# Part 2. Employer's Requirements

# Section VI – 1 Scope of Works

# Civil Works and Maintenance Equipment for Depots

# EMPLOYER'S REQUIREMENTS – SCOPE OF WORKS

## TABLE OF CONTENTS

# ABBREVIATIONS

| Abbreviation | Description |
|---|---|
| CCTV | Closed Circuit Television |
| D&C | Design and Construct |
| DLP | Defect Liability Period |
| E&M | Electrical and Mechanical |
| FAT | Factory Acceptance Test |
| GS | General Specification |
| IM | Interface Management |
| IMP | Interface Management Plan |
| JICA | Japan International Cooperation Agency |
| km | Kilometres |
| LRT | Light Rail Transit |
| LRTA | Light Rail Transit Authority |
| LV | Low Voltage |
| m | Metres |
| O&M | Operation and Maintenance |
| OCS | Overhead Catenary System |
| ODA | Official Development Assistance |
| PPP | Public Private Partnership |
| SAT | Site Acceptance Test |
| SOW | Scope of Works |
| T&C | Testing and Commissioning |
| TS | Technical Specification |

# 1.0 Introduction

## 1.1 General

This Depot Civil Works and Maintenance Equipment Project is to be carried out under a JICA ODA Loan Agreement as one Project with two funding mechanisms, comprising a JICA ODA Loan and Philippines Government Funding

This Scope of Works (SOW) provides only the description of Works pertaining to the Manila LRT Line 1 South (Cavite) Extension Project, here in after referred to as LRT Line 1.

The detailed SOW, the description of Work and the Specifications are provided in the Bid Document, Part 2 Employer's Requirements – General Specifications, Technical Specification.

In the event of any discrepancies between this SOW and General Specification (GS) and Technical Specification (TS), the provisions in the GS and TS shall prevail.

## 1.2 Interfaces with the Existing System

The LRT Line 1 Project includes the following:

a) Procurement of Rolling Stock Works;

b) Baclaran Expansion Depot Civil and Architectural Works;

c) New construction of Zapote Satellite Civil and Architectural Works;

d) Depot Building Electrical and Mechanical Works; and

e) Depot Maintenance Equipment Works.

Within these activities, the Baclaran Expansion Depot Civil and Architectural Works are to be performed adjacent to the existing Baclaran Depot. Because of the close proximity of the new works with the existing depot, all Works shall be undertaken with extreme caution to ensure that the works to be implemented will have no impact on the daily operations of the existing system.

## 1.3 Interfaces with Other Scheme Project/Package Contractors

The LRT Line 1 South Project shall be performed under two (2) separate schemes.

One scheme is to be carried out under a Public Private Partnership (PPP) agreement between DOTr and LRMC and involves the extension of the existing line by 11.7km adding eight (8) new stations with a provision for a further two (2) future stations. Also included is track works, power supply, overhead catenary system (OCS), signalling and telecommunication works on the main line and in the depots.

The second scheme (This Project) is to be carried out under a JICA ODA Loan Agreement that involves the procurement of 120 new rolling stock vehicles, which will form 30 trains, expansion of the existing Baclaran Depot (about 4.2 hectares) to accommodate additional stabling tracks for 13 additional trains and provide light and heavy maintenance facilities that is required by the whole system when the services have been expanded.

The construction of a new Satellite Depot in Zapote will approximately cover 4.3 hectares which include Entrance Access Road to the Depot and will be capable of accommodating tracks to enable the stabling of 18 trains and the provision of light maintenance works.

Both depot works shall include the supply of rolling stock maintenance equipment and non-rolling stock maintenance equipment.

Except as stated in the Technical Specification both depot SOWs excludes track works, power supply, OCS, signalling and telecommunication works and some building works.

The project works to be performed under the JICA ODA Loan Agreement are separated into two packages. One (1) package is for the procurement of the 120 new rolling stock vehicles

(JICA ODA Loan) and the other package is for the Depot Construction Project package. The Depot Construction Project package shall include the construction works for the expansion of the Baclaran Depot, the new Zapote Satellite Depot and the supply of the required maintenance equipment (JICA ODA Loan + Philippine Government Fund).

As these works are divided in to two (2) different schemes and different packages all works to be undertaken will require fully detailed coordination of interfacing. The Interface Management and detailed coordination shall be performed throughout the entire works.

### 1.4 Renovation of Existing Administration Building/Structures Works

Renovation works of the existing administration buildings / structures at Baclaran Depot which is to be occupied by LRTA are also included in the scope of works.

## 2.0 Scope of Work

### 2.1 General

The Depot Construction Project is a Design and Build arrangement. The SOW for this project involves but is not limited to the following works:

a) All necessary surveying and investigations works for the Design and Build works;

b) Design works;

c) All required and necessary temporary works for the construction;

d) All construction works for the expansion of the Baclaran Expansion Depot;

e) All construction works for the new Zapote Satellite Depot; and

f) The Supply, installation, testing and commissioning of Maintenance Equipment.

Both depots construction works involves, but is not limited to the following:

g) All depots Architectural Works;

h) All depots Civil Works;

i) All depots buildings E&M works;

j) Supply of all necessary spare parts for all works;

k) The low voltage (LV) power distribution systems under the Depot Construction Project for buildings and facilities; and

l) Other services as required including but not limited to the following:

   i. Fire Detection and Alarm System;

   ii. Fire Suppression System; and

   iii. Security Camera System, etc.

The Supply and installation of Maintenance Equipment including but not limited to the following:

m) Supply and installation of Rolling Stock Maintenance Equipment;

n) Supply and installation of Non-Rolling Stock Maintenance Equipment;

o) Supply of all necessary spare parts;

p) Testing and Commissioning; and

q) Training of operations and maintenance staff.

All works to be performed by the Contractor shall comply with all the requirements as detailed within the Bid Document Part 2 Employer's Requirements – General Specifications and Technical Specification.

The Contractor shall provide the required Depot Civil Works, Architectural Works Structures and Maintenance Equipment taking into consideration all the requirements of each building, spaces, services and staff facilities for all operational and maintenance activities at the new Zapote Satellite Depot and the Baclaran Expansion Depot.

The Depot Civil Works, Architectural Works, Structures and Maintenance Equipment shall be constructed in full compliance with the Employer's Requirements and in accordance with all recognized Standards and Codes and shall be designed for safe and efficient operations taking into account the specific characteristics of the prevailing operating environment.

The Contractor shall provide the Depot Civil Works, Architectural Works, Structures and Maintenance Equipment being totally adequate to achieve the operational performance requirements for the Initial Service including provisions for subsequent expansion to achieve the operational performance requirements for the Ultimate service.

The Depot Civil Works, Architectural Works, Structures and Maintenance Equipment shall be inherently safe with a particular regard to the fire safety. In the event of a fire emergency the safety of staff is of the highest priority and the Contractor shall take every precaution to minimize all risks of fire and shall take into account in their design all necessary requirements for emergency evacuation.

The Contractor shall refer to and comply with the requirements for System Assurance as detailed in the Employer's Requirements Section VI-2-1 General Specifications to the extent that they apply to the provision of the Depot Civil Works, Buildings, Structures and Maintenance Equipment.

## 2.2 Depot Civil Works

The SOW for the Depot Civil Works involves but is not limited to the following works:

a) All necessary survey and investigation for the Design and Build works;

b) Securing of all necessary Permits from government agencies required to complete the works;

c) Design work;

d) All required and necessary temporary works for the construction of the depot;

e) Demolishing and removal of all existing structures;

f) Clearing and removal of grasses, trees and vegetation;

g) Removal and disposal of all unsuitable materials / debris and non-used materials;

h) Dewatering;

i) Relocation of underground utility;

j) Soil improvement;

k) Test pit excavations;

l) Verifications of bid drawings;

m) Detailed design; and

n) Preparation, Submission and Approval of all Construction Drawings;

o) The construction of Depot Civil Works such as embankment;

p) Sub-ballast;

q) Track underdrain;

r) Roads and parking lot;

s) Rain water drainage system;

t) Water supply system (including water tank);

u) Domestic / industrial waste water drainage and treatment system (including oil / grease separators and water treatment system);

v) OCS Foundation;

w) Level crossings;

x) Working decks;

y) River walls;

z) Retaining walls at the borders of the depot area and inside of depot; and

aa) Other minor structures such as height limit barriers, perimeter fence, etc.

The detail of each Depot Civil Works are described as follows;

### 2.2.1 Zapote Satellite Depot Civil Works

The SOW for the new Zapote Satellite Depot shall include, but not be limited to the following:

a) Study of the Employer's Requirements;

b) Study of Concession Agreement;

c) All necessary survey and investigation works of design and construction;

d) Verifications of bid drawings;

e) Design of Depot Civil Works and production of construction drawings;

f) All necessary temporary works for the construction of Zapote Satellite Depot Civil Works;

g) Clearing and removal of existing debris, garbage, grasses, vegetation and trees etc.;

h) Removal and disposal of all unsuitable materials;

i) Relocation of overhead utilities as necessary;

j) Dewatering and temporary cofferdams (if required);

k) Soil improvement;

l) Embankment preparations and embankments;

m) Track underdrains and rain water drainage systems;

n) Cable troughs, ducts, pits, plinths for power, signalling and telecom distribution;

o) Sub-ballast Construction works;

p) Water supply systems (including water tanks);

q) Domestic / industrial waste water drainage and treatment system (including oil / grease separators and waste water treatment system);

r) Civil works for light maintenance and other buildings under the Depot Construction Project

s) Civil work for train wash plant (including water recycle tanks);

t) OCS Foundation;

u) Transition slabs;

v) River walls, retaining walls at the border of depot area;

w) Access roads, depot internal roads, parking and concrete pavement area;

x) Level crossings;

y) Working decks;

z) Landscape; and

aa) Any other minor structures such as height limit barriers, perimeter fence, etc.

### 2.2.2 Baclaran Expansion Depot Civil Works

The scope of Baclaran Expansion Depot Civil Works shall include but not be limited to the following:

a) Study of the Employer's Requirements;

b) Study of Concession Agreement;

c) All necessary survey and investigation works of design and construction;

d) All test pit excavations for the confirmation of existing box culvert and other underground facilities;

e) Relocation of underground utilities as necessary;

f) Verifications of bid drawings;

g) Design of Depot Civil Works and production of construction drawings;

h) All necessary temporary works for the construction of Baclaran Expansion Depot Civil Works;

i) Dewatering;

j) Demolishing and removal of existing houses, structures and existing tracks which will affect the Baclaran Expansion Depot work;

k) Clearing and removal of existing debris, garbage, grasses, vegetation and trees etc.;

l) Removal and disposal of all unsuitable materials, non-used materials etc.;

m) Embankment preparations and embankments;

n) Civil works for light maintenance, heavy maintenance and other buildings under the Depot Construction Project;

o) Retaining wall inside of depot area;

p) Track underdrains and rain water drainage systems;

q) Cable troughs, ducts, pits, plinths for power, signalling and telecom distribution;

r) Sub-ballast Construction works;

s) Water supply systems;

t) Domestic / industrial waste water drainage system (including oil / grease separators);

u) OCS Foundation;

v) Transition slabs;

w) Depot internal roads, parking and concrete pavement area;

x) Train unloading area (to be concrete paved);

y) Level crossings;

z) Landscape; and

aa) Any other minor structures such as height limit barriers, perimeter fence (the currently unfenced section only), etc.

## 2.3 Depot Architectural Works

### 2.3.1 Zapote Satellite Depot Architectural Works

The scope of Zapote Satellite Depot Architectural Works shall include but not be limited to the following:

a) Study of the Employer's Requirements;

b) Study of Concession Agreement;

c) All necessary survey and investigation works of design and construction;

d) Verifications of bid drawings;

e) Design of Depot Architectural Works and production of construction drawings

f) Necessary temporary works for the construction of Zapote Satellite Depot Architectural Works

g) Light maintenance shop which include maintenance pit with depth 1.7m and train floor level platforms at both side of each tracks, roof levels platforms at one side of each track and falling down protection fence at opposite of train roof side, staff and storage rooms etc.;

h) Substation Building;

i) Material storage;

j) Hazardous material storage;

k) Waste material storage;

l) Oil storage;

m) Gate house include entrance gate;

n) Pump room for water tank; and

o) Switch room.

### 2.3.2 Baclaran Expansion Depot Architectural Works

The scope of Baclaran Expansion Depot Architectural Works shall include but not be limited to the following:

a) Study of the Employer's Requirements;

b) Study of Concession Agreement;

c) Necessary survey and investigation works of design and construction;

d) Verifications of bid drawings;

e) Design of Depot Architectural Works and production of construction drawings;

f) Necessary temporary works for the construction of Baclaran Expansion Depot Architectural Works;

g) Light maintenance shop which include maintenance pit with depth 1.7m and train floor levels platforms at both side of each tracks, roof levels platforms at one side of each track and falling down protection fence at opposite of train roof side, staff and storage rooms etc.;

h) Heavy maintenance workshop with depth 1.5m center pit for one car length;

i) Substation Building;

j) Motor Pool;

k) Material storage;

l) Hazardous material storage;

m) Waste material storage;

n) Gate house including entrance gate;

o) Switch room;

p) Infrastructure Maintenance Equipment Storage; and

q) Renovation of existing administration building/ structures to be used by LRTA monitoring team.

## 2.4 Depot Building E & M Works

### 2.4.1 General

For the Depot Buildings E&M works the Contractor's responsibilities shall include, but shall not be limited to, the following activities:

a) Study of the Employer's Requirements;

b) Study of the Concession Agreement;

c) Project management and supervision of the works;

d) Site Surveys;

e) Interface Management (IM);

f) Design and Manufacture;

g) Supply and delivery;

h) Factory Inspections;

i) Factory Acceptance Testing (FAT, if necessary);

j) Installation;

k) Site inspection;

l) Site Acceptance Testing (SAT, if necessary);

m) Commissioning and Integration Testing;

n) Maintenance support during the contract period including the defects notification period (DNP);

o) Defect rectification;

p) Training of the operational and maintenance staff at a level sufficient to allow staff to effectively, safely and efficiently operate and maintain the Works, and

q) Training of the Employer's trainers, who shall be responsible for ensuring that long term training requirements are met.

In addition, the Contractor shall:

r) Provide attendance at the Employer's premises, factory and site along with advice and assistance as necessary;

s) Provide data and information to the Employer as necessary during the course of detailed engineering, design, manufacture, installation, testing, commissioning and maintenance;

t) Provide the Employer with complete documentation, including as-built documents, drawings, reports, meeting notes, planning documents, safety documents, flow charts and software listings for all programmable equipment (as applicable), design and engineering data and other supporting manuals to enable the Employer to operate, maintain, troubleshoot, modify and develop the LRT system;

u) Provide the necessary spare parts, tools, software and test equipment as laid down in the tender document; and

v) Provide the necessary systems, operations, maintenance and training manuals.

### 2.4.2 Depot Electrical Works

The Contractor shall be responsible for the Supply and Distribution of LV Power including the cabling of the electrical equipment at the Depot Buildings and at Depot external area which is to be constructed under JICA ODA Loan and Philippine Government Fund.

The Contractor shall include the design, manufacture, supply of materials, installation, testing, supervision, all necessary labour and equipment necessary to complete and execute the Electrical Works.

Under electrical works the Contractor shall consider the following requirements but not be limited to:

a) LV Power and lighting for Light maintenance shop;

b) LV Power and lighting for Heavy maintenance workshop;

c) LV Power and lighting for Automatic train wash plant;

d) LV Power and lighting for Illumination tower;

e) LV Power and lighting for Hazardous material storage, Material storage, Oil storage, Infrastructure Maintenance Equipment Storage;

f) LV Power and lighting for Motor pool, Gate house;

g) LV Power for Security Camera System;

h) LV Power and lighting for Pump room, Switch room;

i) LV Power and lighting for Waste Water Treatment Plant;

j) Building small power and lighting requirements for Substation;

k) Earthing, Building Lightning Protection;

l) Fire alarm systems including fire detectors and smoke detectors;

m) Illumination Tower;

n) A Security Camera System shall provide security surveillance along with general surveillance of the depot areas; and

o) Risers for power supplies and telecommunications.

p) Perimeter Lighting, Street Lighting

### 2.4.3 Depot Mechanical Works

The Mechanical Works shall include but not be limited to:

a) Air-conditioning and/or ventilation as required for the following:

   i. Gate house;

   ii. Battery rooms;

   iii. Battery workshops;

   iv. Manager rooms;

   v. Staff rooms;

   vi. Workshops;

   vii. Substations and electrical rooms;

   viii. Electronic equipment rooms;

ix. Storage areas;

x. Work areas;

xi. Offices;

xii. Meeting rooms; and

xiii. Wash rooms.

b) Sanitary systems include piping works;

c) Fire protection systems at Depot external area;

d) Compressed air distribution system in light maintenance shop and heavy maintenance workshop; and

e) Water supply systems in the shop, workshops, buildings, storage, facilities, working deck, etc.

The Contractor is also required to refer also to the provision of all Mechanical Equipment as listed within the Technical Specification of Building E&M Works and the Drawings.

## 2.5 Depot Maintenance Equipment Works

### 2.5.1 General

The depot maintenance equipment consist of Rolling Stock Maintenance Equipment and Non-rolling Stock Maintenance Equipment.

Rolling Stock Maintenance Equipment is divided into light maintenance equipment, heavy maintenance equipment and automatic train wash plant.

Non-rolling Stock Maintenance Equipment is divided into five (5) groups as follows:

a) Track maintenance equipment;

b) Power and OCS maintenance equipment;

c) Telecommunication maintenance equipment;

d) Signalling maintenance equipment; and

e) Building (mainly for stations and depot buildings) maintenance equipment.

The scope of the Depot Maintenance Equipment Works include but not be limited to:

f) Study of the Employer's Requirements;

g) Study of Concession Agreement;

h) Manufacture;

i) Supply and delivery;

j) Installation;

k) SAT;

l) Testing and Commissioning for operation;

m) Maintenance support during the contract period, which shall include the DNP;

n) Defect rectification;

o) Training of the operational and maintenance staff at a level sufficient to allow staff to effectively, safely and efficiently operate and maintain the Works; and

p) Training of the Employer's trainers, who shall be responsible for ensuring that long term training requirements are met.

In addition the contractor shall:

q) Provide appropriate advice and assistance including the provision of data and information, to the Employer as necessary, during the testing, installation and commissioning periods;

r) Provide the Employer necessary complete documentation, drawings, flow charts and software listings for all programmable equipment (as applicable), design and engineering data and other supporting manuals, to enable the Employer to operate, maintain, troubleshoot, modify and improve;

s) Provide the necessary spare parts, tools, software and test equipment as laid down in the tender document; and

t) Provide the necessary Operation and Maintenance manuals.

### 2.5.2 Rolling Stock Maintenance Equipment Works

#### 2.5.2.1 Light Maintenance Equipment

The scope of the Light Maintenance Equipment Works include but not be limited to:

a) Light maintenance inspection tools;

b) Motor Truck; and

c) Battery Charger.

#### 2.5.2.2 Heavy Maintenance Equipment

The scope of the Heavy Maintenance Equipment Works include but not be limited to:

a) Overhead Crane;

b) Lifting Jack;

c) Bogie Turn Table;

d) Wheel lathe;

e) Hydraulic Press Machine; (to be supplied by Rolling Stock manufacturer);

f) Bogie Washing Booth;

g) Pneumatic Valve Tester;

h) Air Compressor Tester;

i) Bogie Stand (to be supplied by Rolling Stock manufacturer);

j) Universal Machine;

k) Pantograph Working Stand;

l) Brake tester; (to be supplied by Rolling Stock manufacturer);

m) Parts wash Machine;

n) Electric relay tester;

o) Car Mover (Shunting Locomotive);

p) Jib Crane;

q) Battery charger;

r) Motor Truck;

s) Folk Lift;

t) Dummy Bogie;

u) Table Lifter pit;

v) Table Lifter on pit;

w) Access platform;

x) High Speed Breaker Tester;

y) Arrester Tester;

z) Jet Cleaning Machine;

aa) Levelling Valve Tester;

bb) Bearing Removal and Pressing Device;

cc) Induction Heater;

dd) Universal Press Machine;

ee) Re-Railing Equipment;

ff) Portable Arc Welding Set;

gg) Truck for transportation of Air Conditioner Unit; and

hh) Measurement Instrument and Tools for Rolling Stock Maintenance.

**2.5.2.3 Automatic Train Wash Plant**

**2.5.3 Non-Rolling Stock Maintenance Equipment Works**

**2.5.3.1 Track Maintenance Equipment**

The scope of Track Maintenance Equipment Works include but not limited to:

a) Track Maintenance Vehicle (Rail Car);

b) Flat Open Wagon;

c) Side Covered Wagon;

d) Rail Profile Grinding Car;

e) Rail Grinding Machine (Hand Operation);

f) Track Geometry Measuring Equipment;

g) Tie Tampers with Generator set;

h) Surveying Equipment;

i) Ultrasonic Rail Inspection Equipment;

j) Field Welding Hardware Sets and Welding Kits;

k) Rail Heater;

l) Rail Tensor;

m) Weld Shear;

n) Track work Tools, Human Powered; and

o) Tools and Equipment for Track Maintenance.

**2.5.3.2 Power and OCS Maintenance Equipment**

The scope of Power and OCS Maintenance Equipment Works include but not limited to:

a) OCS Maintenance Equipment;

b) Power Works Maintenance Equipment; and

c) Tools and equipment for Power and OCS Maintenance.

#### 2.5.3.3 Telecommunication Maintenance Works Tools and Test Kits

The scope of Telecommunication Maintenance Works Tools and Test Kits include but not limited to:

a) Test kit for electrical and electronic works;

b) Tool sets for electrical and electronic works;

c) Man Lift to facilitate a working height of 6m; and

d) Special tools and test equipment, to be recommended by the Contractor, as required by the Technical Specification.

#### 2.5.3.4 Signalling Maintenance Works Tools and Test Kits

The scope of Signalling Maintenance Works Tools and Test Kits include but not limited to:

a) Test kit for electrical and electronic works;

b) Tools for electrical and electronic works; and

c) Special tools and test equipment, to be recommended by the Contractor, as required by the Technical Specification.

#### 2.5.3.5 Building Facilities Maintenance Equipment

The scope of Building Facilities Maintenance Equipment include but not limited to:

a) Man lift to facilitate a working height of 12m;

b) Insulated and extendable ladders; and

c) Safety Harness.