Contractor, consists of the construction of Cement Treated Base Course for the pavement composed of aggregate, Portland cement and water in proper proportions, plant-mixed and constructed on prepared subbase in accordance with the specifications herein and in conformity with the lines, levels, grades, thickness and typical cross-sections indicated on the Drawings, and as specified herein.

1.2. The Contractor shall, before any work on the cement treated base course is started, design the material proportions in accordance with the requirements of this Section and the Drawings, and secure the Engineer's approval of the materials to be used, and the method of work execution.

1.3. Before commencement of the work under this Section, the Contractor shall submit Method Statement stating work plan, materials, design the material proportions, schedule, quality control plan, safety control plan and personnel to be engaged in this work for approval of the Engineer.

1.4. The Contractor shall also prepare the finishing elevation drawing of the area for this work in accordance with the design drawings for approval of the Engineer.

2.0 MATERIALS REQUIREMENTS

2.1. Cement

(1) The cement shall conform to the requirements in Reinforced Concrete Specification.

(2) All bags showing initial setting or lumps of caked cement, as well as half used bags, shall be rejected.

2.2. Aggregates

(1) Aggregates shall consist of natural sand, crushed stone or other inert materials with similar characteristics, or combinations thereof, having hard, strong and durable particles approved by the Engineer.

(2) The Aggregate shall not contain more than 3 percent of material passing the 0.075 mm (no. 200 sieve) by washing nor more than 1 percent each of clay lumps or shale. The use of beach sand will not be allowed.

(3) If the fine aggregate is subjected to 5 cycles of the sodium sulfate soundness test, the weighed loss shall not exceed 10 percent.

2.3. Portland Cement

(1) Only Type I Portland Cement conforming to ASTM C 150 shall be used unless otherwise provided for. Different brands or the same brand from different mills shall not be mixed nor shall they be used alternately unless the mix is approved by the Engineer.

(2) Cement which for any reason has become partially set or which contains lumps of caked cement will be rejected. Cement salvaged from discarded or used bags shall not be used.

(3) Samples of cement shall be obtained in accordance with AASHTO T127.

2.4. Water

(1) Water used in mixing, curing or other designated applications shall be reasonably clean and free of oil, salt, acid, alkali, grass or other substances injurious to the finished product. Water will be tested in accordance with Reinforced Concrete Specifications.

(2) Water which is drinkable may be used without test. Where the source of water is shallow, the intake shall be so enclosed as to exclude silt, mud, grass or other foreign materials.

2.5. Proportioning of Mixture

(1) The amount of cement to be added to the soil-aggregate shall be from 6 to 10 mass percent of the dry soil. The exact percentage to be added shall be fixed by the Engineer on the basis of preliminary laboratory tests and trial mixes of the materials furnished by the Contractor.

(2) The mixture shall have the following grading characteristics:

Table 1 – Mixture Gradation (CTBC)

Sieve Designation	Percent passing cement/aggregate mix	
	Minimum	Maximum
2" (19 mm)	85	100
3/8" (9.50 mm)	55	80
1/4" (6.35 mm)	42	66
No. 4 (4.75 mm)	32	56
No. 10 (2 mm)	23	43
No. 40 (0.50 mm)	11	26
No. 80 (0.20 mm)	7	17
No. 200 (0.075 mm)	4	10

2.6. Strength Requirements

(1) The cement content for construction shall be that at which the mix develops a 7-day compressive strength of at least 5.20 MPs (53 kgs/cm^2, /750 psi).

(2) The testing procedure shall be as follows: mold and cure specimens in accordance with ASTM D 560; soak specimens in water for 4 hours; cap and break specimens in compression in accordance with ASTM D 1633.

(3) CBR Test for Gravelly Soils. The mixture passing the 19 mm (3/4 inch) sieve shall have a minimum soaked CBR-value of 100% 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.

(4) Unconfined Compression Test for Finer Textured Soils. The 7-day compressive strength of laboratory specimen molded and compacted in accordance with ASTM D 1632 to a density of 100% of maximum dry density determined according to AASHTO T 134, Method B, shall not be less than 2.1 MPa (300 psi) when tested in accordance with ASTM D 1633.

2.7. Mix Design

(1) The mix design shall be submitted to the Engineer for approval and shall be accompanied by test data. A change in the source of materials during the progress of work may necessitate a new design mix.

(2) The mix design shall determine with accuracy the aggregate grading, the cement content and the required water content.

3.0 STORAGE OF MATERIALS

3.1. Storage of Portland Cement

(1) Cement shall be stored in a cement silo or damp proof warehouses, and used on first in/ first out basis.

(2) The Contractor shall, when storing cement in a cement silo, exercise care not to cause lump of cement sticking to the bottom of silo. Bagged cement shall be stacked on the warehouse floor which has been raised by not less than 30 cm above the surrounding ground in such a way to afford easy inspection and handling. Bags of cement shall not be stacked more than 13 bags in height.

(3) Cement which has been stored for a long period and has not passed a pertinent quality test carried out before use or which contains caked lumps, shall not be used.

(4) The Contractor shall cool cement before use if it has been warmed, having been stored in a hot place. Prior to construction, laboratory tests of the approved soil material shall be made to determine the quantity of cement required in the mix.

3.2. Storage of Aggregate

(1) The Contractor shall stockpile coarse and fine aggregate according to their sizes with proper partitions in between.

(2) The Contractor shall take measures to maintain skin moisture content of stockpiled aggregate uniform in the entire mass by providing shade over the aggregate, water sprinkling or other means.

(3) Care shall be exercised when receiving, storing and handling the aggregate not to cause segregation of sizes or allow mixture of dirt, mud or other foreign materials into the aggregate.

(4) The Contractor when stockpiling aggregate under hot climate shall take measure to prevent direct exposure to the sunlight such as a shade not to excessively heat or dry the aggregate.

4.0 CONTRACTOR'S EQUIPMENT AND PLANT

4.1. Equipment and tools necessary for handling materials and performing all parts of the work shall be approved by the Engineer as to design, capacity and mechanical condition.

4.2. The equipment shall be at the site sufficiently ahead of the start of construction operations to be examined thoroughly and approved.

5.0 CONSTRUCTION METHOD

5.1. Central Batching Plant Method

(1) The aggregate shall be proportioned and mixed with cement and water in a central mixing plant. The plant shall be equipped with feeding and metering devices which will introduce the cement, aggregate and water into the mixer in the quantities specified. Mixing shall continue until a uniform mixture has been obtained.

5.2. Spreading, Compacting and Finishing

(1) The material shall be spread by a mechanical spreader of approved type or asphalt paver. In spreading from the wind row, care shall be taken to avoid cutting into the underlying course.

(2) Initial rolling shall be performed with pneumatic tire roller and final rolling with a 3 wheel or tandem-type steel wheel roller. Rolling shall be discontinued whenever it begins to produce excessive pulverizing of the aggregate or displacement of the mixture.

(3) When the compacted thickness of the cement treated base course is to be more than 150 mm, the mixture shall be spread from the wind row and compacted in 2 approximately equal layers, the first layer to be bladed and rolled before the second layer is spread.

(4) Compaction shall continue until field density of not less than 98% of the compacted maximum dry density determined in accordance with AASHTO T 180 Method D has been attained. Field Density test shall be in accordance with AASHTO T 191.

(5) Where cement treated base is required under asphalt concrete pavement, the compacted cement treated base surface shall be scarified to produce corrugation and allow good bonding between layer of asphalt pavement and the cement treated base course.

5.3. Weather Limitations

(1) The cement treated base shall not be applied during windy, rainy or impending bad weather. In the event rain occurs, work shall be promptly stopped and the entire section if damaged shall be reconstructed in accordance with the Specification.

5.4. Protection, Curing and Maintenance

After the cement treated base course has been finished as specified herein, the surface shall be protected against rapid drying for a period of at least five (5) days by either of the following curing methods:

(1) Maintain in a thorough and continuously moist condition by sprinkling with water.

(2) Cover the completed surface with a 50 mm layer of sand and maintain in moist condition.

(3) Apply on the surface an asphalt membrane of the type and quantity approved by the Engineer.

(4) Apply on the surface a liquid membrane curing compound of the type and quantity approved by the Engineer.

The Contractor shall be required to maintain at his own expense the entire work within the limits of his Contract in good condition satisfactory to the Engineer from the time he first started work until all work shall have been completed. Maintenance shall include immediate repairs of any defects that may occur before and after the lime-stabilized base course has been compacted and finished, which work shall be done by the Contractor at his own expense and repeated as may be necessary to keep the base continuously intact.

5.5. Trial Sections

(1) Before 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.

(2) 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 m2 shall be made for every type of material and/or construction equipment/procedure proposed for use.

(3) 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.

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

(5) If the basic conditions regarding the type of material or procedures change during the execution of the work, new trial section shall be constructed.

6.0 QUALITY CONTROL

6.1. The quality shall satisfy the standard values shown in Table 6.1

Table 6.1 – MATERIALS (CTBC)

WORK ITEM	TEST FORM	TEST METHOD	FREQUENCY	STANDARD VALUE
Cement Treated Base Course	Portland cement	As approved by the Engineer	Once for every 500 tons at receiving materials	To meet the requirements of Type I Portland Cement conforming to ASTM C 150 Manufacturer test data may be substituted as directed by the Engineer
	Gradation of aggregate	AASHTO T 11 and T 27 or equivalent	Once for every quarry	To meet the requirements of Table 20370.1
	Abrasion of aggregate	AASHTO T 96 or equivalent	- ditto -	Not more than 30%
	Soundness of aggregate	AASHTO T 104 or equivalent	- ditto -	Not more than 5%
	Water Absorption of aggregate	AASHTO T 84 and T 85 or equivalent	- ditto -	Not more than 3% (Dry specific gravity)
	Plasticity index	AASHTO T 90 or equivalent	- ditto -	Not more than 6 Aggregate passing No.40 sieve including mineral filler
	Moisture-density Relation	AASHTO T 180	Once for every 500 m^2 at Point designated by the Engineer	-
	Density of Soil in Place by the Sand Cone Method	AASHTO T 191	Once for every 2,000 m2	98 % or more
	Compressive Strength	ASTM D 560 and ASTM D 1633	Once for every 500 tons	More than 5.20 MPa (53 kgs/cm^2 : 754 psi)

Table 6.2 – WORKMANSHIP (CTBC)

WORK ITEM	TEST FORM	TEST METHOD	FREQUENCY	TOLERANCE
Cement Treated Base Course	Finish elevation	As approved by the Engineer	Once for every 400 m^2 at points designated by the Engineer	+ 5 mm/-10 mm
	Thickness	As approved by the Engineer	- ditto -	+0/- 5 mm
	Width	- ditto -	At point designated by the Engineer	+ Not specified - 15 mm
	Evenness of surface	By 3 meters straight edge	- ditto -	Within 5 mm of variation on 2 contacts

6.2. The workmanship shall be controlled in the manner shown in Table 6.2

6.3. Tolerances

(1) The cement treated base course shall be laid to the designed level and transverse slopes shown on the Drawings. The allowable tolerances shall be in accordance with the following:

(a) Permitted variation from design: Thickness of Layer : + 0/-10 mm
(b) Permitted variation from design: Level of Surface : + 5/-10 mm
(c) Permitted Surface Irregularity: measured by 3 m straight edge: 5 mm
(d) Permitted variation from design: Cross-fall of Camber : ± 0.2%
(e) Permitted variation from design: Longitudinal Grade over 25 m length: ± 0.1%

6.4. Traffic

(1) The Contractor shall not be permitted to drive heavy equipment over completed portions prior to the end of 5 days curing period except pneumatic tired equipment required for constructing adjoining sections.

ITEM 13 : INTERLOCKING CONCRETE BLOCK PAVEMENT

SCOPE OF WORK

This specification covers the removal and reinstallation of existing interlocking concrete block pavement on a prepared base materials and the laying of leveling course sand bedding all in accordance with the Specifications and Drawings.

MATERIAL REQUIREMENTS

EXISTING INTERLOCKING CONCRETE BLOCKS

The material should be removed, stockpiled and transfer in a way that the quality of blocks will remain as its pre-removal condition. Damaged blocks should be segregated while the excess blocks that are not utilized shall be stockpiled as coordinated with the PMO officials.

SAND LEVELLING COURSE (Sand Cushion)

Materials for sand cushion shall consist of sand with uncoated grains, free from injurious amount of dust, lumps of clay, soft or flaky particles, shale, alkali, organic matter, loam or other deleterious substances. Beach sand shall not be allowed for use.

EXECUTION

LAYING OF INTERLOCKING CONCRETE BLOCKS

Block work shall be done in uniform manner such that the lines along the length or across the length formed by the edges of the blocks shall remain parallel all throughout the length and width of the pavement and the corners of the pavement forced by the lines of the edge between blocks for all sides shall be 4mm. The top of blocks forming the surface of the pavement shall be kept to the line, grade, slope and elevation as shown on the drawings.

The placing pattern of Interlocking concrete blocks shall be 45 degrees herringbone.

JOINTING AND COMPACTION

After laying the edges, the Interlocking concrete blocks shall be initially compacted into the sand bedding by means of a five (5) Horse Power (HP) vibratory plate compactor for at least two (2) passes.

Spread jointing sand over the block surface and swept into the joints using a soft brush. A second compaction with the vibrating plate compactor shall be performed for at least two (2) passes. The Interlocking concrete block surface shall be proof rolled or compacted with an approved roller not less than 10 tons for at least two (2) passes to further seat the units in to the sand bedding. Lastly, excess jointing sand shall be swept off the surface.

SAND LEVELLING CUSHION

The sand shall be laid in thickness shown in the drawings spread out uniformly over the cement treated base (CTB) and in accordance with the lines and grades as directed by the Engineer.

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.

ITEM 14 : SECURITY FENCE

DESCRIPTION

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

MATERIALS REQUIREMENT

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

CONCRETE HOLLOW BLOCKS (CHB)

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

BEDDING MORTAR

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

PLASTER

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

REINFORCING STEEL BARS AND RODS

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

CONCRETE

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

BARBED WIRE AND STEEL/GI PIPE POST

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

CYCLONE WIRE MESH

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

CONSTRUCTION REQUIREMENT

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

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

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

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

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

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

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

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

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

Details of reinforcement shall be as indicated in the drawings. Reinforcing shall not be bent or straightened in a manner injurious to the steel. Bars with kinks or bends not shown on the drawings shall not be used. Placement of reinforcement shall be inspected and approved prior to placing grout. One piece vertical bars extending from floor to floor or roof above shall be provided. Vertical bars shall be spliced only where indicated.

a. Positioning Bars

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

b. Splices

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

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

PAINTING AND CLEANING

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

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

ITEM 15 : DRAINAGE WORKS

SCOPE OF WORK

The works shall consist of excavation, backfilling and construction of lateral drains, construction of manholes, reconnection to existing lateral and other related works in accordance with the dimensions, size, elevation and grade as shown on the drawing and shall conform with the Specification.

At least thirty (30) days before the start of any construction related to drainage works, the Contractor shall submit to the Engineer for his approval, shop drawings of the drainage work he intends to construct. The shop drawings shall include the materials and the general method of installation he intends to employ.

MATERIAL REQUIREMENTS

BACK FILL

Fill shall be in accordance with Item "Reclamation and Fill".

GRAVEL BEDDING

Gravel Bedding/gravel base shall be in accordance with the specifications of Crushed Course Aggregates in "Reinforced Concrete".

SAND BEDDING

Sand bedding shall be in accordance with Item "Reinforced Concrete (Fine Aggregates)".

CONCRETE

Mixing/Casting and steel reinforcements shall be in accordance with Item "Reinforced Concrete" while the dimensions shall be as shown on the Drawings.

CEMENT MORTAR

Cement mortar shall consist of one part Portland cement to two parts of fine aggregate with water added as necessary to obtain the required consistency.

REINFORCED CONCRETE PIPE

The fabrication of reinforced concrete pipes shall conform to the Specifications of ASTM C 76 while the testing requirements shall conform to ASTM C 497. The Engineer reserves the right to inspect and test the pipe delivered for intended purpose. Defects that are discovered after acceptance of delivery of the pipe but before installation shall be a cause for rejection.

Standard reinforcement details and concrete strength shall be in accordance with DPWH "Standard Two Meter Concrete Pipe Culvert".

STEEL GRATING

All materials shall be compliant with ASTM A36 or equivalent and Hot Dip Galvanizing shall be in accordance with ASTM A123 with minimum average coating of 610gms/sq.m.

The gratings shall be fusion welded type and non-manually fabricated with loading capacity equivalent to HS20-44. Loads and deflection shall be in accordance with AS3990 and the fabrication shall be covered by the requirements of AWS D1.1.

EXECUTION

EARTHWORKS

All earthworks for concrete pipe culvert shall conform to the lines, grades and elevations shown on the drawings or as directed by the Engineer.

The lateral drain shall be excavated to the depth, grade and width established by the Engineer. The bedding surface shall provide a firm foundation of uniform density throughout the entire length. Soft, spongy, or otherwise unstable material encountered that will not provide a firm foundation for the concrete drainage shall be removed to the full width of the trenches and replaced by suitable material to a depth of not less than 30 cm. 100mm thick gravel bedding shall be used as foundation or otherwise as specified.

PIPE LAYING

The pipe shall be tested for watertightness of joints before backfilling the trench. Unsatisfactory work shall be corrected without additional cost to the PPA. The collar shall have set sufficiently prior to backfilling.

Methods of installation and typical bedding for pipe conduits if not included in the plans, shall conform to DPWH "Standard Two Meter Reinforced Concrete Culvert".

LATERAL DRAIN

Concrete cover and the steel gratings shall be set to the required elevations as shown on the drawings to fit the adjoining surfaces and shall be installed after the adjoining concrete is struck off and finished, and the fit on the frames shall be such that there is no rocking.

All completed structures shall be thoroughly cleaned of any accumulations of silts, debris or foreign matter of any kind, until finally accepted and put into service.

CATCH BASIN INLETS, MANHOLES AND OUTLETS

Lid frames shall be set to the required elevations as shown on the drawings to fit the adjoining surfaces. Lids shall be installed after the adjoining concrete is struck off and finished, and the fit on the frames shall be such that there is no rocking.

Where reconstruction of existing catch basin inlets, manholes, outlets, or similar structures are indicated, the work shall be in accordance to the details and elevations as shown on the drawings, including re-installation of existing metal frames, grates and lids, or replacing of concrete covers instead of grates that may have been lost or found lacking. All completed structures shall be thoroughly cleaned of any accumulations of silts, debris or foreign matter of any kind, until finally accepted and put into service.

FIELD DENSITY TEST

Field Density tests to determine the percent of compaction of the fill material shall be conducted until a field density of at least 95 percent of the maximum dry density in accordance with AASHTO T180, Method D has been achieved. In place density determination shall be made in accordance with AASHTO T191.

CLEARING AND DISPOSAL

Dumping or disposal of un-used excavated materials shall be coordinated to PMO. If the excavated materials are determined for disposal, the contractor will provide all necessary works and expenses for its completion in concurrence by the Engineer.

ITEM 16 : PORT LIGHTING SYSTEM

SCOPE OF WORK

The work to be done shall consist of 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 Philippine National Standard	- -	(PEC) (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 of the Port lighting system will be connected to the Main Disconnect Panel (MDP) located on the concrete pedestal post. While the supply voltage should be 230 volts, single phase (1Ø), and 60 hertz.

c) The Contractor shall employ a licensed Registered Electrical Engineer or Master electrician to perform or to supervise and to conduct the continuous inspection of all electrical work.

d) The Contractor shall first obtain approval from the Authority before procurement, fabrication or delivery of electrical materials to the site. Partial submittals will not be acceptable and will be returned without review. Submittals shall include the Manufacturer's Name, Trade Name, Place of Manufacture, Catalog Model or Number, Nameplate Data, Size, Layout Dimensions, Capacity, Project Specification and Paragraph Reference, Technical Society Publication References and other information necessary to establish contract compliance of each item to be furnished.

e) All excavations fill and backfill and concrete works involved herein, shall be carried to the required elevations and shall conform to the provisions of specification under Earthwork and Concrete Construction of this tender document.

f) The materials and equipment to be furnished shall be standard products of reputable manufacturer engaged in the reproduction of such materials and equipment.

g) 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.

h) Electrical installation shall conform to the requirements of Philippine Electrical Code (PEC) and the other approved standards.

i) The contractor shall install all electrical works with the supervision of the qualified Registered Electrical Engineer (REE) or Master Electrician. All electrical installation applications regardless of capacity and voltage whether new, addition or revision shall be accompanied by electrical plans signed and sealed by a duly licensed Professional Electrical Engineer (PEE).

MATERIAL REQUIREMENTS

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

PRODUCTS

WIRES AND CABLES

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

CONDUIT AND FITTINGS

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

LED FLOODLIGHT FIXTURE 200 WATT

Specifications:

Rated	: 200 watt LED Floodlight Fixture or equivalent
Input Voltage	: AC 85-265V / 50-60 HZ
Luminous Flux	: 30000 LM
Color Temperature	: Daylight (5500-6500K)
Optional	
CRI	: Ra>70
PF	:> 0.95
Beam Angle	: 120 degrees
IP Grade	: IP 66 / IP 65
Material	: Die Cast Aluminum

SWITCHES:

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

SINGLE ANGLE BAR FLOODLIGHT STEEL TAPERED LAMP POST

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

PANEL BOARD

Weatherproof control panel board (NEMA-3R) attached to concrete pedestal post.

Panel board shall conform 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.

EXECUTION

INSTALLATION

Single Angle Bar Floodlight Steel Tapered Lamp Post shall be installed as shown on the approved plans.

Pole Setting: Depth as shown on the approved plans.

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

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

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

Metering: the local utility company of Port of Malalag, Davao Del Surl Electric Cooperative is responsible for the supply and installation of measuring equipment, and its accessories, but it is part of the contractor responsibility and expense to contact them about this.

WORKMANSHIP

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

TESTING OPERATIONS

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

GUARANTEE

Upon completion and before final acceptance of the work, the Contractor shall furnish the Engineer a written guarantee stating that all works executed are free from defects on materials and workmanship. The guarantee shall be for a period of one year from the date of the final acceptance. Any work that becomes defective during the said period shall be corrected / replaced by the Contractor at his own expense in a manner satisfactory to the Authority.

ITEM 17 : PROJECT BILLBOARD

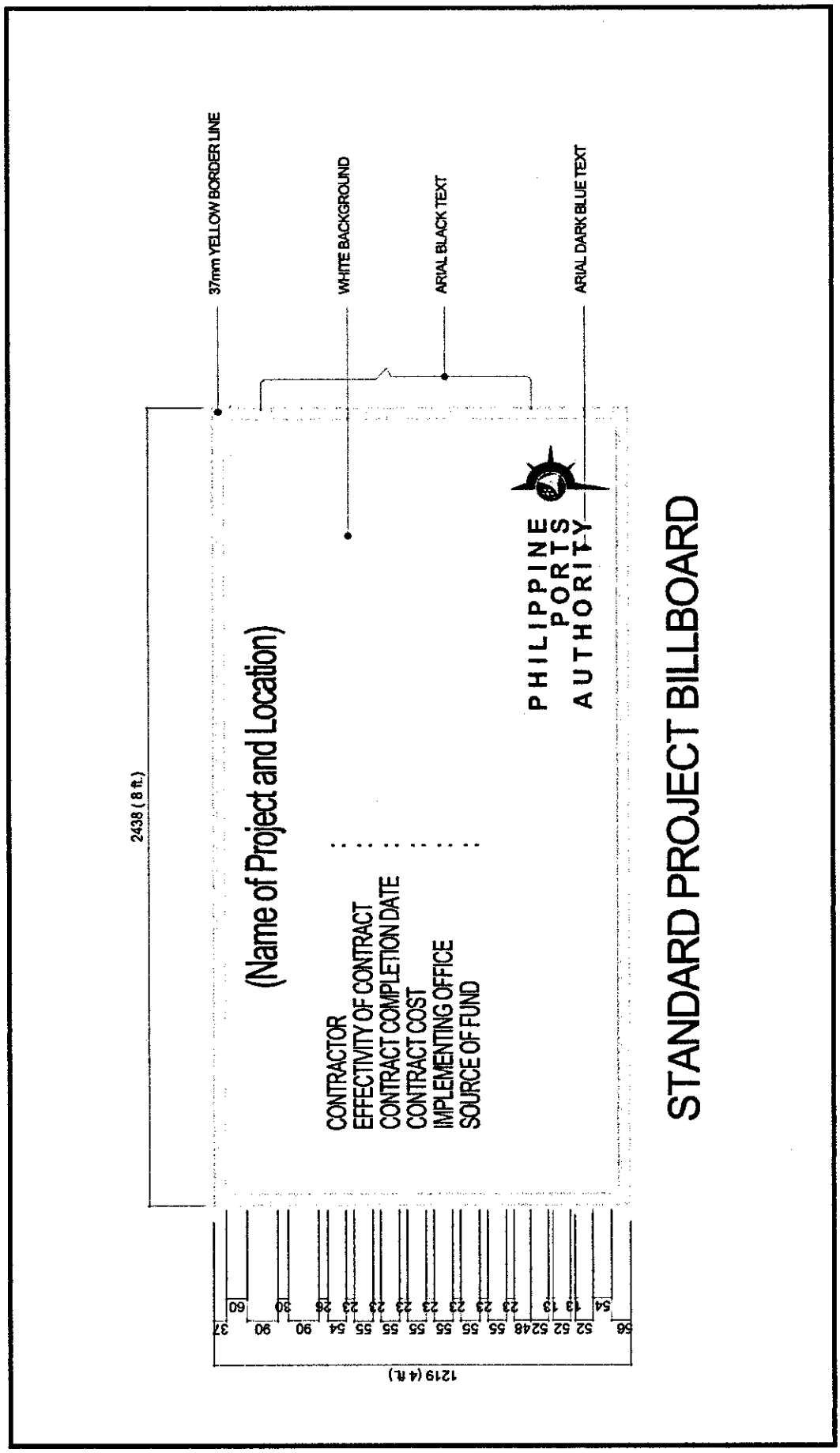
SPECIFICATION

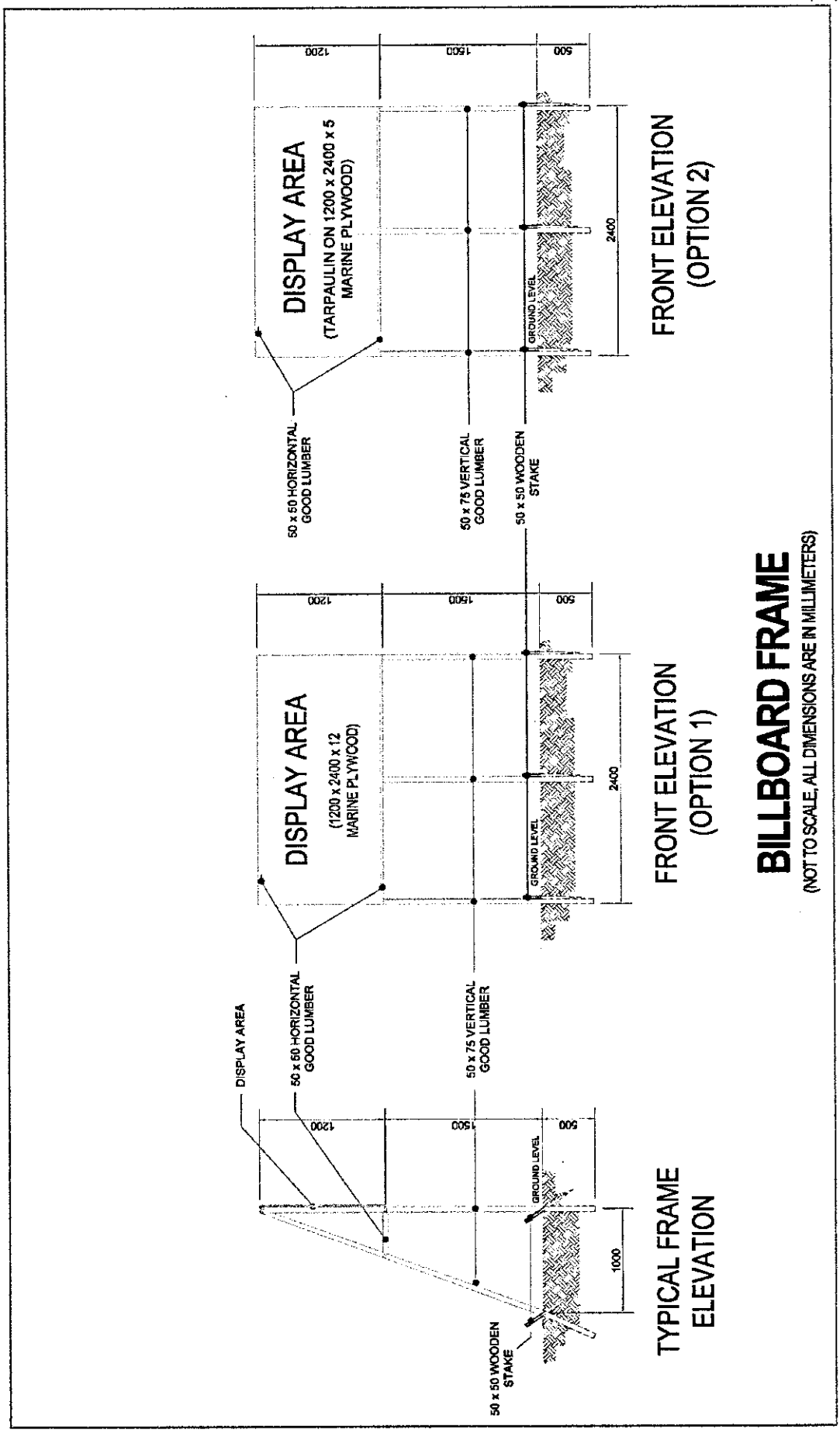
The Project Billboard shall be installed at location(s) designated by the Engineer.

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.


STANDARD PROJECT BILLBOARD
37mm YELLOW BORDER LINE
WHITE BACKGROUND
ARIAL BLACK TEXT
ARIAL DARK BLUE TEXT
PHILIPPINE PORTS AUTHORITY
(Name of Project and Location)
CONTRACTOR
EFFECTIVITY OF CONTRACT
CONTRACT COMPLETION DATE
CONTRACT COST
IMPLEMENTING OFFICE
SOURCE OF FUND
2438 (8 ft.)
1219 (4 ft.)
37 60 90 30 90 54 26 23 55 55 55 55 23 23 55 55 55 23 52 52 13 54


BILLBOARD FRAME
(NOT TO SCALE, ALL DIMENSIONS ARE IN MILLIMETERS)
FRONT ELEVATION
(OPTION 2)
DISPLAY AREA
(TARPAULIN ON 1200 x 2400 x 5
MARINE PLYWOOD)
50 x 50 HORIZONTAL
GOOD LUMBER
50 x 75 VERTICAL
GOOD LUMBER
50 x 50 WOODEN
STAKE
GROUND LEVEL
2400
1200
1500
500
FRONT ELEVATION
(OPTION 1)
DISPLAY AREA
(1200 x 2400 x 12
MARINE PLYWOOD)
TYPICAL FRAME
ELEVATION
DISPLAY AREA
1000

ITEM 18 : SAFETY SIGNAGES AND BARRICADES

DESCRIPTION

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

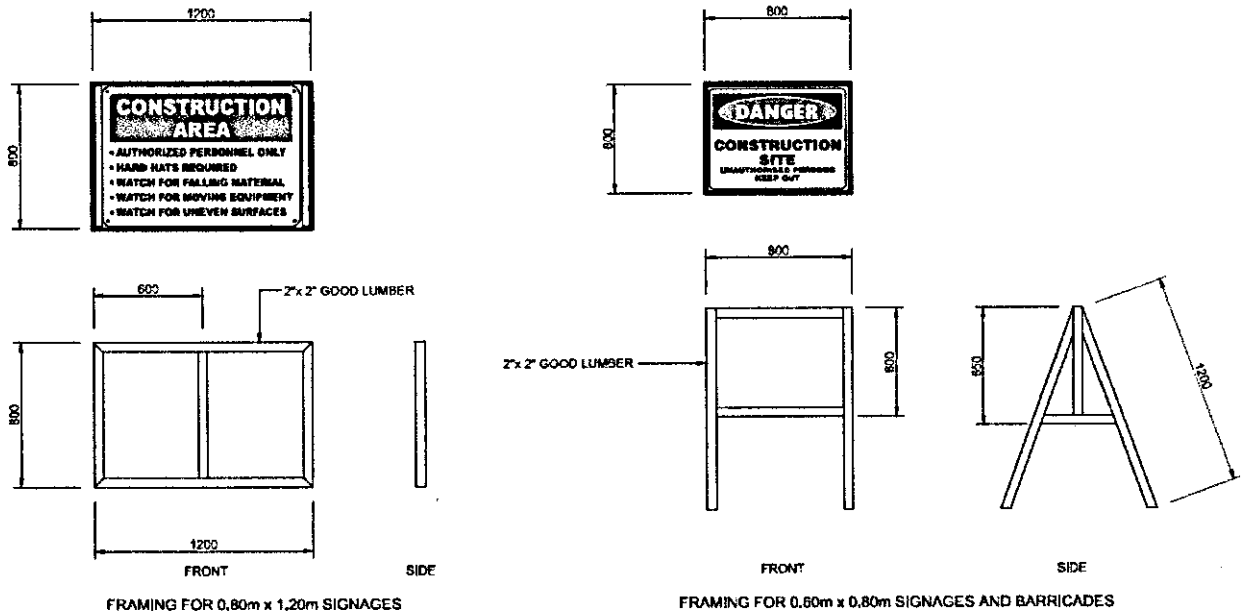
SPECIFICATION

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

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

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

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



STANDARD PLAN FOR SIGNAGES AND BARRICADES

SECTION VII

DRAWINGS
(APPROVED PLANS)

DRAWINGS AND APPROVED PLANS
(SEE ISSUED APPROVED PLANS)

LIST OF DRAWINGS:

1 OF 23	- Vicinity Map, Development Plan, General Notes, List of Drawings
2 OF 23	- General Plan (Reflecting the Affected Existing)
3 OF 23	- General Plan, Section of Concrete Pavement
4 OF 23	- Drainage Layout Plan
5 OF 23	- Section – 1, Section – 2
6 OF 23	- Section – 3, Section – 4
7 OF 23	- Section – 5, Section – 6
8 OF 23	- Section – 7, Section – 8
9 OF 23	- Section – 9, Section – 10
10 OF 23	- Section – 11, Section – 12
11 OF 23	- Section – 13, Section – 14
12 OF 23	- Section – 15, Section – 16
13 OF 23	- Section – 17, Section – 18
14 OF 23	- Sheet Piling Plan, Key Sheet Piling Plan, Detail of Wale Splice, Pile Connector, Detail Of Z-Type Hot Rolled Steel Sheet Piles
15 OF 23	- Detail of Retaining Walls, Detail of Anchor Wall, Detail of Tie Rod
16 OF 23	- Typical Section of 1200mm Ø X 18 mm Thick Tubular Steel Sheet Pile, Typical Section of 900mm Ø X 13 mm Thick Tubular Steel Sheet Pile
17 OF 23	- Detail of Fence-1
18 OF 23	- Detail of Fence-2
19 OF 23	- Detail of Catch Drain Manhole, Detail of Drainage Outfall, Detail of Lateral Drainage
20 OF 23	- Port Lighting Layout Plan, General Notes, Legend
21 OF 23	- Detail of Pre-Stress Concrete Pile (450 mm X 450 mm)

22 OF 23 - Single Angle Bar Floodlight Steel Tapered Lamp Post, Floodlight Post Connection Details, Led Floodlight Fixture 200 Watt, Specification

23 OF 23 - Detail of Concrete Pedestal Post, Load Schedule, Riser Diagram

SECTION VIII

BILL OF QUANTITIES and ATTACHMENTS

BID SUMMARY

MALALAG PORT EXPANSION PROJECT (PHASE III)

Port of Malalag, Malalag, Davao del Sur

NO.	DESCRIPTION OF WORK	AMOUNT (Pesos)
BILL NO. 1	GENERAL EXPENSES	
BILL NO. 2	REMOVAL AND EXCAVATION WORKS	
BILL NO. 3	PORT OPERATIONAL AREA	
BILL NO. 4	REIMBURSABLE ITEMS	1,050,000.00
	BID PRICE	

Name of Firm

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

Date

BILL OF QUANTITIES

MALALAG PORT EXPANSION PROJECT (PHASE III)

Port of Malalag, Malalag, Davao del Sur

NO. (1)	DESCRIPTION OF WORK (2)	UNIT (3)	QTY. (4)	UNIT PRICE (Pesos) (5)	AMOUNT (Pesos) (4) x (5)
BILL NO.	**1 GENERAL EXPENSES**				
1.01	Mobilization, demobilization and cleaning	lot	1		
1.02	Rental of temporary site office and residence for the Engineer and staff	mo.	21		
1.03	Maintain temporary site office and residence for the Engineer and staff	mo.	21		
1.04	Provide Construction Safety and Health Program in the execution of the project	mo.	21		
	TOTAL FOR BILL NO. 1				

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

BILL OF QUANTITIES
MALALAG PORT EXPANSION PROJECT (PHASE III)
Port of Malalag, Malalag, Davao del Sur

NO. (1)	DESCRIPTION OF WORK (2)	UNIT (3)	QTY. (4)	UNIT PRICE (Pesos) (5)	AMOUNT (Pesos) (4) x (5)
BILL NO.	**2 REMOVAL AND EXCAVATION WORKS**				
2.01	Excavate and backfill existing fill materials prior for drainage and electrical system	cu.m.	138		
2.02	Chipp-off and dispose existing R.C. Curb flush to deck level and smoothen with mortar	l.m.	21		
2.03	Remove and dispose existing CHB fence	l.m.	28		
2.04	Remove and dispose existing structure	sq.m.	113		
2.05	Remove existing solar lamp post	no.	2		
	TOTAL FOR BILL NO. 2				

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

BILL OF QUANTITIES
MALALAG PORT EXPANSION PROJECT (PHASE III)
Port of Malalag, Malalag, Davao del Sur

NO. (1)	DESCRIPTION OF WORK (2)	UNIT (3)	QTY. (4)	UNIT PRICE (Pesos) (5)	AMOUNT (Pesos) (4) x (5)
BILL NO.	**3 PORT OPERATIONAL AREA**				
3.01	Supply and deliver to site Z-Type steel sheet piles including connectors	m.t.	354		
3.02	Supply and install dowel bars for steel pipe piles	kg.	1,457		
3.03	Handle, pitch and drive steel sheet piles and connectors	l.m.	2,472		
3.04	Cutting of newly driven steel sheet piles	no.	100		
3.05	Supply and install steel waling and splice plate for the steel sheet piles	kg.	12,435		
3.06	Supply and deliver to site 900mm and 1,200mm dia. tubular steel pipe piles including connectors	m.t.	1,921		
3.07	Supply, fabricate and install cylindrical band for steel pipe piles	no.	78		
3.08	Splice Steel pipe piles	no.	39		
3.09	Supply and place polyurethane external coating for steel pipe pipes	sq.m.	4,072		
3.10	Handle, pitch and drive 900mm and 1,200mm dia. tubular steel pipe piles including connectors	l.m.	3,741		
3.11	Cutting of newly driven steel pipe piles	no.	78		
3.12	Extraction of clogged materials inside the steel pipe piles	cu.m.	1,086		

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

BILL OF QUANTITIES
MALALAG PORT EXPANSION PROJECT (PHASE III)
Port of Malalag, Malalag, Davao del Sur

NO. (1)	DESCRIPTION OF WORK (2)	UNIT (3)	QTY. (4)	UNIT PRICE (Pesos) (5)	AMOUNT (Pesos) (4) x (5)
3.13	Supply and place sand filler for steel pipe piles	cu.m.	429		
3.14	Supply and install reinforcing steel cage for steel pipe piles	kg.	198,190		
3.15	Supply and place 3,500 psi concrete filler for steel pipe piles	cu.m.	1,658		
3.16	Supply and deliver to site 450mm x 450mmm PSC anchor piles	l.m.	3,640		
3.17	Handle, pitch and drive 450mm x 450mm PSC anchor piles	l.m.	3,640		
3.18	Splice 450mm x 450mm PSC anchor piles	no.	91		
3.19	Chip/cut and dispose portion of newly driven PSC Piles	no.	91		
3.20	Supply and place 3,500 psi concrete for the anchor wall, retaining wall drainage outfall, and electrical works	cu.m.	976		
3.21	Supply and install steel reinforcement for the anchor wall, and retaining wall drainage outfall, and electrical works	kg.	62,211		
3.22	Supply and place gravel bedding	cu.m.	16		
3.23	Supply and place 50-100 kg. Core rocks	cu.m.	11,464		

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

BILL OF QUANTITIES
MALALAG PORT EXPANSION PROJECT (PHASE III)
Port of Malalag, Malalag, Davao del Sur

NO. (1)	DESCRIPTION OF WORK (2)	UNIT (3)	QTY. (4)	UNIT PRICE (Pesos) (5)	AMOUNT (Pesos) (4) x (5)
3.24	Supply and install tie-rod of various sizes including accessories				
	a) 42mm Ø x 12.00m	set	48		
	b) 55mm Ø x 18.00m	set	24		
	c) 55mm Ø x 24.00m	set	106		
3.25	Supply and install Geotextile Fabric	sq.m.	4,047		
3.26	Supply and place Sand and Gravel fill	cu.m.	21,205		
3.27	Supply, spread and compact aggregate sub-base course	cu.m.	2,582		
3.28	Supply, spread and compact Levelling course sand cushion	cu.m.	124		
3.29	Supply, spread and compact Cement treated base course	cu.m.	373		
3.30	Supply, deliver and install Interlocking concrete block pavement (ICBP)	sq.m.	2,488		
3.31	Supply, spread and compact aggregate base course	cu.m.	395		
3.32	Construct transition ramp (325mm thk) including concrete edging and temperature bars	sq.m.	338		
3.33	Construct security fence including painting and accessories	l.m.	113		
3.34	Supply deliver and install port lighting system including floodlight steel lamp post and other accessories	lot	1		

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

BILL OF QUANTITIES
MALALAG PORT EXPANSION PROJECT (PHASE III)
Port of Malalag, Malalag, Davao del Sur

NO. (1)	DESCRIPTION OF WORK (2)	UNIT (3)	QTY. (4)	UNIT PRICE (Pesos) (5)	AMOUNT (Pesos) (4) x (5)
3.35	Construct lateral drainage including trench grate, built-up frames, dowels and other accessories	l.m.	119		
3.36	Construct catch drain manhole including trench grate for manhole cover, built-up frames, dowels and other accessories	no.	15		
3.37	Relocate and re-install newly removed solar lamp post	no.	2		
	TOTAL FOR BILL NO. 3				

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

BILL OF QUANTITIES
MALALAG PORT EXPANSION PROJECT (PHASE III)
Port of Malalag, Malalag, Davao del Sur

NO. (1)	DESCRIPTION OF WORK (2)	UNIT (3)	QTY. (4)	UNIT PRICE (Pesos) (5)	AMOUNT (Pesos) (4) x (5)
BILL NO.	**4 REIMBURSABLE ITEMS**				
4.01	Secure approval of environmental Compliance Certificate (ECC) Application, Clearance and other necessary documentary requirements	lot	1	1,050,000.00	1,050,000.00
	TOTAL FOR BILL NO. 4				**1,050,000.00**

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

BASIS OF PAYMENT FOR WORK ITEMS INCLUDED IN THE PROPOSAL

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

BILL NO. 1
GENERAL EXPENSES

Item 1.01 Mobilization, demobilization, and cleaning

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

Item 1.02 Rental of temporary site office and residence for the Engineer and staff

The quantity to be paid for shall be the actual rental of 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.

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
REMOVAL AND EXCAVATION WORKS

Item 2.01 Excavate and backfill existing fill materials prior for drainage and electrical system

The quantity to be paid for shall be the actual volume in cubic meter of existing fill materials to be excavated prior for drainage and electrical system including backfill thereinafter 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 Chip-off and dispose 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 existing R.C. curb to be chipped-off, flushed to required elevation and smoothened with mortar, 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 2.03 Remove and dispose existing CHB fence

The quantity to be paid for shall be the actual length in linear meter of existing CHB fence to be removed, 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 2.04 Remove and dispose existing structure

The quantity to be paid for shall be the actual area in square meter of existing structure to be removed, 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 2.05 Remove existing solar lamp post

The quantity to be paid for shall be the actual number of existing solar lamp post to be removed 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 OPERATIONAL AREA

Item 3.01 Supply and deliver to site Z-Type steel sheet piles including connectors

The quantity to be paid for shall be the actual weight in metric ton of Z-Type steel sheet piles including connectors to be 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 3.02 Supply and install dowel bars for steel pipe piles

The quantity to be paid for shall be the actual weight in kilograms of dowel bars for steel pipe piles to be supplied and installed in accordance with the plans and specifications and accepted by the Engineer. The contract unit price shall be full compensation for furnishing all materials, labor, equipment, tools, and incidentals necessary to complete the work.

Item 3.03 Handle, pitch and drive steel sheet piles and connectors

The quantity to be paid for shall be the actual length in linear meter of steel sheet piles and connectors 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 3.04 Cutting of newly driven steel sheet piles

The quantity to be paid for shall be the actual number of newly driven steel sheet piles to be cut 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 3.05 Supply and install steel waling and splice plate for the steel sheet piles

The quantity to be paid for shall be the actual weight in kilogram of steel waling and splice plate for the steel sheet piles to be supplied and installed in accordance with the plans and specifications and accepted by the Engineer. The contract unit price shall be full compensation for furnishing all materials, labor, equipment, tools, and incidentals necessary to complete the work.

Item 3.06 Supply and deliver to site 900mm and 1,200mm dia. tubular steel pipe piles including connectors

The quantity to be paid for shall be the actual weight in metric ton of 900mm and 1,200mm dia. tubular steel pipe piles including connectors to be 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 3.07 Supply, fabricate and install cylindrical band for steel pipe piles

The quantity to be paid for shall be the actual number of cylindrical band for steel pipe piles to be supplied, fabricated 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 3.08 Splice Steel pipe piles

The quantity to be paid for shall be the actual number of steel pipe piles to be spliced 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 3.09 Supply and place polyurethane external coating for steel pipe pipes

The quantity to be paid for shall be the actual area in square meter of polyurethane external coating for steel pipe piles to be supplied and placed 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 3.10 Handle, pitch and drive 900mm and 1,200mm dia. tubular steel pipe including connectors

The quantity to be paid for shall be the actual length in linear meter of 900mm and 1,200mm dia, tubular steel pipe 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 3.11 Cutting of newly driven steel pipe piles

The quantity to be paid for shall be the actual number of newly driven steel pipe piles to be cut 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 3.12 Extraction of clogged materials inside the steel pipe piles

The quantity to be paid for shall be the actual volume in cubic meter of clogged materials inside the steel pipe piles to be extracted 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 3.13 Supply and place sand filler for steel pipe piles

The quantity to be paid for shall be the actual volume in cubic meter of sand filler for steel pipe piles to be supplied and placed 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 3.14 Supply and install reinforcing steel cage for steel pipe piles

The quantity to be paid for shall be the actual weight in kilogram of reinforcing steel cage for steel pipe piles to be supplied and installed in accordance with the plans and specifications and accepted by the Engineer. The contract unit price shall be full compensation for furnishing all materials, labor, equipment, tools, and incidentals necessary to complete the work.

Item 3.15 Supply and place 3,500 psi concrete filler for steel pipe piles

The quantity to be paid for shall be the actual volume in cubic meter of 3,500 psi concrete filler for steel pipe piles 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 3.16 Supply and deliver to site 450mm x 450mm PSC anchor piles

The quantity to be paid for shall be the actual length in linear meter of 450mm x 450mm PSC anchor piles to be 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 3.17 Handle, pitch and drive 450mm x 450mm vertical PSC anchor piles

The quantity to be paid for shall be the actual length in linear meter of 450mm x 450mm vertical 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 3.18 Splice 450mm x 450mm PSC anchor piles

The quantity to be paid for shall be the actual number of 450mm x 450mm PSC anchor piles to be spliced 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 3.19 Chip/cut and dispose portion of newly driven PSC piles

The quantity to be paid for shall be the actual number of portion of newly driven PSC piles to be chipped/cut, 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 3.20 Supply and place 3,500 psi concrete for the anchor wall, retaining wall, drainage outfall, and electrical works

The quantity to be paid for shall be the actual volume in cubic meter of 3,500 psi concrete for the anchor wall, retaining wall, drainage outfall, and electrical works 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 3.21 Supply and install steel reinforcement for the anchor wall, and retaining wall, drainage outfall, and electrical works

The quantity to be paid for shall be the actual weight in kilogram of steel reinforcement for the anchor wall, and retaining wall, drainage outfall, and for electrical works to be supplied and installed in accordance with the plans and specifications and accepted by the Engineer. The contract unit price shall be full compensation for furnishing all materials, labor, equipment, tools, and incidentals necessary to complete the work.

Item 3.22 Supply and place gravel bedding

The quantity to be paid for shall be the actual volume in cubic meter of gravel bedding to be supplied and placed 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 3.23 Supply and place 50-100 kg. Core rocks

The quantity to be paid for shall be the actual volume in cubic meter of 50-100 kg. core rocks, supplied and set-in-placed in accordance with the plans and specifications and accepted by the Engineer. Hydrographic/Topographic Surveys before and after placing of core rocks 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 3.24 Supply and install tie-rod of various sizes including accessories
a) 42mm Ø x 12.00m
b) 55mm Ø x 18.00m
c) 55mm Ø x 24.00m

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

Item 3.25 Supply and install Geotextile Fabric

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

Item 3.26 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-placed 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 3.27 Supply, spread and compact aggregate sub-base course

The quantity to be paid for shall be the actual volume in cubic meter of aggregate sub-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 3.28 Supply, spread and compact Levelling course sand cushion

The quantity to be paid for shall be the actual volume in cubic meter of levelling course sand cushion 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 3.29 Supply, spread and compact Cement treated base course

The quantity to be paid for shall be the actual volume in cubic meter of cement treated 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 3.30 Supply, deliver and install Interlocking concrete block pavement (ICBP)

The quantity to be paid for shall be the actual area in square meter of interlocking concrete block pavement (ICBP) 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 3.31 Supply, spread and compact aggregate base course

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

Item 3.32 Construct transition ramp (325mm thk) including concrete edging and temperature bars

The quantity to be paid for shall be the actual area in square meter of transition ramp (325mm thk) including concrete edging and temperature bars to be constructed in accordance with the plans and specifications and accepted by the Engineer. The contract unit price shall be full compensation for furnishing all materials, labor, equipment, tools, and incidentals necessary to complete the work.

Item 3.33 Construct security fence including painting and accessories

The quantity to be paid for shall be the actual length in linear meter of security fence including painting and accessories 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 3.34 Supply deliver and install port lighting system including floodlight steel lamp post and other accessories

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

Item 3.35 Construct lateral drainage including trench grate, built-up frames, dowels and other accessories

The quantity to be paid for shall be the actual length in linear meter of lateral drainage including trench grate,' built-up frames, dowels, and other accessories 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 3.36 Construct catch drain manhole including trench grate for manhole cover, built-up frames, dowels and other accessories

The quantity to be paid for shall be the actual number of catch drain manhole including trench grate for manhole cover, built-up frames, dowels, and other accessories 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 3.37 Relocate and re-install newly removed solar lamp post

The quantity to be paid for shall be the actual number of newly removed solar lamp post to be relocated and re-installed in accordance with the plans and specifications and accepted by the Engineer. The contract unit price shall be full compensation for furnishing all materials, labor, equipment, tools, and incidentals necessary to complete the work.

BILL NO. 4
REIMBURSABLE ITEMS

Item 4.01 Secure approval of environmental Compliance Certificate (ECC) Application, Clearance and other necessary documentary requirements

Payment for the aforementioned items will be made upon the successful securement of the approved ECC and, if necessary, the Area Clearance for the Malalag Port Expansion Project (Phase III) located at the Port of Malalag, Malalag, Davao Del Sur. These approvals will be issued by the concerned Department of Environment and Natural Resources (DENR).

The contract's lump sum price will serve as full compensation to the Contractor, who is responsible for all activities related to securing the ECC and Area Clearance, whether carried out in-house or through a commissioned consultant. Claims for payment must be accompanied by invoice and/or other supporting documents (e.g., a notarized certificate of completion). The total amount payable shall not exceed the contract's lump sum price.

FACILITIES TO BE PROVIDED FOR THE ENGINEER & HIS STAFF

RENTAL OF SITE OFFICE AND RESIDENCE FOR THE ENGINEER & STAFF

The Contractor shall provide a temporary site office and residence (rental) with an area of at least 48 square meters for use of the Engineer and his staff for the whole duration of the project.

Secure Approval of Environmental Compliance Certificate (ECC) Application and Area Clearance (If Necessary)

The Contractor shall be responsible for facilitating the securement of the Environmental Compliance Certificate (ECC) and, if necessary, the Area Clearance prior to the commencement of the project. This process may be carried out through either in-house resources or a commissioned consultant. The Contractor's responsibilities include, but are not limited to:

A. Preparation of the Environmental Impact Assessment (EIA) Report

The Contractor shall prepare the EIA Report in compliance with all applicable laws, policies, and guidelines set forth by the Department of Environment and Natural Resources (DENR).

B. Submission of Required Documents

The Contractor shall submit all necessary documentation to the appropriate DENR Regional Office and coordinate with other government agencies to acquire the ECC and Area Clearance. This includes obtaining any additional clearances or permits that may be required.

C. Technical Expertise

The Contractor shall provide technical expertise throughout the processing of the ECC and Area Clearance applications until the approvals are granted.

D. Facilitation of Related Activities

The Contractor shall facilitate any other activities or undertakings associated with obtaining the necessary approvals.

During the initial stages of the ECC application, the Contractor may seek assistance from the concerned Port Management Office (PMO) for tasks such as identifying necessary documents and navigating the initial application submission process.

MINIMUM MAJOR EQUIPMENT REQUIREMENTS

1	unit/s	Air Compressor (250 cfm, minimum), owned
1	unit/s	Backhoe (0.40 cu.m., 94.30hp, minimum), owned
2	unit/s	Centrifugal Trash pumps, owned/leased
1	unit/s	Clamshell, owned
1	unit/s	Concrete cutter, owned
2	unit/s	Concrete Mixer (1 bagger, minimum), owned
2	unit/s	Concrete bucket, owned
2	unit/s	Concrete Screeder, owned
2	unit/s	Concrete Vibrator (3.5 hp, minimum), owned
1	unit/s	Crane Barge (319 GW, minimum) with 60T crane, owned
1	unit/s	Crawler Crane (30T, minimum), owned/leased
1	unit/s	Crawler Crane (20T, minimum), owned
1	unit/s	Pile Hammer (Diesel, 6,500-10,500kg.m. or hydraulic equivalent), owned
1	unit/s	Pile Hammer (Diesel, 13,500-16,000 kg.m. or hydraulic equivalent), owned/leased
1	unit/s	Drop Hammer (2T, minimum), owned
1	unit/s	Dump Truck (10T net capacity, minimum), owned
2	unit/s	Bar Bender (electric, 25mm dia min.), owned
2	unit/s	Bar Cutter (electric, 25mm dia min.), owned
1	unit/s	Forklift (1.36T, minimum), owned/leased
1	unit/s	Jackhammer, owned
2	unit/s	Oxy/Acetylene cutting outfit, owned
1	unit/s	Payloader (80 hp, minimum), owned
2	unit/s	Plate Compactor (5 hp, minimum), owned
1	unit/s	Road Grader (125 hp, minimum), owned/leased
1	unit/s	Road Roller (10T, vibratory, minimum), owned/leased
2	unit/s	Transit Mixer (6 cu.m. cap., minimum), owned/leased
1	unit/s	Tugboat (500hp, minimum), owned/leased
2	unit/s	Water Truck with pump (1,000 gal., minimum), owned
2	unit/s	Welding Machine (400 amp., minimum), owned
1	unit/s	Cargo Truck (2 Tons, minimum) , owned
1	unit/s	Pavement Breaker (Backhoe Attachment), 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:

L A B O R

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

EQUIPMENT / MATERIALS

Personnel Protective Equipment

51	pcs.	Hard Hats
51	pairs	Gloves (rubberized)
51	pcs.	Safety Glasses/Goggles (clear)
102	pcs.	Long sleeve T-shirt
6	pcs.	Aprons
4	pcs.	Safety Belts
51	pairs	Safety Shoes
4	pcs.	Life Lines

Safety Devices

1	lot	Barricades
1	lot	Warning signs
2	unit/s	Fire extinguisher (10kg)

Medical and First Aid System - Twenty-one (21) mos.

NOTE:

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

PPA MEMORANDUM CIRCULAR
No 02
Series of 2016
Attachment

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REVISED SCHEDULE OF MINIMUM TEST REQUIREMENTS OF CONSTRUCTION MATERIALS FOR PPA INFRASTRUCTURE PROJECTS

Materials/Items of Work	*Required Tests*	*Minimum Incremental Frequency of Tests*
I. Construction of Pier/Wharf, Platform and Ramp		
Structural Concrete (SC)		
A Portland Cement	Quality Test	For every 2,000 bags (40kg) or fraction thereof
B Fine Aggregate	Quality Test for Grading, Elutriation (wash), Bulk Specific Gravity, Absorption, Mortar Strength, Soundness, Organic Impurities, Unit Weight, % Clay Lumps and Shale	For every 1,500 cubic meter or fraction thereof
C Coarse Aggregate	Quality Test for Grading, Bulk Specific Gravity, Absorption and Abrasion	For every 1,500 cubic meter or fraction thereof
D Water	Certificate from the Engineer or Quality Test for Density and Chloride Content	One per source
E Steel Bars	Mill Certificate and Quality Test for Chemical Composition and Mechanical Properties	For every 10,000 kg or fraction thereof
F Concrete	Compressive Strength on cylinder samples	1 set consisting of 3 concrete cylinder samples shall be taken from each day's pouring and to represent not more than 75 cu m of concrete or fraction thereof
	Slump Test	For every mix
G Admixture and Concrete Curing Materials	Quality Test	One per shipment
Piling (P)		
A Concrete Piles	Fabrication Report	One per fabrication
1 Concrete	Same test as for SC (F)	Same frequency as SC (F)
2 Steel Bars	Same test as for SC (E)	Same frequency as SC (E)
3 High Tension Strand	Test for Chemical Composition and Mechanical Properties	For every 20000kg or fraction thereof

Materials/Items of Work	Required Tests	Minimum Incremental Frequency of Tests
4 Coarse Aggregates	Same Test as for SC (C)	Same frequency as SC (C)
5 Fine Aggregates	Same Test as for SC (B)	Same frequency as SC (B)
B Steel Pipe Piles	Fabrication Report, Mill Certificate and Quality Test for Chemical and Mechanical properties	One per fabrication
1 Steel	Chemical Composition (refer below)	
	- Under 14" (355 60mm) Outside Diameter	2 from 200 pipe of fraction thereof
	- 14" to 36" (355 6 to 914mm) Outside Dia	2 from 100 pipe or fraction thereof
	- Over 36" (914mm) Outside Diameter	2 from 3000ft (914m) or fraction thereof
	Mechanical/Tensile	One (1) tension test shall be made on one length or fraction thereof of each size, or one piece of skelp representing each lot of 200 lengthis or fraction thereof of each size
2 Polyurethane Coating	Mill Certificate and Quality Test	One per fabrication
3 Concrete	Same test as for SC (F)	Same frequency as SC (F)
4 Fine Aggregate	Same test as for SC (B)	Same frequency as SC (B)
5 Coarse Aggregate	Same test as for SC (C)	Same frequency as SC (C)
6 Steel Bars	Same Test as SC (E)	Same frequency as SC (E)
7 Water	Same Test as SC (D)	Same frequency as SC (D)
Rubber Dock Fenders (RDF)	Physical Test	All units
	Performance Test for Energy Absorption and Reaction Force	All units
Accessories		
Washer and Fixing Bolt, Anchor Bolt	Physical Test	All units
	Quality Test for Chemical Composition and Mechanical Properties	One per fabrication

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

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Materials/Items of Work	***Required Tests***	***Minimum Incremental Frequency of Tests***
Rocks	Test for Apparent Specific Gravity and Abrasion	For every 1,500 cubic meter or fraction thereof
Geotextile Filter	Physical and Mechanical Test	One per batch
	Mill Certificate	One per batch
Sand and Gravel Fill	Quality Test for Organic Impurities and Grading	For every 1,500 cubic meter or fraction thereof
Selected Fill	Quality Test for Grading, Plasticity and Laboratory Compaction Test	For every 1,500 cubic meter or fraction thereof
	Laboratory California Bearing Ratio (CBR)	For every 2,500 cubic meter or fraction thereof
	Field Density Test	For every layer of 150mm of compacted depth at least one group of three In-situ density test for every 500 sq m or fraction thereof
Aggregate Base Course	Quality Test for Grading and Plasticity	For every 300 cubic meter or fraction thereof
	Quality Test for Grading, Plasticity, Abrasion and Laboratory Compaction Test	For every 1,500 cubic meter or fraction thereof
	Laboratory California Bearing Ratio (CBR)	Same frequency as Selected Fill
	Field Density Test	Same frequency as Selected Fill
Portland Cement Concrete Pavement (PCCP)		
A Portland Cement	Same test as for SC (A)	Same frequency as SC (A)
B Fine Aggregate	Same test as for SC (B)	Same frequency as SC (B)
C Coarse Aggregate	Same test as for SC (C)	Same frequency as SC (C)
D Water	Same test as for SC (D)	Same frequency as SC (D)
E Steel Bars (Dowels)	Same test as for SC (E)	Same frequency as SC (E)
F Joint Filler	Quality Test	One (1) per shipment

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

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

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

Materials/Items of Work	***Required Tests***	***Minimum Incremental Frequency of Tests***
III Port Operations Building/Passenger Terminal Building/Transit Shed/Warehouse		
STRUCTURAL WORKS	Refer to Structural Concrete (SC) and Piling Works (P)	
ARCHITECTURAL WORKS		
Ceramic – Filled Liquid Membrane / Water Proofing, Hydrophobic Poreblocking Ingredients with Superplasticizer	Physical Property, Mechanical and Chemical Property, Leak Test / Flood Test	One per shipment
Paint	Quality Test	One 4-L can for every 100 cans or fraction thereof
Ceramic Tile	Inspection and Evaluation Report from the Engineer	One per shipment
Stainless Steel	Inspection and Evaluation Report from the Engineer	One per shipment
Roofing Materials	Inspection and Evaluation Report from the Engineer	One per shipment
Ceiling Materials	Inspection and Evaluation Report from the Engineer	One per shipment
ELECTRICAL AND MECHANICAL WORKS		
Wires / Cables	Inspection and Evaluation Report from the Engineer Testing and Commissioning	One per shipment
Electrical Devices	Inspection and Evaluation Report from the Engineer Testing and Commissioning	One per shipment
Fire Alarm System	Inspection and Evaluation Report from the Engineer Testing and Commissioning	One per item
Wiring Devices	Inspection and Evaluation Report from the Engineer Testing and Commissioning	One per shipment

Materials/Items of Work	Required Tests	Minimum Incremental Frequency of Tests
Protective Devices	Inspection and Evaluation Report from the Engineer Testing and Commissioning	One per shipment
Telephone System	Inspection and Evaluation Report from the Engineer Testing and Commissioning	One per item
CCTV System	Inspection and Evaluation Report from the Engineer Testing and Commissioning	One per item
CATV System	Inspection and Evaluation Report from the Engineer Testing and Commissioning	One per item
Background Music and Paging System	Inspection and Evaluation Report from the Engineer, Testing and Commissioning	One per item
Air Conditioning Units & Ventilation	Inspection and Evaluation Report from the Engineer Testing and Commissioning	One per item
Conduit Pipes	Inspection and Evaluation Report from the Engineer Testing and Commissioning	One per item
Lighting Fixtures	Inspection and Evaluation Report from the Engineer Testing and Commissioning	One per item
PLUMBING WORKS		
Pipes	Inspection and Evaluation Report from the Engineer Testing and Commissioning	One per item

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Materials/Items of Work	Required Tests	Minimum Incremental Frequency of Tests
Fixtures	Inspection and Evaluation Report from the Engineer Testing and Commissioning	One per item
Pipe Culverts	Compression Strength Inspection and Evaluation Report from the Engineer	For every size not more than 25 pipes cast in the field
IV Miscellaneous Materials Fencing A Barbed Wire, Cyclone Wire Mesh, Chain Link B Concrete Post	Physical Test (Dimensions and Coatings) Refer to Superstructure (SC)	One per Batch Refer to Superstructure (SC)
Lamp Post A Structural Steel B Zinc (Hot Dip Galvanizing) Coatings	Physical Test (Dimensions) Same test as for SC (E) Same test as for CJ (C)	All units One per batch
Drainage Steel Grating	Same test as for SC (E) Inspection Report	One (1) batch
Metal Pipe (Cast Iron Galvanized, etc)	Physical Test (Dimensions and Coatings)	1 per delivery
Welding Works	Destructive and Non Destructive Test	One (1) per lot

NOTES
1. **Testing of RDF shall be performed only by an independent Testing Laboratory duly accredited by BRS, DOST and PPA**
2. **Testing of other materials shall be performed only by an independent Testing Laboratory duly accredited by BRS and PPA.**
3. **All other issuances which are otherwise inconsistent herewith are hereby revoked or otherwise amended.**

Approved

RAUL T. SANTOS
Officer-In-Charge,
Office of the General Manager