DEENDAYAL PORT AUTHORITY

ive Engineer,
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No. EL/WK/2876 **Dated: 10.04.2025**

To,
M/s.

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"EXPRESSION OF INTERSET (EOI)"

Sub. : "Supply, Installation, Testing & Commissioning of Drive-through Container Scanner (Road) and Site Preparation with Comprehensive Operation & Maintenance Contract of 08 years after expiry free guarantee O & M of 02 years."

Sir,

Expression of Interest (EOI) are invited to carry out the subject work as per the Technical Specifications, Terms & Conditions, stipulated below.

The Expression of Interest (EOI) along with Schedule-B should reach the office of undersigned on or before 01/05/2025 at 14.00 Hrs. or scanned copy of the offer will also be accepted through e-mail xenedpa@gmail.com/ deepak.hazra@deendayalport.gov.in which shall be opened on the same day.

Yours faithfully,

Sd/-
Executive Engineer (E)
Deendayal Port Authority

SCOPE OF WORK

1. The Contractor shall supply the following goods and services. The cost of all of the followings, except COAMC and Product Support is included in the cost of the Drive-through Container Scanner (Road):
   i. Supply, install and commission of the X-ray based Drive-through Container Scanner (Road) System and associated equipment like Weighbridge, DG Set, UPS etc.;
   ii. Carrying out the site works and providing the site services;
   iii. Obtaining Regulatory and Statutory clearances;
   iv. Training of the Staff of user Commissionerate in the operation and use of the Drive-through Container Scanner (Road);
   v. Delivery of the Drive-through Container Scanner (Road) to the user Commissionerate;
   vi. Comprehensive free Operation & Maintenance of the Drive-through Container Scanner (Road) for 02 years under warranty including supply of spare parts and consumables;
   Vii. Comprehensive operation & Annual Maintenance under a contract (hereinafter referred to as (COAMC) including supply of spare parts and consumables for a period of eight years after completion of warranty period of two years;
   Viii. Product Support for fifteen years after the two years warranty period;
   ix. Provide upgrades from time to time.
   x. HT & LT Electrical Infrastructure.

2. **Supply, Installation, Testing and Commissioning**
   The Drive-through Container Scanner (Road) should be supplied, installed and commissioned at DPA, Kandla. The Drive-through Container Scanner system (Road) and the facility should meet the specifications and technical details indicated and should be designed to provide a minimum throughput of 100 Containers (40') per Hour.

3. The supply, installation and commissioning are deemed to be completed once the Certificate of Installation is signed by the Contractor and the DPA/user commissionerate.

4. Successful bidder, after award of contract, shall submit General Arrangement Drawings and Detailed Project Report (DPR) to concerned Port Authorities before start of construction for necessary approval. Wherever required, they would also obtain other approvals from the Electrical Inspector etc. Necessary fees and other expenditures on this account shall be borne by the contractor.

5. All site construction works and installation activities undertaken by the successful bidder will be supervised by representatives of DPA/ user Commissionerate. The contractor shall also appoint consultant, duly approved by Directorate of Logistics, to oversee civil, electrical and mechanical works, who will check & certify of all the materials, civil, electrical, electronics works. Schematic layouts the facility and O & M building are enclosed in **Annexure-I**.

   Site Works :

6. The site works will have to be carried out on developed/ undeveloped piece of land. Hence, the Contractor is advised to visit the site of installation, at his own expenses, to have first-hand assessment of the extent/type of construction work involved at each site, its surrounding and availability of services. Prospective bidders may contact following officers during the site visit for obtaining relevant information relating to site and other associated activities required for installation and commissioning of container scanner system.

Location	contact address
Kandla	Commissioner of Customs, Custom House, Near Balaji Temple, Kandla: (02836) 271468-9, Fax: (02836) 271467, Email: commr-cuskandla

Contractor should inform M/s. KICTL & Executive Engineer (E), DPA of their intention of visiting the site, so that a common date can be fixed and representative(s) of M/s. KICTL & EE (E), DPA can provide necessary coordination at site.

7. In general, the site works involve construction of RCC framed structure building, RCC column & roof shed, concrete pad, site entry & exit roads, sentry cabins, fencing & boundary wall, parking shed, paving, painting/epoxy coating, anti-termite treatment, horticulture & landscaping, etc. Site work will include providing/ establishing electrification, air-conditioning, communication, lighting, networking, public health services, electrical trenches, fire detection, mitigation & fighting, water storage (underground & overhead) & distribution, doors & windows, furniture & fixtures, venetian blinds, false ceiling in air-conditioned areas, security & surveillance, etc. for the Scanner Facility. Extend services such as electric power, water supply, communication/ networking lines, storm water drains, soak pit and septic tank along with connecting sewer lines, fire water line, etc. up to the nearest identified points (by Port Authority) for connection/ integration purposes. This may need existing roads to be crossed requiring road cutting, embedding concrete pipes and repairing the road. These will form part of the site works. The land shall be filled & developed at least 500 mm. above surrounding road level to avoid water logging/stagnation. All the cables shall be laid in the safe duct above ground level. This includes all the materials, tools & tackles for execution of the work. However, before using the materials contractor shall take the approval from Engineer-In-charge, DPA.

8. **Civil & Structural Construction works should meet the following requirements**:

   a) Foundation of the structure/buildings should be decided, based on the geotechnical survey, carried out by the contractor for the sites. Design of the foundation shall be carried out as per the respective BIS codes & standards. Concrete pad should be designed after considering the soil conditions and should be as per the Indian Road Congress specification IRC 58 : 2002 (Guidelines for design of plain jointed rigid pavement for highways). Sub-grade soil should be treated suitably to increase the bearing capacity. Expansive soil at the top level should be removed up to minimum 300 mm. depth. It should be backfilled with compacted murrum before soling. Consolidation of soil may also be required in certain cases. Approach roads should be as per the specifications of Ministry of Road & Highways.

   b) Structure/ building should be designed for site specific strata (obtained through geo-technical investigations) and should meet the requirements of seismic design criteria as per the seismic zone in which each site falls and as per the provisions of IS 456-2000 with due to consideration to environmental exposure condition. Structure/ building should undergo static & dynamic design analysis under different live & dead load combinations.

   c) Minimum M30 grade concrete shall be used in RCC construction along with suitable reinforcement, which should be provided in accordance with IS 13920- 1993. Piles for foundation, when found necessary upon geotechnical studies, shall be designed as per the provisions of ARE 2911. Non-destructive testing of cast plies shall also be carried out as per the provisions of IS 14893-2001.

   d) Scanner Facility should be located above the highest flood level noted for the site. In any case, it shall not be located lower than 450 mm from the adjacent road level.

   e) Scanner Facility might have to be constructed in the proximity of the existing installations. Hence, the contractor must consider, while making the bid, the care and caution to be taken and necessary provisions to be made such that no damage (underground/ over ground) occurs to the existing structures/ installations and services there. These installations shall continue to function normally during the construction of the scanner Facility. Also, the architectural features of the proposed structure/building for the facility should be in consonance with the existing/planned structures & buildings at DPA. Similarly, design of the boundary wall/fencing, gates etc. will be as existing/planned in DPA.

f) Flooring and dado should be of granite/vitrified tiles/kota stone with PVC/Antiskid ceramic/IPS-Hardonite/acid resistant etc. depending upon the use of the area. Metallic components, wherever used within the Facility should be of rust free steel. Hand rails, wherever used, should be of approved design in austenitic stainless steel pipes/plates.

g) Boom-barriers, operable from the check-in/check-out stations, should be of approved design and materials.

h) Provision of one ladies' toilet, which could be in combination with gents' toilet. All sanitary fitting & fixtures shall be of heavy duty, ISI marked. Toilets shall have wash basins, mirrors, towel rails, liquid soap dispensers etc. and all necessary connections & valves. Pantry shall be provided with kitchen sink with fittings, instant water heater, water cooler having purification system, etc.

i) Adequate provisions shall be made to detect and mitigate fire of any kind in the Facility. For this purpose, the Contractor may have to construct and install an appropriate firefighting system. Water for firefighting will have to be drawn from the nearest source, if available, or it may have to be tankered and stored in underground RCC tank.

j) Building should be friendly to physically challenged persons.

k) Storage capacity of the fuel to operate DG sets for three days.

l) The water during operation period shall be arranged by DPA.

9. Equipment/components/systems/ assemblies, materials etc. available in India should only be used in constructing and equipping the facility. Furniture & fixture required for the Facility shall be of approved numbers and quality. All materials & items used in the construction of facility should be new and of reputed brand/make and of tested quality (supported by test certificates from the manufacturer or Govt. approved laboratory). Three levels of quality control & surveillance checks should be employed during the construction phase; by utilizing the services of duly qualified & experienced staff.

10. Electrical & communication works will cover, but not limited to, supply, installation, testing and commissioning of :

a) 415 V, 3 phase, 4 wire Power Control Centre(s)

b) Local Push Button Stations as needed for the facility operation and its associated systems such as weigh-bridge, boom-barriers, motorized shutters/gates, air conditioning units, pumps, ventilation dampers etc.

c) Air-conditioning in service engineer's room, operational station, inspection stations, facility in charge room, discussion and record room, additional workstation room, and other rooms/covered areas in the vicinity of scanner. The tentative areas require in the vicinity of the scanner is (i) 40 Meter X 15 Meter, (ii) 30 Meter X 10 Meter.

d) Supply of cables & trays, cabling and terminations at various electrical panels/equipment of the Facility for power supply distribution including materials, wiring, lugs, glands, termination kits etc.

e) Supply & installation of high static electricity & lightning protection systems.

f) Concealed lighting distribution boards (LDB), lighting panels/switch boards/ sockets, power receptacles, lighting fixtures and accessories within the Facility plot.

g) Supply & installation of DG set of suitable rating for the operation of the scanner with compliance of latest amendment and shall be as per CPCB Norms IV+ & Facility as a whole.

h) Integration of DG power with commercial power supply with auto switch-over.

i) Supply & installation of day oil tank & oil storage tank (to meet three days' requirement) and oil transfer arrangement for DG set.

j) Supply & installation UPS (along with necessary battery banks) of suitable rating to sustain the scanning operation for 30 minutes and its integration to commercial/ emergency power supply.

k) Flood lighting system for optimum illumination that provides, when measured at ground level, least 100 lux within 5 meters of the scanner system and at least 25 lux within the whole security zone during work at night or in poor visibility conditions and should be

without direct glare. The sitting and maintenance areas shall have lighting of 250 lux.

l) Supply & installation of separate grounding arrangement for electrical and electronic systems insulated from each other.

m) Indication/alarm in the operation station, with associated hardware and cabling, of important parameters of the support/ auxiliary systems.

11. Obtaining Electrical Inspector's and any other statutory clearances should be responsibility of Contractor. This will include approaching the concerned authorities with necessary technical literature, drawings, documents, etc. along with application forms. The expenses incurred in obtaining such approvals shall be borne by DPA.
12. It will be the responsibility of contractor to offer right type of equipment/system/fixtures/ accessories etc. to meet the Facility needs. These shall be with IS specifications of reputed make (to be approved by the DPA) having energy saving features. Complete bill of quantities (for all items of works & supplies) shall be furnished along with technical bid.
13. General requirements of Civil and Public Health works would be as per the provisions of latest editions of "Central Public Works Department (of India) Specifications". Electrical works should be carried out as per the provisions and requirements of Indian Electricity Rules, Indian Electricity Acts, National Building Electrification Code, Bureau of Indian Standards (BIS) or equivalent standards. All designs and items of work shall have the approval of the DPA prior to its implementation /execution.
14. Any modifications necessitated during design & detailing of the Facility to meet functional & operational requirements or due to constructional & site requirements, shall be carried out by the contractor at no extra cost to the DPA. However, in case any new or additional requirements in civil and public health services, electrical and air-conditioning, furniture and fixtures items are prescribed (within or outside the premises of the scanner facility, but as part of fulfillment of the work) during the course of construction, the cost difference for such alterations/changes or cost of new/additional items ordered in writing by the DPA.
15. Periodic maintenance of various structures, concrete pads, roads, fencing, etc., in the Scanner Facility, regular upkeep & repairs of the Facility, etc. during warranty and post- warranty periods will form part of the site services. These will include, but not limited to, the following :

    i) Periodic maintenance of building/structures, gates, pavements, roads, fencing;
    ii) Painting of the building/structures, fencing, gates etc. once in three years;
    iii) Repair/replacement of non-working electrical fittings & fixtures;
    iv) Repair/replacing non-working doors, windows, toilet fittings & fixtures;
    v) Repair of non-working air-conditioners, water cooler, water purifier, any such gadgets;
    vi) Repair/replacing furniture & fixtures;

16. All site works & services shall be carried out as per the provisions of relevant design & construction codes/ standards of Bureau of Indian Standards, Indian Electricity Rules & Acts, Indian National Building Codes & Standards, Ministry of Road & Highways, and CPWD manuals.

Site Services

17. Contractor shall render these services as part of the overall project management service. The services shall broadly include, but not be limited to, the following:

    a. Construction water and construction power and their respective distributions shall have to be arranged by the contractor at his own cost.
    b. Providing support services for the Contractor's erection staff e.g. construction of site offices, temporary stores, residential accommodation and transport to work site for erection personnel, insurance cover, watch & ward for security and safety of the materials under the contractor's custody etc. as required.
    c. Maintaining proper documentation of all the site activities undertaken by the contractor as per the proforma mutually agreed with the DPA and/or his representative.
    d. Providing 'Industrial Relations' unit and 'Medical' unit to take care of his erection staff. DPA or his representative shall have no obligation in this regard.

e. Securing necessary permits/clearances from authorities for construction including local bodies, port authorities, and other government authorities.
f. All these arrangements/requirement can be inspected by DPA other regulatory authorities at any time during the course of construction.
g. The entry pass for staff & materials vehicles shall be arranged by the contractor.

Site Organisation

18. Site shall be near the container terminal, where movement of containers takes place on the regular basis. As such, site is continuously being used by the Roadways and any work undertaken has to take into consideration the regular movement of containers on the road. As such, appropriate standard operating procedure will have to be prepared in consultation with concerned port authorities before commencement of the work. Contractor shall maintain a site organization of adequate strength in respect of manpower, construction machinery and other implements at all times for smooth execution of the contract. This organization shall be reinforced from time to time, as required, to make up for slippages from the schedule without any commercial implication to the DPA or his representative. The site organization shall be headed by a competent construction manager having 10-15 years of experience, in supervision of construction work and adequate authority to take decisions at site.

Site Facilities

19. The contractor will be responsible for providing the following site facilities during the execution of the project:

a. Contractor may construct temporary buildings associated with site administration, car parks, cycle stands and access ways shall also be constructed.

b. Before the erection of any temporary site accommodation, the contractor must obtain approval from the DPA or his representative of the size, type, condition, location, access and services proposed. DPA or his representative's approval shall be obtained before any accommodation is dismantled or removed from the site.

c. The site office accommodations should be reasonably maintained and suitably identified with the contractor's name and that of his site engineer.

d. Contractor shall provide his own on-site / off-site telephone facilities. The Contractor shall obtain permission; from the appropriate authorities before any radio wave emanating system is used at the site. This includes radio telephones and pagers, transceivers, cordless and cellular telephones and such any other systems. The contractor shall ensure that the radio-communication systems do not cause interference to the existing control and instrumentation and communication systems.

e. A food facility may be provided on the site by the contractor for the reasonable use of both his and his sub-contractor's employees, and his staff and employees of other contractors.

f. Contractor should establish a suitable records office to maintain updated records of all relevant documentation, as-built drawings & test certificates and to ensure that these are available to meet obligations to all statutory bodies and to any commissioning committee, working parties or test teams which are established to meet the needs of the contract. These records shall be maintained and retained until hand over on completion of all works at site and shall be subject to Audit by the Engineer / Consultant or any other government authorities.

g. Contractor shall be responsible for provision of suitable temporary storage facilities.

h. The erection of signboards or posters will not be allowed without DPA or his representative's approval of the size, type, location, wording, etc.

i. Use of Motor Vehicles, Parking and Cycle Sheds Parking facilities and cycle sheds would be provided by the Contractor in a compound within the site boundary but outside the security fence of the construction area and as near to the site access as possible. Only authorised vehicles shall enter the construction area and these must display the vehicle pass issued by the Contractor. Designated parking spaces shall be allocated near the main site office for the Contractor's and the DPA or his representative's staff.

Site Restrictions

20. Contractor and his employees shall not trespass beyond the boundary limits of the site on to any adjoining land and the Contractor shall take necessary action to prevent trespassing and shall follow all security regulations and access control as enforced at site by the DPA or their representatives in regard to men & material movement.

Training

21. After installation and commissioning, the contractor shall initially, train five customs officers (to be nominated by the user Commissionerate) in the operation and use of the Drive-through Container Scanner (Road) System. Thereafter, the contractor shall train Customs officers nominated by the Commissionerate once every six months during the warranty and COAMC period. The training should take place in an environment where each participant has access to a workstation of his/her own. The training programme (class room, on-screen simulation and hands-on) shall cover all aspects of operation, image interpretation and first level trouble shooting. Operator feedback mechanism on the system performance should exist, which will assist in addressing the concerns, if any, of the users and also to upgrade the software as necessary. No additional cost will be paid in regard to the above.

Delivery

22. After successful completion of tests and trials, the contractor shall deliver the Drive-through Container Scanner (Road) System and all related equipment, manuals etc. to the user Commissionerate. The delivery will be completed when the contractor and the user Commissionerate sign the Certificate of Delivery and Acceptance. Decisions of the DPA as to compliance or non-compliance with the requirements shall be final and binding upon both parties hereto.

Terms of Delivery

23. Until the delivery is completed, the Drive-through Container Scanner (Road) System and all its associated systems & equipment are the responsibility of the Contractor. Accordingly, its packing, transport, insurance, clearance through Customs, handling, maintenance and upkeep until the delivery at site shall be to the responsibility of the Contractor and to his account.

24. Any loss or damage to the Drive-through Container Scanner (Road) System & associated equipment during handling, transportation, etc. until completion of delivery shall be to the Contractor's account. The Contractor shall be responsible for the damage of loss by way of repairs and/or replacement of the portion of equipment damaged or lost.

Tests and Trials

25. After installation and commissioning, the contractor and the user Commissionerate will conduct tests and trials for 30 days. If the delivered system works in accordance with the agreed specifications and without faults or malfunction or deviation during this trial period of one month, the equipment will be deemed to have been commissioned. During the trial period, the ownership of the equipment shall continue to be with the contractor. The faults and

malfunctions are to be rectified and a further trial period of one month shall be added to permit an additional attempt to meet contract specification. For this extension of one month, the warranty period would be extended by two months. Only one extension of one month shall be granted. If the functioning of the system is not faultless in this extended period, then the contract will be terminated as per contract. In that case, DPA will not release the pending payment & DPA may engage any outsider/contractor/expert to rectify the faults/defect at the risk & cost of the contractor and Training will be given as above.

26. Drive-through Container Scanner (Road) System to the user Commissionerate within 09 (Nine) Months from the date of issuing of the work order.

Progress and Monitoring

27. Within 15 days of the notification of award of contract, the Contractor should submit a detailed Time Bar Chart/PERT chart covering key phases of design, manufacture, inspection & testing, site works, supply, installation and commissioning of the Drive-through Container Scanner (Road) System and its associated systems & equipment. If the DPA so requires, the Contractor shall discuss the Time Bar /PERT Chart with the DPA and revise it. Time Bar Chart/PERT Chart will be used to periodically review the progress of the project. The DPA through its representatives may convene periodic monitoring meetings with the contractor/sub-contractors and other stakeholders, from time to time, to ensure that the construction and other activities are being carried out as per the specifications given in the contract. All key plans, detailed drawings, materials stipulated in requirements and workmanship entering into the making of the Systems may at all times be subject to inspection and tests by the DPA. The facilities, labour and materials necessary for the safe and convenient conduct of such inspection shall be furnished by the contractor without extra charge.

General Maintenance Requirements

28. The Drive-through Container Scanner (Roads) will be required to operate 24 X 7 and the contractor shall offer satisfactory service during warranty period of two years and post warranty comprehensive Operation & Annual Maintenance under (COAMC) for eight years, the contractor should either have his own service setup in India or he should appoint as 'Maintenance Contractor' any indigenous manufacturer/reputed contractor who is capable to maintain the Drive-through Container Scanner (Road) System and its associated systems & equipment. The contractor must indicate in the tender the name of the maintenance contractor and enclose a copy of the agreement with them. The agreement must be valid for at least ten years. The availability of the scanner system should be better than 95 % of the time in a year. 5 % time in a year is allowed for break down maintenance, which also includes preventive maintenance. COAMC shall be entered with the successful bidder bringing out modalities of apportionment of time required for break down as well as preventive maintenance.

29. The agreement between the contractor and the maintenance contractor should clearly specify that the contractor will provide all necessary technical support including supply of spares and consumable to the maintenance contractor during the maintenance period; both during warranty and post warranty; so that the latter can effectively maintain the Drive-through Container Scanner (Road) System.

Warranty Maintenance

30. During warranty period, the contractor or, as the case may be, the Maintenance contractor shall set right the Drive-through Container Scanner (Road) System immediately on receipt of a complaint but in no case later than 24 hours. Preventive Maintenance shall be carried out once in 06 (Six) months i.e. 4 times during the warranty period of 02 years. The Contractor must deploy only qualified and experienced staff in maintenance activities. The spare parts whatever

required shall be provided by the contractor free of cost.

Post Warranty Maintenance

31. Scope of COAMC shall include: (a) supply of all spare parts and consumables, (b) periodical preventive maintenance visits, (c) Local operational staff &unlimited 'on-call visits' to attend the repairs and breakdowns. During COAMC all parts/components shall be repaired / replaced by the Contractor or, as the case may be, maintenance contractor. No extra payment shall be made for replacement of parts.
32. The operational related activities shall be carried out strictly under the supervision of Commisionarate on 24 X 7 basis.

33. Full particulars of maintenance service Centre and qualified engineering staff should be enclosed with the technical bid.

34. Maximum time limit for attending the complaint shall be 24 hours. However, Govt. Holidays will not be included in the maximum time limit prescribed therein for attending and making the equipment operational. If the Drive-through Container Scanner (Road) System remains non–operational continuously beyond this time limit, 1/2 % per week (7 days) or part thereof, on the total contractual price of COAMC & Operation Cost.

35. The OEM shall make visit at least once in 6 months. For every failure to carry out OEM visit the 1 % of the total contractual price of CAMC & operation Cost will be deducted.

Performance Security

36. At the time of signing the COAMC, the Contractor shall submit Performance security equivalent to 5 % of the value of the contract in the form of Bank Guarantee from any Scheduled Commercial Bank. The Guarantee will remain valid during the currency of the contract.

Spares and Tools

37. The Contractor shall indicate the list of Tools, Toolkits or loose components that are to be given as part of supply and form accessories for servicing purposes. The spares and additional tools recommended by the manufacturer/contractor for all machinery equipment for smooth running of the Drive-through container scanner (Road) System for a period of 10 years excluding warranty period should be listed. The spare parts shall be based on his previous experience and failures encountered in earlier Installations.

DPA's Right to Terminate the Maintenance Contract

38. DPA reserves its right to terminate the operation & maintenance contract at any time with one month's notice without assigning any reason. The contractor will not be entitled to claim any compensation against such termination. However, while terminating the contract, if any payment is due to the Contractor for maintenance services already performed in terms of the contract, the same shall be paid to him as per the contract terms.

Software & Software Upgrades

39. The Contractor shall agree to provide copies of as-built software in executable codes that are installed in the system at all levels. It shall also state the Hardware that needs to be in place for implementation ensuring that the system un-availability is minimal. The Contractor shall also comply and guarantee software upgrades for the service life of the scanner. Commercial image processing software, if used, should be provided with each set of the image inspection unit (work station).

40. Taking into account the operational requirements of the DPA, there may be a need to customize some portion of the software. Contractor should agree for such customization, which is expected to be limited, at no extra cost.

41. Any software upgrades developed by the Contractor during the warranty and the post warranty period should be made available to the DPA at no extra cost and should be delivered and installed in a prompt and efficient manner. The Contractor should install and train the operator with software upgrades.

Disaster Management

42. The Contractor has to provide detailed disaster management plan to meet any eventuality, which may arise during the operation of drive-through container scanner. The disaster management plan should be elaborate, detailing the actions to be undertaken in the case of any emergency and/or disaster and defining the role of every authority and person during such a situation.

Documentation

43. The Contractor shall document design, manufacture, inspection, testing, site works & services, installation, commissioning, test & trials, operation & maintenance, quality assurance and delivery of Drive-through Container Scanner (Road) System and its associated systems & equipment. The complete documentation work shall be in English.

44. Relevant documents as required by the DPA shall be submitted for review/ reference, from time to time, during the execution of the contract. Complete documents, quality assurance records and as-built drawings shall be provided to the DPA, both in soft & hard copies, after the completion of the contract.

Signature & Seal of Contractor

Executive Engineer (E)
Deendayal Port Authority

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Specifications and Allied Technical Details:

Technical Specification No. 01

1. Drive-through X-ray Container Scanner System will be used in the detection of: (a) Mis-declaration of description, and/or and quality of goods, (b) concealment of contraband goods viz. fire arms of various types, assorted ammunitions, explosives of various varieties; (c) different types of detonators, circuits, cordex wires, electronic components used in fabrication of improvised explosive devices; and (d) narcotic drugs and psychotropic substances.

2. Drive-through Container Scanner System shall be an X-ray based system which should enable the scanning of containers loaded on truck-trailers moving at a speed varying between 2-10 kmph without the need for drivers to get down from the truck. The scanner system shall meet the following requirements:

System requirements		
1	***X-Ray generator***	Dual energy : High – 6 MeV (Nominal); Low – within a differential of 2 to 3 MeV.
2	***Penetration***	Minimum 320 mm. of steel
3	***Scan speed***	a) Should be able to scan the conveyance being driven at a speed of 2-10 Kmph. Higher speed would be preferred. b) Suitable sensors should be provided to measure the speed of the conveyance and to carry out necessary adjustment, if required, in the system.
4	***Wire detect ability in free air***	1 mm. or better
5	***Contrast sensitivity***	1 % or better
6	***Spatial resolution (at any location in the container)***	5 mm. or better at any location
7	***Scan size***	Should scan the entire 40-foot container carried on a truck-trailer and display the transmitted scan image from a height of 0.3 Meters above to the top of the container without missing any area or corner cut-off. The scanner shall not scan the driver's cabin.
8	***Material discrimination***	Capability to distinguish between organic, inorganic, metallic, plastics, and intermediate materials.
9	***Threat detection***	Image processing should be capable of assisting the operator in threat detection and identification. Colorization based on atomic number for the assisted recognition of threats may be available.
10	***Density threshold alert***	It should be possible to alert the operator of presence of non-penetrating materials along with audio alarm
11	***Release/Hold decision***	Should have the capability to tag an image as `suspect' or `non-suspect' and store the decision with the image data set.

12	***Image quality***	Should have high performance imaging capability. In addition to achieving the required penetration, contrast sensitivity and spatial resolution, images are to appear clear, have sharp edges, and have aspect ratio that is not compressed
13	***Detectors***	Any detectors to achieve the performance requirements as above.
14	***Image processing***	Should have the following minimum features: a) Zoom-in (up to 16 X) zoom-out ($1/4^{th}$), pan, scroll, density expands, edge enhancement, reverse video, brightness &contrast adjustment, etc. b) Pseudo coloring (at least 16 pseudo colour), ruler functions c) ROI (Region of Interest) processing d) Original image and processed image - to allow attending operator to alternate between the original and processed images in the same window e) Negative and positive image toggling f) Filtering functions g) Gray scale re-mapping and adjustment h) Shape marking or text annotations highlighting suspicious area. i) Histogram- liner, non-liner defined functions j) GUI- menu bar, tool bar, in-put window, main inspection window, whole scan image window, etc. k) Image depth-16 bits The above features shall be available on each workstation supplied.
15	***Data/Image Processing Hardware***	a) Servers & Workstations should be of state-of-the-art and the operating system should be based on LINUX/ Microsoft Windows or an equivalent or superior multi-tasking operating system supported internationally. b) Monitors should be minimum 24" flat LCD (TFT) colour having resolution 1920 X 1080 or better. One of the displays should be on a reasonably larger screen (over 60") without any distortions or loss of resolution. c) Printer should include an A3/A4 (regular) format coloured laser printer, as well as software which will allow printing by control system displays, image analysis outputs, video capture snap shots, notes, manifest etc. It should have multifunction capability such as scanner, copier etc.
16	***Image inspection station (per site of installation)***	a) Image inspection station (IIS) must have a minimum of 06 sets of workstations (including two for remote location inspection) and provision to add at least two more, if work load demands. b) Each work station shall be supplied such that the operators perform independent inspection activities, simultaneously or sequentially
17	***Net-working***	a) Adequate number of sensors should be provided to detect when the truck-trailer is approaching, entering and exiting the Scanner Facility. b) Sensors should detect the height of the truck so as to protect the scanner system from over-dimensioned

		conveyance, if any. A bye-pass lane should be provided for such conveyances. c) Sensors should be provided to measure the speed of the conveyance and to carry out necessary adjustment, if required, in the system. d) Sensors should detect presence of any car or other passenger vehicle; if accidentally pass through, so that these are not scanned. e) Sensors should be provided to detect the gap between the driver's cabin and the cargo container loaded on to the trailer, which could be as low as 500 mm. X-ray generator shall not be ON unless the driver's cabin has fully passed the scanner system and start of the container is recognized. f) Sensors should be provided to determine the end of the cargo container such that the X-ray generator is put-Off as soon as the end of the container is detected. g) Sensor should be provided to detect any conveyance if stalled while being scanned and should put-Off the X-ray generator. The sensors for the above purposes should be based on diverse technologies and should also have redundancy in them.
18	***Redundancy features***	Adequate redundancy features should be provided to minimize single point of failure in the system leading to no availability of the scanner
19	***Sensors***	a) Adequate number of sensors should be provided to detect when the truck-trailer is approaching, entering and exiting the Scanner Facility. b) Sensors should detect the height of the truck so as to protect the scanner system from over-dimensioned conveyance, if any. A bye-pass lane should be provided for such conveyances. c) Sensors should be provided to measure the speed of the conveyance and to carry out necessary adjustment, if required, in the system. d) Sensors should detect presence of any car or other passenger vehicle; if accidentally pass through, so that these are not scanned. e) Sensors should be provided to detect the gap between the driver's cabin and the cargo container loaded on to the trailer, which could be as low as 500 mm. X-ray generator shall not be ON unless the driver's cabin has fully passed the scanner system and start of the container is recognized. f) Sensors should be provided to determine the end of the cargo container such that the X-ray generator is put-Off as soon as the end of the container is detected. g) Sensor should be provided to detect any conveyance if stalled while being scanned and should put-Off the X-ray generator. The sensors for the above purposes should be based on diverse technologies and should also have redundancy in them.

20	***Safety interlocks***	X-ray generator shall remain in OFF mode. It shall be in ON mode only on fulfilment of, but not limited to, the following conditions: a) The conveyance is only truck-trailer containing standard ISO containers are identified for scanning. It shall be ensured by devising appropriate algorithm. b) The conveyance is moving at the requisite speed (2-10 kmph). Higher speed would be preferred. c) Driver's cabin has completely passed the scanner and start of the container is detected. d) Conveyance has not got stalled during scanning process. e) End of the container has not been detected. Safety interlocks should be achieved by various electrical, electronic, optical and magnetic technologies which should ensure failsafe operation of the scanner system.
21	***Regulatory requirements for Radiation Safety***	a) Drive-through X-ray Container Scanner System must comply with the regulations of Atomic Energy Regulatory Board (AERB) of India and Contractor should produce a no objection certificate (NOC) from AERB along with the Tender or prior to completion of technical evaluation of the offers. b) Radiation dose at the exclusion zone boundary shall not exceed as prescribed by AERB. c) Appropriate failsafe electrical, electronic and optical mechanisms shall be put in place, such that the radiation exposure to driver does not exceed the limit prescribed by AERB for the purpose. d) Scanning operation should be safe for food, vegetables, pharmaceuticals, clothing, active medical supplies, electronic data media, or other commonly traded goods. Dose on cargo per Scanning shall not exceed 100 µSv (10 mR).
22	***Radiation survey meters (per site of installation)***	The system should be supplied with two radiation survey meters which should be able to measure with sufficient accuracy the dose rates (range 0.01 µSv/Hr. to 10 mSv/Hr.) arising from pulsed radiation fields and should not get saturated/paralysed in high radiation fields. The monitors should be calibrated for ambient dose equivalent.
23	***Radiation dosimeters (per site of installation)***	The system should be supplied along with six digital dosimeters which shall be useful in the energy range 20 KeV to 10 MeV and dose rate range from 0.01 µSv/Hr. to 10 Sv/Hr.
24	***Electrical safety***	The scanner and its associated systems must fulfil all legal regulations on safety and health requirements to comply with the Indian Electrical Code & Standards
25	***Data security***	All data and analytical results shall be secured with three levels of user access control viz. operator, supervisor and administrator
26	***Security & Safety***	a) Minimum four CCTV cameras (one with PTZ camera

	(per site of installation)	having facility to view from remote location) with NVR capable of saving more than 12 Hours long video images, should be installed for monitoring the radiation protection area/ boundary of the facility. b) Provisions of safety measures such as audio alarms, visual alarms, flashing of lights, indication of an emergency situation, noticeable warning signal while "scanning on", etc. must be made. The status of safety system shall be displayed on a control panel. c) Provisions should be made to protect the scanner system from being damaged by the truck-trailer while driven through the scanner portal.
27	***Auto-shout down/ emergency stop***	a) System must be equipped to stop the operation by automatic shutdown device(s) in the case of emergency of any kind. b) Emergency stop buttons should be installed in the scan control office and in radiation management area.
28	***Self-diagnostic***	Scanner and its associated systems should have built-in self-test and fault diagnostic capability/facility.
29	***Optical character recognition/ identification number capture***	a) The system should be equipped to capture the number of the container and convert it into characters with an efficacy of 95% or better. b) It should also capture the image of the number so that if there is an error, the operator can correct it. c) It should be possible to integrate the captured number with the image of the container obtained during scanning operation.
30	***Weigh bridge***	An electronic weigh bridge, capable of weighing up to 70 MT, within an accuracy of ± 1 %, should be provided. It shall be of weigh-in-motion type so as not to limit the throughput of the scanner system. It should be possible to integrate the measured weight of container with its image obtain during scanning operation.
31	***Inter-linkage with the Customs EDI network***	a) System should be able to receive IGM information in respect of the containers being scanned from the Customs EDI network and display it along with the image so that the operator can compare the image with the data and draw his conclusions. b) System should store the image and data in the server. c) System should permit export of the image as a pdf or jpeg file to any computer linked to internet or to hand held devices. d) System should enable remote login with full functionality into the server by officers from anywhere in the country.
32	***Data storage, back-up/ recovery***	a) It must be possible to store information about at least 10,00,000 scanned objects (i.e. scanned images, cargo manifests, notes, etc. associated with an inspected object). It should be able to generate a warning when the storage medium, used to store data sets, reaches a set value of its maximum storage capacity.

		b) Data back-up and recovery facility should be independent from the process of collecting image data.
33	***Cargo viewing***	a) System should be provided with suitable software, which would enable the image interpreter to interpret the content of the goods stuffed in the container. b) The software should be able to discriminate images of various goods/commodities, which would enable interpreters to make fair assessment of the goods contained in the containers. c) The software should be able to alert the operator, in case of some contraband or any targeted commodity is encountered during scanning. d) Scanner system should be equipped with standard library of images and should have provision to add scanned images obtained during the operation of the system. e) The software should have function to combine a suspicious marked image, inspector's comments and cargo information data from the database of the DPA. These data files to be saved in server, which can be searched and retrieved.

3. The Drive-through X-ray Container Scanner System and its associated systems and equipment should meet the following technical features.

Technical requirements		
1	***Object to be scanned***	Standard Containers (20 foot or 40 foot) used in international trade loaded on to truck-trailers (approx. size of the conveyance: 3.00 m Width, 4.60 m Height, 17.00 m Length; Max weight of conveyance – 70 MT).
2	***Mode of operation***	Scanner System will operate on a drive-through mode i.e. the truck-trailer is driven through the scanner in a portal configuration while the scanner is on. However, O&M personnel remain outside of the exclusion zone during scanning.
3	***System***	a) Scanner & its associated systems should be of proven design having worked in actual field conditions for more than two years. b) Should be able to operate 24 hours a day and 7 days a week, except during maintenance time. Minimum availability of the scanner system should be 95% of time in a year.
4	***System design & manufacturing***	System/sub-systems & equipment used in the manufacture of the X-ray scanner should as per the international standards
5	***Rated life***	Scanner & its associated systems should have a rated life of at least 10 years
6	***Reference documents***	(a) AERB codes/ standards concerning protection against radiation. (b) ANSI 42.46 – 2008 American National Standard for determination of imaging performance of X-ray & γray systems for cargo & vehicle security scanning. (c) Standards of American Society of Testing &

		Materials. (d) Central Public Works Department (of India) Specifications. (e) Indian Electricity Rules & Indian Electricity Acts. (f) Specifications of Bureau of Indian Standards. (g) National Building Code & Standards. (h) Specifications of Ministry of Road & Highways.
7	***Environment***	Operating temperature (0° to +50°C), humidity (0 to 100%); saline environment of seaport and driving rain (50- 100 mm per hour) with wind speed up to 100 kmph (Normal) & 200 kmph during cyclone.
8	***Corrosion protection & tropicalisation***	a) Scanner system should be designed and manufactured to prevent corrosion by weather, airborne pollution, geographic operating environment, galvanic reaction. b) Components of the system should be fully tropicalised and suitable for trouble free operation in the environment specified above.
9	***Exclusion zone***	Shall be able to fit into the available area, viz., 100 Metres X 50 Meters including the exclusion zone, operator's cabin, maintenance areas, weigh-bridge, etc. In no condition the radiation level outside the exclusion zone should exceed 1 µ Sv/Hr. (instantaneous).
10	***Boundary management***	As a part of boundary management, complete area under Drive-through X-ray Container Scanner System facility should be provided with barrier, fencing, gates, CCTVs, warning signs, lighting etc.
11	***Radiation shielding***	Scanner system should be self-shielded or with suitably designed shielding for protection from radiation by the scanner (including scattered & sky-shine) so that the radiation at the boundary of exclusion zone does not exceed the limit 1µSv/Hr. (instantaneous) as prescribed by AERB.
12	***Electricals & communication***	a) This covers supply, installation, testing and commissioning for electrical & communication systems for the operation of the Drive-through X-ray Container Scanner System & its Facility. b) Electrical power supply will have to be drawn from a nearby commercial source, if available on LT level, or a sub-station of suitable rating will have to be constructed by the Contractor at his own cost for this purpose. c) All the electrical works shall be carried out as per the provisions and requirements of Indian Electricity Rules, Indian Electricity Acts, National Building Electrification Code, Bureau of Indian Standards (BIS) or equivalent standards.
13	***Power supply***	Scanner and its associated systems & equipment, should be able to operate from a power supply source at 415 volts, 3 phase, 50 Hz. normally available in India.
14	***Own power source***	a) A standby diesel generator with adequate power to

		cater to the scanner & its operation, lighting, air conditioning, ventilation and other electrical loads. b) DG set should have built-in provisions for automatic changeover when commercial power fails or resumes. c) It shall comply with Indian Standards & environmental norms and shall have protection against surges in commercial supply power. The DG set should have latest amendment and as per CPCB IV+ Norms.
15	***UPS***	Should have an UPS to enable continuation of full scanning operation (i.e. scanner system along with support systems) for 30 minutes after failure of power with 10 KV surge protection.
16	***Climate control***	Operators' and image interpreters' cabins must have an automatic and reliable climate control system to maintain the temperature in between 18 to 26°C, when out-door temperature is between 0 to 50°C and this should not affect the functioning of other systems in terms of electric load.
17	***Operational requirements***	a) Operation of Drive-through X-ray Container Scanner System will need establishment of Scanner operation station, Image inspection work stations and Check-in/check-out stations. The scanner system should transmit the scanned images by turn or to whichever inspection work station is free. b) Ergonomics of the above stations should be to avoid fatigue, strain on vision and to ensure ease of performance by the operator/inspectors. c) System should have capability to operate on 24 Hours a day and sufficient lighting & other arrangements have to be provided for such operation.
18	***Test instruments (per site of installation)***	One set of test rigs/jigs and instruments for evaluating the performance of the Scanner & its associated systems should be provided. These should have their calibration certificates to be conforming to national/international standards.
19	***Software & software upgrade***	a) Should be provided with copies of as-built software in executable code that are installed in the system at all levels. b) Should be able to customize some portion of software to meet specific operational requirements, if any, of the DPA. c) Should have guaranteed supply of software upgrades for the service life of the scanner. Commercial image processing software, if used, should be provided with each set of the image inspection unit (work station). d) Any software upgrades developed by the Contractor during the warranty and the post warranty period should also be made available promptly, installed and operators trained with software upgrades.
20	***Site works within Scanner Facility***	Total area within exclusion zone should be laid with adequately designed RCC pavement.

		a) Scanner system should be installed under a shed with RCC column & roof (approx. 30m x 15m) so as to provide protection to the scanner & its associated systems from geographic environment prevailing at the site of installation. Check-in & check-out stations should be located near to the shed for scanner system. b) The area within boundary of the Scanner Facility will house a building (RCC frame construction) of approx.40 m X 10 m for housing operations & maintenance staff, electrical panels, DG set, UPS, tools & spares, maintenance stores, etc. The building should have requisite sanitation facility. c) Facility should be fully furnished with requisite table, chairs, cupboards, side boards etc. Systems such as electrical, communication, air-conditioning/ ventilation, security, surveillance, video projection, etc., to meet the operation and maintenance requirements of the Scanner System should also be provided. d) Exclusion zone should be fenced from all sides and two gates for entry and exit of the trucks should be provided. In addition, Scanner Facility should be provided with boundary wall with entry & exit gates. e) Access roads to the site of Scanner Facility should also be provided to facilitate entry and exit of the trucks-trailers. f) Structure/ building should be designed for site specific strata and should meet the requirements of seismic design criteria as per the seismic zone in which each site falls. RCC work in the Facility should be of M-30 grade. (Designs, drawings, documents etc. shall have the approval of the DPA prior to commencement of supply & facility construction).

Quality Control Requirements:

4. All materials, components, equipment and system covered under this specification/contractor shall be designed, procured, manufactured, erected, commissioned and tested at all the stages, as per a comprehensive Quality Assurance Program, inspections and tests at works including shop inspection, performance tests and test at site for all equipment and systems shall be as per respective codes and standards and also as required by the specification.

5. In order to ensure the quality of the Drive-through X-ray Container Scanner System and site preparation works, the following inspection &tests shall be conducted. The Scanner will be accepted only after their successful completion.

   a) Factory Acceptance Tests (FAT)
   b) Site Acceptance Tests (SAT)
   c) Facility Inspection & Acceptance (exclusive of Drive-through X-ray Container Scanner System)
   d) Tests and Trials

Factory Acceptance Tests (FAT)

6. The Contractor shall provide within two months of the notification of award, a FAT document detailing the manner in which the FAT will be conducted and how each of the parameters will be checked. The Contractor shall provide the equipment, instruments, test jigs, etc., and make all

necessary arrangements for conducting the FAT at his own cost. The travel, board and lodging of the representatives of the DPA will be arranged by the Contractor at his cost.

Factory Acceptance Tests		
1	***Submission of FAT document***	Shall be made available to the DPA for review within 02 months of the notification of award.
2	***Contents of FAT document***	a) Details the inspection and tests to be conducted, including the procedures for conducting the same, and where these will be conducted. b) It should describe how each parameter of the Drive-through X-ray Container Scanner System will be checked for conformity with the specified requirements.
3	***Intimation for FAT***	Contractor shall intimate to the DPA at least one month in advance of the dates set for conducting FAT.
4	***Equipment& jigs for FAT***	Contractor shall provide all duly calibrated equipment, instruments & jigs, software & hardware modules, etc. and make all necessary arrangements for conducting the FAT. It is the responsibility of the Contractor to organize the agreed number of test cargo viz. a set of densely loaded containers, lightly loaded containers, mixed cargo, narcotics, arms, explosives, etc.
5	***Access during FAT***	Contractor or its subcontractor(s) shall provide all reasonable facilities and assistance, including access to relevant drawings, design details and production data, to the DPA inspectors at no charge to the DPA.
6	***Documents during FAT***	a) Documents in respect of all QA and QC, inspection reports of assemblies, sub-assemblies, components, type/ routine tests etc. carried out during/ after manufacture shall be made available to the DPA's representatives to ensure that the system meets the DPA's requirements/ complies with industrial standards for these classes of Systems. b) All materials supplied or used in the manufacturing shall be accompanied by valid and approved materials certificates, tests and inspection reports.
7	***Conducting FAT***	FAT shall be conducted as per the agreed document as under `content of FAT document' above. FAT shall include the system as a whole. However, if agreed by the DPA for any specific reason, the Contractor may undertake to offer a few major sub-systems for FAT, in such a way that it possible to control the system in total. The Representatives of the DPA will, within 10 days from the date of FAT, give notice in writing to the contractor of any objection to any specification/parameter of the equipment and workmanship, which in his opinion is not in accordance with the contract. The contractor shall give due consideration to such objections and shall either make the modification that may be necessary to meet the said objections or shall confirm in writing to the DPA that no

		modifications are necessary to comply with the contract.
8	***Re-inspection/re-test***	The Contractor shall resubmit such goods to the DPA's inspector for conducting the inspections and tests again. If the scanner or its sub-systems fail to conform to the required specifications and standards, the DPA's inspector may reject them and the Contractor shall either replace the rejected goods or make alterations necessary to meet the specifications and standards, as required, free of cost to the DPA within 3 (Three) months (max).
9	***Contractor's responsibility***	DPA's contractual right to inspect, test and, if necessary, reject the goods after the goods' arrival at the final destination shall have no bearing of the fact that the goods have previously been inspected and cleared by DPA's inspector during pre-dispatch inspection i.e. FAT mentioned above.
10	***Dispatch of scanner***	Contractor shall dispatch the Drive-through X-ray Container Scanner System or its sub-system (in case partial FAT has been agreed upon) only after FAT has been carried out and the Drive-through X-ray Container Scanner System is accepted by the representative(s) of the DPA.

Site Acceptance Tests (SAT):

7. The Contractor shall submit within four months of the notification of award, SAT document detailing the manner in which the SAT will be conducted and how each of the parameters will be checked. After installing and commissioning the Drive-through X-ray Container Scanner System, the Contractor shall intimate to the DPA the dates for SAT at least one month in advance. The Contractor shall provide the equipment, instruments, test jigs, etc., and make all necessary arrangements for conducting the SAT at his own cost. However, the cost of travel, board and lodging of the representatives of the DPA will be borne by the DPA. The Contractor, in co-ordination with the DPA shall carry out SAT to verify that the equipment fulfils the specifications according to the Contract Document and the Tender Specifications.

Site Acceptance Tests		
1	***Submission of SAT document***	Shall be made available to the DPA for review within four months of the notification of award.
2	***Contents of SAT document***	Plan for installation, inspection and tests to be carried out, including the procedures for conducting the same. It should describe how each parameter will be checked for conformity with the specified requirements.
3	***Pre-requisite for SAT***	All sites works and services should have been completed as per the requirements of specifications & standards and should have been inspected and accepted for installation of the Drive-through X-ray Container Scanner System.
4	***Intimation for SAT***	Contractor shall intimate to the DPA at least one month in advance of the dates set for conducting SAT.
5	***Equipment & jigs for SAT***	Contractor shall provide all duly calibrated equipment, instruments &jigs, software & hardware modules, etc. and make all necessary arrangements for conducting the SAT. However, it will be the responsibility of the DPA to organize necessary test cargo viz. a set of densely loaded

		containers, lightly loaded containers, mixed cargo, narcotics, arms, explosives, etc.
6	***Reference articles***	Contractor in consultation with DPA shall provide at least 10 (ten) reference/test articles for inspection and record their images, which will be used during on-site trials.
7	***Installation test***	It shall secure that the installation has been properly and as per agreed plan. It shall also ensure availability of software, hardware and other modules. All shortfalls in the installation should be fixed before conducting the functionality test. DPA will have right to demand a new Installation test, if found unsatisfactory. The result of this test should be documented.
8	***Functionality test***	It shall be an integrated test to confirm that the system, as whole including OCR & safety interlocks, is working properly and according to specification after delivery and installation the site. Functionality test may, if desired by the DPA, include the same elements as in FAT, or other elements mutually agreed upon. Contractor shall conduct imaging with at least ten (10) test articles and actual cargo to be coordinated with and approved by the DPA. If the test is set aside, the Contractor will be permitted to repeat the test three times after modifications.
9	***DPA interfaces test***	This is to review the DPA interface for the system together with representatives (operators & image interpreters) of the DPA. It will require making checklists and evaluate every screen shot and dialog box. The test is to verify the user friendliness of control and imaging software. Observations should be logged and if required adjustments should be made and noted. This will also test the connectivity of the Contractor's system to the DPA's EDI system and transport of the images to the DPA's network for review and interpretation at off-site locations. The result of this test should be documented.
10	***Documentation check test***	Contractor will be responsible for planning and working out the test. The documentation check test should include test plans and test cases for the system documentation that is relevant for the daily use. This test shall confirm that the documentation contain information relevant for implementing the system. The result of this test should be documented.
Facility Inspection & Acceptance		
11	***Facility inspection &acceptance (Exclusive of Scanner***	The Facility acceptance shall be carried out after successful completion of all tests in respect of Scanner and shall include: - Physical inspection of the Facility for quality & completeness of all works. - Review of quality assurance & inspection reports generated during construction. - Functioning of PH systems, storm water drainage, service water supply etc.

		- Functioning of fire detection, mitigation and fighting systems. - Functioning of electrical systems and fittings & fixtures, air-conditioning & ventilation equipment, etc. - Functioning of communication network, surveillance system, etc. - Demonstration of automatic switch-over to DG power from commercial power and vice-versa. - Integration of DG & UPS operations, and its capabilities, etc. . - Review of all `As-built' drawings/Documents.
	Test & Trials	
12	***Test & trials***	- After successful completion of all tests and inspections, Drive-through X-ray Container Scanner System shall be at the DPA's disposal for a trial period of one month (30 days). - During this period the DPA will operate the system. If the Drive-through X-ray Container Scanner System works in accordance with the agreed specifications and without faults or malfunctions during this trial period of one month, it will be commissioned. - If any fault or malfunctions are to noted the same shall be rectified and a further trial period of one month (30 days) shall be added to permit an additional attempt to meet contract specifications. - For this extension of one month, the warranty period would be extended by two months. - Only one extension of one month shall be granted. If the functioning of the system is not faultless in this extended period, no further extension shall be granted and the contract shall be liable for cancellation. The decision of the DPA in this regard shall be final and binding on the contractor. - DPA shall in no case be responsible for any loss of damage that may occur to the rejected stores while these are in its premises

Final Acceptance/Completion of Work

8. On satisfactory completion of trials Completion of Work shall be effected by the DPA as follows:

(a) Drive-through X-ray Container Scanner System will be handed over to the DPA by the Contractor after commissioning with all the specified certificates, free of recommendations and remarks, at the location of installation.

(b) The user Commissionerate will take delivery of the Drive-through X-ray Container Scanner System and sign the Delivery & Acceptance Certificate.

(c) Acceptance of the Drive-through X-ray Container Scanner System by the DPA shall be subject to receipt by the DPA of the following documents (soft & hard copies) and items from the Contractor :

i) Record of inspection, tests & trials of the Drive-through X-ray Container Scanner System including test reports, review documents submitted/ accepted during FAT and SAT;

ii) Record of inventory of the equipment of the Drive-through X-ray Container Scanner System. This includes, besides the delivery of Drive-through X-ray Container Scanner System and its associated systems required for operation, all the accessories and tools, fixtures, test equipment, etc. required for maintenance or calibration purposes. The inventory shall also include all computer based systems such as servers, workstations, printers, terminals, communication systems & components, operating and application software and other hardware & software mentioned in FAT and SAT;

iii) Scanning system manuals, operation& maintenance manuals and operating manuals for other equipment, drawings and plans pertaining to the Drive-through X-ray Container Scanner System as stipulated in the specifications;

iv) Copy all applications / correspondence made with AERB or any other statutory authority and their approvals / correspondences including stipulations for operations within the site of installation and in public;

v) Declaration of Warranty of the Contractor that the Drive-through X-ray Container Scanner System is/are delivered to the DPA free and clear of any liens, charges, claims, mortgages or other encumbrances upon the DPA's title thereto and in particular, that the Systems is/are absolutely free of all burdens in the nature of imposts, taxes or charges imposed by the prefecture or country of the port of delivery, as well as of all liabilities of the Contractor to its sub-contractor, employees and of all liabilities including those of third parties arising from the operation of Systems, in trials, or otherwise, prior to delivery. The Contractor further covenants to save the DPA harmless from any and all claims, suits, actions or other legal proceedings that might arise from any one or all of the aforementioned causes that might be brought against the DPA.

Periodic Quality Assurance Checks/Tests & Surveillance

9. Once the Scanner System is put under regular operation, it shall undergo periodic quality assurance checks/tests to ensure that the system/ sub-systems, safety features & interlocks, surveillance instruments, etc., are working as per the requisite specifications and design intent. Regular surveys of radiation field/ dose rates shall have to be made to ascertain that these are not exceeding the limits prescribed by AERB.

10. The periodicity of such checks/ tests/ surveillance will be decided based on the system/sub-system/ instrument involved or as prescribed by the Regulator. (Bidder, if so desire, may propose the item-wise periodicity of quality assurance checks/tests and surveillance in his bid).

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Annexure-I

Parametric Tests & Inspections for Acceptance

S. No.	Requirements/ Checks to be carried-out for compliance of Contract Tech. Specs.	Compliance / Acceptance Criteria	
		FAT Stage	SAT Stage
1.	**General Requirements**		
1.1	Scanner & its associated systems should be of proven design having worked in actual field conditions for more than two years.	Documentation	
1.2	Scanner system should be able to operate 24 hours a day and 7 days a week.	Documentation	
1.3	Minimum availability of the scanner system should be 95% of time in a year.	Documentation	
1.4	System/sub-system & equipment used in the manufacture of the X-ray scanner should be as per the international standards.	Documentation	
1.5	Scanner & its associated systems should have a rated life of at least 10 years.	Documentation	
1.6	Scanner system should be designed and manufactured to prevent corrosion by weather, airborne pollution, geographic operating environment, galvanic reaction	Documentation + Process employed	
1.7	Components of the system should be fully tropicalised and suitable for trouble free operation in the specified environment.	Documentation + Process employed	
2.	**Scanning Conditions**		
2.1	Scanner Facility should be able to fit into the available area, including the exclusion zone, operator's cabin, maintenance areas, etc.	Documentation + Drawings	Documentation + Drawings
2.2	Scanning of trailer mounted ISO cargo container (20' or 40') of sizes: 3.00 m Width, 4.60 m Height, 17.00 m Length.	Process+ Demonstration + Documentation	Demonstration + Documentation
2.3	Scanner System to operate in a drive-through (Road) mode.	Demonstration	Demonstration
2.4	System to operate under temperature (0° to +500C), humidity (0 to 100%); saline environment of seaport and driving rain (50-100 mm per hour)	Documentation + Demonstration	Documentation + Demonstration

	with wind speed upto 100 kmph.		
2.5	Boundary management –all areas under Scanner Facility should be provided with barrier, fencing, gates, CCTV, warning signs, lighting, etc.	Documentation + Specifications + Drawings	Specifications + Drawings + Demonstration
2.6	Supply of one set of test rigs / jigs and instruments (per site of installation) for evaluating the performance of the Scanner & its associated systems should be provided.	Verification+ Demonstration	Verification+ Demonstration
2.7	Test rigs / jigs and instruments for evaluating the performance of the Scanner & its associated systems should have calibration certificates to be conforming to national/international standards.	Verification+ Calibration certificates	Verification+ Calibration certificates
2.8	System should be equipped to capture the number of the ISO container and convert it into characters with an efficacy of 95% or better	Process+ Documentation + Demonstration	Documentation + Demonstration
2.9	System should capture the image of the number so that if there is an error, the operator can correct it.	Process+ Documentation + Demonstration	Documentation + Demonstration
2.10	It should be possible to integrate the captured number with the image of the ISO container obtained during scanning operation	Documentation + Demonstration	Documentation + Demonstration
2.11	Functioning of weigh-in-motion type weigh bridge of approved specifications	Specifications + Demonstration	Documentation + Demonstration
2.12	Integration of measured weight of container with its image obtain during scanning operation.	Demonstration + Documentation	Documentation + Demonstration
2.13	Providing a through-put of over 100 containers (40' long) in hour from the scanner facility.	Process+ Documentation	Documentation + Demonstration
3	**Sensors & Safety**		
3.1	Sensors to perform various safety functions as mentioned in `System requirements'.	Documentation+ Specifications + Demonstration	Documentation+ Specifications + Demonstration
3.2	Provision of safety interlocks as mentioned in `System requirements' and functionality of the interlocks	Documentation+ Demonstration	Documentation+ Demonstration
3.3	Redundancy features should be provided to minimise single point of failure in the system leading to non-availability of the scanner.	Documentation + Demonstration	Documentation + Demonstration
3.4	Scanner and its associated systems should have built-in self-test and fault	Specification+ Documentation+	Documentation + Demonstration

	diagnostic capability/ facility.	Demonstration	
3.5	Scanner and its associated systems should have trouble shooting and auto correction capability	Documentation+ Demonstration	Documentation + Demonstration
3.6	System should have automatic shutdown device to stop scanning operation in the case of emergency of any kind.	Specification+ Documentation+ Demonstration	Documentation + Demonstration
3.7	Provision of sensors to measure the truck speed and to carry out necessary adjustment, if required, in the system.	Specification+ Documentation+ Demonstration	Documentation + Demonstration
4	**Hardware**		
4.1	Monitors should be minimum 24" flat LCD (TFT) colour having resolution 1920 X 1080 or better.	Specification + Verification	Specification + Verification
4.2	One of the displays should be on a reasonably larger screen (over 60") without any distortions or loss of resolution and can take signals from all other monitors	Specification + Verification	Specification + Verification
4.3	Printer should include an A3/A4 (regular) format coloured laser printer (with multifunction capability such as scanner, copier, etc.	Specification + Demonstration + Documentation	Specification + Demonstration + Documentation
4.4	Printer should allow printing by control system displays, image analysis outputs, video capture snap shots, notes, manifest, etc.	Demonstration + Documentation	Demonstration + Documentation
5	**Scanner System**		
5.1	X-ray emission system for cargo container scanning [Dual energy: High – 6 MeV (Nominal); Low – within a differential of 2 to 3 MeV].	Documentation + Specification + Demonstration	Documentation + Specification + Demonstration
5..2	X-ray detection system to achieve the specified performance requirements from the scanner system.	Documentation + Specification + Demonstration	Documentation + Specification + Demonstration
5.3	Image processing system with features & functionality mentioned under `System requirements' of the contract'.	Documentation + Specification + Demonstration	Documentation + Specification + Demonstration
5.4	Servers & Workstations should be of state-of-theart and the operating system should be based on LINUX/Microsoft Windows or an equivalent or superior multi-tasking operating system supported internationally	Documentation + Specification + Demonstration	Documentation + Specification + Demonstration
5.5	Availability of six sets of workstations for image inspection (including two for remote location inspection).	Documentation + Specification + Demonstration	Documentation + Specification + Demonstration

5.6	Each work station shall be supplied such that the operators perform independent inspection activities, simultaneously or sequentially.	Documentation + Specification + Demonstration	Documentation + Specification + Demonstration
6	**System performance (at the specified speed of train) – refer to `System Requirements':**		
	(i) Penetration	Documentation + Specification + Digital data+ Demonstration	Documentation + Specification + Digital data+ Demonstration
	(ii) Wire detect ability in free air		
	(iii) Contrast sensitivity		
	(iv) Spatial resolution		
	(v) Scan size		
	(vi) Material discrimination		
	(vii)Threat detection		
	(viii) Density threshold alert		
	(viii) Density threshold alert		
	(x) Image quality		
7	**Integrated System Performance**	Demonstration + Documentation + Digital data	Demonstration + Documentation + Digital data
8	**Image Quality Data (at the specified speed)**		
8.1	Varying steel plate thickness of 300 mm to 350 mm. and behind 25 mm. lead brick of size 100 X 100 mm. in steps of 10 mm. located at the floor, center and top of container levels	Demonstration + Digital data+ Documentation	Demonstration + Digital data+ Documentation
8.2	Wire detect ability in free air, preferably for 10 12,14,16,18 & 20 AWGs preferably in horizontal and vertical planes of length 300 mm.	Demonstration + Digital data+ Documentation	Demonstration + Digital data+ Documentation
8.3	Contrast sensitivity for a 1 mm. steel shim with minimum width of 200 mm. to be discernable behind 100 mm. thick steel block.	Demonstration + Digital data+ Documentation	Demonstration + Digital data+ Documentation
8.4	Spatial resolution in air of 5 mm. or better, horizontal and vertical grid.	Demonstration + Digital data+ Documentation	Demonstration + Digital data+ Documentation
9.	**Reference Articles**		
9.1	Contractor in consultation with DPA shall provide at least ten (10) reference/test articles for inspection and record their images, which will be used during on-site trials.	Physical+ Functional Verification	Physical+ Functional Verification
10	Software & Net-working (local/remote)		
10.1	Scanner operation station, Image inspection station, Remote inspection	Specification+ Demonstration +	Demonstration + Documentation

	Areas should be connected through wide area network.	Documentation	
10.2	Workstations, Servers, Control stations linked through local area network allowing error free data flow for uninterrupted operation	Specification+ Demonstration + Documentation	Demonstration + Documentation
10.3	DB Servers at scanner station having connectivity and compatibility to external (away from site) network for data retrievals and image manipulation along with requisite software and hardware.	Specification+ Demonstration + Documentation	Demonstration + Documentation
10.4	System should be provided with suitable software, which would enable the image interpreter to interpret the content of the goods stuffed in the container	Specification+ Demonstration + Documentation	Demonstration + Documentation
10.5	Software should be able to discriminate images of various goods/commodities, which would enable interpreters to make fair assessment of the goods in the containers.	Specification+ Demonstration + Documentation	Demonstration + Documentation
10.6	Software should be able to alert the operator, in case of some contrabands are noticed.	Specification+ Demonstration + Documentation	Demonstration + Documentation
10.7	Providing copies of as-built software in executable code that are installed in the system at all levels	Listing of software	Listing of software + submissions
10.8	Customization of software to meet specific operational requirements, if any, of the DPA.	Customization + Demonstration + Documentation	Customization + Demonstration + Documentation
10.9	Inter-linkage with the Customs EDI network as specified in `System Requirements'.	Customization + Demonstration + Documentation	Customization + Demonstration + Documentation
11	**Data Security & Storage**		
11.1	All data and analytical results shall be secured with three levels of user access control viz. operator, supervisor, and administrator	Customization + Demonstration + Documentation	Customization + Demonstration + Documentation
11.2	Storage of information about at least 10,00,000 scanned objects (i.e. scanned images, cargo manifests, notes, etc. associated with an inspected object).	Specification + Demonstration	Specification + Demonstration
11.3	Storage devices should be able to generate a warning when a set value of its maximum storage capacity is reached.	Specification + Demonstration	Specification + Demonstration
11.4	Data back-up and recovery facility should be n independent from the	Specification + Demonstration	Specification + Demonstration

	process of collecting image data.		
12	**Safety & Security System**		
12.1	Supply of, per installation, minimum 6 Nos. of CCTV cameras with NVR capable of saving more than 15 days long video images.	Specifications + Drawings + Demonstration + Snapshot recording	pacifications + Drawings + Demonstration + Snapshot
12.2	Supply of, per installation, two PZT CCTV camera having facility to view from remote location with NVR capable of saving more than 15 days long video images.	Specifications + Drawings + Demonstration + Snapshot recording	Specifications + Drawings + Demonstration + Snapshot recording
12.3	Provisions of safety measures such as audio alarms, visual alarms, flashing of lights, indication of an emergency situation, noticeable warning signal while "scanning on", etc.	Documentation + Drawings + Demonstration	Documentation + Drawings + Demonstration
12.4	Provisions for display of status of safety system control panel.	Documentation + Drawings + Demonstration	Documentation + Drawings + Demonstration
12.5	System to be equipped to stop the operation by automatic shutdown devices in the case of emergency of any kind	Documentation + Demonstration	Documentation + Demonstration
12.6	Installation of emergency stop buttons in scan control office and in radiation management area.	Documentation + Demonstration	Documentation + Demonstration
13	**Radiological & Regulatory Requirements**		
13.1	Scanner system should be suitably shielded for protection from radiation by the scanner as per the requirement of AERB.	Documentation + Drawings + Demonstration	Documentation + Drawings + Demonstration
13.2	Radiation dose at the exclusion zone boundary shall not exceed 1 micro Sv/Hr. (instantaneous).	Estimation + Demonstration + Documentation	Demonstration + Documentation
13.3	Appropriate failsafe mechanisms such that the radiation exposure to driver does not exceed the limit prescribed by AERB for the purpose.	Demonstration + Documentation	Demonstration + Documentation
13.4	Scanning operation should be safe for food, vegetables, pharmaceuticals, chemicals, active medical supplies, electronic data media, or other commonly traded goods.	Documentation+ Demonstration	Documentation+ Demonstration
13.5	Radiation dose to the driver of the conveyance shall be within the limits prescribed by AERB	Estimation	Demonstration
13.6	Dose on cargo per Scanning shall not exceed 100 microSievert (10 mR).	Documentation+ Demonstration	Documentation
13.7	Supply of radiation survey meters (2 Nos.) of requisite specifications (per	Estimation + Documentation+	Specifications + Certification+

	site of installation) and calibrated for ambient dose equivalent.	Demonstration	Functional check
13.8	Supply of personnel digital dosimeters (6 Nos.) of requisite specifications per site of installation.	Specifications + Certification+ Functional check	Specifications + Certification+ Functional check
13.9	Statutory provisions on safety as specified Roadway authorities.	Specification + Demonstration	Demonstration+ Documentation
13.10	Statutory provisions for safe operation of electrical sub-station and electrical systems	Demonstration+ Documentation	Demonstration+ Documentation
13.11	Statutory provisions for fire safety of the scanner facility	Demonstration+ Documentation	Demonstration+ Documentation
14	**Civil / Structural Works**		
4.1	Review of layouts, specifications, method statements, documents, construction drawings etc.		Submissions
14.2	Inspection of all areas for dimensions, finishes, fitments & fixtures, etc. as per the contract requirements and as-built drawings.		Verification + Documentation
14.3	Checking installation and functioning of fire detection, mitigation and fighting system as per specifications and as-built drawings.		Specification+ Verification + Documentation
14.4	Inspection of boundary wall/ internal fencing, gates, access roads, paver blocks, etc., as per asbuilt drawings		Verification + Documentation
14.5	Inspection as per as-built drawings and smoothness of operation of barriers, gates etc.		Verification + Documentation
14.6	Inspection of water proofing work, sanitary drain works, storm water drainage etc. as per as-built drawings.		Verification + Documentation
14.7	Check for cleanliness in and around Facility, house-keeping etc		Verification + Documentation
14.8	Check for landscaping, storm water drainage, curb stones etc.		Verification + Documentation
14.9	Checking availability of all as-built drawings used in the construction of the Facility.		Verification + Documentation
14.10	Checking availability of method statements, QAP and other documents used in the construction of the Facility.		Verification + Documentation
15	**Electrical, AC & Communication Works**		
15.1	Review of layouts, specifications, documents, drawings etc.		Submissions + Documentation
15.2	Installation checks for all equipment,		Verification +

	components, fittings & fixtures etc.		Documentation
15.3	Review of documents on inspection, testing & commissioning of complete electrical & communication system, as per specifications/as-built drawings.		Submissions + Documentation
15.4	Operation of boom barriers, dampers, pumps, and other motorized items as per operational scheme	Specifications+ Documentation	Demonstration + Documentation
15.5	Supply, installation, testing & commissioning of climate control (i.e. air-conditioning, heating and ventilation) systems in different areas of the Facility meeting functional requirements and as per specification.	Design calculation+ Specifications+ Demonstration+ Documentation	Design calculation+ Specifications+ Demonstration+ Documentation
15.6	Supply, installation, testing & commissioning of DG set & its associated systems as per specification, and its integrated operation with commercial power supply	Design calculation+ Specifications+ Demonstration + Documentation	Specifications + Demonstration + Documentation
15.7	Supply, installation, testing & commissioning of fuel oil storage & transfer system, as per specification.	Design calculation+ Specifications+ Documentation	Specifications + Demonstration + Documentation
15.8	Supply, installation, testing & commissioning of UPS its associated system, including battery banks, as per specification.	Design calculation+ Specifications+ Demonstration	Specifications + Demonstration + Documentation
15.9	Integrated operation of UPS with DG/ commercial power supply source	Specifications+ Demonstration	Demonstration + Documentation
15.10	As-built' drawings for complete installation work, compilation of testing & commissioning reports, QA and acceptance documents		Submissions + Verifications
16	**Regulatory Approvals & other Statutory Clearances**		
16.1	Availability of clearances from statutory bodies, as applicable, for the construction of the Facility	Submissions	Submissions+ Approvals
16.2	Authorization for the regular operation of the Facility from AERB.		Submissions + Documentation
17	Software & Software upgrades		
17.1	Fulfilment as per Contract Document		
18	Training		
18.1	Fulfilment as per Contract Document		
19	Warranty Maintenance		
19.1	Fulfilment as per Contract Document		
20	Post-warranty Maintenance		
20.1	Fulfilment as per Contract Document		

Signature & Seal of Contractor

Executive Engineer (E)
Deendayal Port Authority

Schedule –B

Sub. :- "Supply, Installation, Testing & Commissioning of Drive-through Container Scanner (Road) and Site Preparation with Comprehensive Operation & Maintenance Contract of 08 years after expiry free guarantee O & M of 02 years."

PART-I

Sr. No.	Description Of item	Qty.	Unit	Rate (Rs.)	Amount
				In Fig.	
1.	Cost of the Drive-through container scanner (Road) (including insurance and freight) (Rs. or any freely convertible currency) (indicate the currency)	1	No.		
(a)	Any other charges up to the stage of landing/delivery (to be specified), if any, (Rs. or any freely convertible currency) (indicate the currency)				
(b)	Total landed cost (Rs. or any freely convertible currency) (indicate the currency)				
(c)	Installation and Commissioning charges, if any (Rs.)				
(d)	Customs Duty (Rs.)				
(e)	Excise Duty (Rs.)				
(f)	Agent's commission, if any, (Rs.)				
(g)	Any other cost/ charges (to be specified), if any, (Rs.)				
(h)	Any other taxes, levies(to be specified), if any, (Rs.)				
(i)	Total Cost of the Drive-through container scanner (Road) (Rs. or Rs.+ freely convertible currency)				
(j)	Cost of construction of Drive-through container scanner (Road) facility including site preparation (Rs.)				
				Part-I Total Rs.	

Signature & Seal of Contractor

Executive Engineer (E)
Deendayal Port Authority

Part – II

Comprehensive Operation & Annual Maintenance Contract for Drive-Through Container Scanner (Road) for the period of Eight Years.

1	2	3	4	5	6
Sr. No.	Description of Services	Quantity	Physical Unit	Unit Price in Rs.	Total Price per line item in Rs.(3 x 5)
1.	**Operation after Commissioning & taking over of Container Scanner**				
(a)	First Year	12	Month		
(b)	Second Year	12	Month		
2.	**Comprehensive Operation & Annual maintenance after the completion of guarantee period of two years.**				
(i)	Third Year	12	Month		
(ii)	Fourth Year	12	Month		
(iii)	Fifth Year	12	Month		
(iv)	Sixth Year	12	Month		
(v)	Seventh Year	12	Month		
(vi)	Eighth Year	12	Month		
(vii)	Ninth Year	12	Month		
(viii)	Tenth Year	12	Month		
			Total of Part-II Rs.		
			Total (Part-I+ Part-II) Rs.		

Net Amount in words_____

(The rates should be inclusive of all taxes, duties, fees, cess etc. and all incidental charges; but exclusive of GST).

Signature & Seal of Contractor

Executive Engineer (E)
Deendayal Port Authority

Terms & Conditions

1. The rates quoted must be inclusive of all taxes and levies (Excluding GST), No claims of contractor shall be entertained on account of any other taxes levied by central / state government or any authorities paid by him.
2. The contractor shall study the local working conditions at the site of work before tendering and no claim what-so-ever shall be entertained.
3. The work shall be carried out in accordance with the best standards of workmanship and to the entire satisfaction of the Engineer-in-Charge.
4. 1st & Final Bill shall be paid after satisfactory completion of the work.
5. CME reserves the right to cancel the quotation without assigning any reasons and also increase/decrease the quantum of work.
6. The contractor shall execute the work in such a way that not to cause inconvenience to the public or staff or nearby offices and not to cause hindrance to traffic. Necessary barricading shall be done by the contractor at his own cost if required.
7. All tools, plants, scaffolding ladder etc. and other machinery etc. required temporary for the purpose of execution of work will have to be arranged by the contractor at his own cost and storing of such tools, plants etc. will have to be made by him.
8. All the materials should be got approved from Engineer-in-Charge before put into use.
9. The contractor has to arrange Gate Passes for entry/exit of labours and equipment's / vehicles inside/outside Cargo Jetty area at his own cost from CISF.
10. All the rules & regulations governing DPA will be applicable.
11. The Contractor shall ensure not to cause any damage to the port properties in the vicinity of work site during execution of work. If any damage occurs due to workmen/machinery of the contractor, the contractor has to make good the loss/damage at his cost.
12. Taxes & Duties: GST Extra @ 18% Income Tax & GST will be deducted at applicable rates.

Signature & Seal
of Contractor

Executive Engineer (E)
Deendayal Port Authority

Approved Make List for Electrical Items		
Sr. No.	Description	Recommended Makes
1	HV VCB	SIEMENS /ABB/Schneider
1(a)	HV Gas Insulated Breakers	SIEMENS /Schneider/ABB
2	POWER TRANSFORMERS	VOLTAMP/CROMPTON GREAVES /BHARAT BIJLEE/ BHEL/ SIEMENS/ABB/ Schneider/T&R
3	DISTRIBUTION TRANSFORMERS	EMCO/KIRLOSKAR/PATSON/VOLTAMP/ABB/ Schneider/T&R
4	RESIN CAST TRANSFORMERS	
	A) RESIN CAST IMPREGNATED	VOLTAMP/KIRLOSKAR/EMCO
	B) DRY CAST	VOLTAMP/KIRLOSKAR/EMCO
5	HT XLPE CABLES	POLYCAB/TORRENT/RPG ASIAN/ NICCO/GLOSTER/ UNISTAR/ UNIVERSAL
6	LT XLPE CABLES	POLYCAB/TORRENT/RPG ASIAN/ NICCO/ RALLISON/PRIMECAB/ HAVELLS/ UNIVERSAL/ UNISTAR/AVOCAB
7	LT ACB	SIEMENS/L&T/SCHNEIDER/C&S
8	PROTECTION RELAYS	AREVA/L&T/SIEMENS/ABB/C&S
9	LT PANEL	CPRI APPROVED
10	CHANGE OVER SWITCH	SIEMENS/L&T/ABB/C&S/SCHNIDER/ LEGRAND / INDOASIAN
11	SFU FOR MAIN LT DISTRIBUTION PANELS	SIEMENS/L&T/ABB/C&S
12	SFU FOR DISTRIBUTION PANELS & FEEDER PILLERS	SIEMENS/L&T/ABB/C&S/ SCHNEIDER/ LEGRAND/ INDOASIAN/HAVELLS
13	MCCB FOR MAIN LT DISTRIBUTION PANELS	SIEMENS/L&T/ABB
14	MCCB FOR DISTRIBUTION PANELS AND FEEDER PILLERS	SIEMENS/L&T/ABB/C&S/ SCHNIDER/ LEGRAND/ INDOASIAN/HAVELLS
15	MCB/ELCB/RCCB/ RCCBO FOR MAIN LT DISTRIBUTION PANELS	SIEMENS/HAGER L&T/ABB
16	MCB FOR DISTRIBUTION PANELS AND FEEDER PILLERS	SIEMENS/L&T/ABB/C&S/ SCHNEIDER/ LEGRAND/ INDOASIAN/ HAVELLS/ STANDARD

17	MCB DISTRIBUTION BOARD	STANDARD / HENSEL/LEGRAND / INDOASIAN / HAVELLS
18	MULTI FUNCTION DIGITAL METER FOR MAIN LT DISTRIBUTION PANELS/DIGITAL KWH METERS	L&T/ENERCON/SECURE/L&G/ RISHABH
19	ANALOG VOLT/AMPARE METER FOR DISTRIBUTION PANELS AND FEEDER PILLERS	RISHABH/AE/ENERCON/L&T
20	SLECTOR SWITCH FOR VOLTMETER/AMPARE METER	L&T/SIEMENS/C&S
21	POWER CONTACTOR & OVER LOAD RELAYS	L&T/SIEMENS/ABB
22	QUARTZ TIME CLOCK SWITCH	L&T/INDOASIAN/SIEMENS
23	PVC WIRE WITH COPPER CONDUCTOR	RR KABEL/KEI/POLYCAB/MILEX/GUJCAB/ STANDARD/ FINOLEX/ANCHOR
24	FLUSH TYPE SWITCHES, SOCKETS, HOLDERS AND CEILING ROSES & ELECTRONIC REGULATORS	ANCHOR/MK/NORTHWEST/VINAY/PANAMA/ HAVELLS
25	DOOR BELLS/CALL BELLS	ANCHOR/LEGEND/MK/NORTHWEST
26	MODULAR SWITCHES, SOCKETS, PLATES & BOXES	ANCHOR / MK / NORTHWEST / LEGRAND /HAVELLS/INDOASIANSIEMENS
27	PVC CONDUIT/OVAL CONDUIT & CASSING CAPPING AND ACCESSORIES	PRECISION/VULCAN/FINOLEX/ GARWARE/RESTOPLAST/SWASTIK/BPI
28	GLS LAMPS & FLUORESCENT LAMPS	PHILIPS / BAJAJ / WIPRO / CROMPTON GREAVES / OSRAM / SURYA ROSHNI /GE
29	HPSV, HPMV & METAL HELIDE LAMPS	PHILIPS / BAJAJ / WIPRO / CROMPTON GREAVES / OSRAM / SURYA ROSHNI /GE
30	IGNITORS FOR HPSV, METAL HELIDE LAMPS	PHILIPS / BAJAJ / WIPRO / CROMPTON GREAVES / OSRAM / SURYA ROSHNI /GE
31	LUMINARIES	PHILIPS/BAJAJ/WIPRO/CROMPTON GREAVES / OSRAM / SURYA ROSHNI /GE
31a	LED Luminaries	Philips /Bajaj/Wipro/CG/Surya/Pyrotech/Syska/Nessa having surge Protection ≥10KV for fittings & internal Surge rotection for Driver of≥4KV, LED Chip only OSRAM/CREE/Philips Lumileds/Citizen/Nicia with LM-79,80 CERTIFICATION
32	CEILING FANS	BAJAJ/ORIENT/USHA/CROMPTON GREAVES / ALMONARD/GEC
33	WALL MOUNTING FANS	BAJAJ/ORIENT/USHA/CROMPTON GREAVES / ALMONARD/GEC
34	EXHUAST FANS	BAJAJ/ORIENT/USHA/CROMPTON GREAVES / ALMONARD/GEC

35	HEAVY DUTY INDUSTRIAL WALL MOUNTING FANS	BAJAJ/ORIENT/USHA/CROMPTON GREAVES / ALMONARD/GEC
36	WATER COOLER	VOLTAS/SHRIRAM USHA/BLUE STAR
37	AIR CONDITIONERS	VOLTAS/CARRIER/BLUESTAR/USHA/ HITACHI/LG/ SAMSUNG/ONIDA
38	REFRIGERATORS	VOLTAS/CARRIER/BLUESTAR/USHA/ HITACHI/LG/ SAMSUNG/WHIRLPOOL
39	VOLTAGE STABILIZER	VEELINE / CAPRI
40	INVERTERS	SUKAM / MICROTEK
41	DG SETS A) ENGINE B) ALTERNATOR	 CUMMINS/GREAVES/KIRLOSKAR/ CATERPILLAR/ ASHOK LEYLAND/VOLVO STAMFORD/CROMPTON GREAVES /JYOTI/ KIRLOSKAR ELECTRIC
42	ELECTRIC MOTOR	ALSTOM/CROMPTON GREAVES /SIEMENS/ KIRLOSKAR/ABB
43	WATER PUMPS	SWASTIK / KSB
44	WATER GEYSER	BAJAJ/USHA / CROMPTON GREAVES / SPHEREHOT / RACOLD
45	HT/LT Heat Shrinkable Joint Kit	3M/Raychem/Yamuna Denson /Compaq
46	LUGS & CABLE GLANDS	DOWELLS / JAINSON / BRACO

Signature & Seal of Contractor

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