



# COCHIN PORT TRUST

Civil Engineering Department  
E-Tender No. T15/T-1946/2021-C

NOTICE INVITING REQUEST FOR PROPOSAL  
FOR  
Construction of International and Domestic Cruise Terminal and  
Other Allied Facilities at Mormugao Port Trust



## AMENDED VOLUME-IV EMPLOYER'S REQUIREMENTS AND MILESTONES JUNE 2021

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## VOLUME-IV

### EMPLOYER'S REQUIREMENT

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## 1..... V4 EMPLOYER'S REQUIREMENTS

### 1.1. ...V4 GENERAL

Employer's Requirements are that the Contractor shall carryout the Engineering, Design, Procurement of Materials & Labour and Construction / Installation of all the items listed along with associated Works including testing and commissioning as outlined in this Bid Document. For this purpose, the Bidder shall conduct all necessary field tests and surveys to satisfy / verify himself regarding the correctness of the data furnished vis-à-vis actual condition. No claim whatsoever will be entertained for any variation between the actual site condition met with during the execution of the Work and those indicated in the Tender Document.

## 2. ....V4 PROJECT FACILITIES OVER VIEW

**2.1.....V4** The Project Site is located inside Mormugao Port Trust and near the Breakwater , with an area of 13.40 acres. There are four sheds existing thereon, which are proposed to be partially dismantled and used as the new construction area and partially to be upgraded/refurbished to serve as a new Cruise Terminal Building and an Ancillary Commercial building.

Ferry Terminal, Ro-Ro/Ro-Pax facilities and other ancillary facilities are also proposed to be provided adjacent to the said Terminal area.

### 2.1.1..V4 BRIFE DETAILS EXISTING SHED

The sizes of existing Sheds to be dismantled / refurbished under this contract are as follows:

- a) Shed 1 : 132m x 27m
- b) Shed 2 : 81m x 17m
- c) Shed 3. : 106m x17m
- d) Shed 4. : 82m x17m
- e) Shed 5 : 35m x22m
- f) Shed 6 : 140m x 22m

### 2.1.2..V4 PROPOSED NEW FACILITIES OVER VIEW

The State of Art Cruise Terminal Building(total floor area to be around 9900 sqm.) shall house both the International Cruise Terminal and Domestic Cruise Terminal, with the following facilities:

International Cruise Terminal: 24 immigration counters, 10 check-in counters, waiting lounge, baggage carousel etc.

Domestic Cruise Terminal: 12 check-in counters, waiting lounge, baggage carousel, etc.

Other facilities in the Terminal Building will include Duty free retail shops, lounges, food court, etc.

The Ancillary Building (floor area to be around 3700 sqm.) shall house an experiential shopping zone mainly targeting Cruise Tourists but also made accessible to the General Public.

Sufficient Parking Area along with internal Road network and Utilities are also proposed for integrated development.

The proposed Utilities include Electrical (HT/LT), Air-Conditioning (HVAC System using Precision/VRV/VRF Air-conditioners in row cooling system etc.), Lifts/Elevators, DG sets, UPS system, IBMS (CCTV, Access Control, Public Address System, Fire & Safety Systems and integrating it with Building Management System), Security, Landscaping and other beautification works, Networking & IT Systems and all essential and ancillary services as required in a state of art International and Domestic Cruise Terminal.

The Operation and Maintenance of the Project Facilities developed under this Contract, viz., International and Domestic Cruise Terminal Facilities, Ferry and Ro-Ro/Ro-Pax Facilities, will be entrusted with separate agencies by the Mormugao Port Trust.

## 2.2....V4 PROJECT COMPONENTS

The entire Scope of Work of the Contractor for this Bid is split into various groups for the purpose of monitoring. The broad items of works covered under each group are listed below.

- a) Group A -TERMINAL BUILDING
- b) Group B - ANCILLARY COMMERCIAL BUILDING
- c) Group C -FERRY TERMINAL BUILDING (Portable cabins)

- d) Group D- RORO/ ROPAX FACILITIES
- e) Group E – EXTERNAL INFRASTRUCTURE DEVELOPMENT WORKS

#### 2.2.1..V4 Group A -TERMINAL BUILDING

- i) Non-Destructive Testing and furnishing Structural Report
- ii) Dismantling & Demolishing existing building
- iii) Civil Construction Works
- iv) Toilet Cubicles Ceiling and Wall Paneling works
- v) Plumbing Works
- vi) Electrical Works
- vii) Fire Fighting Works
- viii) Fire alarm and Public address system
- ix) Lifts (5nos)
- x) Escalators (2nos)
- xi) Civil work for Underground Baggage carousel
- xii) IBMS
- xiii) HVAC

#### 2.2.2..V4 Group B - ANCILLARY COMMERCIAL BUILDING

- i) Dismantling, Internal Civil Construction Works, Elevation Finishes
- ii) Plumbing Works
- iii) Toilet cubicles and Toilet area Ceiling
- iv) Fire Fighting Works
- v) Electrical Works
- vi) Fire CCTV and access control system
- vii) HVAC
- viii) alarm Lifts (2nos)
- ix) and Public address system

#### 2.2.3..V4 Group C - FERRY TERMINAL BUILDING

Portable Cabins- 2 Nos. (only shifting and positioning in new location and execution of allied work)

### 2.2.3..V4 Group D - RORO/ ROPAX FACILITIES

Development / Refurbishment Works- Civil works for Ramp

### 2.2.3..V4 Group E- EXTERNAL INFRASTRUCTURE DEVELOPMENT WORKS

- i) External Electrical Works, external Street Lighting and Parking area Lighting, High Mast (2 nos.)
- ii) External Plumbing Works
- iii) External Fire Fighting works
- iv) Civil works for Roads, SW Drain, External filling / levelling and parking area
- v) Civil works for Electrical Trench
- vi) Civil works for Sump, Pump Room, STP, Utility and Service buildings
- vii) General infrastructure works: Compound wall, Landscape, Streetscape works, Hardscape works, National flag development, Signages, other Unforeseen items and Miscellaneous works.

2.3....V4 The Contractor shall submit warranty/guarantee cards or receipts of the various parts used in the Works. In this regard, the Contractor has to enter into agreement with the suppliers, who have to pass on the said warranty/right to the Employer. The Contractor shall submit warranty / guarantee effective from the date of commissioning of the Works.

2.4...V4 The structures, equipment, system/sub-systems and components shall confirm in all respects to high standards of engineering, design and workmanship and shall be capable of performing in continuous operation in a manner acceptable to the Employer and shall also be in line with the current practices for reliable and efficient functioning of facility.

2.5...V4 In the event of conflict between requirements of any two clauses of the Specifications / Documents or requirements of different codes / standards specified, the more stringent requirement as per the interpretation of the Employer shall apply.

2.6...V4 The Contractor while executing the Works shall follow good industry practice, which however shall meet the Employer's Requirements. The Contractor shall adhere to and honour the Conditions of Contract, in all respects.

### 3.....V4 DESCRIPTION OF CONTRACTOR'S SCOPE OF WORK

#### 3.1...V4 General

The Specifications provided in the Bid together with enclosed Scope Drawings outline the functional requirements and the operating characteristics which the structures/facilities must fulfil. Alternative technical features/designs other than those specified may be acceptable subject to meeting the functional requirements and the operating characteristics and has the approval of the Employer. In any case, the

performance of the system/ equipment, if any delivered, shall be guaranteed in every detail by the Contractor. Overall dimensions (boundary dimensions) and functional requirements as specified shall be strictly adhered to. The Scope of Work detailed below is for overall understanding of the Works and does not absolve the Contractor from successful commissioning and operation of the Works with best available latest technology. Any item/equipment not listed but required for completion of the Works shall be considered as included in the Scope of the Contractor.

The Contractor shall be deemed to have examined the Site and familiarized himself with all existing Site conditions. He shall accept the Site in the existing condition at the time of Award of Contract.

#### 3.2...V4 Detailed Scope of Work under this Bid

3.2.1.V4 The Detailed Scope of Work under all Project Components are given below in the form of Scope Matrices. This shall be read in conjunction with the Tender Drawings provided as part of the Bid document.

#### Scope Matrix -01

DISMANTLING WORKS			
Sl. no	Scope of work	Location	Item spec / Materials
I	<b>TERMINAL BUILDING</b>		
1	Raking/Floor removal	Existing building Floor area (Shed 1 & 2)	20mm Raking
2	Dismantling / Demolishing (Brick, Chipping old wall & RCC)	Existing buildings (Shed 1 & 2)	Dismantling / Demolishing by Mechanical means/manually .



			Complete brick work of both sheds and first floor slab with beam of Shed No.2 to be dismantled and other RCC components subject to validation of health of structure
3	Removal (Shed, Windows, Doors, shutters, pipes, flooring)	Existing building (Shed 1 & 2)	Dismantling existing windows, doors, shutter, flooring
4	Dismantling roof	Existing building (Shed 1 & 2)	Dismantling steel work in built up sections in angles, tees, flats and channels and Roof
5	Carting / Disposal of Demolished material		The dismantled structural steel and steel reinforcement shall be handed over to MoPT by the EPC Contractor and stacked to the designated location within a lead of 5 kms. The other usable dismantled materials like concrete, brick etc. shall be used for filling the premises wherever required. Unusable debris shall be disposed through mechanical transport at a suitable disposal yard, a feasible location of which has to be identified by the Contractor.
<b>II</b>	<b>ANCILLARY BUILDING - EXISTING 2 SHEDS</b>		
1	Raking/Floor removal	Existing building floor surface area (Shed 3 & 4)	20mm Raking
2	Dismantling / Demolishing (Brick, Chipping old wall & RCC)	Existing buildings (Shed 3 & 4)	Dismantling / Demolishing by Mechanical



			means/manually . Complete brick work of both sheds and first floor slab with beam of Shed No.4 to be dismantled and other RCC components subject to validation of health of structure
3	Removal (Shed, Windows, Doors, shutters, pipes, flooring)	Existing building (Shed 3 & 4)	Dismantling existing windows, doors, shutter, flooring
4	Dismantling roof	Existing building (Shed 3 & 4)	Dismantling steel work in built up sections in angles, tees, flats and channels and Roof
5	Carting / Disposal of Demolished material		The dismantled structural steel and steel reinforcement shall be handed over to MoPT by the EPC Contractor and stacked to the designated location within a lead of 5 kms. The other usable dismantled materials like concrete, brick etc. shall be used for filling the premises wherever required. Unusable debris shall be disposed through mechanical transport at a suitable disposal yard, a feasible location of which has to be identified by the Contractor.
<b>III</b>	<b>PARKING AREA LOCATION</b>		
1	Dismantling the sheds (Structural steel members, Masonry walls)	Two existing sheds in the western periphery of the project area (one around 35m long	Structural steel and masonry of the sheds ,except roofing and wall sheets with door shall be dismantled and removed

		and another around 140 m long)	by the EPC contractor. Structural Steel members shall be stacked to the designated location of MoPT within a lead of 5 km and handed over to MoPT.  Roofing/cladding sheets with doors shall be dismantled by the other agency.
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### Scope Matrix -02

<b>NON DESTRUCTIVE TESTING OF THE EXISTING STRUCTURES</b>			
<b>Sl. no</b>	<b>Scope of work</b>	<b>Location</b>	<b>Item spec / Materials</b>
1	Condition assessment of structural elements of the existing buildings through non-destructive tests.	Existing sheds to be refurbished for Terminal and Commercial building	Condition assessment of all structural elements of 4 sheds (No 1 to 4) except the component to be dismantled as per direction of the employer.
2	Analysis of structural stability of the structures	Existing sheds to be refurbished for Terminal and Commercial building	Analysis of all structural elements of 4 sheds (No 1 to 4) except the component to be dismantled as per direction of the employer.
3	Conduct such additional tests as deemed necessary required to ascertain the structural stability of the structure	Existing sheds to be refurbished for Terminal and Commercial building	As per results of the analysis and as per direction of the employer.

## Scope Matrix -03

TERMINAL BUILDING SCOPE MATRIX			
Sl. no	Scope of work	Location	Item spec / Materials
	<b>Structural - Civil works</b>		
1	Earth work	Raft foundation /as per Structural design	Excavation by Hydraulic excavator
2	Bonding chemical & chemical emulsion for post construction anti termite treatment	Below new foundation	Structural grade bonding agent/old concrete to new concrete and Treatment of soil
3	Anchoring (in between new footing and old foundation)	Foundation	20mm dia bar c/c 1.5M
4	PCC below Foundation	Terminal buildings	PCC 1:2:4 (100mm thk)
5	Screed below flooring	Terminal buildings	PCC 1:2:4 (100mm thk)
6	RCC STRUCTURE	Proposed building structure	M40 grade Design mix
7	Sand and Gravel filling	under floor	Filling with Moorum, local earth and sand filling including watering, ramming, consolidating and dressing complete.
8	Steel Reinforcement	Proposed RCC Structure	Corrosion resistant steel bars as per Design Fe500D with fusion bond epoxy coating as per IS:1786,13620.
9	Steel Structural as per design	Proposed slabs/Mezzanine and roof structures	As per design Structural steel frame work including fabrication and erection, with structural steel tubes, rafters, beams, purlins, Deck slab, Staircase with 6mm thick Chequered plate and mezzanine with GI deck sheet and screed as approved.
10	Roof	Terminal building	PEB Structural steel

			frame work and Aluminium Standing Seam Double Skin Roofing System
11	Roof -Tensile fabric structure	Terminal- new buildings and Entrance	Supply & fixing Tensile fabric structure

### Scope Matrix -04

	Finishes		
12	Block / Brick work (200 & 100mm thick)	Proposed walls	M15 grade Cement Concrete solid Block masonry work / Brick Masonry using wire cut bricks
13	Plastering	on walls	External side 20mm thick plastering & other side 12mm thick plastering
14	POP putty	Internal walls	White Cement putty of 2 mm thickness over plastered surface
15	Painting	Proposed walls	Two coats of Acrylic emulsion paint and one primercoat.
16	Structural glazing		Double glazing system DGU 6-12-6
17	Internal Curtain glazing		vision glass panels (IGUs) 6-12-6 insulated with 12mm thick frameless toughened glass doors
18	Hand railing	Staircase	1.1m ht. SS hand railing ~ Grade 304
	<b>Floor finishes</b>		
19	Italian flooring	Main entrance lobby areas/ International arrival	Mirror polished Italian marble flooring of 18mm thickness @ Grand Entrance
20	Granite flooring & cladding	Lobby/ Lift lobby	18mm thick polished granite & 8mm Polished granite wall cladding

21	Staircase flooring & skirting	Staircase (Risers, treads & landing)	18mm thick Granite stone slab, edge moulding
22	Vitrified flooring & skirting	International & Domestic departure, Restaurants, workstations, office, meeting room and etc.,	Vitrified flooring tile of size 800 x 800mm of (thickness not less than 12mm for flooring / not less than 8mm for skirting)
23	Anti skid vitrified tiles flooring & Glazed ceramic wall tiles	Toilet and wash areas	Vitrified antiskid tiles flooring of 10mm thickness, Ceramic glazed wall tile dadoing (8mm thickness) all around toilets
24	Granite counter top	Toilet block hand wash area , Kitchen	18mm Mirror polished platforms with edge moulding
25	Toilet Cubicles	Toilet blocks	Toilet Cubical fixtures with internal panels (Phenolic core board)
26	Kota stone	Kitchen, Loading bay	25mm thick Kota stone flooring
27	False Ceiling	Terminal - new buildings as per design intent	Supply & fixing Sound scapes shapes acoustical circular clouds and GI Metal Tile Lay-in Plain Tegular edge global white colour tiles For Toilet areas with Fine fissured grid ceiling

### Scope matrix -05

28	ACP cladding	As per drawings/ design intent	ACP material cladding at external Roof ceiling deck / decorative column / wall as per designs
29	External Entrance wall	As per drawings/ design intent	with Reckli finish cladding
30	Reckli cladding	External entrance	Reckli cladding

		area	
31	Aluminium Louvers	External	Powder coated finish
<b>Joinery</b>			
32	Sliding door	Entrance	Sensor based Sliding 12mm thk Toughened glass
33	Glass door	Internal doors	Patch fitting 12mm thk Toughened glass
34	Fire Rated doors	Staircase / Emergency exit	Powder coated FR doors, Galvanized Iron sheet formed to double rebate profile Hot zinc coating and powder coating
35	Doors	Joinery scheduled details	FRP doors for Toilet doors.
36	Windows & Ventilators		uPVC
37	Louvers & shaft doors	Shafts / ducts	Fire rated /Aluminium Anodised louvered powder coated
38	Water proofing treatment	Toilet block areas and Mezzanine floor area	Chemical water proofing as per DSR-2019
39	Plumbing works		Sanitary Fixtures and CP fittings Drainage system Water supply system
40	Electrical works		Light fixtures Point wiring Switches & sockets Wiring Distribution Boards Lighting controls / Sensors
41	Fire fighting works		Fire pump equipment Hydrant system Fire extinguishers Fire safety Signages Automatic sprinkler & water curtain systems
42	Fire alarm and Public address system		Panels, addressable photo thermal Detectors, short circuit isolator, voice alarm,

			Speaker.
43	Lifts		5 nos, Product from approved make. Like: Schindler, Otis, Kone, Thyssenkrupp.
44	Escalators		2 nos, Product from approved make. Like: Schindler, Otis, Kone, Thyssenkrupp.

## Scope matrix -06

45	Civil work for underground Baggage carousel	Baggage carousel routing	Earth work excavation, Anti termite treatment, PCC, M25 Concrete RCC Section, TMT steel, Back filling.
46	IBMS		Access control system Building Management systems Rodent Repellent system Early smoke and water leak detection system
47	HVAC		Centrifugal direct drive

## Scope matrix -07

ANCILLARY BUILDING SCOPE MATRIX			
Sno.	Scope of work	Location	Specification
	<b>Structural - Civil works</b>		
1	Earth work	Raft foundation /as per Structural design	Excavation by Hydraulic excavator
2	Bonding chemical & chemical emulsion for post construction anti termite treatment	Below new foundation	Structural grade bonding agent/old concrete to new concrete and Treatment of soil
3	Anchoring (in b/w new footing and old foundation)	Foundation	20mm dia @ 1.5M c/c rebar
4	PCC below Foundation	Terminal	PCC 1:2:4 (100MM thk)



		buildings	
5	Screed below flooring	Terminal buildings	PCC 1:2:4 (100MM thk)
6	RCC STRUCTURE	Proposed building structure	M40 grade Design Mix
7	Sand and Gravel filling	under floor	Filling with Morrums, local earth and sand filling including watering, ramming, consolidating and dressing complete.
8	Steel Reinforcement	Proposed RCC Structure	Corrosion resistant steel bars as per Design Fe500D with fusion bond epoxy coating as per IS:1786,13620.
14	Steel Structural as per design	Proposed slabs/Mezzanine and roof structures, Staircase	As per design Structural steel frame work including fabrication and erection, with structural steel tubes, rafters beams, purlins, Deck slab, Staircase with 6mm thick Chequered plate and mezzanine with GI deck sheet and screed as approved.
15	Roof	Ancillary building	PEB Structural steel frame work and Aluminium Standing Seam Double Skin Roofing System
16	Tensile fabric roofing	External corridor between Ancillary building	Tensile fabric umbrella shaped Module as per Architectural intent.

### Scope matrix -08

	<b>Finishes</b>		
17	Block work (200 & 100mm thick)	Proposed walls	M15 grade Cement Concrete solid Block masonry work / Brick Masonry using wire cut bricks

18	Plastering	on walls	External side 20mm thick plastering & other side 12mm thick plastering
19	POP putty	Internal walls	White Cement putty of 2 mm thickness over plastered surface
20	Painting	Proposed walls	Acrylic emulsion painting in three coats
21	Hand railing	Staircase	SS hand railing ~ 304
	<b>Floor finishes</b>		
22	Granite flooring	Lobby/ Lift lobby	18mm thick polished granite
23	Staircase flooring & skirting	Staircase (Risers, treads & landing)	18mm thick Granite stone slab, edge moulding
24	Vitrified flooring & skirting	Mall / Rooms	Vitrified flooring tile of size 800 x 800mm and thickness not less than 12mm for flooring and 8mm for skirting.
25	Anti skid vitrified tiles flooring & Glazed ceramic wall tiles	Toilet and wash areas	Vitrified antiskid tiles flooring of 10mm thickness and 8 mm thick Ceramic glazed wall tile dadoing all around toilets The size of tiles shall be 320x 320 mm or nearest size.
26	Granite counter top	Toilet block hand wash area	18mm Mirror polished platforms with edge moulding
27	Toilet Cubicles	Toilet blocks	Toilet Cubicles fixtures with internal panels (Phenolic core board)
28	False Ceiling	Ceiling area	Fine fissured grid ceiling
	<b>Joinery</b>		
29	Doors	Joinery scheduled details	Engineered wood doors
30	Doors	Toilet doors	FRP doors
31	Windows & Ventilators		Anodized aluminium shutters with figured glass
32	Louvers & shaft doors	Shafts / ducts	Fire rated /Aluminium Anodised louvered

			powder coated
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### Scope matrix -09

33	Plumbing works		Sanitary Fixtures and CP fittings Drainage system Water supply system
34	Electrical works		Light fixtures Point wiring Switches & sockets Wiring Distribution Boards Lighting controls / Sensors
35	Fire fighting works		Fire pump equipment Hydrant system Fire extinguishers Fire safety Signages Automatic sprinkler & water curtain systems
36	Fire alarm and Public address system		Panels, addressable photo thermal Detectors, short circuit isolator, voice alarm, Speaker.
37	Lifts		2 nos, Product from approved make. Like: Schindler, Otis, Kone, Thyseenkrupp.
38	HVAC		Centralized Aircooled chiller

### Scope matrix -10

EXTERNAL INFRASTRUCTURE DEVELOPMENT WORKS			
Sl no	Scope of work	Location	Item of work
1	External electrical works, External street lighting, and parking area lighting, 2 high mast		
2	External Plumbing works		
3	External Fire Fighting works		

4	<b>Civil works for Roads</b>	Site Internal Roads at Terminal, Ferry and ancillary allied zones	
i	Earth work		Earth work in surface excavation
ii	Sub grade		Granular Sub Base Consolidation of sub grade with power road roller
iii	Filling		Laying wet mix macadam (WMM) sub-base with brick aggregate and binding material, earth etc.
iv	Road		Cement concrete M-30 grade
v	Expansion joints		Bitumen hot sealing compound
vi	RCC work	Strom water drain	RC wall of M-30 grade with steel reinforcement of grade Fe500D
vii	Road marking		Painting median/taxi track/apron marking with adequate no. of coats to give uniform finish with road marking paint 2.5 mm thick road marking strips (retro reflective) of specified shade/ colour
viii	Sign board		Providing Retro-reflective regulatory sign board of size 900 mm dia meter made out of 2 mm thick aluminium sheet, face to be fully covered with high intensity encapsulated lens type
ix	Kerb stone		M-25 grade cement concrete (0.15X0.45M) with PCC below

x	Paver block	Footpaths / walk way	M50grade CC paver blocks, 100mm thick in the traffic area and 60 mm thick M40 grade CC paver blocks in the non-traffic area
5	<b>External filling/ Site levelling</b>	Site area Terminal, Ferry and ancillary allied zones	
i	Earth filling		Stacking of good earth
ii	Sand filling		Sand filling
iii	PCC		PCC of 1:2:4
iv	Retaining wall	Berth facing/Terminal building void bund walls	Raft footing & wall M40 grade
v	Steel reinforcement for R.C.C		Corrosion resistant steel bars
vi	Anti termite treatment		Post construction treatment
vii	Water proofing	Retaining wall	Integral Crystalline slurry of hydrophilic in nature for waterproofing treatment to the RCC structures
viii	Paver blocks	walk way	M50grade CC paver blocks, 100mm thick in the traffic area and 60 mm thick M40 grade CC paver blocks in the non-traffic area
6	<b>Parking area</b>		
i	Sub grade- Granular Sub Base		Consolidation of sub grade with power road roller
ii	WMM		Laying, spreading and compacting stone aggregate of specified sizes as per WMM specifications in uniform thickness
iii	Paver blocks / Hardscape	Footpath, Park, & lawns, drive way	M50grade CC paver blocks, 100mm thick in

		or light & traffic parking etc.	the traffic area and 60 mm thick M40 grade CC paver blocks in the non-traffic area
7	<b>Civil work for Electrical trench</b>		
	Earth work, anti-termite treatment, PCC, RC walls, Steel, back filling		
8	Ferry Terminal building PCC, Porta cabins	Ferry Terminal building	Existing Porta cabins are to be shifted.
9	<b>Utility and service buildings</b>		
	Yard 1 , 2, Electrical Shed, Sump, Pump Room provision, STP civil works: Earth work, PCC, RCC, Steel, shuttering, block work, plastering, painting, MS gate, security cabins	As per master plan drawing	
10	<b>General infra structure work</b>		
i	<b>Compound wall work:</b> Earth work, anti-termite treatment, PCC, RCC, Steel, shuttering, block work, plastering, painting, MS gates, security cabins, toilet cabins	As per master plan drawing	
ii	PCC, Plum Concrete, RCC works		
iii	Landscape works	As per architectural master plan drawing	
iv	National flag development, Signages, Street scape works, pigmented hardscapes other Unforeseen item and Miscellaneous works	As per architectural master plan drawing	
11	RORO/ ROPAX FACILITIES Development / Refurbishment Works-	RORO/ ROPAX	

	Civil works for Ramp		
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3.2.2.V4 The buildings are to be provided with all provisions for power, lighting, ventilation, air conditioning, communication, water distribution, sanitary arrangements and architectural finishes, etc. in accordance with the Specifications and Drawings.

3.2.3.V4 The minimum built-up area of each building shall be as specified in ~~Table 3.1~~ the drawing. However, the Contractor shall be required to build more area, in case it is required to meet the functional and design requirements.

3.2.4.V4 The Contractor shall prepare architectural layouts for each building, meeting the requirements as set out in the Bid Document and submit to Employer. The detailed design of the buildings shall be taken up only after the Employer's acceptance of the final architectural scheme of the respective building.

### 3.3...V4 **THIRD PARTY CERTIFICATION**

3.3.1.V4 All the design calculations and reports shall be duly vetted by reputed Third Party Agencies of international repute such as IIT Madras or IIT Mumbai , IIT Kanpur or IIT Delhi and accordingly, a certificate shall be enclosed along with each submission for review and approval of the Employer.

3.3.2.V4 Structural Stability Certificate for the structures certified by the above said Third Party shall be submitted prior to Taking Over of the Works.

3.3.3.V4 All major Mechanical items of work executed for the Project shall be certified by renowned Classification Agencies at the cost of the Contractor. The Contractor shall appoint any one/ more among the list of agencies viz. IRS, ABS, LRS, DNV or BV as Classification Society.

3.3.4.V4 For the works where Third party inspection is required/ envisaged, the Third party inspection agency shall be selected by the Employer from the list of minimum 3 agencies suggested by the Contractor. The Employer may engage another Third party inspection agency also and the decision of the Third party inspection agency engaged by the Employer shall be final.

3.3.5.V4 Mere certification from the Third Party Agencies shall not relieve the Contractor from fulfilling his contractual obligations. The Contractor is responsible for the successful completion of the Works and the Works shall serve the required design life.



#### 4.0...V4 MILESTONES FOR PAYMENTS

Stage payments shall be released to the Contractor on completion of the work as per Milestones given in the Table below. The percentage figures as filled in Column (3) by the Employer for the apportionment of the Accepted Contract Amount for completion of the Works corresponding to the items given against each mile stones are fixed and payment will be released as per the percentage break-up of Accepted Contract Amount.

#### MILESTONES FOR PAYMENTS

Sl. No	Description of items of works	Payment (%)	Period of Mile Stone
(1)	(2)	(3)	(4)
1.	<p><b><u>MILESTONE 1</u></b>  <b><u>Terminal Building &amp; Ancillary Bldgs :</u></b></p> <p>i) All NDT            ii) All dismantling works;            iii) All earth cutting works            iv) All filling works with sand/ moorum/ good earth including back filling ;            v) PCC works for foundation and for baggage carousel including applying epoxy bonding agent            vi) Anti-termite treatment;            vii) Providing fusion bond epoxy coated reinforcement for foundation            viii) RCC works for foundation and baggage carousel</p>	5%	<p>Commencement-SD            Completion :SD+ 3 months            Note : SD means Schedule Date of Commencement.</p>
2.	<p><b><u>MILESTONE 2</u></b>  <b><u>External Works:</u></b></p> <p>i) All earth cutting works for providing roads, drains, electrical trench, sump, STP, compound wall including back filling;            ii) Anti-termite treatment;            iii) PCC for drains, electrical trench,</p>	5%	<p>Commencement : SD+ 1.5 months            Completion: SD + 5 months            (Time Period 3.5 months)</p>

	<p>sump, STP, compound wall, Ro-Ro, Ro- Pax</p> <p>iv) Providing fusion bond epoxy coated reinforcement for foundation &amp; side walls for drains, electrical trench, sump, and for foundation of STP, compound wall and for Ro-Ro, Ro- Pax ramp works;</p> <p>v) RCC works for foundation and side walls for drains, electrical trench, sump;</p> <p>vi) RCC works for foundation of STP, compound wall and for Ro-Ro, Ro- Pax ramp works;</p> <p>vii) Granular sub-base, WMM work for roads and Parking Area</p> <p>viii) CC works of roads and parking Area</p> <p>ix) Paver block work of Parking Yard</p>		
3.	<p><b><u>MILESTONE 3</u></b> <b><u>Terminal Building &amp; Ancillary Bldgs :</u></b></p> <p>i) Providing fusion bond epoxy coated reinforcement for RCC columns and beams upto First Floor level</p> <p>ii) RCC columns and beams upto First Floor level</p> <p>iii) Brick work - external wall, internal partitions including toilets in GF</p> <p>iv) Structural Steel work for deck floor including GI sheeting</p>	7%	<p>Commencement: at SD+ 3 months Completion: SD + 5.5 months (Time Period- 2.5 months)</p>
4.	<p><b><u>MILESTONE 4</u></b> <b><u>External works</u></b></p> <p>i) Compound wall Superstructure.</p> <p>ii) Landscaping bed preparation work</p> <p>iii) Fire fighting arrangements – external pipeline and allied works</p> <p>iv) External filling and RCC works</p>	5%	<p>Commencement: at SD+ 5 months Completion: SD + 8 months (Time Period- 3months)</p>

	<ul style="list-style-type: none"> <li>v) External plumbing pipeline laying work</li> <li>vi) Balance Road work excluding</li> <li>vii) Hardscaping works other than parking area</li> </ul>		
5.	<p><b><u>MILE STONE 5</u></b> <b><u>Terminal Building &amp; Ancillary Bldgs :</u></b></p> <ul style="list-style-type: none"> <li>i) Providing fusion bond epoxy coated reinforcement for balance RCC works mainly of 1st Floor.</li> <li>ii) Balance RCC works.</li> <li>iii) Brick work- external wall, internal partitions including toilets in First floor</li> <li>iv) CC flooring in GF</li> <li>v) Cement Plastering of both ground floor and first floor</li> <li>vi) White Cement Putty work of both ground floor and first floor</li> </ul>	6%	Commencement: at SD+ 5.5 months Completion: SD + 8.5 months (Time Period- 3months)
6.	<p><b><u>MILE STONE 6</u></b> <b><u>Terminal Building &amp; Ancillary Bldgs :</u></b></p> <ul style="list-style-type: none"> <li>i) Pre Engineered Building Structure with roofing</li> <li>ii) Tensile Roofing system with structural supports</li> <li>iii) Internal Wall painting both ground floor and first floor</li> </ul>	15%	Commencement: at SD+ 8.5 months Completion: SD + 11.5 months (Time Period- 3months)
7.	<p><b><u>MILE STONE 7</u></b> <b><u>Terminal Building &amp; Ancillary Bldgs :</u></b></p> <ul style="list-style-type: none"> <li>i) External Wall painting both ground floor and first floor</li> <li>ii) Ceiling and wall paneling works</li> <li>iii) Fixing frame structure for lift and escalator</li> <li>iv) Electrical works – Laying cable after making necessary duct</li> <li>v) Fire fighting works –Laying pipelines</li> <li>vi) Fire Alarm and PA system TB-Laying cable lines</li> <li>vii) HVAC works – Laying cable and</li> </ul>	6%	Commencement: at SD+ 11.5 months Completion: SD + 14months (Time Period- 2.5months)

	other pipelines		
8.	<p><b><u>MILE STONE 8</u></b>  <b><u>Terminal Building &amp; Ancillary Bldgs :</u></b></p> <p>i) External glazing work with structure at Terminal Building  ii) Internal curtain glazing in both the buildings  iii) Providing and fixing all types of doors  iv) Providing uPVC windows &amp; louvers</p>	17%	<p>Commencement:  at SD+ 11.5 months  Completion: SD + 14months  (Time Period- 2.5months)</p>
9	<p><b><u>MILE STONE 9</u></b></p> <p>i) Waterproofing works to floor  ii) Flooring with granite/ marble/ vitrified tile of both Terminal and Ancillary building  iii) Dado, skirting, wall cladding with granite etc.  iv) Balance External electrical works  v) Balance work of lift and escalator  vi) Balance Fire fighting works  vii) Balance Fire Alarm and PA system including testing</p>	16%	<p>Commencement:  at SD+ 14 months  Completion: SD + 16months  (Time Period- 2months)</p>
10	<p><b><u>MILE STONE 10</u></b></p> <p>i) All Internal electrical works including fixing electrical fittings  ii) All external electrical works including fixing electrical fittings  iii) All internal plumbing works including all fixtures  iv) All external plumbing works including all fixtures  v) Balance HVAC works including commissioning  vi) Balance works sump, STP etc  vii) Painting compound wall and gate  viii) Balance Landscape works  ix) Aluminium Composite Panel work  x) Ornamental Reckli finish external elevation work  xi) S.S hand railing work,</p>	18%	<p>Commencement:  at SD+16 months  Completion: SD + 18months  (Time Period- 2months)</p>

	xii) Water proofing work of roofing area		
	xiii) Miscellaneous / Additional works		
		100	18 months

## 5.0...V4 PLANNING AND DESIGNING IN PURVIEW OF VULNERABILITY ATLAS OF INDIA:

Vulnerability Atlas of India is a comprehensive document which provides existing hazard scenario for the entire country and presents the digitized State / UT- wise hazard, maps with respect to earthquakes, winds and floods for district- wise identification of vulnerable areas. It also includes additional digitized maps for thunderstorms, cyclones and landslides. The main purpose of this Atlas is its use for disaster preparedness and mitigation at policy planning and project formulation stage.

The Atlas is one of its kind single point source for the various stakeholders including policy makers, administrators, municipal commissioners, urban managers, engineers, architects, planners, public etc. to ascertain proneness of any city/location/site to multi hazard which includes earthquakes, winds, floods, Thunderstorms, cyclones and landslides. While project formulation, approvals and implementation of various urban housing, buildings and infrastructures schemes, this Atlas provides necessary information for risk analysis and hazard assessment.

The Vulnerability Atlas of India has been prepared by Building Materials and Technology Promotion Council under ministry of Housing and Urban Affairs, Government of India and available at their website [www.bmtpc.org](http://www.bmtpc.org).

It is mandatory for the bidders to refer Vulnerability Atlas of India for multi – hazard risk assessment and include the relevant hazard proneness specific to project location while planning and designing the project in terms of :

- i) Seismic zone (II to V) for earthquakes.
- ii) Wind velocity (Basic Wind Velocity: 55,50,47,44,39 & 33 m/s)
- iii) Area liable to floods and Probable max. surge height
- iv) Thunderstorms history
- v) Number of cyclonic storms / severe cyclonic storms and max. sustained wind specific to coastal region
- vi) Landslides incidences with Annual rainfall normal

- vii) District wise Probable Max. Precipitation

## 6.0...V4 DESIGN CRITERIA REQUIREMENTS

### 6.1... V4 Levels to be maintained

Finished Level of all the paved area around the Terminal and Ancillary Building shall be kept as (+) 4.50m w.r.t Chart Datum of MoPT and the finished floor level of the Terminal as well as Ancillary Building shall be kept 0.45 m above the Finished level of the project area i.e at (+)4.95 m .w.r.to Chart Datum of MoPT

### 6.2... V4 Codes and Standards

The codes and standards stated here below or elsewhere in this document shall be the latest editions. All materials, testing, design and execution shall be in conformity with these codes and standards unless otherwise stated in these specifications. It is well understood that when a brand name is given for a material, the Contractor has the right to propose any equivalent material of any other brand for approval of the Employer / Engineer.

All works shall satisfy the requirement of latest relevant codes, standards and regulations for the works as per Bid. Indian Standards shall generally be followed. In case, any work or item is not covered by the Indian Standards, following standards shall be adopted in order of preference.

1. British Standards
2. American Standards
3. General Standards

Codes and standards covering the major part of the works are included in the Bid Document and some of them are listed below:

IS 456	Code of Practice for Plain and Reinforced Concrete
IS 1893	Criteria for Earthquake Resistant Design of Structures
IS 875	Code of Practice for Design Loads for Buildings and Structures – (Part 1 – 5)
IS 800	Code of Practice for General Construction in Steel
IS 2911	Code of Practice for Design & Construction of Pile Foundations

IS 3370	Code of Practice for Concrete Structures for the Storage of Liquids
IRC 37	Guideline for the Design of Flexible Pavements
IS 13920	Ductile Detailing of Reinforced Concrete Structures subjected to Seismic Forces – Code of Practice
IS 4326	Earthquake Resistant Design & Construction of Buildings – Code of Practice
IRC 58	Guidelines for the Design of Plain Jointed Rigid Pavements for Highways
	National Building Code

Relevant codes for Utilities items like water supply, power supply, drainage, lighting as indicated in Specifications.

### 6.3... V4 Design Life

The permanent works shall be designed and constructed to give the following design lives:

- Buildings - 50 years
- Pavements - 25 years
- Equipment - as per manufacturer's recommendations.

Above design lives are defined as a period within which the asset will continue to be serviceable for design loads without collapse subject to the regular inspection and preventive maintenance but not the major repairs and rebuilding.

### 6.4... V4 Buildings

The buildings shall be provided with adequate arrangements for plumbing, sanitary, electrical fittings, illumination, air-conditioning, water distribution etc. All buildings shall be provided with data cables, sockets for telephone and network and adequate space shall be kept for future cables. All structures shall be analysed as framed structure using STAAD Pro for the loads and their combinations. All designs of RCC structures shall be carried out by limit state method. Following minimum considerations shall be followed:



- Floor to floor height shall satisfy the bylaws of National Building Code.
- Finished floor level of building shall be 450 mm above the finished ground level.
- All external walls shall be of 200 mm thick, all partition walls shall be minimum 100 mm thick with 1:4 cement mortar.

#### 6.5... V4 Materials

- Cement shall be ordinary Portland cement of minimum grade 53 as per IS:8112
- Grades of concrete shall be M-40 for Sub structure and super structure.
- Grade of steel shall be thermo-mechanically treated corrosion resistant steel Fe500D with epoxy coated as per IS:1786,13620
- Grade of structural steel shall be as per IS:2062 (Grade-A) with minimum thickness of 10 mm
- Protective coating to structural steel shall be minimum DFT of 240 micron after sand blasting to SA 2.5 grade
- Grade of Stainless Steel shall be SS 304.

#### 6.6... V4 Minimum Cover

Clear cover to any reinforcement shall be as mentioned here under but shall not be less than the diameter of such reinforcement

##### Clear Cover for Buildings

Top, bottom & side of footing (if any)	50 mm
Pedestal / column <ul style="list-style-type: none"> <li>• Below ground</li> <li>• Above ground</li> </ul>	50 mm 40 mm
Beams	25 mm
Slab	20 mm
Face of walls & grade beam	50 mm (in contact with soil)
Face of walls not exposed to soil	25 mm(min.) or dia. of main bar

#### 6.7... V4 Stair case

Minimum Clear Width	: 1.0 m
Tread Width	: Not less than 250 mm
Riser	: Not Greater than 180 mm

#### 6.8... V4 Loads

##### 6.8.1... V4 Dead Loads



Dead loads shall include the weight of all structural and architectural components and other permanently applied external loads. The unit weight of all other materials shall satisfy the requirements of IS: 875

**6.8.2... V4 Environmental Loads**

Wind

- Basic Wind Speed in storm condition : 39 m/s
- Basic Wind Speed in operating condition : 18 m/s

Seismic

- Zone factor : 0.16 (Corresponding to seismic zone III)
- Importance factor : 1.50
- Response reduction factor : 3

**6.8.3... V4 Superimposed Loads**

Live Loads on Buildings

Flat Roof	150 kg/m <sup>2</sup> + Dust load of 50 kg/m <sup>2</sup> hanging load for pipe shall be considered as 100 Kg/m <sup>2</sup> and 50 Kg/m <sup>2</sup> for electrical, ventilation & air conditioning (wherever applicable)
Non-accessible roof	75 kg/m <sup>2</sup> + Dust load of 50 kg/m <sup>2</sup>

**6.8.4... V4 Superimposed Loads**

Load due to elevator of about minimum capacity of 8 passenger or as directed by the employer shall be considered for design of Terminal building. The Substation building / Pumphouse shall be designed to accommodate anticipated static and dynamic loading from electrical equipment. Where the uniform floor live load adequately accounts for the equipment weight, the weight of such equipment as a dead load need not be considered. Manufacturer’s technical specifications shall be followed for any other equipment loading considerations during detailed design stage

**Impact Factor:**

- For Manual monorail/Hoist design an impact factor of 1.20 shall be considered in design.
- For Electrical monorail/Hoist design an impact factor of 1.25 shall be considered in design.

**6.8.5... V4 Load combinations**

The load combinations shall be in accordance with IS:456 :2000 .as given below.

- DL+ LL+ Equipment Load
- DL + LL +Equipment Load
- DL + LL + Equipment Load +WL
- DL + 0.5 LL + Equipment Load + Seismic Load
- 0.9\*DL + W.L.
- 0.9\*DL + Seismic Load.

Note:

- In addition, load due to earth pressure/surcharge shall be considered as per specific structures requirement
- Underground tank shall be checked for Uplift in empty condition. Minimum factor of safety against uplift shall be 1.2.

#### **6.8.6... V4 Deflection limits**

- For steel structures, conform to IS 800: 2007, Clause 5.6.1, Table 6
- For reinforced concrete structures, conform to IS 456: 2000, Clause 23.2.

#### **6.8.7... V4 Crack width**

Crack width of all the structural elements shall be calculated wherever necessary as per IS: 456 and limiting Crack width for all structural components below ground and in contact with water shall be 0.2 mm and for structural elements above ground shall be 0.3 mm