

JAPAN INTERNATIONAL COOPERATION AGENCY (JICA)
COMISION EJECUTIVA PORTUARIA AUTONOMA (CEPA)

THE DETAILED DESIGN
ON
PORT REACTIVATION PROJECT IN LA UNION PROVINCE
OF
THE REPUBLIC OF EL SALVADOR

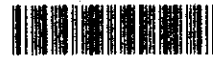
FINAL REPORT

(DRAFT) BIDDING DOCUMENTS

Package A Civil and Building Works

VOLUME II-A
BILLS OF QUANTITIES

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OCTOBER 2002

NIPPON KOEI CO., LTD.

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PORT REACTIVATION PROJECT IN LA UNION PROVINCE
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Package A: Civil and Building Works

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LA UNION PORT DEVELOPMENT PROJECT

Bidding Documents for Package A: Civil and Building Works (Final Draft)

Volume II-A

Bill of Quantities

CONTENTS

	Page
PREAMBLES	
1. Preamble for General Application (PG).....	PG-1
2. Preamble for General Requirements (PR)	PR-1
3. Preamble for Civil Works (PC)	PC-1
4. Preamble for Building Works (PB).....	PB-1
5. Preamble for Utility Works (PU).....	PU-1
BILLS OF QUANTITIES	
1. Summary of Bid Price.....	II.A(1)-1
2. Breakdown of Bid Price.....	II.A(2)-1
3. Breakdown of Local Taxes and Duties.....	II.A(3)-1

Preambles

PREAMBLES TO BILLS OF QUANTITIES

1. PREAMBLE FOR GENERAL APPLICATION (PG)

- PG001**
Preamble
Guidance in
Pricing
- The preambles are prepared for guidance to the Bidder in pricing the Bills of Quantities. Those preambles appearing under the "General Application" apply to the whole of the Works required under the Contract including additional works. Preambles for the remaining sections are to assist the Bidder in the interpretation of the items of the Bills of Quantities which are still unclear to the Bidder.
- PG002**
Examined
Documents and
Site Conditions
- Bidders shall be deemed to have examined the Drawings, Specifications, General Conditions of Contract, Conditions of Particular Applications, Bills of Quantities (BOQ), and conditions of the Site, and have provided in his Bid for everything necessary for completion of the whole of the Works in accordance with the program set out in the Specifications or as otherwise agreed and for maintenance of the Works, all in accordance with the Contract.
- PG003**
Method of
Measurement
- All quantities measured for payment shall be the quantities of the finished work executed in accordance with the Contract without making allowances for waste, laps, cut-offs and the like. The method of measurement shall comply with the provisions hereafter.
- Work shall be measured net as fixed in position and each measurement for calculation of quantity per item shall be taken to the nearest 10 millimeters; this principle shall not apply to dimensions stated in descriptions.
- Final quantities for each item shall be taken to the nearest whole number, with 0.50 and above being rounded up, 0.49 and below being rounded down.
- Unless otherwise stated, no deduction shall be made from items required to be measured by area, for voids of less than 1.00 m². Minimum deductions of voids shall refer only to voids within the edges of measured areas; voids which are at the edges of measured areas shall always be deducted, irrespective of their size.
- PG004**
Unit and
Currency
- All sizes and quantities shall be entered in the metric system of units in the BOQ. The symbol "t" when used in item descriptions refers to thickness; "h" or "H", height; "w" or "W", width; and "d" or "D", depth. All prices shall be stated in the currencies stipulated in Clause 14 of the Instructions to Bidders.
- PG005**
Fixed Prices
- All rates and sums quoted by the Bidder shall remain fixed and valid until completion of the Contract execution. Price adjustment will not be applicable, except in the cases of any change in price resulting from variation orders.
- PG006**
Rates and Sums
to be included
- Notwithstanding any limits which may be implied by the wording of the individual items and/or the explanations in these Preambles, the rates and sums which the Bidder enters in the BOQ shall be for the work finished complete in every respect. The Bidder will be deemed to have taken full account of all requirements and obligations, whether expressed or implied, covered by all parts of this Contract and to have priced the items herein accordingly. The rates and sums shall therefore include all incidental and contingent expenses and risks of every kind necessary to construction, completion and maintenance of the whole of the Works in accordance with the Contract.
- Full allowance is to be made in the rates and sums against the various items in the

BOQ for all costs involved but not limited to the following items.

- a) all setting out and survey works,
- b) all temporary works as far as not included in the BOQ such as access roads, temporary drainage, fencing, watching, lighting, moorings and buoys,
- c) payment of fees and giving notices to authorities,
- d) payment of all patent rights and royalties,
- e) reinstatement of the Site,
- f) preparation of Contractor's design, shop drawings and As-built drawings,
- g) preparation, supply and delivery of all drawings, calculations, samples, mock ups, testing and commissioning, operation manuals, spare parts, tools and information and copies thereof, which the Contractor is required to provide under the terms of the Contract shall not be paid for separately, but shall be deemed to have been included and allowed for in the rates and prices of the relevant portions of the Works.
- h) safety precautions and all measures to prevent and suppress fire and other hazards,
- i) interference to the Works by persons, vehicles, vessels and the like being legitimate users of the on-shore and off-shore facilities on or in the vicinity of the Site,
- j) protection and safety of adjacent structures and shoreline insofar as they may be affected by the Works,
- k) supply, maintenance and removal on completion of Contractor's own accommodation, offices, stores, workshops, transport, welfare, services and other facilities including telephones and all charges in connection therewith,
- l) maintenance of public thoroughfares and footpaths, and maintenance of access to upon existing recognized routes,
- m) opening of quarries and borrow pits, including all surveys, site investigations, removal and disposal of overburden, trimming of quarry or borrow pit faces and floors and all measures necessary to render quarries or pits safe on completion,
- n) work adjacent to or across existing services and installations,
- o) recruitment, transportation to and from the Site, and all incidental costs and expenses involved in the provision of all necessary skilled/unskilled labor and supervisory/administrative staff,
- p) liaison with port operators and coordination of the Works to avoid any disruption to the operations of the Employer, if any, and any other operators within the port area or in the vicinity,
- q) preservation and maintenance at all times of marine navigation access for the Employer, Fuerza Naval de El Salvador, fishing boats registered in the

Fonseca Bay and any operators within the Bay area.

A rate or price shall be entered against each item in the priced BOQ, whether quantities are stated or not with exception of items which already have Provisional Sums affixed thereto. The cost of items against which the Contractor has failed to enter a rate or price shall be deemed to be covered by other rates and prices entered in the BOQ.

PG007

Quantities Not Final

The quantities set down for the items in the BOQ shall not be considered as representing the final measurements. These are the quantities estimated for each kind or work included in the Contract and are given for the convenience of forming a common basis for Bidding. Unless otherwise stated, the quantities shall be confirmed by the Engineer or his Representative and shall be net as they are finished and fixed in the Works, and the rates and prices.

PG008

No Claim

No claim will be considered for further payment in respect of any work or method of execution which may be described in the Contract or is inherent in the construction of the Works or is detailed in the Drawings on account of:

- a) items having been omitted from the BOQ; or
- b) any omission from the wording of items or from clauses in the Preambles; or
- c) no mention of such work or method of execution having been made in the Preambles.

PG009

Ascertain Water Levels

It is the Bidder's responsibility to ascertain for himself the probable states of tides, their levels and durations. Any water levels given in the Specification and marked on the Drawings are intended to give an indication only of those likely to be encountered.

PG010

Rates for the Whole

The Contractor shall be deemed to have included in his rates and prices in the BOQ all costs and expenses of whatsoever nature that would be incurred in the construction, completion and delivery of the whole of the Works or the sections of the Works in accordance with the Program of Works.

PG011

Rates for All Tests

The Contractor shall be deemed to have included in his rates and prices in the BOQ the costs for complying with and for carrying out all necessary trials, tests and taking all necessary samples for testing by the Engineer, as described in the Specifications and/or indicated on or inferred from the documents.

PG012

Making Good Damage to Adjacent Structures

The Contractor shall be deemed to have included in his rates and prices the costs for establishing the locations of and for taking all temporary measures for the support and protection of adjacent constructions, existing structures and services such as pipes, drains, trenches, cables, ducts and other apparatus when carrying out works adjacent to or beneath such adjacent constructions, existing structures and services and for making good any damage or consequential damage which may be caused by his operations under the Contract.

PG013

Allowing for Removal of Temporary Works

The Contractor shall be deemed to have included in his rates and prices the costs for the provision, maintenance and final removal of all temporary works of whatsoever nature required for the proper execution of the Works, except for those temporary works for which specific items have been provided in the BOQ as particular temporary works. The prices entered for these specific items of particular temporary works shall be deemed to include the provision, maintenance and final removal of

these temporary works. No further specific items of particular temporary works will be measured separately.

PG014

**Rates for
Diversions**

The Contractor shall be deemed to have included in his rates and prices in the BOQ the costs for all temporary diversions of services occasioned solely by the Contractor's sequence or method of construction of the temporary or permanent works.

PG015

**Testing
Laboratory**

The rates and prices submitted for the provision of instruments, equipment, testing laboratory and skilled attendants, and for the maintenance and removal of the same shall allow for the reversion of the said instruments and equipment to the Contractor, unless otherwise specified.

PG016

**Taxes, Duties
and Levies**

The unit rates and prices entered on the BOQ shall be deemed as inclusive of all foreign taxes and duties but exclusive of local taxes, duties and levies. The amounts of taxes, duties and levies payable in the Republic of El Salvador, including but not limited to Value Added Tax (IVA), Goods and Services Tax (GST), Business Income Tax (BIT), Withholding Tax, Customs and Import Duties, shall be indicated in the appropriate columns in (1) Summary of Bid Price and (4) Breakdown of Taxes and Duties in the BOQ.

Exemption of some tax and duty categories may be granted as mentioned in Sub-Clause 73.2 of the Conditions of Particular Application. However, it remains the sole responsibility of the Bidder to make sure of all local taxes, duties and levies imposable on him under the Contract so as to calculate the amounts of such taxes, duties and levies properly in his Bid.

PG017

**Progress
Payment on
Sums**

Progress payment for the items of permanent works priced as Sums shall be made on the basis of the estimated percentage completion of the work covered by such items at the time of the related progress measurement.

PG018

**Payment of
Items on a
Monthly Basis**

Payment for the items in Division 1 "General Requirements" measured on a monthly basis will not be commenced until the full facilities described in the items and the Specifications have been provided to the satisfaction of the Engineer. The first progress payment will be made for the period from the date of acceptance by the Engineer to the end of the said month by computing the number of days in service divided by 30 days with one decimal below zero.

Payment will continue so long as such facilities continue to be provided to the satisfaction of the Engineer and until such facilities are no longer required.

PG019

**Arithmetic
Error**

Any arithmetic errors in computation or summation in the submitted BOQ will be corrected by the Employer as follows:

- (a) where there is a discrepancy between amounts in figures and in words, the amount in words will govern;
- (b) where there is a discrepancy between the unit rate and the total amount derived from the multiplication of the unit rate and the quantity, the unit rate as quoted will govern, unless in the opinion of the Employer, there is an obviously gross misplacement of the decimal point in the unit rate, in which case the total cost per item as quoted will govern and the unit rate will be

corrected; and

- (c) where there is a discrepancy between the total bid amount and the sum of the total price per item, the sum of the total price per item will govern and the total bid amount will be corrected.

PG020

**Rates for
Materials**

The rates for materials and goods are to include:

- a) Cost of purchase
- b) Cost of packing
- c) Cost of handling
- d) Freight rates
- e) Insurance premium
- f) Port dues, charges and other similar levies
- g) Fees and storage charges
- h) Cost of transport to the Contractor's work yards
- i) Cost of unpacking
- j) Cost of cleaning and storing
- k) Cost of providing samples, and
- l) Cost of testing except the radiographic examination and test on welds of steel materials or structures on the Site.

PG021

**Unit Rate
Analysis**

For any pay item costing US\$ 300,000 or more, in the column of "Total" in the BOQ, the Bidder shall provide a detailed unit rate analysis along with the priced BOQ, for the purpose of bid evaluation. Detailed unit rate analyses of all the remaining items of the BOQ shall be provided by the Bidder with the lowest evaluated bid price, upon request by the Employer.

PG022

**Provisional
Sums**

When required by the Engineer, the Contractor shall submit quotations for additional investigations and daywork covered by Provisional Sums in Pay Item 1E of the BOQ, timely for the Engineer's approval in order to comply with the construction program. Measurement and payment for the whole or part of the work under such item will be made by the unit and rates so quoted by the Contractor or pro-rata thereto or as accepted by the Engineer. The use of Provisional Sums shall comply with the provisions of Clause 58 of the Conditions of Contract.

PG023

**Schedule of
Daywork**

For the purpose of calculating the value of additional works to be executed by variation orders on a daywork basis, the Bidder shall submit along with the priced BOQ the Schedules of Daywork Rates for i) Labor, ii) Construction materials, and iii) Construction plant and equipment, in the following sample forms. The rates shall include overhead and profit.

SCHEDULES OF DAYWORK RATES

I. LABOR

Item No.	Description	Unit (in hour)	Unit Rate in US\$
1.			
2.			
3.			
4.			
5.			

II. CONSTRUCTION MATERIALS

Item No.	Description	Unit (in weight or volume)	Unit Rate in US\$
1.			
2.			
3.			
4.			
5.			

III. CONSTRUCTION PLANT AND EQUIPMENT

Item No.	Description	Unit (in hour)	Unit Rate in US\$
1.			
2.			
3.			
4.			
5.			

2. PREAMBLE FOR GENERAL REQUIREMENTS (PR)

- PR1A01
Mobilization of
Dredging Fleet** The cost for mobilization of dredging fleet and associated shall be paid based on the submitted breakdown of this pay item upon arrival of such plant and equipment at site and upon presentation of documentary evidence accepted by the Engineer.
- PR1A02
Demobilization
of Dredging
Fleet** The cost for demobilization of dredging fleet and associated shall be paid based on the submitted breakdown of this pay item upon shipment of such plant and equipment from the site and upon presentation of documentary evidence accepted by the Engineer.
- PR1A03
Mobilization of
Other
Construction
Plant and
Equipment** The cost for mobilization of other construction plant and equipment shall be paid based on the submitted breakdown of this pay item upon arrival of such plant and equipment at site and upon presentation of documentary evidence accepted by the Engineer.
- PR1A04
Demobilization
of Other Plant
and Equipment** The cost for demobilization of other construction plant and equipment shall be paid based on the submitted breakdown of this pay item upon shipment of such plant and equipment from the site and upon presentation of documentary evidence accepted by the Engineer.
- PR1B01
Temporary
Jetty** Payment for this pay item shall be made after completion of the temporary jetty and confirmation of its operation by the Engineer. Payment shall be made on a lump sum basis.
- PR1B02
Demolition and
Clearance of
Temporary
Jetty** Payment for this pay item shall be made on a lump sum basis after acceptance of the work by the Engineer.
- PR1B03
Shooting of
Digital Video
Films of the
Project** Payment for this pay item shall be made on a monthly basis upon presentation of evidence by the Contractor and acceptance by the Engineer
- PR1B04
Compilation and
Submission of
Digital Video
Documentary
Film of the
Project** Payment of this pay item shall be made on a lump sum basis upon acceptance of the completed Digital Video Documentary Film by the Engineer.
- PR1C01
Renovation of
CEPA's
Temporary
Office** Payment of this pay item shall be made on a lump sum basis upon completion of the renovation work specified in Section 111000 of the Specifications and acceptance of its operation by the Engineer
- PR1C02
Maintenance for
Item 1C02** Payment of this pay item shall be made on a monthly basis for the services specified in Section 11100 of the Specifications and acceptance of such services by the Engineer.

- PR1C03
Construction
and Furnishing
of Office for the
Employer/
Engineer** Payment of this pay item shall be made on a lump sum basis upon issuance of the completion certificate for the construction of the office and provision of furniture, equipment, and other required facilities in accordance with Section 11100 of the Specifications.
- PR1C04
Maintenance for
Item 1C02** Payment of this pay item shall be made on a monthly basis for the services specified in Section 11100 of the Specifications and acceptance of such services by the Engineer.
- PR1C05
Renovation
before Hand-
over for Item
1C03** Payment of this pay item shall be made on a lump sum basis upon acceptance of the renovation work specified in Section 11100 of the Specifications by the Engineer.
- PR1C06
Renovation of
Laboratory** Payment of this pay item shall be made on a lump sum basis upon completion of the renovation work specified in Section 111000 of the Specifications and acceptance of its operation by the Engineer
- PR1C07
Provision and
Maintenance of
Laboratory
Equipment** Payment of this pay item shall be made on a monthly basis and according to the breakdown submitted by the Contractor for its cost allocation for each item after the Engineer's acceptance of provision and maintenance of laboratory equipment.
- PR1C08
Provision,
Maintenance
and Services of
Boats for the
Engineer** Payment of this pay item shall be made on a monthly basis and according to the breakdown submitted by the Contractor after acceptance of the services by the Engineer.
- PR1C09 to 12
Provision of
Vehicles
Type-A, Type-B,
Type-C and
Type-D** Payment of this pay item shall be made on a lump sum basis upon hand-over of the vehicles and completion of necessary arrangements specified in Section 11100 of the Specifications and acceptance by the Engineer.
- PR1C13
Maintenance of
Vehicles Type-
A, B, C, and D** Payment of this pay item shall be made on a monthly basis for the services specified in Section 111000 of the Specifications and their acceptance by the Engineer.
- PR1C14
Provision and
Maintenance of
Engineer's
Survey
Equipment** Payment of this pay item shall be made on a monthly basis for the services specified in Section 11100 of the Specifications and their acceptance by the Engineer
- PR1D01
Demolition and
Clearance** Payment of this pay item shall be made on a lump sum basis upon completion of all the demolition and clearance work specified in Section 11200 of the Specifications. Partial payment shall be made based on the submitted breakdown indicating the costs for the demolition and clearance of temporary CEPA office and laboratory separately.

PR1E01
Additional
Geotechnical
Investigation

Payment of this pay item shall be made based on the number and length of geotechnical investigations based on the submitted breakdown and upon presentation of the geotechnical investigation report by the Contractor to the Engineer.

3. PREAMBLE FOR CIVIL WORKS (PC)

PC2A Dredging Work

For all items of 2A Dredging Work

The measurement of dredging quantities for payment shall be based on the net cubic volume of the voids formed by the removal of the material from within the limits of payments in the areas to be dredged. No payment will be made for any dredging carried out beyond the limits of payment. The limits of payment are:

- a) the seabed as surveyed during the pre-dredging survey and agreed with the Engineer prior to dredging;
- b) the level or levels shown on the Drawings or as instructed by the Engineer to which dredging is to be carried out;
- c) the side slopes at the limits of dredging as defined on the Drawings or as instructed by the Engineer.

The rates for dredging shall include all costs for:

- a) pre-dredging surveys, interim surveys and post-dredging surveys, and sweeping prior to issuance of the Taking-over Certificate.
- b) Removal and disposal of any debris and other objects encountered.
- c) Dredging of any material and removal of any sedimentation or siltation of the Works.
- d) Placing of dredged material which is suitable as fill material in reclamation areas when indicated by the Engineer, and haulage of unsuitable materials shall be carried out to offshore dumping and onshore dumping sites indicated by the Engineer, in accordance with the Specification.
- e) Controlling the amount of suspended soils in the discharge water from the dredging areas in accordance with the Specification.
- f) Relocation of live or dead sub-marine cables in accordance with the Specifications.

Dredging quantities for progress payments shall be measured as the net volume in cubic meter of the dredged bank executed to date within the limits of payment.

PC2A01 Offshore Dumping

2A01, 2A03, 2A05, 2A07, 2A08, 2A09, 2A10, 2A11 and 2A12

The dredged material shall be dumped at the offshore area indicated on the Drawings and in accordance with the Specification.

PC2A02 Onshore Dumping

2A02, 2A04 and 2A06

Dredging and onshore dumping shall include the costs of all reclamation, confinement, transport and disposal of fines, all other works and temporary works required for the adequate completion of the dredging and reclamation works in accordance with the Contract and to the satisfaction of the Engineer and insofar not included in other Items in the BOQ.

PC2A13 Temporary Revetment and Bund

Temporary revetment and bund for onshore dumping shall be constructed at the position shown on the Drawings. The Contractor shall submit the breakdown of temporary revetment and bund.

The cost of this Item shall include not only the construction cost but also the maintenance cost. The quantities of temporary revetment and bund shall be measured for payment by volume in cubic meter based on the Contractor's Drawings.

**PC2B
Container Berth
Work**

**PC2B01
Rubble Mound
of Caisson**

The quantities of rubble mound of caisson foundation shall be measured for payment by volume in cubic meter based on the Drawings.

Rubble mound work shall include supply, delivery, placing, compaction and trimming work by divers in accordance with the Specification.

**PC2B02
Asphalt Matt**

The quantities of asphalt matt work shall be measured for payment by area in square meter based on the Drawings. Asphalt matt work shall include supply, delivery, placing with overlap.

**PC2B03
Armor Stone**

The quantities of armor stone shall be measured for payment by volume in cubic meter based on the Drawings. Armor stone work shall include supply, delivery, placing and trimming work by divers.

**PC2B04
Caisson
Production**

The quantities of caisson production shall be measured for payment by the number of caissons based on the Drawings. The caisson production work consists of 4 items as follows;

1) Caisson production facility

A facility such as floating dock or dry dock shall be used for the production of caissons. The Contractor shall submit the breakdown of the production facility.

2) Scaffolding

Scaffolding work shall include supply of materials, fabrication and removal. The Contractor shall submit the breakdown of scaffolding work.

3) Reinforcement bar

Reinforcement bar work shall include supply of reinforcement bars as specified on the Drawings, cutting and bending, transportation to site, site assembly, temporary support, concrete spacers and all other related works. The Contractor shall submit the breakdown of reinforcement bar work.

4) Concrete

Concrete work shall include supply of concrete as specified on the Drawings, transportation to site, placing, curing, form, temporary support, roofing and all other items required for its proper performance. The Contractor shall submit the breakdown of concrete work.

**PC2B05
Temporary
Anchoring of
Caisson**

The quantities of temporary anchoring of caissons shall be measured for payment by the number of caissons. Caisson anchoring shall include mooring tools, launching, towing and all related works.

- PC2B06**
Placing of Caisson
The quantities of placing of caissons shall be measured for payment by the number of caissons. Caisson placing shall include launching, towing and all related works.
- PC2B07**
Sand Filling into Caisson
The quantities of sand filling work shall be measured for payment by volume in cubic meter based on the Drawings. Sand filling work shall include supply of sand and crushed stone as specified, delivery, placing and compact filling in caissons.
- PC2B08**
Cover Concrete of Caisson
The quantities of cover concrete work and all other related works shall be measured for payment by volume in cubic meter based on the Drawings.
- PC2B09**
Coping Concrete
The quantities of coping concrete work shall be measured for payment by volume in cubic meter based on the Drawings. Coping work shall include supply of concrete as specified, transportation to site, placing, curing, reinforcement bar, expansion joint, corner protection and form.
- PC2B10**
Apron Concrete Pavement
The quantities of apron concrete pavement work shall be measured for payment by area in square meter based on the Drawings. Concrete pavement work shall include supply of concrete as specified, transportation to site, placing, curing, expansion joint and all other related works.
- PC2B11**
Sand Protection Sheet
The quantities of sand protection sheet shall be measured for payment by length in meter based on the Drawings. Sand sheet protection work shall include supply, installation and all other related works.
- PC2B12**
Backfilling Behind Caisson
The quantities of back filling for caissons shall be measured for payment by volume in cubic meter based on the Drawings. Back filling for caisson shall include trimming work by divers and geotextile sheeting.
- PC2B13**
Driving of Steel Pipe Pile
The quantities of driving of steel pipe piles for crane rail foundation shall be measured for payment by number of piles based on the Drawings. Driving of steel pipe piles for crane rail foundation shall include supply of steel pipe piles as specified, transportation to site, temporary support, guide beam and all other items required for its proper execution.
- PC2B14**
Concrete of Crane Rail Foundation
The quantities of concrete work for crane rail foundation shall be measured for payment by volume in cubic meter based on the Drawings. Concrete work for crane rail foundation shall include supply of concrete as specified, transportation to site, placing, curing, expansion joint, reinforcement bar and form.
- PC2B15**
Crane Rail with Accessories
The quantities of crane rail with accessories shall be measured for payment by length in meter based on the Drawings. Crane rail with accessories shall include supply, transportation, installation and all other related works.
- PC2B16**
Cable Trench
The quantities of cable trench shall be paid for on a lump sum basis. Cable trench shall include manhole, cover of manhole and all other related works as specified on the Drawings. The Contractor shall submit the breakdown of cable trench work.
- PC2B17**
Jack-up Base for Crane
The quantities of jack-up base for crane shall be measured for payment by number based on the Drawings. Main elements of jack-up base for cranes are included in Package B, then the installation including cover and all other related works shall be carried out under this Package A as specified on the Drawings.
- PC2B18**
End Stopper for Crane
The quantities of end stoppers shall be measured for payment by number based on the Drawings. Main elements of end stopper are included in Package B, then the concrete work including cover and all other related works shall be carried out under this Package A as specified on the Drawings.

PC2B19 Socket Block for Crane	The quantities of socket blocks for cranes shall be measured for payment by number based on the Drawings. Main elements of socket block for cranes are included in Package B, then the concrete work including cover and all other related works shall be carried out under this Package A as specified on the Drawings.
PC2B20 Crane Anchoring Frame for Crane	The quantities of crane anchoring frames shall be measured for payment by number based on the Drawings. Main elements of crane anchoring frames for cranes are included in Package B, then the concrete work including cover and all other related works shall be carried out under this Package A as specified on the Drawings.
PC2B21 Fender for Container Berth	The quantities type A of fenders installation shall be measured for payment by number of fenders installed. Fender work shall include supply of fenders as specified, transportation to site, placing and all other related works.
PC2B22 Bollard for Container Berth	The quantities of bollard installation work for container berth shall be measured for payment by number of bollards installed. Bollard work shall include supply of 100-ton bollards as specified, transportation to site, placing and all other related works.
PC2B23 Ladder for Container Berth	The quantities of ladder installation work for container berth shall be measured for payment by number of ladders installed. The ladder type is rubber ladder with extension ladder and galvanized steel hand hole. Ladder work shall include supply of ladders as specified, transportation to site, placing and all other related works.
PC2C Multipurpose Berth Work	
PC2C01 Rubble Mound of Caisson	Same as 2B01
PC2C02 Asphalt Matt	Same as 2B02
PC2C03 Armor Stone	Same as 2B03
PC2C04 Caisson Production	Same as 2B04
PC2C05 Temporary Anchoring of Caisson	Same as 2B05
PC2C06 Placing of Caisson	Same as 2B06
PC2C07 Sand Filling into Caisson	Same as 2B07
PC2C08 Cover Concrete of Caisson	Same as 2B08
PC2C09 Coping Concrete	Same as 2B09

PC2C10 Apron Concrete Pavement	Same as 2B10
PC2C11 Sand Protection	Same as 2B11
PC2C12 Backfilling behind Caisson	Same as 2B12
PC2C13 Driving of Steel Pipe Pile	Same as 2B13
PC2C14 Concrete of Crane Rail Foundation	Same as 2B14
PC2C15 Crane Rail with Accessories	Same as 2B15
PC2C16 Cable Trench	Same as 2B16
PC2C17 End Stopper for Crane	The quantities of end stoppers for cranes shall be measured for payment by number based on the Drawings as same as in 2B17. End stopper work shall include manhole, cover work and sand filling in the manhole.
PC2C18 Socket Block for Crane	The quantities of socket blocks for cranes shall be measured for payment by number based on the Drawings as same as in 2B18. Socket block work shall be manhole, cover work and sand filling in the manhole.
PC2C19 Crane Anchoring Fram	The quantities of crane anchoring frames shall be measured for payment by number based on the Drawings as same as in 2B19. Crane anchoring frame work shall include manhole, cover work and sand filling in the manhole.
PC2C20 Fender for Multi-Purpose Berth	Same as 2B21
PC2C21 Bollard for Multi-Purpose Berth	Same as 2B22
PC2C22 Ladder for Multi-purpose Berth	Same as 2B23
PC2D Passenger Berth Work	

- PC2D01
Driving of Steel
Pipe Pile** The quantities of driving of steel pipe piles for passenger berth shall be measured for payment by number of piles based on the Drawings. Driving of steel pipe piles for passenger berth shall include supply of steel pipe piles as specified, transportation to site, temporary support, guide beam and all other items required for its proper execution.
- PC2D02
Superstructure** The quantities of superstructure for passenger berth shall be measured for payment by volume in cubic meter based on the Drawings. Superstructure work shall include supply of concrete as specified, transportation to site, placing, curing, reinforcement bar, corner protection, form, curb, plate, rib-band and all other related works.
- PC2D03
Corrosion-
Proofing** The quantities of corrosion-proof work shall be measured for payment by number based on the Drawings. Corrosion-proof work shall include supply of cathodic protection and petrolatum lining as specified, transportation to site, installation and all other works.
- PC2D04
Catwalk** The quantities of catwalk work shall be measured for payment by number based on the Drawings. Catwalk work shall include supply of catwalks as specified, transportation to site, installation and all other related works.
- PC2D05
Fender for
Passenger Berth** The quantities of type B and type C fenders installation shall be measured for payment by number of fenders installed. Fender work shall include supply of fenders as specified, transportation to site, placing and all other related works.
- PC2D06
Bollard for
Passenger Berth** The quantities of bollard installation for passenger berth shall be measured for payment by number of bollards a installed as shown on the Drawings.
Bollard work shall include supply of 100-ton bollards, 15-ton bitt and mooring rings as specified, transportation to site, placing and all other related works.
- PC2D07
Access Bridge
for Passenger
Berth** The quantities of access bridges for passenger berth shall be measured for payment by number of bridges installed. Access bridges work shall include supply of access bridges with lifting bar and corner angle as specified, transportation to site, placing, rubber shoe and all other related works.
- PC2D08
Ladder for
Passenger Berth** The quantities of ladders for passenger berth shall be measured for payment by number of ladders installed. The ladder type is rubber ladder with extension ladder and galvanized steel hand hole as shown on the Drawings. Ladder work shall include supply of ladders as specified, transportation to site, placing and all other related works.
- PC2E
Revetment
Work**
- P2E01
West Revetment** The quantities of west revetment work shall be measured for payment by length in meter based on the Drawings. The west revetment work consists of four items as follows:
- 1) Rubble stone including geotextile and leveling
Rubble stone work shall include supply of rubble stone as specified, transportation to site, placing, leveling, geotextile and all other related works.
 - 2) Armor stone
Armor stone work shall include supply of armor stone as specified, transportation to site, placing, leveling and all other related works.

3) Concrete block

Concrete block work shall include supply of concrete blocks with lifting bar as specified, transportation to site, placing and all other related works.

4) Concrete wall

Concrete wall work shall include supply of concrete as specified, transportation to site, placing, curing, form and all other related works.

**PC2E02
East Revetment**

The quantities of east revetment work shall be measured for payment by length in meter based on the Drawings. The east revetment work consists of three items as follows:

1) Rubble stone including geotextile and leveling

Rubble stone work shall include supply of rubble stone as specified, transportation to site, placing, leveling, geotextile and all other related works.

2) Armor stone

Armor stone work shall include supply of armor stone as specified, transportation to site, placing, leveling and all other related works.

3) Concrete wall

Concrete wall work shall include supply of concrete as specified, transportation to site, placing, curing, form and all other related works.

**PC2F
Reclamation
Work**

**PC2F01
Land
Reclamation by
Imported
Material**

The quantities of land reclamation shall be measured for payment by volume in cubic meter. In order to determine quantities for payment, the Contractor shall carry out bathymetric survey witnessed by the Engineer and submit to the Engineer the quantities of reclamation work based on the survey results for approval prior to reclamation commencement. Reclamation shall include fill material supplied from the land cutting material (only suitable one) behind the project site area and imported one and excess filling for provision for consolidation, and all other items required for its proper execution.

**PC2F02
Land
Reclamation by
Dredged
Material**

The quantities of reclamation by dredged material shall be included for payment in Items of dredging work and onshore dumping. Therefore, the quantities in this item shall be estimated only but not included in the cost. The dredged materials to be used for reclamation of the construction areas shall be selected suitable materials approved by the Engineer.

**PC2G
Pavement Work**

**PC2G01
Concrete
Pavement
Type 1**

The quantities of concrete pavement type 1 for RTG traffic lane shall be measured for payment by area in square meter based on the Drawings. Concrete pavement Type 1 for RTG traffic lane consists of five items as follows:

- 1) Subgrade preparation
Subgrade preparation work shall include leveling and compaction based on the Drawings.
- 2) Subbase course
Subbase course work shall include supply of crushed stone as specified, transportation to site, placing, leveling and compaction in accordance with the Specification.
- 3) Base course
Base course work shall include supply of crushed stone with cement treatment as specified, transportation to site, placing, leveling and compaction in accordance with the Specification.
- 4) Prime coating
Prime coating work shall include supply of asphalt primer coat as specified, transportation to site, placing and curing by sand in accordance with the Specification.
- 5) Concrete slab
Concrete slab work shall include supply of concrete as specified, transportation to site, placing, finishing, elas tigh board, filter, reinforcement, joint bar and all other related works.

**PC2G02
Concrete
Pavement
Type 2**

The quantities of concrete pavement type 2 shall be measured for payment by area in square meter based on the Drawings. Concrete pavement work consists of five items as follows:

- 1) Subgrade preparation
Subgrade preparation work shall include leveling and compaction based on the Drawings.
- 2) Subbase course
Subbase course work shall include supply of crushed stone as specified, transportation to site, placing, leveling and compaction in accordance with the Specification.
- 3) Base course
Base course work shall include supply of crushed stone with cement treatment as specified, transportation to site, placing, leveling and compaction in accordance with the Specification.
- 4) Prime coating
Prime coating work shall include supply of asphalt primer coat as specified, transportation to site, placing and curing by sand in accordance with the

Specification.

5) Concrete slab

Concrete slab work shall include supply of concrete as specified, transportation to site, placing, finishing, elas tigh board, filter, reinforcement, joint bar and all other related works.

**PC2G03
Asphalt
Concrete
Pavement
Type 3**

The quantities of asphalt concrete pavement type 3, work shall be measured for payment by area in square meter based on the Drawings.

Asphalt concrete pavement type 3 consists of seven items as follows:

1) Subgrade preparation

Subgrade preparation work shall include leveling and compaction based on the Drawings.

2) Subbase course

Subbase course work shall include supply of crushed stone as specified, transportation to site, placing, leveling and compaction in accordance with the Specification.

3) Base course

Base course work shall include supply of crushed stone with cement treatment as specified, transportation to site, placing, leveling and compaction in accordance with the Specification.

4) Prime coating

Prime coating work shall include supply of asphalt primer coat as specified, transportation to site, placing and curing by sand in accordance with the Specification.

5) Binder course

Binder course work shall include supply of coarse graded asphalt as specified, transportation to site, placing, leveling and all other related works.

6) Tack coating

Tack coating work shall include supply of asphalt primer tack coat as specified, transportation to site, placing and curing in accordance with the Specification.

7) Surface course

Surface course work shall include supply of dense graded asphalt as specified, transportation to site, placing, finishing and all other related works in accordance with the Specification.

**PC2G04
Macadam
Pavement
Type 4**

The quantities of macadam pavement type 4 shall be measured for payment by area in square meter based on the Drawings. Macadam pavement work consists of 4 items as follows:

1) Subgrade preparation

Subgrade preparation work shall include leveling and the compaction based on the Drawings.

2) Subbase course

Subbase course work shall include supply of crushed stone as specified, transportation to site, placing, leveling and compaction in accordance with the Specification.

3) Base course

Base course work shall include supply of crushed stone as specified, transportation to site, placing, leveling and compaction in accordance with the Specification.

4) Prime coating

Prime coating work shall supply of asphalt primer coat as specified, transportation to site, placing and curing by sand in accordance with the Specification.

**PC2G05
Macadam
Pavement
Type 5**

The quantities of macadam pavement type 5 shall be measured for payment by area in square meter based on the Drawings. Macadam pavement work consists of 4 items as follows:

1) Subgrade preparation

Subgrade preparation work shall include leveling and compaction based on the Drawings.

2) Subbase course

Subbase course work shall include supply of crushed stone as specified, transportation to site, placing, leveling and compaction in accordance with the Specification.

3) Base course

Base course work shall include supply of crushed stone as specified, transportation to site, placing, leveling and compaction in accordance with the Specification.

4) Prime coating

Prime coating work shall supply of asphalt primer coat as specified, transportation to site, placing and curing by sand in accordance with the Specification.

**PC2G06
Interlocking
Concrete Block
Pavement
Type 6**

The quantities of interlocking concrete block pavement type 6 for sidewalk shall be measured for payment by area in square meter based on the Drawings. Interlocking concrete block pavement type 6 work for sidewalk consists of four items as follows:

1) Subgrade preparation

Subgrade preparation work shall include leveling and compaction based on the Drawings.

2) Base course

Base course work shall include supply of crushed stone as specified, transportation to site, placing, leveling and compaction in accordance with the Specification.

3) Sand

Sand work shall include supply of sand as specified, transportation to site, placing and leveling in accordance with the Specification.

4) Interlocking concrete block

Interlocking concrete block work shall include supply of interlocking concrete blocks as specified, transportation to site, placing and compaction in accordance with the Specification.

**PC2G07
Gravel
Pavement**

The quantities of gravel pavement work shall be measured for payment by area in square meter based on the Drawings. Gravel pavement work consists of seven items as follows:

1) Gravel pavement

a) Subgrade preparation

Subgrade preparation work shall include leveling and compaction based on the Drawings.

b) Gravel pavement

Gravel pavement work shall include supply of crushed stone as specified, transportation to site, placing, leveling and compaction in accordance with the Specification.

2) Foundation for stacking plate

a) Subgrade preparation

Subgrade preparation work shall include leveling and compaction based on the Drawings.

b) Base course

Base course work shall include supply of crushed stone as specified, transportation to site, placing, leveling and compaction in accordance with the Specification.

- c) Lean concrete
Lean concrete work shall include supply of concrete as specified, transportation to site, placing and finishing in accordance with the Specification.
- 3) Concrete stacking plate type-A
 - a) Production of concrete stacking plates
Production of concrete stacking plates shall include supply of concrete and reinforcement bar as specified, fabrication, placing, curing, form and all other related works in accordance with the Specification.
 - b) Placing of concrete stacking plates
Placing of concrete stacking plates shall include transportation to site, placing and leveling in accordance with the Specification.
- 4) Concrete stacking plate type-B
 - a) Production of concrete stacking plates
Production of concrete stacking plates shall include supply of concrete and reinforcement bar as specified, fabrication, placing, curing, form and all other related works in accordance with the Specification.
 - b) Placing of concrete stacking plates
Placing of concrete stacking plates shall include transportation to site, placing and leveling in accordance with the Specification.
- 5) Concrete stacking plate type-C
 - a) Production of concrete stacking plates
Production of concrete stacking plates shall include supply of concrete and reinforcement bar as specified, fabrication, placing, curing, form and all other related works in accordance with the Specification.
 - b) Placing of concrete stacking plates
Placing of concrete stacking plates shall include transportation to site, placing and leveling in accordance with the Specification.
- 6) Concrete stacking plate type-D
 - a) Production of concrete stacking plates
Production of concrete stacking plates shall include supply of concrete and reinforcement bar as specified, fabrication, placing, curing, form and all other related works in accordance

with the Specification.

- b) Placing of concrete stacking plates

Placing of concrete stacking plates shall include transportation to site, placing and leveling in accordance with the Specification.

- 7) Concrete stacking plate type-E

- a) Production of concrete stacking plates

Production of concrete stacking plates shall include supply of concrete and reinforcement bar as specified, fabrication, placing, curing, form and all other related works in accordance with the Specification.

- b) Placing of concrete stacking plates

Placing of concrete stacking plates shall include transportation to site, placing and leveling in accordance with the Specification.

**PC2G08
Topsoil and
Grassing**

The quantities of topsoil and grassing work shall be measured for payment by area in square meter based on the Drawings. Topsoil and grassing work consists of two items as follows:

- 1) Topsoil

Topsoil work shall include supply of suitable soil for grassing as indicated by the Engineer, placing and leveling.

- 2) Grassing

Grassing work shall include supply of grass as indicated by the Engineer and placing.

**PC2G09
Concrete Curb
Type 1**

The quantities of concrete curb type 1 shall be measured for payment by length in meter based on the Drawings. Concrete curb type 1 work consists of two items as follows:

- 1) Production of curbs

Production of curbs shall include supply of concrete as specified, placing, curing, form and all other related works.

- 2) Placing of curbs

Placing of curbs shall include transportation to site, placing, leveling and connection by mortar in accordance with the Specification.

**PC2G10
Concrete Curb
Type 2**

The quantities of concrete curb type 2 shall be measured for payment by length in meter based on the Drawings. Concrete curb type 2 consists of two items as follows:

- 1) Production of curbs
Production of curbs shall include supply of concrete as specified, placing, curing, form and all other related works.
 - 2) Placing of curbs
Placing of curbs shall include transportation to site, placing, leveling and connection by mortar in accordance with the Specification.
The quantities of concrete curb type 3 shall be measured for payment by length in meter based on the Drawings. Concrete curb type 3 consists of two items as follows:
 - 1) Production of curbs
Production of curbs shall include supply of concrete as specified, placing, curing, form and all other related works.
 - 2) Placing of curbs
Placing of curbs shall include transportation to site, placing, leveling and connection by mortar in accordance with the Specification.
- PC2G11
Concrete Curb
Type 3**
- PC2G12
Traffic Marking**
The quantities of traffic marking work shall be measured for payment by area in square meter based on the Drawings. Traffic marking shall be clearly and neatly painted in white or other color as approved by the Engineer. The surface to be marked out shall be clean and dry.
- PC2G13
Traffic Sign
Board**
The quantities of traffic sign boards shall be measured for payment by in lump sum based on the Drawings. The marking shall be clearly and neatly painted in white or other color as approved by the Engineer. Traffic sign boards consist of three items as follows:
 - 1) Guide post
The quantities of guide posts shall be measured for payment by number of guide posts based on the Drawings.
 - 2) Sign post
The quantities of signs posts shall be measured for payment by the number of sign posts based on the Drawings.
 - 3) Road sign
The quantities of road sign shall be measured for payment by area in square meter based on the Drawings.
- PC2H
Drainage Work**
- PC2H01
Pipe Culvert 457
mm**
The quantities of pipe culverts dia. 457 mm shall be measured for payment by length in meter based on the Drawings.
Pipe culvert dia. 457 mm work consists of five items as follows:

- 1) Excavation and disposal
Excavation and disposal work shall include excavation and disposal of extra material for backfilling at the disposal area indicated by the Engineer.
- 2) Crushed stone for foundation
Crushed stone work for foundation shall include supply of crushed stone as specified, transportation to site, placing, leveling and compaction in accordance with the Specification.
- 3) Lean concrete
Lean concrete work shall include supply of concrete as specified, transportation to site, placing and finishing in accordance with the Specification.
- 4) Installation of drainage pipe
Installation of drainage pipe work shall include supply of drainage pipe as specified, transportation to site, placing, connection and all other related works in accordance with the Specification.
- 5) Sand backfill and compaction
Sand backfill and compaction work shall include supply of sand as specified, transportation to site, placing, leveling and compaction in accordance with the Specification.

PC2H02
Pipe Culvert
610 mm

The quantities of pipe culvert dia. 610 mm shall be measured for payment by length in meter based on the Drawings.

Pipe culvert dia, 610 mm work consists of five items as follows:

- 1) Excavation and disposal
Excavation and disposal work shall include excavation and disposal of extra material for backfilling at the disposal area indicated by the Engineer.
- 2) Crushed stone for foundation
Crushed stone work for foundation shall include supply of crushed stone as specified, transportation to site, placing, leveling and compaction in accordance with the Specification.
- 3) Lean concrete
Lean concrete work shall include supply of concrete as specified, transportation to site, placing and finishing in accordance with the Specification.
- 4) Installation of drainage pipe
Installation of drainage pipe work shall include supply of drainage pipes as

specified, transportation to site, placing, connection and all other related works in accordance with the Specification.

5) Sand backfill and compaction

Sand backfill and compaction work shall include supply of sand as specified, transportation to site, placing, leveling and compaction in accordance with the Specification.

PC2H03
Pipe culvert
762 mm

The quantities of pipe culvert dia. 762 mm shall be measured for payment by length in meter based on the Drawings.

Pipe culvert dia. 762 mm work consists of five items as follows;

1) Excavation and disposal

Excavation and disposal work shall include excavation and disposal of extra material for backfilling at the disposal area indicated by the Engineer.

2) Crushed stone for foundation

Crushed stone work for foundation shall include supply of crushed stone as specified, transportation to site, placing, leveling and compaction in accordance with the Specification.

3) Lean concrete

Lean concrete work shall include supply of concrete as specified, transportation to site, placing and finishing in accordance with the Specification.

4) Installation of drainage pipe

Installation of drainage pipe work shall include supply of drainage pipes as specified, transportation to site, placing, connection and all other related works in accordance with the Specification.

5) Sand backfill and compaction

Sand backfill and compaction work shall include supply of sand as specified, transportation to site, placing, leveling and compaction in accordance with the Specification.

PC2H04
Pipe culvert
1219 mm

The quantities of pipe culvert dia. 1219 mm shall be measured for payment by length in meter based on the Drawings.

Pipe culvert dia. 1219 mm consists of five works as follows:

1) Excavation and disposal

Excavation and disposal work shall include excavation and disposal of extra material for backfilling at the disposal area indicated by the Engineer.

2) Crushed stone for foundation

Crushed stone work for foundation shall include supply of crushed stone as

specified, transportation to site, placing, leveling and compaction in accordance with the Specification.

3) Lean concrete

Lean concrete work shall include supply of concrete as specified, transportation to site, placing and finishing in accordance with the Specification.

4) Installation of drainage pipe

Installation of drainage pipe work shall include supply of drainage pipes as specified, transportation to site, placing, connection and all other related works in accordance with the Specification.

5) Sand backfill and compaction

Sand backfill and compaction work shall include supply of sand as specified, transportation to site, placing, leveling and compaction in accordance with the Specification.

**PC2H06
Diversion Canal
Type A**

The quantities diversion canal of type A shall be measured for payment by length in meter based on the Drawings.

Diversion canal type A work consists of six items as follows:

1) Excavation and disposal

Excavation and disposal work shall include excavation and disposal of extra material for backfilling at the disposal area indicated by the Engineer.

2) Placing of stone and sodding

Placing of stone and sodding work shall include supply of clay, crushed stone and concrete as specified, transportation to site, placing, leveling, compaction and masonry work in accordance with the Specification.

3) Outlet

Outlet work shall include excavation, disposal and placing work as mentioned above in accordance with the Specification.

4) Canal branch A-1

Canal branch A-1 work shall include excavation, disposal and placing work as mentioned above in accordance with the Specification.

5) Canal branch A-2

Canal branch A-2 work consists of six items as follows:

a) Excavation and disposal
Same as 1)

b) Crushed stone for foundation

- Same as 2H05-2)
 - c) Lean concrete
Same as 2H05-3)
 - d) Reinforcement bar
Reinforcement bar work shall include supply of reinforcement bar as specified, bar bending, bar cutting, transportation to site, fabrication and placing in accordance with the Specification.
 - e) Concrete placing
Concrete placing work shall include supply of concrete as specified, transportation to site, placing and finishing in accordance with the Specification.
 - f) Sand backfill and compaction
Same as 2H05-5)
- 6) Catch basin
- Catch basin work consists of two items as follows:
- a) Excavation and disposal
Excavation and disposal work shall include excavation and disposal of extra material for backfilling at the disposal area indicated by the Engineer.
 - b) Placing of stone
Placing of stone work shall include supply of clay, crushed stone and concrete as specified, transportation to site, placing, leveling, compaction and masonry work in accordance with the Specification.

PC2H07
Diversion Canal
Type B

The quantities of diversion canal type B shall be measured for payment by length in meter based on the Drawings.

Diversion canal type B work consists of four items as follows:

- 1) Excavation and disposal
Excavation and disposal work shall include excavation and disposal of extra material for backfilling at the disposal area indicated by the Engineer.
- 2) Placing of stone and sodding
Placing of stone and sodding work shall include supply of clay, crushed stone and concrete as specified, transportation to site, placing, leveling, compaction and masonry work in accordance with the Specification.
- 3) Outlet
Outlet work shall include excavation, disposal and placing work as mentioned above in accordance with the Specification.
- 4) Canal branch
Same as PC2H06-5)

PC2H08
Manhole with
Concrete Cover
Type 1

The quantities of manhole type 1 with concrete covers shall be measured for payment by number of manholes installed based on the Drawings.

Manhole Type 1 with concrete cover work consists of seven items as follows:

- 1) Excavation and disposal
Excavation and disposal work shall include excavation and disposal of extra material for backfilling at the disposal area indicated by the Engineer.
- 2) Crushed stone for foundation
Crushed stone work for foundation shall include supply of crushed stone as specified, transportation to site, placing, leveling and compaction in accordance with the Specification.
- 3) Lean concrete
Lean concrete work shall include supply of concrete as specified, transportation to site, placing and finishing in accordance with the Specification.
- 4) Reinforcement bar
Reinforcement bar work shall include supply of reinforcement bars as specified, bar bending, bar cutting, transportation to site, fabrication and placing in accordance with the Specification.
- 5) Corner angle
Corner angle work shall include supply of angles as specified, transportation to site, fabrication and placing in accordance with the Specification.
- 6) Concrete placing
Concrete placing work shall include supply of concrete as specified, transportation to site, placing and finishing in accordance with the Specification.
- 7) Sand backfill and compaction
Sand backfill and compaction work shall include supply of sand as specified, transportation to site, placing, leveling and compaction in accordance with the Specification.

PC2H09
Manhole with
Concrete Cover
Type 2-A

The quantities of manhole type 2-A with concrete covers shall be measured for payment by number of manholes installed based on the Drawings.

Manhole Type 2-A with concrete cover work consists of seven items as follows:

- 1) Excavation and disposal
Excavation and disposal work shall include excavation and disposal of extra material for backfilling at the disposal area indicated by the Engineer.
- 2) Crushed stone for foundation

Crushed stone work for foundation shall include supply of crushed stone as specified, transportation to site, placing, leveling and compaction in accordance with the Specification.

3) Lean concrete

Lean concrete work shall include supply of concrete as specified, transportation to site, placing and finishing in accordance with the Specification.

4) Reinforcement bar

Reinforcement bar work shall include supply of reinforcement bars as specified, bar bending, bar cutting, transportation to site, fabrication and placing in accordance with the Specification.

5) Corner angle

Corner angle work shall include supply of angles as specified, transportation to site, fabrication and placing in accordance with the Specification.

6) Concrete placing

Concrete placing work shall include supply of concrete as specified, transportation to site, placing and finishing in accordance with the Specification.

7) Sand backfill and compaction

Sand backfill and compaction work shall include supply of sand as specified, transportation to site, placing, leveling and compaction in accordance with the Specification.

**PC2H10
Manhole -B with
Grating Cover
Type 2**

The quantities of manhole type 2-B with grating covers shall be measured for payment by number of manholes installed based on the Drawings.

Manhole Type 2-B with grating cover work consists of seven items as follows:

1) Excavation and disposal

Excavation and disposal work shall include excavation and disposal of extra material for backfilling at the disposal area indicated by the Engineer.

2) Crushed stone for foundation

Crushed stone work for foundation shall include supply of crushed stone as specified, transportation to site, placing, leveling and compaction in accordance with the Specification.

3) Lean concrete

Lean concrete work shall include supply of concrete as specified, transportation to site, placing and finishing in accordance with the

Specification.

4) Reinforcement bar

Reinforcement bar work shall include supply of reinforcement bars as specified, bar bending, bar cutting, transportation to site, fabrication and placing in accordance with the Specification.

5) Corner angle

Corner angle work shall include supply of angles as specified, transportation to site, fabrication and placing in accordance with the Specification.

6) Concrete placing

Concrete placing work shall include supply of concrete as specified, transportation to site, placing and finishing in accordance with the Specification.

7) Sand backfill and compaction

Sand backfill and compaction work shall include supply of sand as specified, transportation to site, placing, leveling and compaction in accordance with the Specification.

PC2H11

**Manhole Type
2-C with
Grating Cover
and Concrete
Cover**

The quantities of manhole type 2-C with grating covers and concrete covers shall be measured for payment by number of manholes installed based on the Drawings.

Manhole Type 2-C with grating cover and concrete cover work consists of seven items as follows:

1) Excavation and disposal

Excavation and disposal work shall include excavation and disposal of extra material for backfilling at the disposal area indicated by the Engineer.

2) Crushed stone for foundation

Crushed stone work for foundation shall include supply of crushed stone as specified, transportation to site, placing, leveling and compaction in accordance with the Specification.

3) Lean concrete

Lean concrete work shall include supply of concrete as specified, transportation to site, placing and finishing in accordance with the Specification.

4) Reinforcement bar

Reinforcement bar work shall include supply of reinforcement bars as specified, bar bending, bar cutting, transportation to site, fabrication and placing in accordance with the Specification.

- 5) Corner angle
Corner angle work shall include supply of angles as specified, transportation to site, fabrication and placing in accordance with the Specification.
- 6) Concrete placing
Concrete placing work shall include supply of concrete as specified, transportation to site, placing and finishing including grating cover in accordance with the Specification.
- 7) Sand backfill and compaction
Sand backfill and compaction work shall include supply of sand as specified, transportation to site, placing, leveling and compaction in accordance with the Specification.

**PC2H12
Trench
Type 1 without
Cover**

The quantities of trench type 1 without cover shall be measured for payment by length in meter based on the Drawings.

Trench type 1 without cover work consists of five items as follows:

- 1) Excavation and disposal
Excavation and disposal work shall include excavation and disposal of extra material for backfilling at the disposal area indicated by the Engineer.
- 2) Crushed stone for foundation
Crushed stone work for foundation shall include supply of crushed stone as specified, transportation to site, placing, leveling and compaction in accordance with the Specification.
- 3) Reinforcement bar
Reinforcement bar work shall include supply of reinforcement bars as specified, bar bending, bar cutting, transportation to site, fabrication and placing in accordance with the Specification.
- 4) Concrete placing
Concrete placing work shall include supply of concrete as specified, transportation to site, placing and finishing in accordance with the Specification.
- 5) Sand backfill and compaction
Sand backfill and compaction work shall include supply of sand as specified, transportation to site, placing, leveling and compaction in accordance with the Specification.

PC2H13
Trench with
Concrete Cover
Type 1

The quantities of trench type 1 with concrete covers shall be measured for payment by length in meter based on the Drawings.

Trench type 1 with concrete cover work consists of five items as follows:

1) Excavation and disposal

Excavation and disposal work shall include excavation and disposal of extra material for backfilling at the disposal area indicated by the Engineer.

2) Crushed stone for foundation

Crushed stone for foundation work shall include supply of crushed stone as specified, transportation to site, placing, leveling and compaction in accordance with the Specification.

3) Reinforcement bar

Reinforcement bar work shall include supply of reinforcement bars as specified, bar bending, bar cutting, transportation to site, fabrication and placing in accordance with the Specification.

4) Concrete placing

Concrete placing work shall include supply of concrete as specified, transportation to site, placing and finishing in accordance with the Specification.

5) Sand backfill and compaction

Sand backfill and compaction work shall include supply of sand as specified, transportation to site, placing, leveling and compaction in accordance with the Specification.

PC2H14
Trench Type 1
with Grating
Cover

The quantities of trench type 1 with grating cover shall be measured for payment by length in meter based on the Drawings.

Trench type 1 with grating cover work consists of five items as follows:

1) Excavation and disposal

Excavation and disposal work shall include excavation and disposal of extra material for backfilling at the disposal area indicated by the Engineer.

2) Crushed stone for foundation

Crushed stone work for foundation shall include supply of crushed stone as specified, transportation to site, placing, leveling and compaction in accordance with the Specification.

3) Reinforcement bar

Reinforcement bar work shall include supply of reinforcement bars as specified, bar bending, bar cutting, transportation to site, fabrication and placing in accordance with the Specification.

4) Concrete placing

Concrete placing work shall include supply of concrete as specified, transportation to site, placing and finishing in accordance with the Specification.

5) Sand backfill and compaction

Sand backfill and compaction work shall include supply of sand as specified, transportation to site, placing, leveling and compaction in accordance with the Specification.

PC2H15
Trench Type 2
without Cover

The quantities of trench type 2 without cover shall be measured for payment by length in meter based on the Drawings.

Trench type 2 without cover work consists of five items as follows:

1) Excavation and disposal

Excavation and disposal work shall include excavation and disposal of extra material for backfilling at the disposal area indicated by the Engineer.

2) Crushed stone for foundation

Crushed stone work for foundation shall include supply of crushed stone as specified, transportation to site, placing, leveling and compaction in accordance with the Specification.

3) Reinforcement bar

Reinforcement bar work shall include supply of reinforcement bars as specified, bar bending, bar cutting, transportation to site, fabrication and placing in accordance with the Specification.

4) Concrete placing

Concrete placing work shall include supply of concrete as specified, transportation to site, placing and finishing in accordance with the Specification.

5) Sand backfill and compaction

Sand backfill and compaction work shall include supply of sand as specified, transportation to site, placing, leveling and compaction in accordance with the Specification.

PC2H16
Trench Type 2
with Concrete
Cover

The quantities of trench type 2 with concrete covers shall be measured for payment by length in meter based on the Drawings.

Trench type 2 with concrete cover work consists of five items as follows:

1) Excavation and disposal

Excavation and disposal work shall include excavation and disposal of extra material for backfilling at the disposal area indicated by the Engineer.

- 2) Crushed stone for foundation
Crushed stone work for foundation shall include supply of crushed stone as specified, transportation to site, placing, leveling and compaction in accordance with the Specification.
- 3) Reinforcement bar
Reinforcement bar work shall include supply of reinforcement bars as specified, bar bending, bar cutting, transportation to site, fabrication and placing in accordance with the Specification.
- 4) Concrete placing
Concrete placing work shall include supply of concrete as specified, transportation to site, placing and finishing in accordance with the Specification.
- 5) Sand backfill and compaction
Sand backfill and compaction work shall include supply of sand as specified, transportation to site, placing, leveling and compaction in accordance with the Specification.

**PC2H17
Trench Type 2
with Grating
Cover**

The quantities of trench type 2 with grating covers shall be measured for payment by length in meter based on the Drawings.

Trench type 2 with grating cover work consists of five items as follows:

- 1) Excavation and disposal
Excavation and disposal work shall include excavation and disposal of extra material for backfilling at the disposal area indicated by the Engineer.
- 2) Crushed stone for foundation
Crushed stone work for foundation shall include supply of crushed stone as specified, transportation to site, placing, leveling and compaction in accordance with the Specification.
- 3) Reinforcement bar
Reinforcement bar work shall include supply of reinforcement bars as specified, bar bending, bar cutting, transportation to site, fabrication and placing in accordance with the Specification.
- 4) Concrete placing
Concrete placing work shall include supply of concrete as specified, transportation to site, placing and finishing in accordance with the Specification.
- 5) Sand backfill and compaction

Sand backfill and compaction work shall include supply of sand as specified, transportation to site, placing, leveling and compaction in accordance with the Specification.

PC2I

Navigation Aids

- PC2I01
Lighthouse** The quantities of lighthouse shall be measured for payment by number of lighthouse installed. Lighthouse work shall include supply of lighthouse as specified, transportation to site, erection, base concrete and all other related works as specified on the Drawings.
- PC2I02
Light Beacon** The quantities of light beacons shall be measured for payment by number of beacons installed. Light beacon work shall include supply of light beacons as specified, transportation to site, placing, base concrete and all other works as specified on the Drawings.
- PC2I03
Channel
Entrance
Marker Buoy** The quantities of channel entrance marker buoys shall be measured for payment by number of buoys installed. Channel entrance marker buoy work shall include supply of buoys as specified, transportation to site, placing, sinkers, mooring chains and all other works as specified on the Drawings.
- PC2I04
Channel Marker
Buoy (high
wave)** The quantities of channel marker buoys (high wave) shall be measured for payment by numbers of buoys installed. Channel marker buoy (high wave type) work shall include supply of buoys as specified, transportation to site, placing, sinkers, mooring chains and all other works as specified on the Drawings.
- PC2I05
Channel Marker
Buoy** The quantities of channel marker buoys shall be measured for payment by numbers of buoys installed. Channel marker buoy work shall include supply of buoys as specified, transportation to site, placing, sinkers, mooring chains and all other works as specified on the Drawings.
- PC2I06
Basin Marker
Buoy** The quantities of basin marker buoys shall be measured for payment by number of buoys installed. Basin marker buoy work shall include supply of buoys as specified, transportation to site, placing, sinkers, mooring chains and all other works as specified on the Drawings.
- PC2I07
AIS Base Unit
and VTS
Display** The quantities of AIS base unit and VTS display shall be measured for payment by number of unit installed. AIS base unit and VTS display work shall include supply of instruments as specified, adjustment and placing as indicated by the Engineer.
- PC2I08
Spare Parts for
Five Years** The tender price of all the spare parts for Item 2I01 Item 2I08 shall be based on the delivery at the La Union Port.
- PC2I09
VHF Radio** The quantities of VHF radio shall be measured for payment by number of radio set installed. VHF radio work shall include supply of instruments as specified, adjusting and placing as indicated by the Engineer.
- PC2I10
Anemometer** The quantities of anemometer shall be measured for payment by numbers of anemometer installed. Anemometer work shall include supply of anemometer as specified and placing as indicated by the Engineer.
- PC2I11
Barometer** The quantities of barometer shall be measured for payment by numbers of barometer installed. Barometer work shall include supply of barometer as specified and placing as indicated by the Engineer.

PC2I12 The quantities of clocks shall be measured for payment by number of clock installed.
Clock Clock work shall include supply of clock as specified and placing as indicated by the
Engineer.

PC2I13 The quantities of binoculars shall be measured for payment by number of binocular
Binocular provided.

PC2J

**Supply and
Installation of
Security Fence**

PC2J01 The quantities of security fence shall be measured for payment by length in meter
Security Fence based on the Drawings. Security fence work shall include supply of gates and fences
as specified, transportation to site and installation.

4. PREAMBLE FOR BUILDING WORKS (PB)

PB001
General

Building Materials and Works

All the building works shall include materials specified in the BOQ and Specification, and also labor cost, equipment, temporary works, transportation cost, testing and all the other related works needed to complete.

The work items for payment shall be applied to all the buildings individually.

PB002
Earthworks

Excavation for foundation and other structures below the existing ground level shall be measured by volume in cubic meter. The excavation lines may be showed on the drawings and shall as such serve as payment limits for the excavation works. Where excavation lines are not explicitly shown on drawings the lowest plane level of the excavation shall be deemed as equal to the lowest point of the structure or lean concrete used below the structure. This horizontal plane shall be extended to 1.5 m in the case the excavation depth is 3 m or more and to a half of excavation depth in the case the excavation depth is less than 3 m outside the vertical outline of the structure. From the thus defined lower excavation plane shall the excavation slopes shall be deemed to have an angle of 45 degrees until the intersection line with the existing ground level. Where a structure has several levels or is overlapping another structure the above measurement pattern shall be repeated for the full structure.

Excavation rates shall, whether explicit by or implicit by defined, include cost for transport and proper disposal of surplus soil or transport to an intermediate depot for the soil to be used for backfilling.

The rate shall also include the cost for watering, if any, of the excavation during the construction time.

Backfill shall include supply of suitable soil material as stipulated in Section 20500 of the Technical Specification, Volume III-A, transportation and compaction whether specified or not, and the item shall be measured by placed volume of material in cubic meter.

Bedding of rubble or crushed stones for foundation shall be included and be measured by volume in cubic meter.

PB003
Pile Works

The unit of measurement for precast prestressed concrete piles including test piles will be the linear meter of pile furnished, driven and accepted in the structure. The pay lengths of the satisfactorily driven piles will be measured from the pile tip to the cut-off.

Cut-off lengths will not be measured for payment.

The quantities of steel reinforcement or prestressing wire or strand required in concrete piling, including the length extending into pile caps, footings or braced beams, will not be paid for separately but will be considered as included in the Contract unit price per linear meter for concrete piles, unless otherwise specified by the Engineer.

Precast prestressed concrete piles shall be paid for at respective Contract unit prices per linear meter, complete in place, which prices shall include all materials, including reinforcement, prestressing strand, hardware, furnishing, formwork, driving, cutting off, splicing, welding, coupling, if any, and all related equipment including rigs, cranes, boilers, hammers, jets, leads stressing, jacks and tools, as well as labor and all other incidentals necessary for the satisfactory completion of the

works.

The length of each pile described in th Pay Items shall be tentative. The final length shall be determined by the Engineer based on the result of the geological survey and load tests or the driving records.

PB004
Concrete and
Formworks

- a) Concrete shall be measured by volume in cubic meter, but in separate items with concrete strength.
- b) Reinforcement shall be measured by weight in kilogram or ton.
- c) Formworks shall be measured by area in square meter.

PB005
Structural Steel
Works

The quantities of steel frames and major structures shall be measured by weight in ton of the installed structure. No addition shall be made for waste and cut of steel profiles, etc. during manufacturing.

The major steel items are generally separated into 4 sub items

- a) Manufacture and delivery on site, including all plates, cleats and other items necessary for assembling the structural items, or a part of the structure, whether welded or bolted. All cost for transportation to and from painting and galvanizing workshop, and handling with crane during the manufacturing and delivery shall be included in this item.
- b) Painting at workshop and at site, including all preparations of surface, sandblasting, priming, handling and storage.
- c) Installation and erection of steel on site, including welding and bolting on site, and including all labor, crane, scaffolding, temporary bracing and other necessary items. Grouting underneath foot-plates, installation of bolts embedded in concrete structures, and all such necessary permanent or temporary templates required for the correct spacing of the bolts shall be included in this item.
- d) For items to be galvanized the rate shall include treatment and preparation of surface before and after galvanizing and handling and storage at workshops

PB006
Masonry Works

The measurement of masonry shall be made by volume in cubic meter or by area in square meter, whichever is applied in the BOQ.

Concrete block masonry works shall include reinforced concrete lintel and stud as specified on the Drawings.

The prices for masonry shall include raw material i.e. red brick, prices of concrete block or the like, bedding mortar, steel bar for anchor and tie, pointing plaster, fungicide spray paint, if needed as stated on the Drawings and Specifications.

PB007
Waterproofing
Works

The measurement of waterproofing work shall be made by area covered in square meter or by volume of protection concrete or mortar as may respectively be stated in the BOQ.

The prices shall include surface finishing with concrete or mortar for plastering with slope and expansion joints as shown on the Drawings and as required in the Specifications.

**PB008
Tile Works**

The measurement of ceramic tiles, granite stone tiles, non-slip tiles shall be made the area in square meter.

The measurement of non-slip tiles for step nosing shall be made the length in meter.

The measurement of granite stone tiles for shelf-top in toilet shall be made by area in square meter or by the length in meter, whichever specified in the BOQ.

The rates for tile works shall include mortar for leveling, adhesive material, i.e. fixing cement or glue and grout material for joint sealing, i.e. special grouting and pointing cement.

**PB009
Plastering
Works**

The measurement of plastering works shall be made by area of walls and floors in square meter, or by length of skirtings in linear meter.

Plastering shall include surface preparation and grooving, if any, to complete the walls to be ready for painting.

**PB010
Door and
Window Works**

The measurement of doors (including sliding doors and overhead doors) and windows shall, as may respectively be defined in the B OQ be made either.

a) by number; or

b) by area in square meter of the gross area in the wall to be filled in by the item.

The prices for doors and windows shall include finished frame, finished door and window leaves, glass and glazing seals, hardware, insect screens, accessories and paint, galvanizing or anodize finish for steel, wooden and aluminum doors and windows respectively. All such sealings, gaskets and flashes between wall and window or door required to render the item watertight shall be included. Frames and rails necessary for the operation and support of swinging and overhead doors shall be included.

**PB011
Painting Works**

The measurement of painting shall be made by area covered in square meter. Each unit area to be painted shall be counted only once, but shall receive the number of priming, sealing and base coats layer as stated in the Specification. Openings with area less than 0.10 m² will not be deducted.

**PB012
Carpentry and
Joinery Works**

The quantities of wooden skirtings, door frames, handrails, and blind boxes shall be measured by length in meter, and partition screens shall be measured by area in square meter.

The rates of partition screens shall include panels, doors, metal foot stands, overhead tie bars, wall angle brackets, necessary fixing materials, hardware, and all accessories.

**PB013
Interior
Finishing Works**

The measurement of suspended ceilings and light weight walls shall be made by the area in square meter.

The rates of suspended ceilings shall include suspension, fittings, fixing materials, surface preparation and painting complete as shown on the Drawings and as required in the Specifications. For all ceilings the rates shall include all provisions for maintenance access to installations, etc. above the ceiling.

The unit rate of lightweight walls shall include metal framing for support of the wall,

all necessary fittings and fixing materials, scaffolding and necessary equipment.

PB014
Miscellaneous
Metal Works

The measurement of formed steel roof sheet, formed steel wall sheet, cable trench covers, metal wire mesh sheets for bird prevention shall be made by area in square meter.

The measurement of stainless steel handrails, steel handrails, roof gutters shall be made by length in meter.

The measurement of roof drains, floor drain, steel ladders, steel caged ladders, door mats, parapet rings, manhole covers, rope ladders shall be made by number.

The measurement for payment of fittings for the disabled shall be made by lump sum.

The prices of formed steel roof sheet shall include ridges on top of roof, fascia cover, flashing at necessary places or as shown on the Drawings, foam filling of joints where specified on the Drawings, overlap material complete with fixing materials, i.e. hook bolt, blind rivet or the like.

The prices of formed steel wall sheets shall include steel frame, protective coating and paint finish for steel frames, aluminum flashing at necessary place or as shown on the Drawings, overlap material, complete with fixing materials.

The price of roof gutter shall include necessary brackets, plates for bedding of zinc plate, fittings, fixing materials, protective coating for zinc plates, protective coating and oil paint finish for steel plates.

The prices of cable trench covers, steel handrails, steel ladders, parapet rings, manhole covers, roof drains, floor drains shall include all fixing materials, protective coating and oil paint finish as specified on the Drawings or Specifications.

PB015
Miscellaneous
Works

The measurement of corrugated cement fiber board, roof insulation shall be made by area in square meter.

The measurement of expansion joint filler, shower curtain rails shall be made by length in meter.

The measurement of rainwater downpipes shall be made by length in meter installed up to the nearest drainage as shown on the Drawings.

The prices of PVC pipes shall include bends, sockets, screens, paints, fitting and fixing materials, i.e. clamps, glue, etc.

The measurement for payment of room name plates shall be made by number or as specified in the BOQ.

PB016
Outdoor Works

Measurement for payment of the plant boxes and drain ditches shall be made by length in meters of the wall lines constructed in accordance with the Drawings and the Specifications and as directed by the Engineer.

The prices of plant boxes shall include supply and installation of concrete block walls, foundation concrete, cement plastering, PVC 50 mm Ø drain pipes, and slate stone finishing or painting, and any other related works.

Measurement for payment of planting and turfing shall be made on lump sum in

accordance with the Drawings and Specifications and as directed by the Engineer.

The prices shall include construction of concrete, masonry or rock borders, supply and furnishing of top-soil, fertilizing, planting of trees and flower, turfing and any other related works.

Measurement for payment of catch basin shall be made by number of basis constructed in accordance with the Drawings and Specifications and as directed by the Engineer.

The prices shall include construction of concrete walls, foundation, covers and any other related works.

The measurement of parking shed and guard boxes shall be made by lump sum in accordance with the Drawings and Specifications and as directed by the Engineer.

The rate shall include all the related works specified in the Drawings and Specifications.

The measurement for payment of gravel bedding shall be made by volume in cubic meter.

The measurement for payment of interlocking block shall be made by area in square meter.

The rate shall include sand base and compacted gravel base.