

5. PREAMBLE FOR UTILITY WORKS (PU)

PU40

(1) Scope

General

Utility Works are classified by function under appropriate the following Sections:

- 40: General
- 4A: Firefighting System
- 4B: Water Supply System
- 4C: Wastewater and Sewer System
- 4D: Ventilation and Air-conditioning
- 4E: Plumbing and Sanitary Appliances
- 4F: Transmission Line and substation
- 4G: Emergency Power Generation Equipment
- 4H: Power Distribution Equipment
- 4I: Cabling and Piping
- 4J: Area Lighting System
- 4K: Fire Alarm System
- 4L: Telephone/Data Network
- 4M: Electrical Works for Buildings
- 4N: Miscellaneous Equipment
 - 4N01 Fuel Supply
 - 4N02 Elevator
 - 4N03 Overhead Crane
 - 4N04 Weighing Bridge
 - 4N05 Weigh Scale

Each section is then subdivided into Sub-Sections to cover all the respective Pay Items of the Bill of Quantities as detailed below.

PU4A Firefighting System

PU4A01

(1) Scope

Pipe Work

This Sub-Section covers Pay Items; 4A0101 and 4A0102.

The works shall include supply, installation, testing, disinfection and flushing of pipelines and shall be applicable to the Firefighting and Water Supply System in the

Administration Building, which shall consist of the whole system from the Stationary Fire Pump to the indoor hydrants.

Pipelines for the outdoors Firefighting System are not included in this item but shall be included in the Sub-Section PU4B01.

(2) Measurement

The unit of measurement for all pipe work shall be linear meter (m).

The length shall be measured along the centerline of the installed pipeline and shall include all joints, couplings, tees, bends, reducers, blank flanges, clamps, sleeves, rings, gaskets, bolts, nuts, washers, and any other jointing appurtenances but exclude valves, pumps and in-line equipment.

(3) Rates

The rates for pipe works shall include supply and installation of pipes, joints, couplings, tees, bends, reducers, sleeves, gaskets, bolts and washers, solvent cement, thrust blocks, coatings, wrappings, linings, hangers, and supports.

The rates shall also include full compensation for excavation of pipe trenches, bedding and support (if any), all temporary and permanent supports and restraints necessary for the proper completion of the pipe work, backfilling and tamping of filling, de-watering, surface and/or building restoration, coating, painting, and other incidentals necessary to complete the work specified.

PU4A02

**Outdoor
Hydraulic
Firefighting
Equipment**

(1) Scope

This Sub-Section covers Pay Items; 4A0201, 4A0202, 4A0203, 4A0204 and 4A0205

This works shall include supply and installation of valves meter, outdoor hydrants and monitors for the Firefighting System in the buildings and outdoors and for the service for vessels.

Valves and meters used for the water supply for buildings and outdoors shall not be included under this Sub-Section; but, shall be entered under the Water Supply System. Angle valves used for indoor hydrants are considered as a constituent part of them, so they shall be included in indoor hydrants.

(2) Measurement

Valves, meters, outdoor hydrants and monitors shall be measured for payment by the number installed.

(3) Rates

The rates shall include the supply and installation of all valves, meters, hydrants, and monitors, including flange adaptors, gaskets, bolts, nuts and washers, thrust and support blocks, solvent cement, and any other jointing and supporting accessories.

PU4A03

**Indoor
Hydrants**

(1) Scope

Indoor hydrants shall be considered as a unity and shall be constituted by cabinet, hose rack, angle valve, fire nozzle, fire hose and appurtenances.

(2) Measurement

Indoor hydrants shall be measured for payment by the numbers installed.

(3) Rates

The rates shall include furnishing and installation of cabinet, hose rack, angle valve, fire nozzle and fire hose.

Couplings, gaskets, bolts, nuts and washers, and any other connection accessories, supports and hangers shall be included in the rates.

Surface and/or building restoration, coating, painting, and other incidentals necessary to complete the work specified shall be included.

PU4A04

Fire Stations

(1) Scope

Fire Stations and the specified contents shall be considered as a unity.

(2) Measurement

Fire Stations shall be measured for payment by the numbers installed.

(3) Rates

The rates shall include supply and installation of Fire Station cabinet and furnishing of all utensils, tools and appurtenances listed in the Specifications.

PU4A05

**Stationary
Fire Pump**

(1) Scope

This Sub-Section shall include furnishing, installation, connection, testing and running start up of the Stationary Fire Pump for the Administration Building.

(2) Measurement

Stationary Fire Pump shall be measured for payment by the numbers installed.

(3) Rates

The rates of Stationary Fire Pump shall include supply and installation of the pump. All connecting appurtenances such as couplings, gaskets, flanges, bolts, nuts and washers, connecting pipes shall be included.

If required by the manufacturer or the Engineer, the base and foundation for the pump, fixing, hangers and supporting devices shall be included.

Performance and operation tests and submission of performance certificate, running start up test of the unit, and any other incidental, necessary to complete the work specified shall be taken into account in the rates.

Cables, conduits, hangers and supports, electrical connection devices, control panel and any other electrical appurtenance, required for the completion and correct operation of the pump shall be included in the rates.

PU4A06

**Mobile Fire
Pump**

(1) Scope

This Sub-Section shall include supply of pump, driver, skid base, trailer, connections and accessories as an integral unit as specified.

(2) Measurement

Mobile Fire Pump shall be measured for payment by the numbers provided.

(3) Rates

The rates of Mobile Fire Pump shall include supply of pump, driver, skid base, trailer, connections and accessories. Operator's panel and electrical system shall also be included. All connecting appurtenances such as couplings, gaskets, flanges, bolts, nuts and washers, and connecting pipes shall be included.

Performance and operation tests and submission of performance certificate, running start up test of the unit, and any other incidental necessary to complete the work specified shall be taken into account in the rates.

PU4A07

**Fire
Extinguishers**

(1) Scope

This Sub-Section covers the Pay Items; 4A0701, 4A0702, 4A0703, 4A0704, 4A0705, 4A0706 and 4A0707.

This works shall include all types of Fire Extinguishers as defined in the Specifications and on the Drawings. Extinguishers to be located inside the Cabinets for Indoor Hydrants and the wheeled Extinguishers shall be included. Fire Extinguishers shall be supplied with the full charge as specified.

(2) Measurement

Fire extinguishers shall be measured for payment by the numbers installed.

(3) Rates

The rates for Fire Extinguishers shall include supply and installation as required in the Specifications and Drawings. Brackets, bolts, nuts and washers, screws, straps and any other supporting devices shall be included.

Fire Extinguishers' appurtenances such as hoses, nozzles, gauges, safety ring pins, levers and any other as specified shall be included in the rates.

PU4A08

Pits

(1) Scope

This Sub-Section cover the Pay Items; 4A0801, 4A0802, 4A0803 and 4A0804.

Pits for underground hydrants in Container and Multipurpose Yards shall be included in this item. Pits for Firefighting in the Berth area shall not be taken into account in the rates of this item.

(2) Measurement

Pits shall be measured for payment by the numbers installed.

(3) Rates

The rates for pits shall include full compensation for excavation of hole, and backfilling and tamping of filling of over excavation.

The rates shall also include the supply of materials, labor, equipment and tools for the construction of the foundation, walls, vaults and covers of the pits.

Framing for structural concrete and finishes of walls, floor and vaults shall be included. Steps and ladders, if required in the drawings, shall be included.

PU4A09 (1) Scope

Hydrostatic Test This Item shall include pressure/hydrostatic and leak test and disinfection of piping installation.

(2) Measurement

Measurement for payment shall be made by lump sum.

(3) Rates

Temporary stoppers, anchors and testing equipment shall be considered in the rates.

PU4B Water Supply System

PU4B01 (1) Scope

Pipe Work This Sub-Section covers the Pay Items; 4B0101, 4B0102, 4B0103, 4B0104, 4B0105, 4B0106, 4B0107, 4B0108, 4B0109, 4B0110, 4B0111, 4B0112, 4B0113, 4B0114 and 4B0115

This works shall include supply, installation, testing, disinfection and flushing of Pipelines and shall be applicable for the Potable/Firefighting Water Supply System in buildings and in the outdoors.

Pipelines for the Firefighting System in the Administration Building, which shall consist of the system from the Stationary Pump to the indoor hydrants, shall be excluded from this item and included in the Firefighting Section.

(2) Measurement

The unit of measurement for all pipe works shall be linear meter (m).

Length shall be measured along the centerline of installed pipelines and shall include all joints, couplings, tees, bends, reducers, blank flanges, clamps, sleeves, rings, gaskets, bolts, nuts, washers, and any other jointing appurtenances but exclude valves, pumps or in-line equipment.

(3) Rates

The rates for pipe works shall include supply and installation of pipes, joints, couplings, tees, bends, reducers, sleeves, gaskets, bolts and washers, solvent cement, thrust blocks, coatings, wrappings, linings, hangers and supports.

The rates shall also include full compensation for excavation of pipe trenches, bedding and support (if any), all temporary and permanent supports and restraints necessary for the proper completion of the pipe works, backfilling and tamping of filling, de-watering, surface and/or building restoration, coating, painting, and other incidentals necessary to complete the work specified.

The rates of installation shall also include building ends of pipes into walls of manholes, pits and boxes. Where the pipe manufacturer's instructions for laying and jointing pipe work are not included in the Specifications, such instructions shall be deemed to form part of the Specifications and any further costs incurred in complying with the instructions shall be deemed to be covered by the rates.

- PU4B02**
- Valves and Meters**
- (1) Scope**
- This Sub-Sections covers the Pay Items; 4B0201, 4B0202, 4B0203, 4B0204, 4B0205, 4B0206, 4B0207, 4B0208, 4B0209, 4B0210, 4B0211, 4B0212, 4B0213 and 4B0214.
- The supply and installation of valves and meters used for the Water Supply System in the buildings and outdoors, including the ones contained in the House for Valves of the Water Storage Facility shall be entered under this item. Valves and meters used for the Firefighting System and for service to vessels shall not be included under this section but shall be entered under the Firefighting System. Service control valves for sanitary appliances shall not be included under this section but included under section Plumbing and Sanitary Appliances.
- (2) Measurement**
- Valves shall be measured for payment by the numbers installed.
- (3) Rates**
- The rates shall include supply and installation of all valves and meters. including flange adapters, gaskets, bolts, nuts and washers, thrust and support blocks, solvent cement, and any other jointing and supporting accessories.
- PU4B03**
- Pits and Manholes**
- (1) Scope**
- This Sub-Sections covers the Pay Items; 4B0301, 4B0302, 4B0303 and 4B0304.
- Pits for valves and meters at the inlets for buildings shall be included in this item. Manholes for valves in the main pipeline shall also be included, as well as, pits for hose faucet around the buildings.
- (2) Measurement**
- Pits and Manholes shall be measured for payment by the numbers installed.
- (3) Rates**
- The rates for pits and manholes shall include full compensation for excavation of the hole, and backfilling and tamping of filling of over excavation.
- The rates shall include supply of materials, labor, equipment and tools for the construction of the foundation, walls, vaults and covers of the pits and manholes.
- Framing for structural concrete and finishes of walls, floor and vaults shall be included. Steps and ladders, if required in the drawings, shall be included.
- PU4B04**
- Water Storage Tanks**
- (1) Scope**
- This item shall include detailed design, supply, construction, testing, disinfections and flushing of the Water Tanks including all the accessories and appurtenances as specified. Nozzles shall be considered as a constituent part of the Tanks. Pipes and valves connected to the tanks shall be measured as specified in Sub-Section PU4B01 and in Sub-Section PU4B02 respectively.
- (2) Measurement**
- Measurement for payment shall be made by lump sum and shall include both tanks.

(3) Rates

The rates shall include architectural, structural and mechanical detailed design. All costs (if any) of required submittal of documents shall be included in the rates. This item shall be in accordance with: items f) and g) of Preamble PG006 Rates and Sums to be Included.

The rates shall include design, supply and construction of the foundation for both tanks; consequently soil-bearing test shall be included in the rates. The rates shall also include full compensation for excavation for the foundation, all temporary and permanent supports, backfilling and tamping of filling.

Structural steel, ladders, cages and railings, nozzles, flanges, bolts, washers and nuts, gaskets, hatches, vents, screens, filters, water level indicator, coatings, painting and any other incidentals necessary to complete the work as specified shall be included in the rates.

For carrying out all water tightness and leak tests and disinfection and flushing of tanks to the satisfaction of the Engineer, the Contractor shall provide all necessary temporary stoppers, anchors and testing equipment and the costs shall be included in the rates.

All equipment, tools and machines necessary for the correct setting up of the tanks shall be included in the rates.

PU4B05

**Water
Purification
System**

(1) Scope

This item shall include detailed design, supply, installation, testing, disinfection and flushing of the Water Purification System. Inlet and outlet pipes for water supply and drainage shall not be included in this item, but included in the Pipe Works item as defined in Sub-Section PU4B01.

(2) Measurement

Measurement for payment shall be by lump sum (LS).

(3) Rates

The rates shall include structural (for bases), mechanical and electrical detailed design of Water Purification System. This item shall be in accordance with items j) and g) of Preamble PG006: Rates and Sums to be Included.

The rates shall include supply and installation of all required equipment, pipes, valves, gauges, fittings, joints and any other appurtenance required for the proper operation of the system.

If required by the Contractor's Design, supply of materials and construction of foundations and bases for the equipment or special tanks shall be included in the rates.

The specified equipment, utensils and consumables for water quality analysis shall be included in the rates.

Furnishing and installation of control panel for the equipment shall be included in the rates.

PU4B06

(1) Scope

**Service House
and Exterior
Works**

This Sub-Section covers the Pay Items; 4B0601 and 4B0602.

This item shall include detailed design and construction of the Service House for Valves and the Water Purification System. This item shall also include the construction of external works as shown in the Drawings the rates shall be entered separately for the Service House and External Works and conform to items f) and g) of Preamble PG-006.

(2) Measurement

Measurement for payment shall be by lump sum (LS).

(3) Rates

The rates shall include architectural, structural and electrical detailed design.

The rates shall include supply of materials, labor, equipment and tools for construction of the foundation, walls, partitions, floor and roof.

Earthworks, leveling and terrain protection works shall be included in the rates.

Windows, doors and all finishes shall also be included.

External Works shall include earthworks, leveling, retention walls, slopes and any other terrain protection works, pavements, sidewalks, ramps and any other access works, curbs, gutters, pipes, pits, manholes and any other storm drainage works, fence, gates, lawn planting and any other landscaping works and outdoor illumination.

PU4B07

(1) Scope

**Pressure /
Hydrostatic
Test and
Disinfections**

This Sub-Section shall include pressure/hydrostatic and leak tests and disinfection of piping and appurtenances installation.

(2) Measurement

Measurement for payment shall be by lump sum (LS).

(3) Rates

Temporary stoppers, anchors and testing equipment shall be included the rates.

PU4C Wastewater System

PU4C01

(1) Scope

Pipe Work

This Sub-Section covers the Pay Items; 4C0101, 4C0102, 4C0103, 4C0104, 4C0105, 4C0106 and 4C0107.

This item shall include supply, installation, testing, disinfection and flushing of pipelines and shall be applicable for the Separated waste and sanitary drainage system inside buildings, from the outlets of each sanitary appliance to the connecting manhole.

Waste and sanitary joint drainage system, which conducts the wastewater from

buildings to the wastewater treatment facilities shall also be included.

(2) Measurement

The unit of measurement for all pipe work shall be linear meter (m).

The length shall be measured along the centerline of installed pipeline and shall include all joints, couplings, tees, bends, reducers, blank flanges, clamps, sleeves, rings, gaskets, bolts, nuts, washers, and any other jointing appurtenances but exclude valves, pumps or in line equipment.

(3) Rates

The rates for pipe works shall include supply and installation of pipes, joints, couplings, tees, bends, reducers, sleeves, gaskets, bolts and washers, solvent cement, thrust blocks, coatings, wrappings, linings, hangers and supports.

The rates shall also include full compensation for excavation of pipe trenches, bedding and support (if any) all temporary and permanent supports and restraints necessary for the proper completion of the pipe works, backfilling and tamping of filling, de-watering, surface and/or building restoration, coating, painting, and other incidentals necessary to complete the work specified.

The rates of installation shall also include building ends of pipes into walls of manholes, pits and boxes. Where the pipe manufacturers instructions for laying and jointing pipe are not included the Specifications, such instructions shall be deemed to form part of the Specifications and any further costs incurred in complying with the instructions shall be deemed to be covered by the rates.

PU4C02

Manholes and Grease Traps

(1) Scope

This Sub-Section covers the Pay Items; 4C0201 and 4C0202.

Manholes shall be included in these items. Grease traps for buildings shall also be included. The rates shall be entered separately for each type.

(2) Measurement

Manholes and Grease Traps shall be measured for payment by the numbers installed.

(3) Rates

The rates for grease traps and manholes shall include full compensation for excavation of the hole, and backfilling and tamping of filling of over excavation.

The rates shall include supply of materials, labor, equipment and tools for construction of the foundation, walls, vaults and covers of the grease traps and manholes.

Framing for structural concrete and finishes of walls, floor and vaults shall be included. Steps and ladders, if required in the drawings, shall be included.

PU4C03

Catch Basins

(1) Scope

This Sub-Section covers the Pay Item; 4C0301.

Catch Basins shall be included in this section.

(2) Measurement

Catch Basins shall be measured for payment by the numbers installed.

(3) Rates

The rates for catch basins and trench drains shall include full compensation for excavation of the hole, and backfilling and tamping of filling of over-excavation.

The rates shall include supply of materials, labor, equipment and tools for construction of the foundation, walls and grating cover.

Framing for structural concrete and finishes of walls, floor and grate shall be included. Steps and ladders, if required in the Drawings, shall be included.

PU4C04

**Oil/Water
Separator**

(1) Scope

Oil/water Separator for Fuel Station and for Maintenance and Repair Shop shall be included in this item. Inlet and outlet pipes shall not be included in this item but shall be included in Item 4C01 Pipe Works.

(2) Measurement

Oil/Water Separator shall be measured for payment by the numbers installed.

(3) Rates

The rates for oil/water separators shall include full compensation for excavation of the hole, and backfilling and tamping of filling of over-excavation.

The rates shall include supply of materials, labor, equipment and tools for construction of the foundation, walls, vaults and covers of the separators.

Framing for structural concrete and finishes of walls, floor and vaults shall be included. Steps and ladders shall be included.

Interior pipes and fittings, metal mesh, and pipes for ventilation shall be included in the rates.

PU4C05

**Wastewater
Treatment
Facilities**

(1) Scope

This Sub-Section covers the Pay Items; 4C0501 and 4C0502.

This works shall include detailed design, supply, installation, construction, testing and flushing of the Wastewater Treatment Facilities No.1 and No. 2.

(2) Measurement

Measurement for payment shall be made by lump sum, separately for each Facility.

(3) Rates

The rates shall include architectural, structural and mechanical detailed design. This item shall be in accordance with item f) and g) of Preamble PG006: Rates and Sums to be Included. All costs (if any) of required submittal of documents shall be included in the rates.

The rates shall include design, supply and construction of the foundation for both plants' tanks and Service House; consequently soil-bearing test shall be included in

the rates.

The rates shall also include full compensation for excavation for the foundations, pipes, trenches, gutters and pits, all temporary and permanent supports, backfilling and tamping of filling.

Design, material supply and labor, furnishing and installation of equipment of the Wastewater Pump Station and Treatment Tanks shall be included in the rates.

Design, supply of materials, tools and equipment and labor for the complete construction of the Service House shall be included in the rates.

Control Panel, including all cables, connections, outlets, and other electrical power appurtenances required for the system to operate shall be count in the rates.

Earthworks, leveling, retention walls, slopes and any other terrain protection works, pavements, sidewalks, ramps and any other access works, fence, gates, lawn planting and any other landscaping works, outdoors illumination, and any other exterior works as required in the Contractor's Design Drawings and the Specifications shall be included in the rates.

All equipment, tools and machines necessary for the correct setting up of the tanks and equipment shall be included in the rates.

The specified equipment, utensils and consumables for effluent water quality analysis shall be included in the rates.

Maintenance and Repair Manuals and any other required documents, and the Employer's personnel training costs shall be included in the rates.

For carrying out all water tightness and leak tests of tanks and pipelines to the satisfaction of the Engineer, the Contractor shall provide all necessary temporary stoppers, anchors and testing equipment and the costs shall be included in the rates.

PU4C06

**Hydrostatic
Test**

(1) Scope

This item includes pressure/hydrostatic and leak tests of piping and appurtenances installation.

(2) Measurement

Measurement for payment shall be by lump sum (LS).

(3) Rates

The rates shall include temporary stoppers, anchors and testing equipment.

PU4D Ventilation and Air-conditioning System

PU4D01

(1) Scope

This system shall cover the following buildings. Pay Items shall be divided into general, piping, ducting, equipment.

- A. Port Administration Building
- B. Container Freight Station
- C. Maintenance and Repair Shop
- D. Container Gate
- E. Cargo gate
- F. Power Supply Station

The following conditions shall be read carefully or pricing in the Bill of Quantity.

(2) General

Pay Items shall cover all requirements in the Preamble for General Requirements (PR).

(3) Measurement

The Ventilation and Air-Conditioning system shall be measured in accordance with the relevant clauses in this section and the Drawings. The measurement shall be made by lump sum for each unit separately.

(4) Work Incidental to Mechanical Installations

Incidental works of the following types or similar shall be included:

- a) Coordination with other civil, utility and building works and other mechanical and electrical installations.
- b) Cutting or forming holes, mortices, chases or the like and making good finishings.
- c) Building in or cutting and piping brackets or the like and making good finishings.

(5) Painting

Protective painting and decorative painting shall be included, together with:-

- a) Removing protective coating or wrapping
- b) Cleaning and polishing exposed surfaces.

(6) Testing and Commissioning

All mechanical works shall include testing and commissioning to satisfaction of the Engineer. All required measurement and testing equipment shall be included, and records and report shall be submitted to the Engineer.

PU4D02

**Pipework and
Gutterwork**

(1) Scope

This item shall cover all required works to be done for erection of ducting works including materials, installation, and testing and commissioning, all in accordance with international acceptable standards. Testing and commissioning shall be subject to the Engineer's approval.

(2) Piping

Pipes and gutters shall be measured by length, taken along the center line over all fittings. Length shall be calculated from the relevant Drawings.

(3) Fittings

Fittings to pipes and gutters, e.g. bends, junctions, elbows, tees and all structural steel supports, bearers, brancings, brackets, hangers, clips, ties and the like shall be included.

(4) Accessories

Accessories including valves, traps, expansion compensators or the like and sleeves, cover-plates or the like shall be included.

(5) Sundries

Supports, which shall include fixings, anchors, insulation blocks and anti-vibration devices, identification, including plates, discs, labels, charts and color coding shall be included.

(6) Insulation, Including Linings / Protective Coverings

Insulation to pipe works shall be measured by length, taken along the center line over all fittings and accessories; additional insulation to flanges, fittings, accessories or the like shall be included.

(7) Vapor Barrier

Vapor barrier, sheet metal cladding, cloth and plaster cladding, sealant to openings, joints and around accessories and fittings of cladding, shall be included.

PU4D03

Ductwork

(1) Scope

This item shall be cover all required works to be done for erection of ducting works including materials, installation, and testing and commissioning all in accordance with international acceptable standards. Testing and commissioning shall be subject to the Engineer's approval.

(2) Ducting

Rectangular ductwork shall be measured by area for each different gauge of thickness of sheet as shown on the Drawings. The area shall be calculated from the length, taken along the center line over all fittings, trims at the net area of nominal dimensions. Blank ends shall be added to the area but no deduction shall be made for intersections or openings; extra material for seams, stiffeners, supports, fixings or the like shall be included.

Circular, oval and flexible ductworks shall be measured by length, taken along the center line over all fittings stating the diameter.

(3) Duct Fittings

Fittings to ductwork and all structural steel supports, bracings, brackets, hangers, clips, ties and the like shall be included.

(4) Accessories

Accessories including dampers, grilles, flexible connector or the like) shall be included as shown on the Drawings; independent grills fixed to the building structure shall be included in the section for miscellaneous metalwork/woodwork.

(5) Duct Insulation

Insulation to rectangular ductwork shall be measured by area, calculated as described in item (2) above; additional insulation to flanges, fittings, accessories or the like shall be to be included.

Insulation to circular, oval and flexible ductwork shall be measured by length, taken along the center line over all fittings.

Vapour barrier, sheet metal cladding, cloth and plaster cladding, sealant to openings, joints and around accessories and fittings of cladding, shall be included.

PD4D04

Equipment

(1) Scope

Chillers, air handling units, mini sprits systems, fans, pumps, hoods, air-handling units or the like shall be entered in the BOQ.

This Pay Item shall cover the following:

- A. Port Administration Building
AD0101 to AD 0108
- B. Container Freight Station
AD0201 to AD 0202
- C. Maintenance and Repair Shop
AD0301 to AD 0303
- D. Container Gate
AD0401 to AD 0402
- E. Cargo Gate
AD0501 to AD 0502
- F. Power Supply Station
AD0601 to AD 0602

This item shall include equipment supply, installation, any required accessories testing and commissioning to be satisfaction of the Engineer.

(2) Automatic Controls

Sensing or activating devices, including thermostats, humidistats, motorised valves and control panels, air compressors and receivers or the like shall be included.

(3) Monitoring and Control System

Monitoring and control systems shall be entered in the BOQ separately for each system or item of equipment on a locational or functional basis with accessories and interconnecting cable.

(4) Sundries

Supports, including fixings, anchors, insulation blocks and anti-vibration devices, identification, which shall include plates, discs, labels, charts and color coding shall be included.

PU4E Plumbing and Sanitary Appliances

PU4E01

**Sanitary
Appliances**

(1) Scope

This item shall include supply, installation and testing of Sanitary Appliances as mentioned in the Specifications and Drawings.

Sanitary Appliances to be taken into account shall include closets, wash basins, metal and concrete sinks, floor service sinks and urinals.

(2) Measurement

Sanitary appliances shall be measured for payment by the numbers installed.

(3) Rates

The rates for Sanitary Appliances shall include fittings, gaskets, couplings and any other connecting accessories, hangers, supports.

Faucets, taps, drainage traps, service control valves and any other appurtenances specified for each appliance shall be included in the rates.

PU4E02

**Plumbing
Accessories**

(1) Scope

This item shall include supply and installation of Plumbing Accessories as defined in the Specifications and Drawings.

Showers complete with shower rose and riser tube and gate valve, floor drains, sanitary cleanouts, and shower drains shall be included in this item.

(2) Measurement

Plumbing Accessories shall be measured for payment by the numbers installed.

(3) Rates

The rates shall include supply, installation and testing of plumbing accessories.

Materials, labor and tools used for finishing holes and cuttings done for installation shall be included in the rates.

Couplings, adapters, fittings, gaskets, supports, flange covers, hangers and any other connection or fixing accessory shall be included.

Covers, grates, domes and any other specified appurtenance shall be included.

PU4E03

(1) Scope

**Toilet
Accessories**

This item shall be included Shower Curtain Holders, Toilet Tissue Dispensers, Hand Driers and Grab Bars.

(2) Measurement

Toilet Accessories shall be measured for payment by the numbers installed.

(3) Rates

The rates shall include supply, installation and any incidentals necessary to complete the work specified for toilet accessories in accordance with the Drawings and the Specifications.

Hangers, bolts, nuts and washers, anchors, screws and any other fixing accessories shall be included.

Materials, labor and tools used for finishing holes or cuttings performed for installation shall be included in the rates.

Performance and operation tests and submission of performance certificate and running start up test of the Electrical Hand Driers shall be included.

PU4E04

(1) Scope

**Hydrostatic
Test**

This item shall include pressure/hydrostatic and leak test and disinfection of sanitary appliances.

(2) Measurement

Measurement for payment shall be by lump sum (LS).

(3) Rates

Temporary stoppers, anchors and testing equipment shall be included in the rates.

PU4F Transmission Line and Substation

PU4F01

This item shall include design and construction of a 46 kV transmission line as follows:

**46 kV
Transmission
Line**

- a) 46 kV, 3-Phase pole mounted section switch
- b) kWh, kVAR including CT and PT
- c) 46 kV aerial line

Measurement for payment shall be by lump sum (LS).

The rates cost shall include the cost for design, supply, delivery, construction and test, and all other necessary items required for the 46 kV line.

PU4F02

This item shall include design and construction of a 46 kV substation, consisting of the following:

**46 kV
Substation**

- a) 46 kV GCB, DS, PT, CT and LT
- b) 46 kV outdoor structure

c) 46 /4.16 kV, 4000 kVA transformer

d) Grounding system

Measurement for payment shall be by lump sum (LS).

The rates shall include the cost for design, supply, delivery, construction and test, and all other necessary items required for the substation.

PU4G Emergency Power Generation Equipment

PU4G01 Diesel Engine Generator This item shall include two (2) units of AC generator by diesel engine including, cooling and ventilation equipment, exhaust system, daily fuel system, starting and supply equipment, generator control panel and engine control panel.

Measurement for payment shall be made by the number of units installed.

The rates of the diesel engine generator shall include the cost for supply, delivery, installation and test of engine, generator, fuel system, exhaust system, cooling and ventilation equipment, and other incidentals necessary to complete the work specified.

PU4G02 Switchgear and Control Equipment This item shall include one (1) set of switchgear and control equipment for the two units of diesel engine generator.

Measurement for payment shall be made by the number of units installed.

The rates of switchgear and control equipment shall include the cost for supply, delivery and test of control and switch panel, starting and operating equipment, and other incidentals necessary to complete the work specified.

PU4G03 Fuel Tank This item shall include one underground fuel tank, including piping system and foundation work.

Measurement for payment shall be made by the number of units installed.

The rates of fuel tank shall include the cost for foundation work, supply, delivery and installation of fuel tank, and piping work to connect the two diesel engine generators. The rate shall include other incidentals necessary to complete the work specified.

PU4H Power Distribution Equipment

PU4H01 4H0101 Switchgear Cubicle This item shall include switchgear cubicle with no more than eight (8) panels consisting of one incoming line from 46/4.16 kV transformer, two gantry feeders, two 4.16/0.48 kV transformers primary line, one 4.16/0.208-0.12 kV transformer primary line, change-over switch for normal/emergency condition and two diesel generator lines.

Measurement for payment shall be made by the number of units installed

The rate of the switchgear cubicle shall include the cost for design, supply, delivery, installation and test, and other incidentals necessary to compete the work specified.

4H0102

This item shall include switchgear cubicle with no more than six (6) panels, consisting of two (2) 4.16/0.48 kV transformer secondary line, one (1) tie circuit between No.1 group and No.2 group, six (6) service outlet feeder, four (4) flood lighting feeder, two (2) reefer outlet feeder, two (2) street lighting feeder, one (1) Port Administration feeder, one (1) Container Freight Station feeder and two (2) spare feeder.

Measurement for payment shall be made by the number of units installed

The rate of the switchgear cubicle shall include the cost for design, supply, delivery, installation and test, and other incidentals necessary to complete the work specified.

4H0103

This item shall include switchgear cubicle with no more than two (2) panels, consisting of one (1) 4.16/0.208-0.12 kV transformer secondary line, one (1) Maintenance and Repair Shop feeder, one (1) Container Gate feeder, one (1) Cargo Gate feeder and two (2) space feeder.

Measurement for payment shall be made by the number of units installed

The rate of the switchgear cubicle shall include the cost for design, supply, delivery, installation and test, and other incidentals necessary to complete the work specified.

PU4H02

**Distribution
Transformer**

4H0201

Measurement for payment shall be made by the number of 4.16/0.48 kV transformers installed in the transformer room of the power supply station.

The rate of the transformer shall include the cost for supply, delivery, installation and test, and other incidentals necessary to complete the work specified.

4H0202

Measurement for payment shall be made by the number of 4.16/0.208-0.12 kV transformers installed in the transformer room of the Power Supply Station.

The rate of transformer shall include the cost for supply, delivery, installation and test.

PU4H03

**Control
Switchboard
and Auxiliary**

4H0301 to 4H0304

Measurement for payment shall be made by the number of panels installed in the control room of the power supply station.

The rate of panel shall include the cost for design, supply, delivery, installation and test, and other incidentals necessary to complete the work specified.

4H0305

This item shall include storage battery, support for cell, base structure, accessories and spare parts.

Measurement for payment shall be made by the number of batteries installed.

The rate of battery shall include the cost for supply, delivery, installation and test, and other incidentals necessary to complete the work specified.

PU4I Cabling and Piping

PU4I01

4I0101 to 4I0108

Cabling

Measurement for payment shall be made by the length in meter of 4.16 kV cable installed for the 4.16 kV switchgear cubicle to each load connection point.

The rate shall include the cost for supply, delivery, installation and test, and other incidentals necessary to complete the work specified.

4I0109

Measurement for payment shall be made by the number of cable terminals for both 4.16 kV cable ends.

The rate shall include the cost for supply, delivery, installation and test, and other incidentals necessary to complete the work specified.

4I0110 to 4I0126

Measurement for payment shall be made by the length in meter of 480 V cable installed from the 480 V switchgear to each load connection point.

The rate shall include the cost for supply, delivery, installation and test, and other incidentals necessary to complete the work specified.

4I0127

Measurement for payment shall be made by the number of cable terminals for both 480 V cable ends.

The rate shall include the cost for supply, delivery, installation and test, and other incidentals necessary to complete the work specified.

4I0128 to 4I0133

Measurement for payment shall be made by the length in meter of each 208 V-120 V cable installed from 208 V-120 V switchgear to each load connection point.

The rates shall include the cost for supply, delivery, installation and test, and other incidentals necessary to complete the work specified.

4I0134

Measurement for payment shall be made by the number of cable terminals for both 208 V-120 V cable ends.

The rate shall include the cost for supply, delivery, installation and test, and other incidentals necessary to complete the work specified.

4I0135

In this Pay Item, all control cables required in power distribution equipment system shall be covered.

Measurement for payment shall be by lump sum (LS).

PU4I02

4I0201 to 4I0204

Piping

Measurement for payment shall be made by the length in meter of each size PVC pipe installed for protecting underground power cable.

The rates shall include the cost for supply, delivery and installation of PVC pipe, and all other incidentals necessary to complete the work specified.

4I0205 to 4I0208

Measurement for payment shall be made by the length in meter of each size steel pipe encased in reinforced concrete in case of power cable route under road.

The rate shall include the cost for supply, delivery and installation of steel pipe, and other incidentals necessary to complete the work specified.

4I0209

In this Pay Item, all cable supports required in case of installing power cable in cable trench shall be covered.

Measurement for payment shall be by lump sum (LS).

PU4J Area Lighting System and Power Outlet

PU4J01

4J0101 and 4J0102

Area Lighting System

These Pay Items include light mast structure, lightning protection system and foundation work.

The quantity for each item shall be eight (8).

The rate shall include the cost for supply, delivery and installation of the light mast including lighting fixture fitting, lowering device, inside mounted panel, inside wiring, lightning protection and foundation.

4J0103

Measurement for payment shall be made by the number of flood light fixtures for 4J0101 and 4J0102.

The rate shall include the cost for supply and delivery of light fixture including lamp, ballast and accessories.

4J0104 and 4J0105

Measurement for payment shall be made by the number of each type of street pole or area light pole installed.

The rate shall include the cost for supply, delivery and installation of the street pole or area light pole including light fixture, fitting, inside switch box, inside wiring, and foundation.

4J0106 and 4J0107

Measurement for payment shall be made by the number of double brackets or single brackets.

The rate shall include the cost for supply, delivery and installation of the bracket and other incidentals necessary to complete the work specified.

4J0108

Measurement for payment shall be made by the number of road light fixtures installed.

The rate shall include the cost for supply and delivery of light fixture including lamp, ballast and accessories.

4J0109

Measurement for payment shall be made by the number of panels installed.

The rates shall include the cost for supply, delivery, installation and test, and other incidentals necessary to complete the work specified.

PU4J02

Power outlet

4J0201

Measurement for payment shall be made by the number of service outlet.

The rate shall include the cost for supply, delivery, installation and test, and other incidentals necessary to complete the work specified.

4J0202

This Pay Item includes 480/440 V transformer, 440 V switch board with two (2) circuits, 440/120 V transformer, one (1) 440 V outlet pugs and three (3) 120 V outlet plugs for set.

The quantity for the service outlet shall be four (4) sets.

The rate shall include the cost for supply, delivery, installation and test, and other incidentals necessary to complete the work specified.

4J0203

This Pay Item includes 480 V switch board with eight (8) circuits 480/240 V transformer, 240 V switch board with four (4) circuits, eight (8) 480 V outlet plugs and four (4) 240 V outlet plugs for one set.

The quantity for reefer outlet shall be eight (8) sets.

The rate shall include the cost for supply, delivery, installation and test, and other incidentals necessary to complete the work specified.

PU4K Fire Alarm System

PU4K01

Outdoor

4K0101

The Pay Item include Contractor's design and construction work of the outdoor fire alarm system.

Measurement for payment shall be by lump sum.

The rates shall include the cost for design, supply, delivery, construction and test for

fire alarm system, and other incidentals necessary to complete the work specified.

PU4K02

4K0201 to 4K0206

Buildings

These Pay Items include Contractor's design and construction work of fire alarm system for each building. The fire alarm system shall consist of fire alarm panels, detectors, slow-whoops, cabling and accessories.

Measurement for payment shall be by lump sum.

The rate shall include the cost for design, supply, delivery, construction and test for fire alarm system, and other incidentals necessary to complete the work specified.

PU4L Telephone/Data Network

PU4L01

4L0101 to 4L0105

**Telephone and
Data System**

These Pay Items include Contractor's design and construction work for telephone and data network system.

Telephone network shall include connection to public network, PABX, main distribution frame, multi-core cabling to patch-panel cabinets and terminal boxes, telephone sets, testing and accessories.

Data network shall include sever, workstation, UPS, optic fiber cable, patch-panel cabinets, HUB and switches, UTP CAT5 cabling, 2 x RJ45 outlets, testing and accessories.

Measurement for payment shall be by lump sum.

The rate shall include the cost for design, supply, delivery, construction and test for telephone and data system, and other incidentals necessary to complete the work specified.

PU4L02

4L0201 to 4L0203

**Mobile Phone
and VHF**

These Pay Items include Contractor's design and construction work for mobile phone and VHF system.

Mobile phone system shall include transmitters, operating terminal, receivers, integration in PABX, cabling, testing and accessories.

VHF system shall include transmitting station, operating terminal, licenses, cabling, testing and accessories.

Measurement for payment shall be by lump sum.

The rate shall include the cost for design, supply, delivery, construction and test for mobile phone and VFH system, and other incidentals necessary to complete the work specified.

PU4M Electrical Work of Buildings

PU4M01

Port Administration Building

4M0101 to 4M0115

These Pay Items include fluorescent fixtures, metal halide fixtures, exit light, single switch, double switch and junction box.

Measurement for payment shall be made by the number of units installed.

The rates shall include the cost for supply and installation of each fluorescent fixture, metal halide fixture, exit light, single switch, double switch and junction box and other incidentals necessary to complete the work specified.

4M0116 to 4M0128

These Pay Items include various kinds of receptacles, junction boxes and connections.

Measurement for payment shall be made by the number of units installed.

The rate shall include the cost for supply and installation of receptacles, switches, connections and junction box, and other incidentals necessary to complete the work specified.

4M0129 to 4M0134 and 4M0151

These Pay Items include the various sizes of PVC cables, PVC pipe and galvanized steel down conductor.

Measurement for payment shall be made by the length in meter.

The rate shall include the cost for supply and installation of PVC cable, PVC pipe and galvanized steel down conductor, and other incidentals necessary to complete the work specified.

4M0135 to 4M0150

These Pay Items include the transformer panel-boards and active lightning terminal.

Measurement for payment shall be made by the number of units installed.

The rate shall include the cost for supply, installation and test of transformer, panel-board and active lightning terminal, , and other incidentals necessary to complete the work specified.

4M0152 and 4M0153

In these Pay Items, all clamps, fitting hardware, ground rods, and conductors required in case of installing lightning system grounding shall be included.

Measurement for payment shall be by lump sum.

PU4M02

Container Freight Station

4M0201 to 4M0208

These Pay Items include fluorescent fixtures, high pressure sodium fixture, halide fixture and switches.

Measurement for payment shall be made by the number of units installed.

The rate shall include the cost for supply and installation of each fluorescent fixture, high pressure sodium fixture, halide and switches, and other incidentals necessary to complete the work specified.

4M0209 to 4M0217

These Pay Items include various kinds of receptacles and connections.

Measurement for payment shall be made by the number of units installed.

The rate shall include the cost for supply and installation of receptacles and connections and other incidentals necessary to complete the work specified.

4M0218 to 4M0226 and 4M0233

These Pay Items include various sizes of PVC cable, PVC pipe, EMT pipe and galvanized steel down conductor.

Measurement for payment shall be made by the length in meter.

The rate shall include the cost for supply and installation of PVC cable, PVC pipe, EMT pipe and galvanized steel down conductor, and other incidentals necessary to complete the work specified.

4M0227 to 4M0232

These Pay Items include the transformer, panel-board and active lightning terminal.

Measurement for payment shall be made by the number of units installed.

The rate shall include the cost for supply, installation and test of transformer, panel-board and active lightning terminal, and other incidentals necessary to complete the work specified.

4M0234 to 4M0235

In these Pay Items, all clamps, fitting hardware, ground rods, and conductors required in case of installing lightning system grounding shall be included.

Measurement for payment shall be by lump sum.

PU4M03

**Maintenance
and Repair
Shop**

4M0301 to 4M0310

These Pay Items include fluorescent fixture, high pressure sodium fixture, metal halide fixture, exit light and switches.

Measurement for payment shall be made by the number of units installed.

The rate shall include the cost for supply and installation of each fluorescent fixture, high pressure sodium fixture, metal halide fixture, exit light and switches and other incidentals necessary to complete the work specified.

4M0311 to 4M0320

These Pay Items include various kinds of receptacles and connections.

Measurement for payment shall be made by the number of units installed.

The rate shall include the cost for supply and installation of receptacles and connections, and other incidentals necessary to complete the work specified.

4M0321 to 4M0332 and 4M0338

These Pay Items include the various sizes of PVC cable, PVC pipe, EMT pipe and galvanized steel down conductor.

Measurement for payment shall be made by the length in meter.

The rate shall include the cost of supply and installation of PVC cable, PVC pipe, EMT pipe and galvanized steel down conductor, and other incidentals necessary to complete the work specified.

4M0333 to 4M0337

These Pay Items include panelboard, and active lightning terminal.

Measurement for payment shall be made by the number of units installed.

The rate shall include the cost for supply, installation and test of panel-board and active lightning terminal. and other incidentals necessary to complete the work specified.

4M0339 and 4M0340

In these Pay Items, all clamps, fitting hardware, ground rods, and conductors required in case of installing lightning system grounding shall be covered.

Measurement for payment shall be by lump sum.

PU4M04

**Container
Gate**

4M0401 to 4M0406

These Pay Items include fluorescent fixture, metal halide fixture, switch and connection for sign light.

Measurement for payment shall be made by the number of units installed.

The rate shall include the cost of supply, and installation of each fluorescent fixture, metal halide fixture, switch and connection for sign light, and other incidentals necessary to complete the work specified.

4M0407 to 4M0410

These Pay Items include duplex receptacles, junction boxes and connections.

Measurement for payment shall be made by the number of units installed.

The rate shall include the cost for supply and installation of receptacle, junction box and connections, and other incidentals necessary to complete the work specified.

4M0411 to 4M0419 and 4M0423

These Pay Items include the various sizes of PVC cable, PVC pipe, EMT pipe and galvanized steel down conductor.

Measurement for payment shall be made by the length in meter.

The rate shall include the cost of supply and installation of PVC cable, PVC pipe, EMT pipe and galvanized steel down conductor, and other incidentals necessary to complete the work specified.

4M0420 to 4M0422

These Pay Items include panel-board and active lightning terminal.

Measurement for payment shall be made by the number of units installed.

The rate shall include the cost for supply, installation and test of panel-board and active lightning terminal, and other incidentals necessary to complete the work specified.

4M0424 and 4M0425

In these Pay Items, all clamps, fitting hardware, ground rods, and conductors required in case of installing lightning system grounding shall be covered.

Measurement for payment shall be by lump sum.

PU4M05

Cargo Gate

4M0501 to 4M0506

These Pay Items include fluorescent fixture, metal halide fixture, switches and connection for sign light.

Measurement for payment shall be made by the number of units installed.

The rate shall include the cost of supply and installation of each fluorescent fixture, metal halide fixture, switches and connection for sign light, and other incidentals necessary to complete the work specified.

4M0507 to 4M0510

These Pay Items include duplex receptacle, junction box and connections.

Measurement for payment shall be made by the number of units installed.

The rate shall include the cost of supply and installation of receptacle, junction box and connections, and other incidentals necessary to complete the work specified.

4M0511 to 4M0519 and 4M0523

These Pay Items include the various size of PVC cable, PVC pipe, EMT pipe and galvanized steel down conductor.

Measurement for payment shall be made by the length in meter.

The rate shall include the cost of supply and installation of PVC cable, PVC pipe, EMT pipe and galvanized steel down conductor, and other incidentals necessary to complete the work specified.

4M0520 to 4M0522

These Pay Items include panel-board and active lightning terminal.

Measurement for payment shall be made by the number of units installed.

The rate shall include the cost for supply, installation and test of panel-board and active lightning terminal, and other incidentals necessary to complete the work specified.

4M0524 and 4M0525

In these Pay Items, all clamps, fitting hardware, ground rods, and conductors required in case of installing lightning system grounding shall be covered.

Measurement for payment shall be by lump sum.

PU4M06

**Power Supply
Station**

4M0601 to 4M0607

These Pay Items include cost of fluorescent fixture, HPS fixture, metal halide fixture, exit light and switches.

Measurement for payment shall be made by the number of units installed.

The rate shall include the cost of supply and installation of each fluorescent fixture, HPS fixture, metal halide fixture, exit light and switches, and other incidentals necessary to complete the work specified.

4M0608 and 4M0609

These Pay Items include double receptacle and connection.

Measurement for payment shall be made by the number of units installed.

The rate shall include the cost of supply and installation of double receptacle and connection, and other incidentals necessary to complete the work specified.

4M0610 to 4M0614 and 4M0617

These Pay Items include the various sizes of PVC cable, EMP pipe and galvanized steel down conductor.

Measurement for payment shall be made by the length in meter.

The rate shall include the cost of supply, installation of PVC cable, EMT pipe and galvanized steel down conductor, and other incidentals necessary to complete the work specified.

4M0615 to 4M0616

These Pay Items include panel-board and active lightning terminal.

Measurement for payment shall be made by the number of units installed.

The rate shall include the cost for supply, installation and test of panel-board and active lightning terminal, and other incidentals necessary to complete the work specified.

4M0618 and 4M0619

In these Pay Items, all clamps, fitting hardware, ground rods, and conductors required in case of installing lightning system grounding shall be covered.

Measurement for payment shall be by lump sum.

PU4N Miscellaneous Equipment

PU4N

(1) Scope

Miscellaneous
Equipment

Pay Items are shown as a set of price in BOQ. The contractor should understand, each pay items including equipment, material, accessories and installation and necessary electrical works, and testing and commissioning for the approval to the Engineer. This miscellaneous equipment system shall include the following equipment:

- 4N01 Fuel Supply
- 4N02 Elevator
- 4N03 Overhead Crane
- 4N04 Weighing Bridge
- 4N05 Weigh Scale

(2) General of Preamble

Items shall be given to cover all requirements of General Preamble.

(3) Measurement

Miscellaneous equipment shall be measured in set basis. All equipment, material, installation, and testing and commissioning shall be included in each item to be functioned.

(4) Work Incidental to Miscellaneous Equipment Installations

Incidental work of the following types or similar, shall be included:

- a) Coordination with other civil, utility and building works and other mechanical and electrical engineering installations.
- b) Cutting of forming holes, mortices, chases or the like and making good finishing
- c) Building in or cutting and piping brackets or the like and making good finishing.

(5) Painting

Protective painting and decorative painting shall be included, together with:

- a) Removing protective coating or wrapping
- b) Cleaning and polishing exposed surfaces.

(6) Testing and Commissioning

All mechanical works shall include and testing and commissioning to be satisfaction and approval by the Engineer. All required measurement and testing equipment shall be included, and records and report shall be submitted to the Engineer for approval.

(7) Spared Parts and Maintenance Tools

Spare parts for 5 years guarantee and required maintenance tools shall be included in each item. Spare parts and maintenance tools shall be approved by the Engineer.

(8) Training

Training fees of CEPA staff shall be included for the purpose of maintenance. Duration and training schedule shall be approved by the Engineer.