Annexure 19

Functional & Technical Scope along with Specification of Components to be used for Logistics Management System (LMS) and Command & Control Centre (CCC)

CONTENTS

1. Logistics Management System (LMS)

1.1 Functional Scope of Logistics Management System (LMS)

Logistics Management System (LMS) is expected to be application (standalone/ web based), which will be used to manage Sales, Transportation and Production activities at various mines of OMC. Software will manage daily IN/Out activity with proper validation before allowing vehicle for any activity, weigh bridge operation, to capture detailed vehicle movement data, keep track of daily sales data, daily production data etc. Further it will help corporation to get detailed live report instantly for further analysis. In addition to this, there shall be location specific Command Control Center which will have 24X7 CCTV Surveillance, Public Address System and Speed Violation Detection mechanism.

OMC is planning to install different servers at different locations of mines to manage its daily activity. Each mine has these important elements/ locations:

- Entry and Exit Gate
- Tare and Gross weighment at Sales weighbridges
- Tare and Gross weighment at Production weighbridges
- Stock yard
- Parking yard

Note:

- One Central Server on Meity approved Cloud has been considered which will keep different mines sales and Production data as backup at a common place and this server will be frequently synchronized (within 12 hours) with respective LMS local server at mines. The timeframe for synchronization can be mutually decided during SRS finalization.
- The Data center of the CSP (Cloud Service Provider) should be within the geographical boundary of India
- Production means Quantity shifted from Contractor location to OMC Stockyard through Production weighbridge. Weighbridge will be integrated with LMS Production module to get shifting weighment.
- In mines level individual dedicated LMS server will be installed at respective CCC along with local i3MS server under the same LAN (new Optical Fiber Cable (OFC)).
- i3MS (INTEGRATED MINES AND MINERAL MANAGEMENT SYSTEM) solution has been designed by Department of Steel & Mines, Odisha to regulate the mining activities through electronic mode.

Below table captures mine-wise count (indicative) of various key points which shall be considered as part of the project. Moreover, the details of the hardware which may be required at these points of the mines are also captured in the subsequent section.

Sl.No.	Mines	No. of IN Gate	No. of OUT Gate	No. of Prod. WB (Tare & Gross)	No. of Sales WB (Tare)	No. of Sales WB (Gross)	No. of Parking Yard	No. of Stock Yard
1.	**Kurmitar**	1	1	3	2	4	1	2
2.	**Guali**	2	2	3	3	8	0	1
3.	**Jilling**	1	1	3	2	3	0	3
4.	**Apahatu**	1	1	1	1	1	0	1
5.	**Kodingamali**	1	1	2	1	1	1	1
6.	**Dubuna**	2	2	2	2	4	1	2
7.	**Tiringpahad**	1	1	1	1	0	1	1
8.	**SouthKaliapani**	1	1	1	4	3	2	1
9.	**Uchabali**	1	1	2	1	1	1	1
10.	**Banspani**	1	1	2	1	2	1	1
11.	**Khandbandh**	1	1	2	1	2	1	1
12.	**Bangur**	1	1	0	0	1	1	2
13.	**Sukrangi**	1	1	0	0	2	0	3

Note: Activities at Apahatu to be monitor from CCC of Jilling and activities at Sukrangi & COBP to be monitored from CCC of South Kaliapani.

The table below contains indicative requirements from various modules. The detail scope shall be finalized during SRS preparation by Vendor.

#	Modules – Indicative Scope
Common modules in LMS which will be applicable for capturing activities in both Sales and Production	
1	**Mines Registration - Common** Admin shall be given option to register various mines with details will be used to get any data from these mines. For example, some of the fields related to mines for configuration are: • Mines Code/ID (Source Code) – Ex. 093013015636 • Mines Name – Ex. Kurmitar Iron Ore Mines • Region Name and Address • CIN Number, PAN Number, GSTIN Number
2	**User Authentication - Common** • Only authorized users can access LMS. Hence Individual user having approved authorization shall operate the application at IN/Out/ Other

#	Modules – Indicative Scope
	locations. • For users at various designated locations, a dedicated user- interface for Login shall be given. • User validation using User ID/Name or Email • Forgot Password/ User ID
3	**Registration Management - Common** • Vehicle and RFID • Driver, • Material, • Weighbridge, • Loading point (Sales) • Unloading point (Production)
Sales Dispatch Management: The web-application will manage daily IN/Out vehicle activity with proper validation before allowing vehicle to stockyard and parking space, weigh bridge operation, capturing detailed vehicle movement, keeping track of daily sales data etc. Further it will help corporation to get detailed live report instantly for further analysis.	
1	**Trip Scheduling** • Buyer wise and permit wise trip allocation for each Sales Order (SO) and Delivery Order (DO) which will be interfaced from SAP. • Permit integration with i3MS (Real time approved permit details will be interfaced to LMS) • LMS integration with SAP (for fetching SO, DO details) • Access to buyer for loading slip printing, which may be printed using thermal printers. The format of the loading slip to be decided during the SRS discussion.
2	**Vehicle Entry Management** • Validation of vehicles using Fixed Long Range UHF RFID Reader (Fixed/ Handheld) • Provision for scanning of QR Code through scanner using loading slip to map the permit details with validated vehicle details. • Vehicle tagging validation in i3MS through integration • Driver detail entry, validation & displaying photograph of driver from driver master • Boom barrier opens based on validation • DO Balance quantity checking and vehicle entry clearance • Integration with Boom barrier & Traffic light • Blacklisting of Driver and Vehicle • Integration with Vehicle Inspection System to allow or disallow vehicles Note: Please refer the process flow for more details

#	Modules – Indicative Scope
3	**Tare Weighment Automation (Unmanned WB)** • Precondition: Successful validation at Gate entry point • Automatic capture of Vehicle information through RFID (Primary) • Provision for scanning of QR Code through scanner using loading slip (Alternate) • Integration with Boom barrier, traffic light, Positioning sensors • Weighbridge Integration with i3MS to store Tare weight detail after conformation from LMS • Tare weighments capture in LMS through i3MS • LED display during weighment • Boom barrier opens/ closes on confirmation in LMS • LMS to guide PA (Public Addressal) System for the correct positioning of the vehicle for weighment, weighment details and then exit from the location • Integration with Vehicle Inspection System to allow or disallow vehicles (if the inspection is not done at the entry gate) Note: Please refer the process flow for more details
4	**Stockyard Management** • Precondition: Tare weighment shall be complete • Validation of Vehicle, Material, Grade and Stockyard name using handheld device • Loading supervisor shall accept or reject the trip based on the data displayed in handheld terminal
5	**Gross Weighment Automation (Unmanned WB)** • Precondition: Tare weighment shall be complete & stockyard conformation • Automatic capture of Vehicle information through RFID (Primary) • Provision for scanning of QR Code through scanner using loading slip (Alternate) • Integration with Boom barrier, traffic light, Positioning sensors • Weighbridge Integration with i3MS to store gross weighment after conformation from LMS • Gross weighments capture in LMS through i3MS • LED display during weighment • Boom barrier opens/ closes on confirmation in LMS • LMS to guide PA (Public Addressal) System for the correct positioning of the vehicle for weighment, weighment details and then exit from the location • Note: Please refer the process flow for more details
6	**Exit Management**

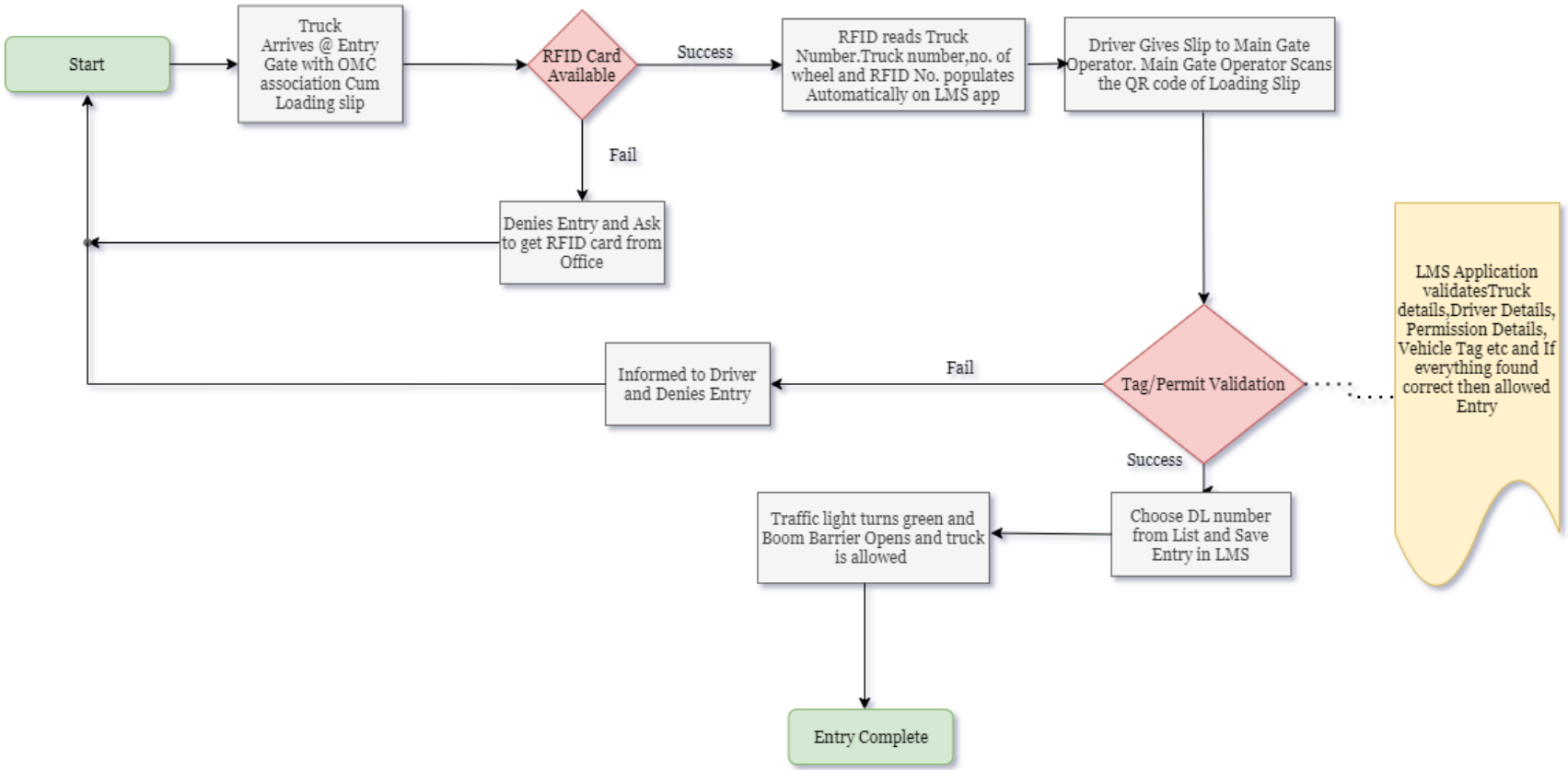
#	Modules – Indicative Scope
	• Precondition: Gross weighment before exit (positive flow) • Validation at the exit gate through LMS • Integration with I3MS for TP Generation. • TP Printing from I3MS through RFID reading /Manual TP Printing using Vehicle number • Provision for scanning of QR Code through scanner using loading slip for TP Printing (Alternate) • Exit time stamp storing in LMS after TP generation. • DO wise Sales data integration with SAP through batch mode/schedule job Note: Please refer the process flow for more details
7	**Vehicle Blacklisting** • Manage Blacklist/ Un-blacklist vehicle with reason • Count of black-listed vehicles shall be captured in the database for later analysis • Once vehicle is blacklisted it is not allowed to enter mines and will be restricted at the gate entry.
8	**Driver Blacklisting** • Manage Blacklist/ Un-blacklist driver with reason • Count of black-listed drivers shall be captured in the database for later analysis • Once the driver is blacklisted it is not allowed to enter mines and will be restricted at the gate entry.
9	**Parking Management** • Validates the vehicles at the entry and exit point • Allows the vehicle into the parking based on the available capacity • The vehicles shall be allowed using Fist IN First OUT method and related information shall be displayed on the LED screen. • Control in the movement at the Parking IN and OUT using boom barrier
10	**Shift Allocation** • Create/ Update /Delete shift duty for Driver/Vehicle • Options to be given to assign time which can be used for validation at the entry gate
11	**Buyer's Module** • Option to the buyers to view the schedule • Real time status of the lifting and remaining quantity of Ores as per the permit

#	Modules – Indicative Scope
	• Ability to generate chalan/ entry pass from the buyer's end
12	**Capture of data for Rail evacuation** • Trip wise Vehicle data capture from stockyard to railway siding in LMS • Automatic tare & gross weighment capture • Vehicle wise TP generation from I3MS • Conformation from railway siding using handheld device by scanning the TP in LMS • Note: If the railway siding is inside the mines lease area, then i3MS integration is not required only the Vehicle details, weighment details, buyer information & railway siding information to be captured in LMS.
Production Material Transfer: The web-application will manage daily vehicle activity with proper validation before allowing vehicle to mines, weighbridge operation, there by capturing detailed vehicle movement, keeping track of daily production data etc. Further it will help corporation to get detailed live report instantly for further analysis.	
1	**Tare and Gross Weighment** • Tare Weighment shall be done once in every shift. • The process is mostly similar to Sales Dispatch Management (no i3ms integration) • Scheduling of vehicles in advance • Validation of vehicles using RFID • LED display during weighment • Boom barrier opens based on confirmation
2	**Gross Weighment and Material Transfer** • Precondition: Tare weighment shall be completed • Vehicle information through RFID • Integration with SAP • Contractor code, material code etc. shall be interfaced with LMS (from SAP) before the weighment • WB integration with LMS for gross weighment capture. • Contractor, Day and Material-wise daily posting in SAP
3	**Unloading of Materials** • Validation at unloading point through application • Unloading time stamp capture through RFID/ handheld device

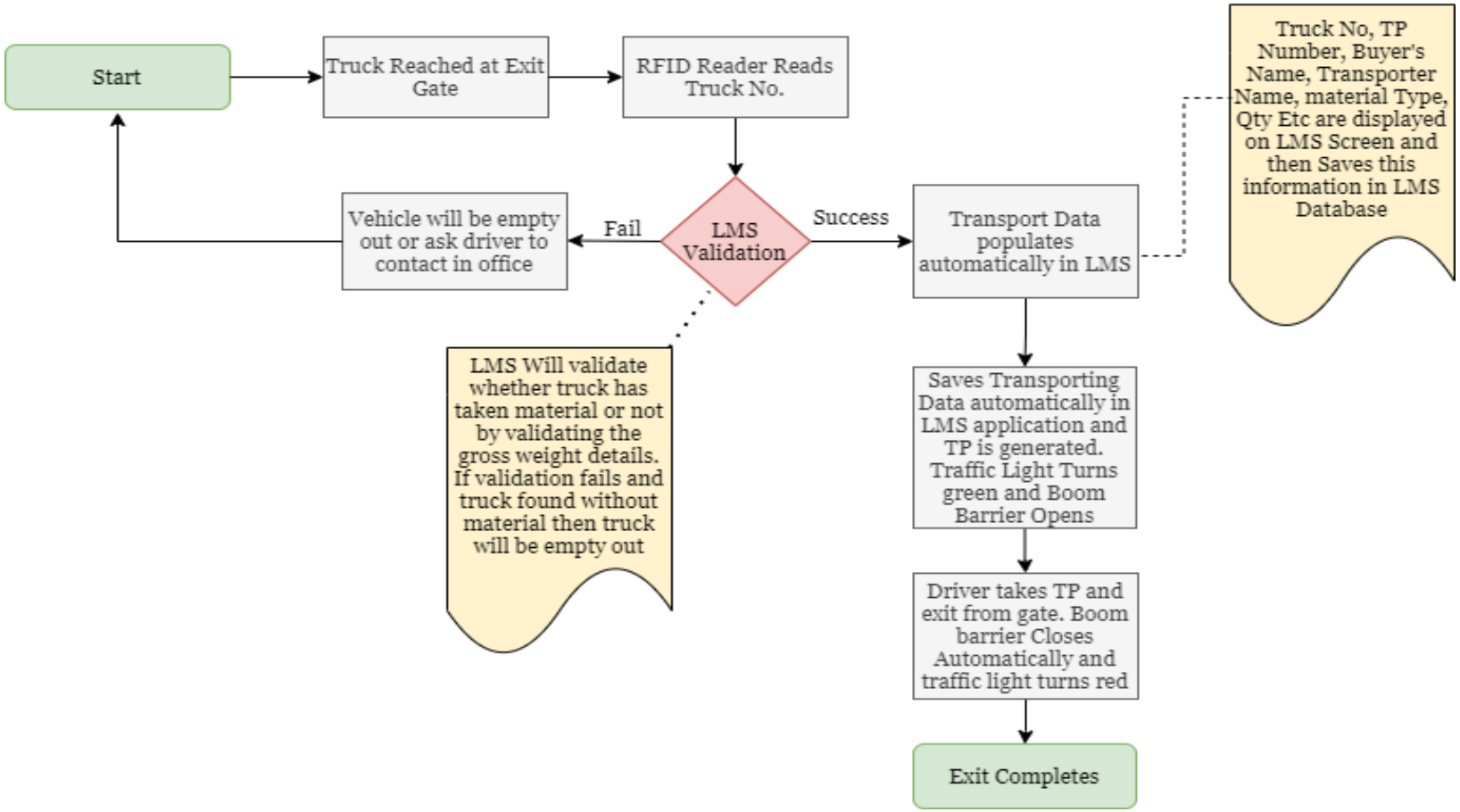
Note: Indicative i3MS integration flow for LMS is attached in Annexure.

Primary Functional Flow Diagrams (indicative)

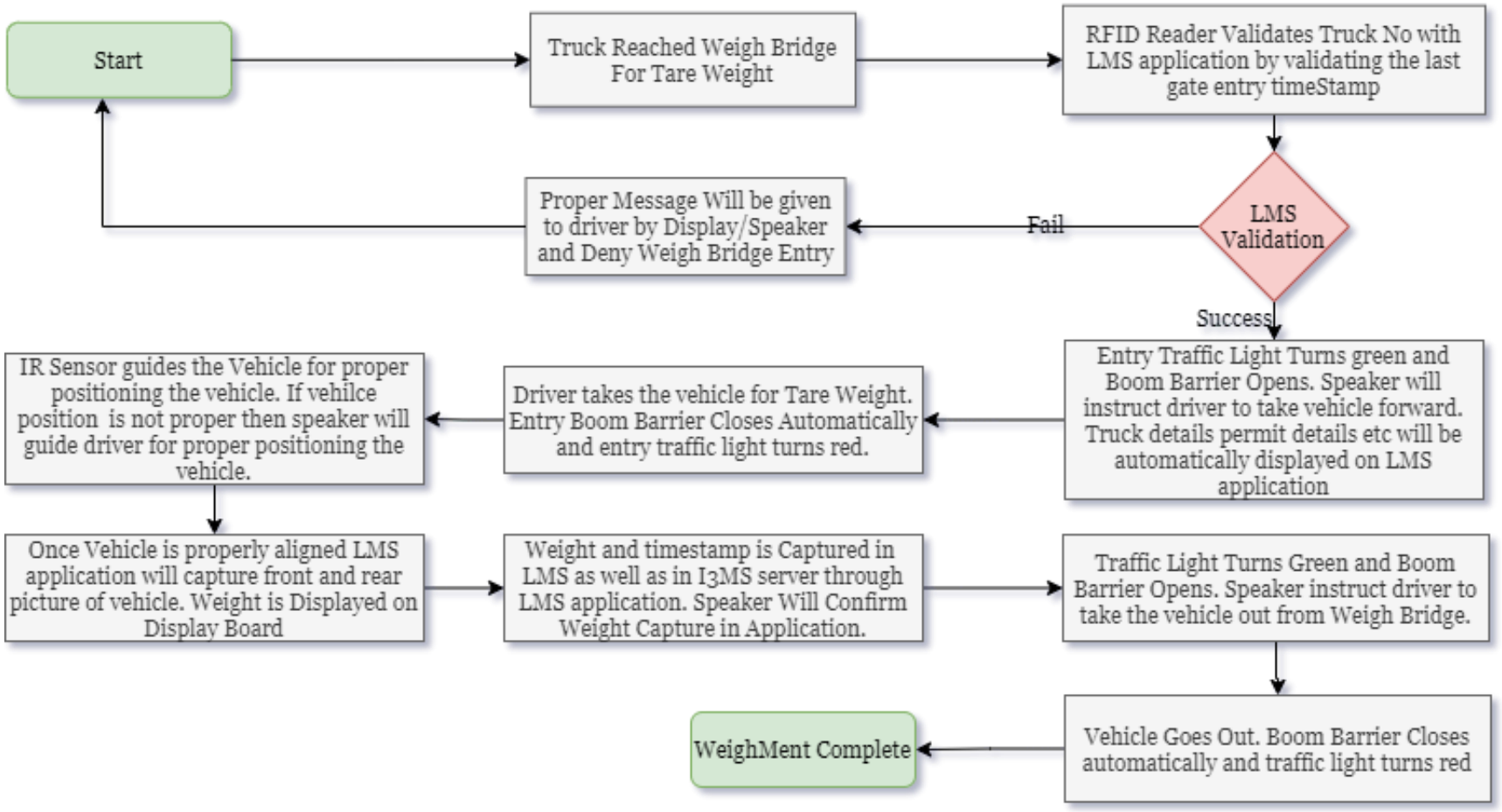
Entry Management:



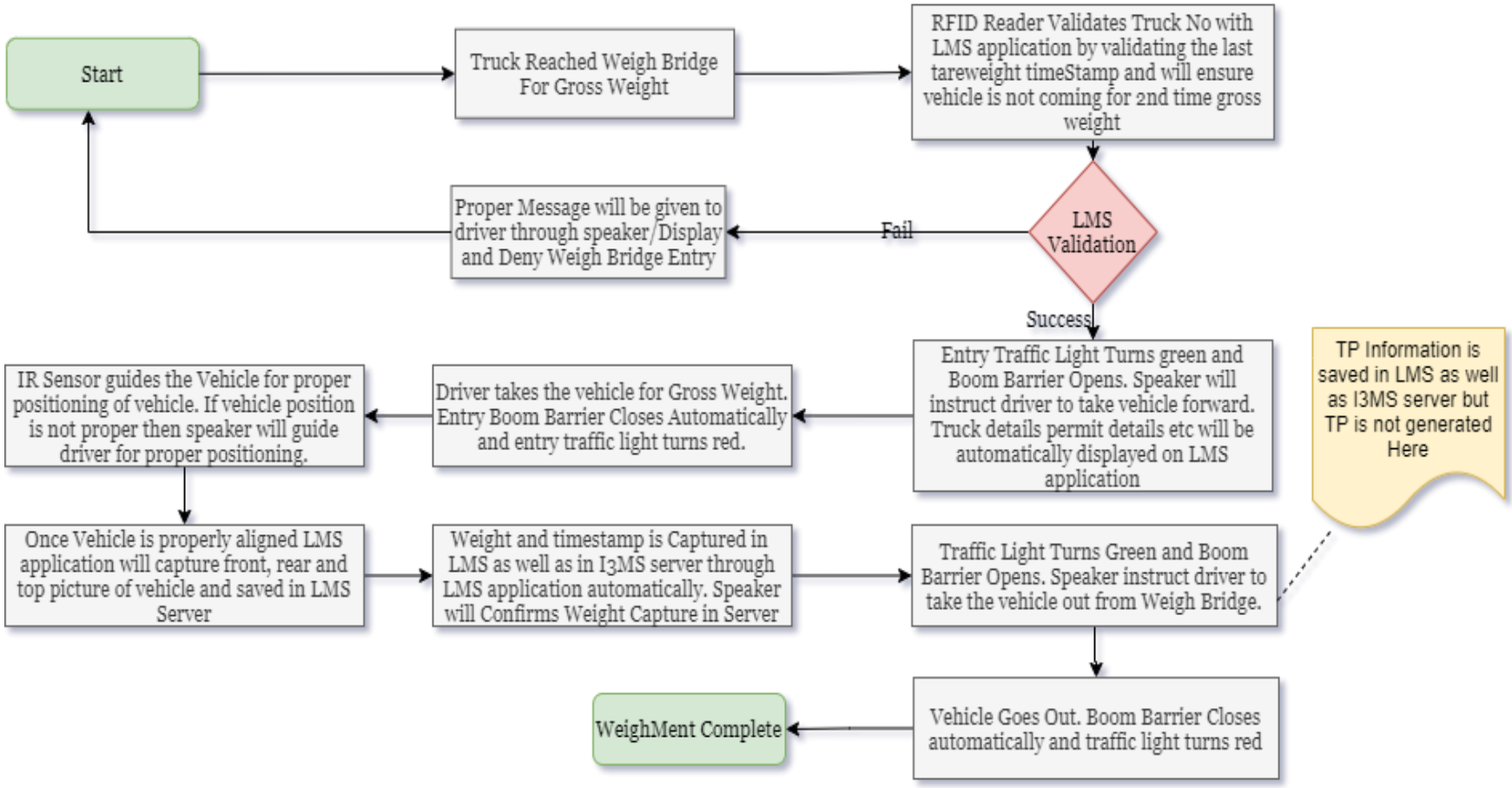
Vehicle Exit Management



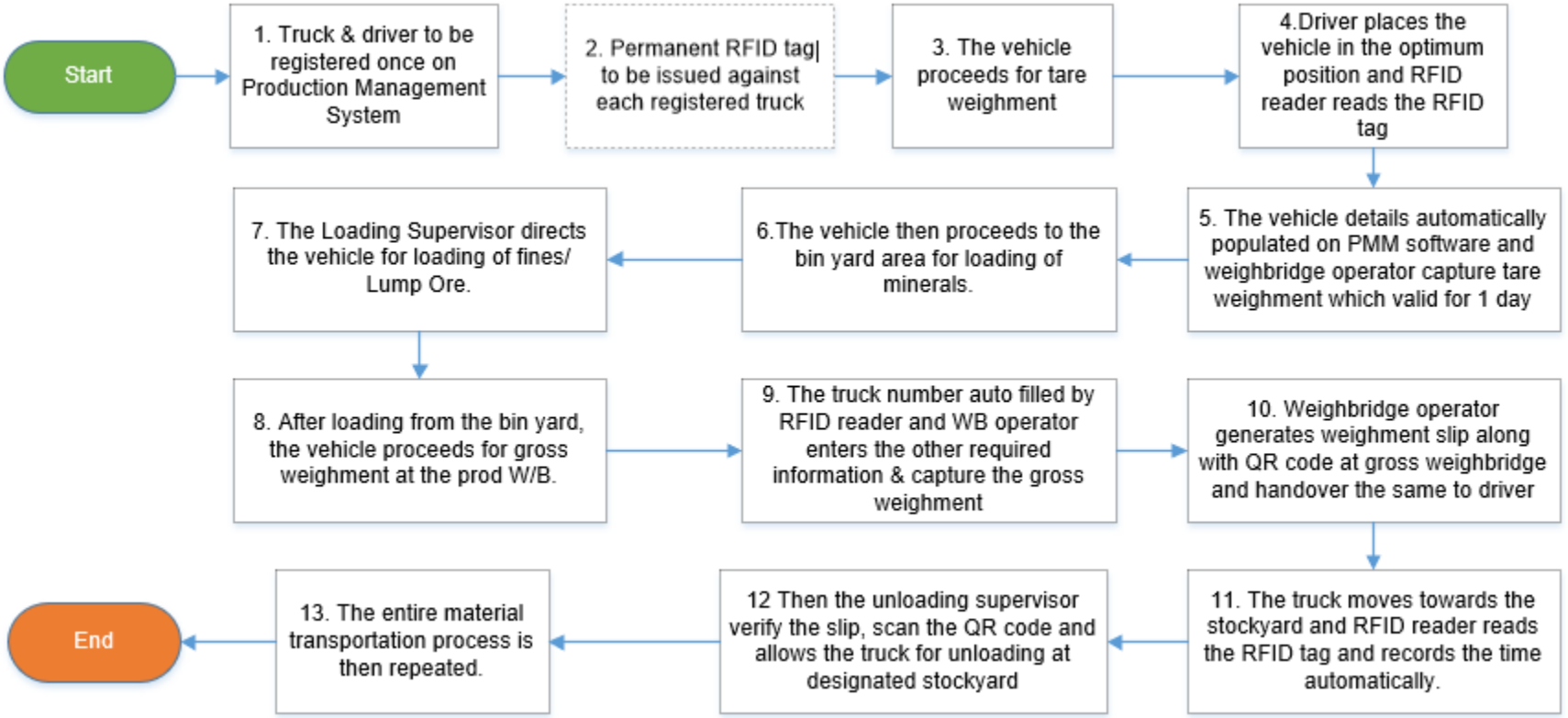
Tare Weighment



Gross Weighment



Production Material Transfer



1.2 Technical features of Logistics Management System

The Logistics Management System is expected to have features as captured in the below tables. The Agency is required to develop/ customize and configure the requirements for OMC.

- **Technical features (indicative) of the Logistics Management System**

#	Description	Req. Type
1	**User Dashboard:** • A user specific single view dashboard to capture critical KPIs based on access control by fetching the data from local and/or central back-up server.	Must Have
2	**Alerts and escalation management** • Automated reminders to required users/ task owners • Escalation mechanism using auto trigger • Field User – Mines Manager – Regional Manager – HoD	Must have
3	**Document storage and Archive management** • To customize, share, secure, authenticate and also manage versions of the documents. • Secure and centralized document storage • Easy search of the uploaded documents (based on projects, users, period etc.) • Storage of all project and task related checklists, scanned supporting approvals, site photos and videos etc. • A well-defined and configurable archival mechanism for artefacts • Artefacts to be archived after one year with exceptions	Must have
4	**Audit Trail management** • Audit trails management to be made available at least to the administrator/ master user • User/ Location/ Activity-wise audit trail history • Audit trail history captures the business username, status, remark & updated document, date and time etc.	Must have
5	**MIS reports** • Automatic generation of report weekly/ monthly/ quarterly / yearly to the respective users • Customization of report as per OMC Limited format (if any) specified • The MIS reports generated must be downloadable in at least .csv, .xls,	Must have

	.xlsx, .pdf formats.	
6	**SMS & Email Management** • Automated email triggers to be enabled • Enable facility for the administrator/user to send adhoc email and SMS through official email id and mobile number respectively. • OMC is responsible for the procuring SMS & e-Mail gateways.	Must have
7	**Integration with SAP, Active Directory, Outlook, and other 3rd party application(s) like i3MS, Vehicle Inspection System etc.** • System should have the provision to integrate with OMC's ERP (SAP), Active Directory System, Outlook, and other 3rd Party applications like i3MS, Vehicle Inspection System, etc.	Must have
8	**Web Application** • A device agnostic (desktop, tablet and mobile) application to be enabled for users to monitor all relevant parameters, activities etc. • The application is expected to be responsive and be accessible seamlessly from various user devices like desktop, mobile etc.	Must have
9	**Functional and Technical Support** • A prompt user support on functional (like feature understanding etc.) and technical matters (like system errors, bugs etc.) resulting in uninterrupted use of the product	Should have
10	**Access Control** • A custom defined role-based access control mechanism	Must have
11	**Search** • Search for objects like document, tasks etc.	Should have
12	**Export and Import** • The product shall have the capabilities to export the data on to file (.csv and .pdf) • The product shall have the capabilities to import the data from to external file (.csv and .pdf) as bulk upload.	Must have
13	**User Management** • User can be created, modified and viewed by the admin or concerned user	Must have

Note:

- All software licenses (e.g. Database license), if required, to be used shall be procured by the bidder in the name of Odisha Mining Corporation.
- Proposed Databases should be of Enterprise Edition and not open source.

1.3 Indicative List of Hardware (Module Wise)

#	Indicative list of hardware (module wise) to be installed at various locations of mines
1	**Entry Management:** • 8 Port L2 PoE + Switch • Networking components viz. UTP Cable, LIU, Patch Panel, Faceplate, Patch chord etc. • Electrical components such as Electrical Cables, HDPE Duct, JB's etc. • Outdoor Junction Box with required accessories • Public Address System Components • Electrical Distribution system inside cabins/rooms • Network Distribution system inside cabins/rooms for IP connectivity • Dome Camera • Bullet Camera • 2 KVA UPS • Fixed Long Range UHF RFID Reader and accessories • Traffic Light • Boom Barrier and accessories • Controller • LED Display (only production site) • Protection components such as SPD's, Earthing, Lightning Arrestors etc.
2	**Weighbridge Automation** • 8 Port L2 PoE + Switch • Networking components viz. UTP Cable, LIU, Patch Panel, Faceplate, Patch chord etc. • Electrical components such as Electrical Cables, HDPE Duct, JB's etc. • Outdoor Junction Box with required accessories • Public Address System Components • Electrical Distribution system inside cabins/rooms • Network Distribution system inside cabins/rooms for IP connectivity • Dome Camera • Bullet Camera • 2 KVA UPS

	• Fixed Long Range UHF RFID Reader and accessories • Traffic Light • Boom Barrier and accessories • Controller • LED Display • WB Automation with required accessories (IR/ Ultrasonic Sensors, Poles, PLC etc.) & Integration • Protection components such as SPD's, Earthing, Lightning Arrestors etc.
3	**Parking Management** • 8 Port L2 PoE + Switch • UTP Cable Networking components viz. UTP Cable, LIU, Patch Panel etc. • Electrical components such as Electrical Cables, HDPE Duct, JB's etc. • Outdoor Junction Box with required accessories • PTZ Camera • Boom Barrier • Junction Box • 2 KVA UPS • Protection components such as SPD's, Earthing, Lightning Arrestors etc.
4	**Stockyard Management** •8 Port L2 PoE + Switch •Networking components viz. UTP Cable, LIU, Patch Panel etc. •Electrical components such as Electrical Cables, HDPE Duct, JB's etc. •Outdoor Junction Box with required accessories •PTZ Camera •Junction Box •2 KVA UPS •Protection components such as SPD's, Earthing, Lightning Arrestors etc.
5	**Exit Management** •Similar to Entry Management
6	**LMS Common IT Network Upgradation** •24 Port L3 Switch •1G SFP Module 10KM (part of switch OEM) •SM Fibre Patchcord •24C SM Fibre Cable •24 Port LIU •42U Rack •10 KVA UPS

	•Number of Poles for OFC cable laying •Redundant Fiber Ring Network Architecture to each WBs, IN/OUT Gate & CCC

Note: Details of Technical Specifications of Equipment has been captured in subsequent section in this document for reference.

OMC already has few boom barriers across locations as mentioned in the table below. These boom barriers (primarily at Entry and Exit gate) shall be included as part of the LMS implementations. However, the Bidder is expected to include O&M of 5 years for all the mentioned boom barriers.

Mines	**No. of boom barrier**	**Details**
Guali (A & B)	6	Guali A (Entry Gate - 2 and Exit Gate – 2), Guali B (Entry Gate – 1, Exit Gate – 1)
Jilling	2	Entry Gate – 1, Exit Gate – 1
Apahatu	2	Entry Gate – 1, Exit Gate – 1
Kurmitar	2	Entry Gate – 1, Exit Gate – 1
Tiringpahad	1	Entry Gate – 1
South Kaliapani	4	Entry Gate – 1, Exit Gate – 1, Parking entry – 1, Parking exit – 1
Sukrangi	2	Entry Gate – 1, Exit Gate – 1
Kodingamali	2	Entry Gate – 1, Exit Gate – 1
Bangur	1	Entry Gate – 1

Note:

Product Name: ALASKA Drop Arm Barrier (Boom Barrier), As Per MHA QR for Drop Arm Barrier (Boom Barrier

Brand: ALASKA,

Under warranty period: Yes

2. Command Control Centre

2.1 General Specifications for Command Center Interior Design

2.1.1 CCC-Interiors

The CCC interiors shall be state of the art adhering to various best practices norms for control center wherein the scope includes designing, engineering, supply & installation of 24X7 Critical Control Room Interiors. It shall be designed properly in terms of Aesthetics, Ergonomics and Functionality. Various aspects should be considered while designing Control Room area to create ideal workplace, considering physiological aspects such as line of sight and field of vision and cognitive factors such as concentration and perceptivity as per latest ISO Ergonomic Norms. The following norms shall be adhered to: -

i) The entire wall paneling, and partition system must be 100% modular with type self inter lockable panels.

ii) Quality Certifications for Control Room (Wall Paneling/ Partition & Ceiling) -
   (1) ASTM standards, as applicable from time to time, for Wall Paneling & Partition tiles.
   (2) Compliant to IS and ISO standards.
   (3) The proposed interior system should be modular, scalable & Sustainable and shall comply to ISO 11064 (Ergonomic Design of Control Centers).
   (4) All material / finished components should be rugged enough to handle 24/7, 365 days VOC's (within permissible limits) working environment.

2.1.2 Civil and Architectural work

The scope for civil work in this RFP is to furnish the Command-and-Control Centre including server room, UPS room and corridor in all aspects. The furnishing includes but not limited to the following:

1. Cutting and chipping of existing floors
2. Hardware and metals
3. Glazing
4. Paint work
5. False flooring
6. False ceiling
7. Storage
8. Partitioning
9. Doors and locks
10. Fireproofing all surfaces
11. Cement concrete works
12. Insulation and Soundproofing
13. Woodwork and Paneling.

14 Blinds

All material to be used shall be of fine quality ISI marked unless otherwise specified.

2.1.3 **False Ceiling**

The SI shall install the top false ceiling at CCC. This false ceiling shall house A/C ducts (if required) and cables of electrical lighting, firefighting, and CCTV. Appropriate pest control measures shall be taken to keep pests at bay.

2.1.4 **Electrical Distribution System**

The SI shall be responsible for installation of electrical distribution system at CCC. SI shall be responsible for proper and uninterrupted working and shall ensure this by having the IT equipment, essential building infrastructure necessary of uninterrupted operations, and server room power distribution system with redundancy:

1. Two incoming HT feeder supply from different sub-stations. Even if one feeder is down, the other one keeps power available.
2. Emergency Diesel- Generator backup on failure of both main feeders. Bidder to ~~provide and~~ maintain DG set at CCC for redundancy.
3. UPS system with battery bank for critical loads
4. Connection between UPS system and the IT equipment shall be redundant. No single point of failure shall exist in the power connectivity between network racks and UPS system.

2.1.5 **Electrical and Communication work**

SI shall do complete electrical cabling and, communication infrastructure work for CCC and shall include but not limited to:

1. Main electrical panel in CCC
2. Power cabling
3. UPS distribution board
4. UPS point wiring
5. Power cabling for utility component and utility points etc.
6. Online UPS
7. Separate Earth pits for the component
8. Metering for different loads
9. The SI shall use fire retardant cables of rated capacity exceeding the power requirements of existing and proposed components to be used at maximum capacity.
10. All communication network and infrastructure works including Ethernet cabling, modems, switches, routers, patch panels, Wi-Fi routers etc. for facilitation of inter-CCC and temporary command and control center networking.
11. All materials to conform to ISI standards as per industry practice.
12. Lightening Arrester, Surge Protection Device and Chemical Earthing

2.1.6 **Lighting Works**

SI shall be responsible for the lighting works at CCC. Following items need to be undertaken by SI for lighting:

1. Supply of all equipment associated with implementation of lighting including fixtures, lamps, wiring etc.;
2. Wiring for lighting system in the building;
3. Installation of lighting fixtures.
4. Warranty for the lighting equipment.
5. Critical lights shall be connected to UPS for uninterrupted lighting;
6. Post the installation, SI shall ensure that lux levels of the building are as per IES-HB-10-11.

2.1.7 **CCTV System**

The SI shall provide CCTV system within the CCC on 24X7 basis. All important areas of the CCC along with the non-critical areas like locations for DG sets, entry exit of CCC, Entry and Exit of building premises need to be under constant video surveillance. Monitoring cameras shall be installed strategically to cover all the critical areas of all the respective locations.

Cameras and system to be used as per the specifications provided under relevant sections.

2.1.8 **Access control system**

The Biometric/Access card-based Access Control System shall be deployed at CCC with the objective of allowing entry and exit to and from the premises to authorized personnel only with appropriate door locks and controller assemble connected with BMS system if available. The system deployed shall be based on proximity as well as biometric technology for critical areas and proximity technology for non-critical areas.

The system to be provided as per the specifications provided under relevant section.

2.1.9 **Water leak detection system**

The Water Leak Detection System shall be installed at CCC to detect any seepage of water into the critical area and alert the security control room for such leakage. It shall consist of water leak detection cable and alarm module. The cable shall be installed in the ceiling and floor areas around the periphery.

2.1.10 **Rodent Repellent System**

Since good amount of cabling runs in the CCC and the damage to any cable by rodents could be of serious concern so an effective system to curb this need to be provided which helps is keeping the rodents away from the CCC area and at the same time it should not kill the rodents. Other than this system SI also need to conduct periodic pest control using chemical spray once in a quarter as a contingency measure to effectively fight pests once the CCC is up and running and during the entire O&M period.

The system to be provided as per the specifications provided under relevant section.

2.1.11 **HVAC/Air Conditioning**

The Air Conditioners shall be provided by OMC and SI need to install the same in the Command & Control Centre. SI need to decide the number of Air Conditioners and submit the same with OMC during design phase and accordingly OMC shall provide the ACs. SI need to consider the electrical load for the AC's and consider the same for the design of LT and Distribution panel.

2.2 General Specifications for Good Construction practices

2.2.1 **Lightning-proof measures**

The SI shall comply with lightning-protection and anti–interference measures for system structure, equipment type selection, equipment earthing, power, signal cables laying. The SI shall describe the planned lightning-protection and anti–interference measures in the As-Is report. Corresponding lightning arrester shall be erected for the entrance cables of power line, video line, data transmission cables. All crates shall have firm, durable shell. Shell shall have dustproof, antifouling, waterproof function & should be capable to bear certain mechanical external force. Signal separation of low and high frequency; equipment's protective field shall be connected with its own public equal power bodies; small size/equipment signal lightning arrester shall be erected before the earthling. The Internal Surge Protection Device for Data Line Protection shall be selected as per zone of protection described in IEC 62305, 61643-11/12/21, 60364-4/5. Data line protection shall be used for security system, server data path and other communication equipment. Data line protection shall be installed as per zone defined in IEC 62305. Type 1 device shall be installed between zone 0B and zone 1. Type 2 devices shall be installed before the equipment in zone 2 and 3.

2.2.2 **Earthing Systems**

All electrical components are to be earthened by connecting two earth tapes from the frame of the component ring and will be connected via several earth electrodes. The cable arm will be earthen through the cable glands. The entire applicable IT infrastructure i.e. field locations/traffic junctions or traffic command center shall have adequate earthing. Further, earthing should be done as per Local state national standard in relevance with IS standard.

1 Earthing should be done for the entire power system and provisioning should be there to earth UPS systems, Power distribution units, AC units, etc. to avoid a ground

differential. OMC shall provide the necessary space required to prepare the earthing pits.

2 All metallic objects on the premises that are likely to be energized by electric currents should be effectively grounded.

3 There should be enough space between data and power cabling and there should not be any cross wiring of the two, to avoid any interference, or corruption of data.

4 The earth connections shall be properly made.

5 A complete copper mesh earthing grid needs to be installed for the server farm area; every rack needs to be connected to this earthing grid. A separate earthing pit needs to be in place for this copper mesh.

6 Provide separate Earthing pits for Servers, & UPS as per the standards.

2.2.3 **All Junction Boxes, Poles and Cantilever**

7 The SI shall provide the Junction Boxes, poles, and cantilever to mount the field sensors like traffic light aspects, active network components, controller and UPS at all field locations

8 The Junction Box needs to be appropriately sized in-order to accommodate the systems envisaged at the Junctions considering future requirements as well.

9 It should be noted that the SI would have designed the Junction box keeping in mind the scalability requirements of project

10 The junction box should be designed in a way that, separate compartment will be available for the active components and UPS with batteries.

11 The junction box should be weatherproof, theft proof and vandal proof. It should be certified for IP55 or above.

12 All electrical connections/joints must be above 1 meter from nearest Road level, so that un-interrupted power supply can be maintain during flood/water logging situation. All poles‟ base, Junction boxes, etc. should be installed accordingly.

13 All Poles, Cantilevers, Gantries, Junction Boxes, other outdoor fixtures, etc. must be fixed strongly in such a way to handle the wind load up to wind speed of 120 Km/Hr.

14 All the junction box, controller box, poles and gantry should be made of galvanized iron and should be painted, and the quality of the painting should be maintained throughout the contract period.

2.2.4 **Cabling Infrastructure**

15 The SI shall provide standardized cabling for all devices and subsystems in the field.

16 SI shall ensure the installation of all necessary cables and connectors between the field sensors /devices assembly, outstation junction box, for pole mounted field sensors/devices the cables shall be routed down the inside of the pole and through underground duct to the outstation cabinet.

17 All cables shall be clearly labelled with indelible indications that can clearly be identified by maintenance personnel. The proposed cables shall meet the valid directives and standards.
18 Cabling must be carried out per relevant BIS standards. All cablings shall be documented in a cable plan by the SI.
19 Storage House/Godown for the Hardware Infrastructure should be arranged by the SI at its own cost.
20 All the cablings should be done underground via relevant ISI standard duct.
21 The ducting should be done via HDD or micro trenching (min, 12 inch deep from the road surface level and will be measured from road surface to the top of the duct.) methodology without damaging any existing infrastructure and utility with prior approval from OMC and relevant authority.
22 The duct size should be appropriate for pulling the cable with the spare space availability for 1 more cable.
23 SI must reinstatement /restore the road from the original road material. Where HDD or micro trenching has been performed, after the reinstatement the road level should be maintained, and no damage should occur to road in future.
24 All the cable entering and exiting to and from the controller, junction box, poles etc. should be covered via appropriate conduit and no cable should be visible and loose at any place.
25 SI should remove the debris from site after work completion and should reinstate the site.

2.3 Common guidelines regarding compliance of systems/equipment

1 The specifications mentioned for various IT / Non-IT components are indicative requirements and should be treated for benchmarking purpose only. SIs are required to undertake their own requirement analysis and may propose higher specifications that are better suited to the requirements.
2 All IT Components should support IPv4 and IPv6
3 All IT/Electronics components shall comply to the IEC/ISI/BSI standards as applicable
4 All systems will be designed to ensure accessibility to the disabled hence all the components related to IT, electronics and/or digital technology should be in accordance to the latest version of WCAG and the European Standards - EN 301 549 or an equivalent standard as approved
5 Bidders should provide complete make, model, for all equipment/software quoted, in the Technical Bid. Technical Bid should also be accompanied by OEM's product brochure / datasheet and MAF for each line item (wherever applicable).
6 Bidder should ensure that only one make and model is proposed for one component in Technical Bid for example all cameras must belong to a single OEM and must be of the same model for particular use.

7 Bidders should ensure warranty and support for all equipment from OEMs during the contract period. All the back-to-back service agreements should be submitted along with the Technical Bid.
8 All equipment, parts should be original and new.
9 The user interface of the system should be a user friendly Graphical User Interface (GUI).
10 Critical core components of the system should not have any requirements to have proprietary platforms and should conform to open standards.
11 For custom made modules, industry standards and norms should be adhered to for coding during application development to make debugging and maintenance easier. Object oriented programming methodology must be followed to facilitate sharing, componentizing and multiple use of standard code. Before hosting the application, it shall be subjected to application security audit (by any of the CERTIN empaneled vendors) to ensure that the application is free from any vulnerability.
12 All the Clients Machines / Servers shall support static assigned IP addresses or shall obtain IP addresses from a DNS/DHCP server.
13 The system servers and software applications will be hosted in Data Centers as specified in the Bid. It is important that the entire set of Data Center equipment are in safe custody and have access from only the authorized personnel and should be in line with the requirements & SLAs defined in the RFP .
14 The Servers provided should meet industry standard performance parameters (such as CPU Utilization of 60 percent or less, disk utilization of 75 percent or less). In case any non-standard computing environment is proposed (such as cloud), detail clarification needs to be provided in form of supporting documents, to confirm (a) how the sizing has been arrived at and (b) how SLAs would be met.
15 SI is required to ensure that there is no choking point / bottleneck anywhere in the system (end-to-end) and enforce performance and adherence to SLAs. SLA reports must be submitted as specified in the Bid without fail.
16 All the hardware and software supplied should be from the reputed Original Equipment Manufacturers (OEMs). OMC/or any other authorized agency as nominated by the Authority reserves the right to ask replacement of any hardware / software if it is not from a reputed brand and conforms to all the requirements specified in the RFP documents.
17 Cameras and the Video Management / Video Analytics Software should be ONVIF Core Specification '2.X' or 'S', 'G' compliant and provide support for ONVIF profiles such as Streaming, Storage, Recording, Playback, retrieval of local stored video and Access Control.
18 The number of licenses required for Video Management Software as described above shall be estimated by the Bidder and shall provide price quote accordingly.
19 All licenses should be in the name of Odisha Mining Corporation (OMC).

2.4 Functional Scope of Command Control Center (CCC)

OMC is expecting to have a six-seater Command Control System across all mentioned location.

20 Video Management System for 24X7 CCTV Surveillance
21 Public Address System
22 Emergency Call Boxes
23 Network Equipment Monitoring
24 Speed Violation Detection Mechanism
25 Incident Management Mechanism
26 Alert Mechanism

Note:

The location specific CCC should have the capability/ features to be integrated with ICCC software in future. However, implementation of ICCC software is not part of the current scope.

The location specific CCC should have the capability/ features to be integrated with a central CCC at HO in future.

#	Modules – Indicative Functional Modules
CCC which will be applicable for monitoring activities inside mines.	
1	**Video Management System for CCTV Surveillance** The core objective of Video Management System is to create a supporting mechanism for the OMC Mines through 24x7 surveillance and monitoring throughout the mines area as well as enable proactive identification of security issues leveraging intelligent analytics from the surveillance system. This module proposes implementation of a holistic surveillance system across the city including: • Integration of the feed of the existing CCTV Cameras • A full-fledged command and control for ensuring 24X7 monitoring and enabling effective action to be taken in case of emergency situations
2	**Public Address System** • Public Address (PA) system shall be used at strategic locations as identified by OMC to make important announcements for the public. It shall be able to broadcast messages across all PA systems or specific announcement for location supporting single zone / multi zone operations. The system shall also deliver pre-recorded messages to the loudspeakers attached to them from external sources like pen drives etc. for public announcements. This system shall be used to announce informatory and emergency messages to the road users and will

#	Modules – Indicative Functional Modules
	be connected to the CCC system. The PAS shall be capable of playing pre-defined audible messages from the CCC. • Some of locations to have Public Address System for emergency are parking yard, tare weighbridge, gross weighbridge, loading point, exit point etc.
3	**Emergency Call Box** • Emergency Call Box System shall provide an end-to-end solution for road-side assistance in case of emergency events. It is expected to be a robust communication system that comprises of telephone boxes installed at the strategic locations within Mines and connected to a control center for swift emergency response. • Some of the locations to have Emergency Call Box are parking yard, tare weighbridge, gross weighbridge, loading point, exit point and stockyard.
4	**Network Equipment Monitoring** • The NMS solution should be Scalable, Secure, Robust, Advanced, State of Art, flexible, easy to deploy, reliable and should support distributed architecture along with 3rd party integrations. Network Management Solution should provide end-to-end, comprehensive, unified and integrated management of IT infrastructure components to maximize the availability of IT services and SLA performance. • The Agency shall work in coordination with existing vendors of OMC for adding existing devices in offered NMS solution required, if any. • 24 X 7 monitoring of all the required Network Equipment like switches, router, firewall, IP devices etc. through Simple Network Management Protocol. • Health, link and bandwidth Monitoring of all IP devices (Existing and Proposed Devices) IP Devices like Fixed Long Range UHF RFID Reader, Boom Barrier, CCTV, PAS and ECB etc. • Integration with email and SMS for scheduled and real-time alert and notification
5	**Speed Violation Detection Mechanism** • Detects vehicles which are beyond/ above permissible speed limit • Informs or alerts concerned stakeholders with required details
6	**Incident Management Mechanism** • Create, Edit, Delete, View and Assign Incidents • Incident Reports and Dashboards • Provision to group the incidents as per Severity and escalation matrix

#	Modules – Indicative Functional Modules
7	**Alert Mechanism** • Alert analytics in real time • Event/ Vehicle/ User/ Location wise grouping of alerts • Powerful filters to search and dig deep to a particular alert/ notification

2.5 Indicative list of components for Command Control Center

#	Indicative list of components for Command Control Center to be installed
1	**Network Active Component** • 24 Port L3 Switch including SFP • 24/8 Port L2 PoE + Switch including SFP • Network Management System
2	**Network Passive Component** • UTP Cable • Unloaded Jack Panel • CAT 6 IO • FacePlate • 1 Mtr. UTP Patchcord • 2 Mtr. UTP Patchcord • 24C SM Fibre Cable • 24 Port LIU • 42U Rack (Network)
3	**Video Wall** •Video Wall (2X2 55" LED Display) + Software + Controller)
4	**Server** • CCC Operator PC • General Servers (Video Management System, Network Management System & PAS, SVDS) • LMS Server - to be configured in high availability (HA) and located in respective CCC • All applications including LMS in high availability to be configured as per the BOQ provided.
5	**CCC Software and License** • PAS Operator Console • PAS Central Software • Variable Message Signboard Central s/w • SVDS central software and accessories • Central Antivirus Software
6	**Utility** • 10 KVA UPS (n+1) • Water Leak Detection System

	• A4 Laser Printer • Desktop Fixed Long Range UHF RFID Reader & Writer • Access Control System • Fire Alarm & Suppression System • Rodent Repellant System
7	**CCTV & Storage** • Video Management System • Dome Camera • PTZ Joystick • Storage (300 TB)
8	**CCC Interior Design** • Command Center Interior Design

Note: Details of Technical Specifications of Equipment has been captured in subsequent section for reference.

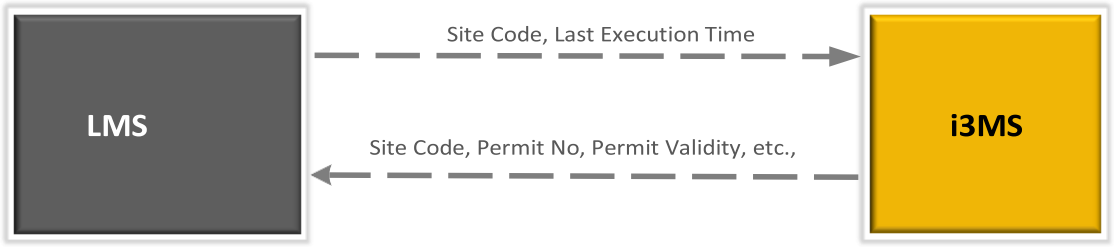
3. LMS integration requirement with i3MS (indicative)

The integration with i3MS system has been anticipated at below stages of the process:

- creating Dispatch Schedule,
- Mine Entry,
- Tare Weighbridge,
- Gross Weighbridge and
- Mine Exit Locations

3.1 Dispatch Schedule Creation

LMS shall send 'site Code' and 'last Execution Time' as request payload to i3MS system over an API that would be hosted by i3MS. Once the input parameters are received, i3MS system shall push the valid details of Permit to LMS in Batches. Same Permit details shall be populated in LMS for dispatch schedule creation and other related features.



Payload: LMS to i3MS

Sl. No.	Parameter	Value	Data Type	Is Mandatory?
1	siteCode	Block Code	String [ ]	Yes
2	lastExecutionTime	Last Transaction Date Time	Date Time	Yes

Response: i3MS to LMS

Sl. No.	Parameter	Value	Data Type	Is Mandatory?
1	siteCode	Block Code	String	Yes
2	lastExecutionTime	Last Transaction Date Time	Date Time	Yes
3	permitNumber	Permit Number	String	Yes

Sl. No.	Parameter	Value	Data Type	Is Mandatory?
4	permitValidity	Permit Validity	Date	Yes
5	permitQuantity	Permit Quantity	Decimal	Yes
6	buyer	Consignee Name	String	Yes
7	buyerCode	Consignee Code	String	Yes
8	material	Material Name	String	Yes
9	destination	Destination	String	Yes
10	permitDate	Permit Allocation Date	Date Time	Yes
11	stackNumber	Stack Number	String [ ]	Yes

If Integration connector fails to run at the schedule time, then LMS considers the value of Transaction Date sent by i3MS system in last execution and reads missed out Permit Numbers added after API schedule time.

API Details:

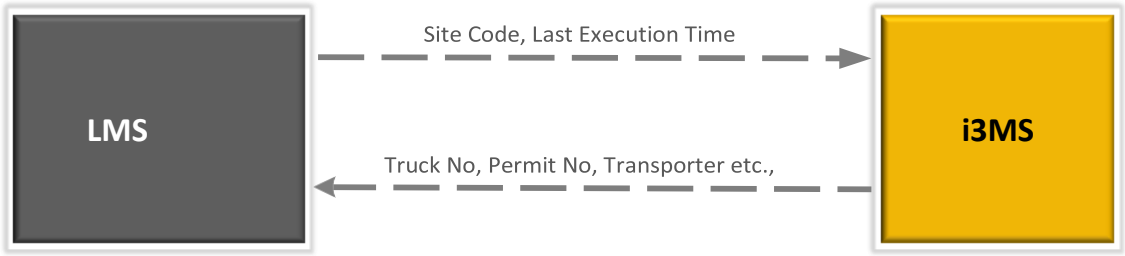
URL	-
Frequency	Batch Mode of every 60 Minutes

3.2 Mine Entry Location

Every truck at the mine entry point shall be validated by LMS through i3MS integration for Truck and Permit Number tagging status. The tagging data shall be synced from i3MS system to LMS prior to start of the trip. LMS shall send 'siteCode' and 'lastExecutionTime' as request payload to i3MS system over an API that would be hosted by i3MS. Once the input parameters are received, i3MS system shall push the tagging data to LMS in Batches.

i. If the truck has been tagged to the given permit number in i3MS application, i3MS system shall send a response along with the tagged status as 'Yes' and Transporter name.

ii. If the truck is not tagged to the given permit number in i3MS application, i3MS system shall send a response along with the tagged status as 'No'.



Payload: *LMS to i3MS*

Sl. No.	Parameter	Value	Data Type	Is Mandatory?
1	siteCode	Block Code	String [ ]	Yes
5	lastExecutionTime	Last Transaction Date Time	Date Time	Yes

Response: i3MS to LMS

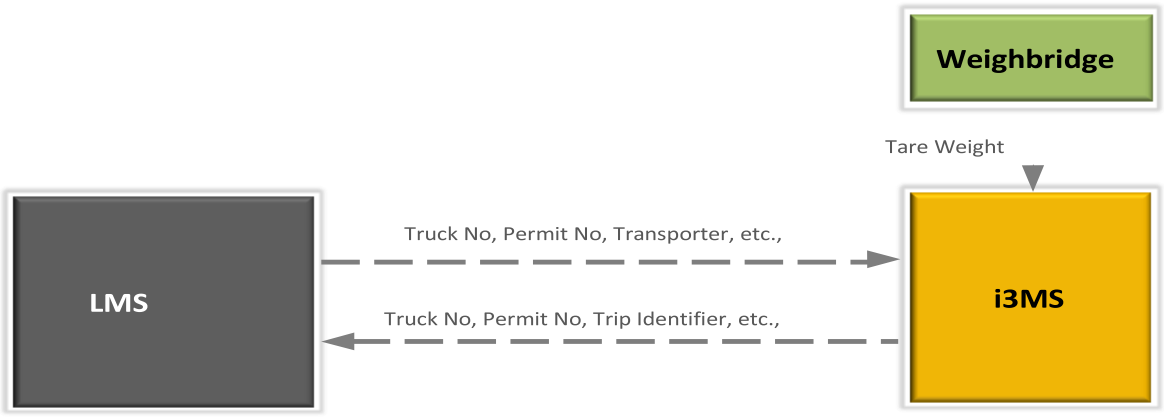
Sl. No.	Parameter	Value	Data Type	Is Mandatory?
1	siteCode	Block Code	String	Yes
2	truckNumber	Truck Number	String	Yes
3	permitNumber	Permit Number	String	Yes
5	taggingStatus	Truck-Permit Tagging Status	Boolean	Yes
6	transporter	Transporter Name	String	Yes
7	taggingTime	Tagging Time	Date Time	Yes

API Details:

URL	-
Frequency	Batch Mode of every 20 Minutes

3.3 Tare Weighbridge Location

On trip detection and weight stabilization, LMS shall send the trip data to i3MS system over an API that would be hosted by LMS. On receiving the trip data, i3MS system shall read the stable tare weight from the weighbridge device and send the weighment status to LMS in response. Once LMS receives weighment details, LMS shall resolve the trip data accordingly.



Payload: LMS to i3MS

Sl. No.	Parameter	Value	Data Type	Is Mandatory?
1	siteCode	Block Code	String	Yes
2	truckNumber	Truck Number	String	Yes
3	permitNumber	Permit Number	String	Yes
4	dispatchTripNumber	Unique Trip Id	String	Yes
5	transporterCode	Transporter Code	String	Yes
6	currentTime	Current Date Time	Date Time	Yes
7	stackNumber	Stack Number	String	Yes
8	allowWeighment	Weighment Confirmation	Boolean	Yes

Response: i3MS to LMS

Sl. No.	Parameter	Value	Data Type	Is Mandatory?
1	weighbridgeName	Weighbridge Name	String	Yes
2	dispatchTripNumber	Unique Trip Id	String	Yes
3	tripIdentifier	Unique Trip Id in i3MS	String	Yes
4	currentTime	Current Date Time	Date Time	Yes
5	weighmentStatus	Weighment Status	Boolean	Yes

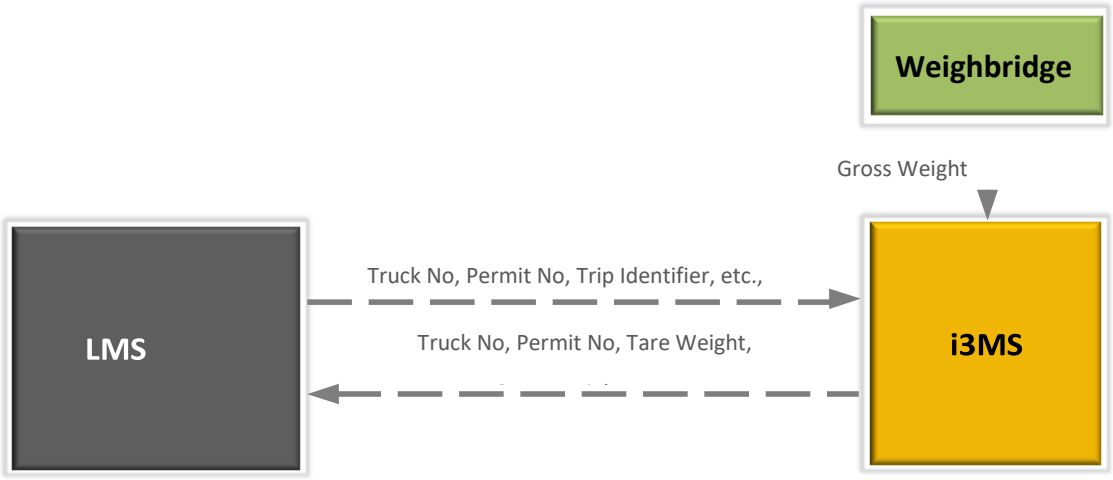
If LMS fails to receive response from i3MS system within certain time duration, then LMS shall resend the request to i3MS system for maximum of 3 attempts with certain time interval to fetch the trip data.

API Details:

URL	-
Frequency	Real Time
Retry (Secs)	

3.4 Gross Weighbridge Location

On trip detection and weight stabilization, LMS shall send the trip data to i3MS system over an API that would be hosted by LMS. On receiving the trip data, i3MS system shall read the stable gross weight from the weighbridge device and send the weighment (tare and gross) details to LMS in response. Once LMS receives weighment details, LMS shall resolve the trip data accordingly.



Payload: LMS to i3MS

Sl. No.	Parameter	Value	Data Type	Is Mandatory?
1	siteCode	Block Code	String	Yes
2	truckNumber	Truck Number	String	Yes
3	permitNumber	Permit Number	String	Yes
4	dispatchTripNumber	Unique Trip Id	String	Yes
5	tripIdentifier	Unique Trip Id in i3MS	String	Yes
6	currentTime	Current Date Time	Date Time	Yes

Response: i3MS to LMS

Sl. No.	Parameter	Value	Data Type	Is Mandatory?
1	siteCode	Block Code	String	Yes
2	truckNumber	Truck Number	String	Yes
3	permitNumber	Permit Number	String	Yes
4	dispatchTripNumber	Unique Trip Id	String	Yes
5	tripIdentifier	Unique Trip Id in i3MS	String	Yes
6	tareWeight	Tare Weight	Decimal	Yes
7	tareWeightDateTime	Tare Weight Time	Date Time	Yes
8	grossWeight	Gross Weight	Decimal	Yes
9	grossWeightDateTime	Gross Weight Time	Date Time	Yes
10	netWeight	Net Weight	Decimal	Yes
11	tpNumber	T P Number	String	Yes
12	weighbridgeName	Weighbridge Name	String	Yes
13	currentTime	Current Date Time	Date Time	Yes

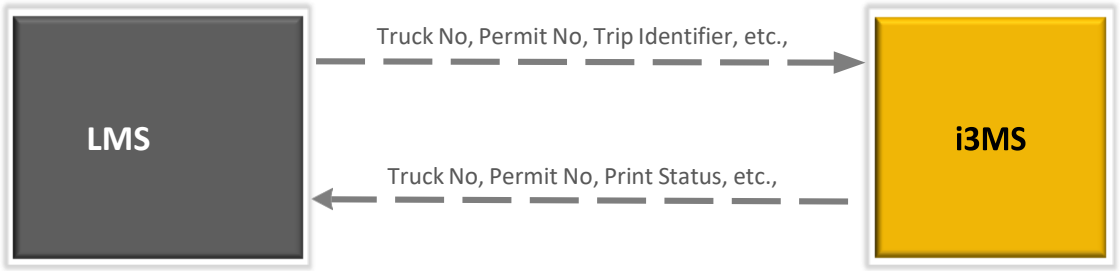
If LMS fails to receive response from i3MS system within certain time duration, then LMS shall resend the request to i3MS system for maximum of 3 attempts with certain time interval to fetch the trip data.

API Details:

URL	-
Frequency	Real Time
Retry (Secs)	

3.5 Mine Exit Location

LMS shall send the trip data to i3MS system over an API that would be hosted by i3MS. Once i3MS system receives trip data as input, the i3MS system shall send instructions to Printer device for Transit Pass generation. And i3MS system shall send Printing status to LMS in return response.



Payload: *LMS to i3MS*

Sl. No.	Parameter	Value	Data Type	Is Mandatory?
1	tpNumber	T P Number	String	Yes
2	currentTime	Current Date Time	Date Time	Yes

Response: *i3MS to LMS*

Sl. No.	Parameter	Value	Data Type	Is Mandatory?
1	siteCode	Block Code	String	Yes
2	tpNumber	T P Number	String	Yes
3	truckNumber	Truck Number	String	Yes
4	permitNumber	Permit Number	String	Yes
5	dispatchTripNumber	Unique Trip Id	String	Yes
6	printStatus	T P Print Status	Boolean	Yes
7	currentTime	Current Date Time	Date Time	Yes

API Details:

URL	-
Frequency	Real Time

3.6 Data Type Format for All APIs:

Decimal: Up to 3 decimal values

Date Time: 2022-05-12T10:58:00Z

Boolean: true/false

3.7 SSL Certificate

For testing setup, self-signed local SSL certificates will be used. For Live deployment, Authority verified certificates can be used with required domain name.

	CCC Interior Design Command Center Interior Design

Note: Details of Technical Specifications of Equipment has been captured in (***Appendix- 6***) for referenc

4. Hardware Components Requirement

Based on initial assessment following quantities of various components & hardware has been estimated for all 13 mines for both LMS & CCC implementation

Sl. No.	Items	UOM	Qty.
A	Supply		
1	24 Port L3 Switch	Nos	22
2	8 Port L2 PoE + Switch (Industrial)	Nos	134
3	8 Port L2 PoE + Switch (Indoor)	Nos	114
4	6U Wall Mount Indoor Rack with one fixed shelf	Nos	114
5	24 Port L2 PoE + Switch	Nos	22
6	UTP Cable	Mtrs	33000
7	Fully Loaded Jack Panel	Nos	156
8	CAT 6 IO	Nos	1374
9	FacePlate	Nos	1268
10	1 Mtr. UTP Patchcord	Nos	1268
11	2 Mtr. UTP Patchcord	Nos	1268
12	SM Fibre Patchcord	Nos	362
13	Dome Camera	Nos	158
14	Bullet Camera	Nos	232
15	PTZ Camera	Nos	30
16	24 Port LIU	Nos	156
17	Outer Junction BOX	Nos	131
18	DIN Rail Mount LIU, 6 Port Duplex, Fully Loaded	Nos	131
19	24F Joint Enclosure	Nos	131
20	Manhole	Nos	131
21	10 KVA UPS (n+1)	Nos	11
22	2 KVA UPS	Nos	130
23	Fixed Long Range UHF RFID Reader	Nos	114
24	6 Meter GI Cantilever Pole (for FRID) along with foundation, Lightening Arrestor, Earthing with GIS Strip, Earth Cable for LA	Set	114
25	FRP/ GRP/ MS Pole Mount JB, Min. for RFID System	Nos	114

Sl. No.	Items	UOM	Qty.
26	Handheld UHF RFID Reader (RFID Sled + Android Terminal)	Nos	14
27	Traffic Light	Nos	114
28	Motorized Boom Barrier with 3/ 3.5 Meter Arm, IP Based	Set	92
29	IR Beam Sensor Mounting Pole arrangement	Pair	228
30	Polycarbonate/ FRP/ GRP JB for Boom Barrier	Nos	228
31	Manual Control Console (Boom Barrier, Traffic Signal)	Nos	114
32	Active LED Display with intelligent controller	Nos	114
33	Intelligent Controller for WB/ PLC Controller	Set	74
34	RS232 Active Splitter	Nos	74
35	WB (IR/ Ultrasonic) Stabilizing Sensor Pole Arrangement	Nos	222
36	Polycarbonate/ FRP/ GRP JB for WB	Nos	222
37	PLC Controller (Excluding Controllers considered in WB)	Nos	40
38	LED Display	Nos	104
39	VMD with Controller and UPS	Nos	10
40	Mounting Structure (Pole) for VMD	Nos	10
41	Outdoor Junction Box for VMD (UPS and other items)	Nos	10
42	DIN Rail Mount LIU for VMD (fully loaded)	Nos	10
43	Media Converter	Nos	10
44	OFC Cable for VMD	Nos	10
45	Lightening Arrestor, Earthing GI Strip for VMD	Nos	10
46	3 Core Armoured Cable for VMD	Nos	10
47	24C SM Fibre Cable	Nos	90000
48	Poles for OFC cable laying including concrete foundation	Nos	1800

Sl. No.	Items	UOM	Qty.
49	Lightening Arrester, Surge Protection Device and Chemical Earthing	Nos	131
50	Network Management System	Nos	11
51	Video Wall (2X2 55" LED Display) + Software + Controller	Nos	11
52	CCC Operator PC	Nos	66
53	42U Rack (Network)	Nos	22
54	General Server	Nos	33
55	PAS Operator Console	Nos	11
56	PAS Central Software	Nos	11
57	PAS Local Sub-System – Horn Speaker	Nos	164
58	PAS Local Sub-System – IP Amplifier	Nos	134
59	PAS Local Sub-System – Control Desk	Nos	63
60	Variable Message Signboard Central Software	Nos	11
61	SVDS Central Software	Nos	11
62	SVD Camera	Nos	26
63	External IR Illuminator	Nos	26
64	Local Processing Unit (LPU) for ANPR & SVD	Nos	26
65	Speed Detection Software Module (As per design)	Nos	26
66	ANPR Software Module (as per design)	Nos	26
67	6U Pole Mount Junction Box for SVD	Nos	26
68	Rack Mount LIU (fully loaded) for SVD	Nos	26
68	6 Meter GI Cantilever Pole (for SVD) along with foundation, Lightening Arrestor, Earthing with GIS Strip, Earth Cable for LA	Nos	26
69	Fire Alarm & Suppression System	Nos	11
70	Rodent Repellant System	Nos	11
71	Video Management Software	Nos	11
72	Storage (300 TB)	Nos	11
73	CCC Interior Design for (6-Seater)	Nos	11

Sl. No.	Items	UOM	Qty.
74	Antivirus Software (Server, PC at CCC) Subscription	Set	99
75	A4 Laser Printer	Nos	11
76	Desktop Fixed Long Range UHF RFID Reader & Writer	Nos	11
77	Access Control System and accessories	Nos	22
78	Water Leak Detection System	Nos	11
79	QR Code Reader/ Scanner	Nos	114
80	Pole for QR Code Reader/ Scanner	Nos	114
81	Handheld device at Loading/ Stock Yard	Nos	20
82	Wifi Access Point	Nos	35
83	Thermal Printer	Nos	26
84	FRP/GRP Pole Mount JB	Nos	116
85	PVC Perimeter Trunking- Modular type switch board (Socket and Switches)	Lot	114
86	PVC Perimeter Trunking- Fire Retardant Cable (2.5 Sq. MM) for internal wiring	Lot	114
87	PVC Perimeter Trunking- Earthing Wire (4 Sq. MM)	Lot	114
88	PVC Perimeter Trunking- PVC Casing Caping for internal wiring	Lot	114
89	PVC Perimeter Trunking- Internal electrical and networking work within local control room	Lot	114
90	Emergency Call Box (ECB) and associated licenses at field	Set	30
91	Network SPD, CAT 6	Nos	1012
92	IR Through Beam Sensors (WB & Boom Barrier)	Nos	654
93	12/24 VDC Power Supply for IR Through Beam Sensor	Nos	179

5. Specifications of Components & OEM Selection Criteria

The functional requirements and technical specifications have been provided in the below sections.

The Bidder has to submit compliance towards functional, technical and OEM criteria by selecting the hardware and software which are compliant to the specifications mentioned in below section. It may be noted that the deviation from Technical Specification is not allowed. Deviation from the specified specification may lead to rejection of bid. The Bidder may provide, higher or better specification.

The below table lists out the components where Annexure 17 of the Tender document sheet to be submitted along with OEM Criteria & Data Sheet. Other components, which has not been part of Annexure 17, the Bidder may choose Make and Model at later stage, however the components to fulfill the functional requirement as mentioned in this document.

As OEM Criteria, for items wherever it is required, the bidder can provide declaration by OEM as per Annexure 18. OEM Criteria is mentioned in Annexure 18.

Compliance Requirement

		Compliance Requirement		
Sl. No.	Components	Annexure 17	Annexure 18	Data Sheet
1	Technical Specifications: Common Components			
1.1	FRP/GRP Pole Mount JB	Y	Y	Y
1.2	Network SPD for CAT6	Y	Y	Y
1.3	Power SPD			
1.3.1	SPD for Sub Distribution Panel – 230 VAC Rated	Y	Y	Y
1.3.2	SPD for Sensitive Electrical & Electronic Equipment – 24 VAC/VDC	Y	Y	Y
1.4	Active LED Display with intelligent controller	Y	N	Y
1.5	Passive Components (Copper & Optical)			
1.5.1	24 Core, ADSS OFC Cable	Y	Y	Y
1.5.2	Double Jacket CAT6 UTP Outdoor Cable	Y	Y	Y
1.5.3	CAT-6 Patch Cord	Y	N	Y
1.5.4	Cat6 Field Termination Plug	Y	N	Y
1.5.5	SM Fiber Patch Cord –Duplex (LC-LC)	Y	N	Y
1.5.6	Rack Mount LIU, 24/48 Port Duplex, fully loaded	Y	N	Y
1.5.7	RJ-45 Information Outlet, Dual Port	Y	N	Y
1.5.8	24 Port Copper Patch Panel, fully loaded	Y	N	Y
1.5.9	Cat 6 UTP RJ 45 Keystone Jack	Y	N	Y

		Compliance Requirement		
Sl. No.	Components	Annexure 17	Annexure 18	Data Sheet
1.5.10	Pigtail LC Type	Y	N	Y
1.5.11	Inline 48 Fibre Optic Splice Enclosure	Y	N	Y
1.5.12	Dome Type Outdoor Fibre Optic Splice Enclosure	Y	N	Y
1.6	40 MM HDPE Duct	N	N	N
1.7	Lightning Arrestor for Pole	N	N	N
1.8	Chemical Earthing for Lightning Arrestor	N	N	N
1.9	Chemical Earthing	N	N	N
1.10	IR Through Beam Sensors	Y	N	Y
1.11	2 Core X 1 Sq. MM Armoured Cable	Y	N	Y
1.12	3 Core X 1 Sq. MM Armoured Cable	Y	N	Y
1.13	3 Core X 2.5 Sq. MM Armoured Cable	Y	N	Y
1.14	Design Guidelines for all Poles	N	N	N
2	Specifications: Subsystem for RFID			
2.1	Fixed Long Range UHF RFID Reader			
2.1.1	Fixed Long Range UHF RFID Reader with Separate RFID Controller & External Antenna	Y	Y	Y
2.1.2	Fixed Long Range UHF RFID Reader with Integrated RFID Controller & Antenna	Y	Y	Y
2.2	Handheld RFID Reader	Y	Y	Y
2.3	FRP/MS Powder Coated Pole Mount JB			
2.3.1	FRP Pole Mount JB	Y	N	Y
2.3.2	MS Powder Coated Pole Mount JB	Y	N	Y
2.4	Network SPD, CAT6	Compliance as per Section 1		
2.5	CAT-6 Patch Cord	Compliance as per Section 1		
2.6	Cat6 Shielded Field Termination Plug	Compliance as per Section 1		
2.7	6 Meter GI Cantilever Pole for RFID Reader	N	N	Y
2.8	Lightning Arrestor for Pole	N	N	N
2.9	Chemical Earthing for Lightning Arrestor	N	N	N
3	Specifications: Sub-System for Boom Barrier			
3.1	Motorized Boom barrier with 3/3.5 Meter Arm, IP Based	Y	Y	Y
3.2	IR Through Beam Sensors	Compliance as per Section 1		
3.3	IR Beam Sensor Mounting Pole arrangement	N	N	Y
3.4	Polycarbonate/FRP/GRP JB, IP67/65, Min 75 X 75 MM	Compliance as per Section 1		
3.5	Manual Control Console (Boom Barrier, Traffic Signal)	Y	Y	Y
3.6	Network SPD, CAT6	Compliance as per Section 1		
3.7	CAT-6 Patch Cord	Compliance as per Section 1		
3.8	Cat6 Shielded Field Termination Plug	Compliance as per Section 1		
3.9	Signal Light (Red & Green)	Y	N	Y
3.10	Active LED Display with intelligent controller	Compliance as per Section 1		

		Compliance Requirement		
Sl. No.	Components	Annexure 17	Annexure 18	Data Sheet
3.11	Polycarbonate/FRP/GRP JB, IP67/65, Min 75 X 75 MM	Compliance as per Section 1		
3.12	Cat-6 UTP Outdoor Armored, Double Jacket Cable	Compliance as per Section 1		
3.13	2 Core X 1 Sq. MM Armored Cable	Compliance as per Section 1		
3.14	3 Core X 1 Sq. MM Armored Cable	Compliance as per Section 1		
3.15	40 MM HDPE Duct	N	N	N
4	Specifications: Sub-System for Weighbridge Integration			
4.1	IR Through Beam Sensors	Compliance as per Section 1		
4.2	Weighbridge Stabilizing Sensor Pole Arrangement	N	N	Y
4.3	Polycarbonate/FRP/GRP JB, IP67/65, Min 75 X 75 MM	Compliance as per Section 1		
4.4	Intelligent Controller / PLC Controller for Weighbridge			
4.4.1	Intelligent Controller for Weighbridge	Y	N	N
4.4.2	PLC Controller for Weighbridge	Y	N	N
4.7	RS232 Active Splitter	N	N	N
4.8	Active LED Display with intelligent controller	Compliance as per Section 1		
4.9	CAT-6 Patch Cord	Compliance as per Section 1		
4.10	Cat6 Shielded Field Termination Plug	Compliance as per Section 1		
4.11	Cat-6 UTP Outdoor Armored, Double Jacket Cable	Compliance as per Section 1		
4.12	2 Core X 1 Sq. MM Armored Cable	Compliance as per Section 1		
4.13	40 MM HDPE Duct	N	N	N
5	Specifications: Sub-System for Public Address System (PAS)			
5.1	Outdoor Horn Speaker, IP PA Amplifier, Control Desk, Armored Shielded PA Cable, PAS Central Software, PAS Central Server and PAS Operator Console – All from Same OEM	Y	Y	Y
5.2	Cat-6 UTP Outdoor Armored, Double Jacket Cable	Compliance as per Section 1		
5.3	Cat6 Shielded Field Termination Plug	Compliance as per Section 1		
5.4	40 MM HDPE Duct	N	N	N
6	Sub-System for CCTV			
6.1	2MP Bullet Camera	Y	Y	Y
6.2	2MP PTZ Camera	Y	Y	Y
6.3	PTZ Joystick	Y	Y	Y
6.4	2MP Dome Camera	Y	Y	Y
6.5	Network SPD, CAT6	Compliance as per Section 1		
6.6	CAT-6 Patch Cord	Compliance as per Section 1		
6.7	Cat6 Shielded Field Termination Plug	Compliance as per Section 1		
6.8	FRP/GRP Pole Mount JB, Min. (250HX250WX120D) MM	Compliance as per Section 1		
6.9	5/6 Meter GI Straight Pole for CCTV Cameras	N	N	Y
6.10	10 Meter GI Straight Pole for PTZ Cameras	N	N	Y

		Compliance Requirement		
Sl. No.	Components	Annexure 17	Annexure 18	Data Sheet
6.11	Lightning Arrestor for Pole	N	N	N
6.12	Chemical Earthing for Lightning Arrestor	N	N	N
6.13	Cat-6 UTP Outdoor Armored, Double Jacket Cable	Compliance as per Section 1		
6.14	40 MM HDPE Duct	N	N	N
7	Specifications: Sub-System for Speed Violation Detection (SVD)			
7.1	SVD cum ANPR Camera	Y	Y	Y
7.2	External IR Illuminator	Y	Y	Y
7.3	Local Processing Unit (LPU) for ANPR & SVD	Y	Y	Y
7.4	1Gbps Media Converter	Y	N	Y
7.5	Speed Detection Software Module	Y	Y	Y
7.6	ANPR Software Module	Y	Y	Y
7.7	Network SPD, CAT6	Compliance as per Section 1		
7.8	Power SPD, 230 VAC	Compliance as per Section 1		
7.9	6U Pole Mount JB	Y	N	Y
7.10	Rack Mount LIU, 12 Port Duplex, fully loaded	Compliance as per Section 1		
7.11	Cat6 Shielded Field Termination Plug	Compliance as per Section 1		
7.12	Cat-6 UTP Outdoor Armored, Double Jacket Cable	Compliance as per Section 1		
7.13	2 Core X 1 Sq. MM Armored Cable	Compliance as per Section 1		
7.14	Chemical Earthing	N	N	N
7.15	6 Meter Cantilever Pole with 2 Meter Arm	N	N	Y
7.16	Lightning Arrestor for Pole	N	N	N
7.17	Chemical Earthing for Lightning Arrestor	N	N	N
8	Specifications: Sub-System for Variable Message Display (VMD)			
8.1	VMD, Full Color with Controller	Y	Y	Y
8.2	Mounting Structure, 5 Meter, Unipole T-Type	N	N	Y
8.3	Outdoor Junction Box for UPS and Other items	N	N	Y
8.4	Network SPD, CAT6	Compliance as per Section 1		
8.5	Power SPD, 230 VAC	Compliance as per Section 1		
8.6	Lightning Arrestor for Pole	N	N	N
8.7	Chemical Earthing for Lightning Arrestor	N	N	N
8.8	Cat-6 UTP Outdoor Armored, Double Jacket Cable	Compliance as per Section 1		
8.9	3 Core X 2.5 Sq. MM Armored Cable	Compliance as per Section 1		
8.10	Chemical Earthing	N	N	N
8.11	40 MM HDPE Duct	N	N	N
9	Specifications: Field Network Switch Sub-System			
9.1	Industrial Grade PoE Switch, 8 Port, Redundant Power Input	Y	Y	Y
9.2	1G SFP Module for Uplink Ports – If required as per design	N	N	Y

		Compliance Requirement		
Sl. No.	Components	Annexure 17	Annexure 18	Data Sheet
9.3	SM Fiber Patch Cord –Duplex (LC-LC)	Compliance as per Section 1		
9.4	CAT-6 Patch Cord	Compliance as per Section 1		
10	Specifications: Sub-System for Local Control Room			
10.1	Desktop with Power Supply	To be provided by OMC.		
10.2	24" FHD Monitor	To be provided by OMC.		
10.3	Keyboard & Mouse	To be provided by OMC.		
10.4	Desktop QR Code Reader	Y	Y	Y
10.5	8 Port PoE Indoor Switch	Y	Y	Y
10.6	3" Thermal Printer	Y	N	Y
10.7	Wi-Fi AP	Y	N	N
10.8	RJ-45 Information Outlet, Dual Port	Compliance as per Section 1		
10.9	CAT-6 Patch Cord	Compliance as per Section 1		
10.10	ACDB with 1 RCCB, 6 DP MCB	Y	N	Y
10.11	PVC Perimeter Trunking complete with accessories	N	N	N
10.12	Modular type Switch Board,	N	N	N
11	Specifications: Sub-System for Outdoor Junction Box			
11.1	Outdoor Junction Box	Y	Y	Y
11.2	Electrical, Control & Signal Wiring complete with PDU, Switchboards, Raceways, Terminals, RCCD, MCB's, Networking elements and all other required accessories	Y	N	Y
11.3	PLC Controller	Y	N	N
11.4	DIN Rail Mount LIU, 6/12 Port Duplex	N	N	N
11.5	SM Fiber Patch Cord –Duplex (LC-LC)	Compliance as per Section 1		
11.6	Cat6 Shielded Field Termination Plug	Compliance as per Section 1		
11.7	Chemical Earthing	N	N	N
12	Specifications: Sub-System Ariel ADSS OFC Laying			
12.1	24 Core, ADSS OFC Cable	Compliance as per Section 1		
12.2	Poles for OFC Laying along with Installation	N	N	Y
12.3	Manhole	Y	N	N
12.4	Inline 48 Fibre Optic Splice Enclosure			
12.5	Dome Type Outdoor Fibre Optic Splice Enclosure	Compliance as per Section 1		
12.6	OFC ADSS Cable Assembly for Suspension & Tension accessories	N	N	N
13	Specifications: Sub-System for 2 KVA UPS			
13.1	2 KVA UPS with 1 Hours Backup on full Load	Y	N	Y
13.2	3.5 KVA, Portable/Stationary Silent DG, Diesel	To be provided by OMC		
14	Specifications: Sub-System for 5 KVA UPA			
14.1	5 KVA UPS with 1 Hours Backup on full Load	Y	N	Y
14.1	5 KVA Silent DG with AMF Panel, Stationary	To be provided by OMC		
15	Specifications: System Components			

		Compliance Requirement		
Sl. No.	Components	Annexure 17	Annexure 18	Data Sheet
15.1	A4 LaserJet, MFP, Monochrome	Y	N	N
15.2	3 Core X 2.5 Sq. MM Armored Cable	Compliance as per Section 1		
15.3	24 Core, ADSS OFC Cable	Compliance as per Section 1		
15.4	UHF RFID Tags, Tamper proof	N	N	Y
15.5	Desktop UHF RFID Reader & Writer	Y	N	Y
15.6	Video Wall, 55" Displays	Y	Y	Y
15.7	Video Wall Controller with Software	Y	Y	Y
15.8	Workstation with Dual Screen	Y	N	N
15.9	L3 Distribution Switch	Y	Y	Y
15.1	L2 Access Switch, 24 Port	Y	Y	Y
15.11	Servers (LMS Software, RFID, VMS)	Y	N	Y
15.12	Central Storage, Approx. 300 TB	Y	N	Y
15.13	42U Network Rack	Y	N	Y
15.14	24 Port Copper Patch Panel, fully loaded	Compliance as per Section 1		
15.15	CAT-6 Patch Cord	Compliance as per Section 1		
15.16	2MP Dome Camera	Compliance as per Section 6		
15.17	2MP PTZ Camera	Compliance as per Section 6		
15.18	Fire Alarm & Suppression System	Y	N	Y
15.19	Access Control System	N	N	N
15.20	Rodent Repellent System	N	N	N
15.21	Water Leak Detection System	N	N	N
15.22	CCC Interiors with Electrical & Networking Work	N	N	N
15.23	HVAC/Air Conditioning	To be Provided by OMC		
15.24	10 KVA UPS in N+1 Configuration with 30 Min Backup	Y	Y	Y
15.25	62.5 KVA Silent DG with AMF Panel, Stationary	To be Provided by OMC		
15.26	Public Address System Central Software	Compliance as per Section 5		
15.27	Variable Message Sign Board Central Software	Y	N	Y
15.28	Video Management System (VMS)	Y	Y	Y
15.29	Speed Violation Detection System Central Application	Compliance as per Section 7		
15.30	Anti-Virus Software	N	N	N
15.31	Network Management System	Y	N	N
16	6U Wall Mount Indoor Rack	Y	N	Y
17	Presentation Type Barcode Scanner	Y	N	Y
18	2-4 Meter Pole with housing for Barcode Scanner	N	N	N
19	Emergency Call Box	Y	Y	Y
20	Other Specifications			
20.1	Good Construction practices	N	N	N

5.1 **Technical Specifications: Common Components**

5.1.1 **FRP/GRP Pole Mount JB**

Sl.	Functional Requirement	
1	These boxes should be installed on each of the poles (except for the ones for OFC laying) wherever IP devices are coming to install the RFID readers, SPDs, local power supplies, terminals etc.	
2	These boxes can also be used to keep the Power Supplies for PTZ camera.	
3	The position of the box should be such that the CAT6 cable distance from the SPD to the field device is not more than 3 Meter in any case.	
4	All cable entries and exit should be strictly through PG9 or suitable size glands and should be properly done so that the cable is tightly held by the gland and that JB portion remains waterproof.	
5	All the cable entries should be from bottom only	
6	Proper earthing to be done for the SPDs which are being installed inside the boxes	
Sl.	**Technical Specifications**	
1	Junction Box should be manufactured with UL 746A or equivalent certified sheet molding compound (SMC)	
2	The Junction Boxes should have Polyurethane Formed-In-Place (FIP) gasket system and should be completely waterproof	
3	Should have waterproof SS304 snap latch hinged opaque cover (IP66) & Hinge/latch (IP66) as per IEC-50529	
4	Should be provided with DIN Rail and minimum 4 nos. PG9 glands from day 1	
5	Material	FRP/GRP
6	Size	As per requirement
7	UV Resistance	UV stabilized 2000 Hours
8	Protection	IP-66 to IEC-60529, IK10 to IEC-62262
9	Wall Thickness	4 MM or better
10	Flammability	UL 94 V-0.
11	Toxicity	Halogen free
12	Gasket	Polyurethane
13	Hinge, Latch & pole mounting arrangement	SS 304

5.1.2 **Network SPD for CAT6**

	Functional Requirement	
1	Network SPD to be used for all the IP Devices which are installed in outdoor environment even if not mentioned in the BOQ or elsewhere.	
2	Surge protection to be considered for both ends of the CAT6 cable.	
3	Distance of SPD from the field device should not be more than 3 Meter.	
4	SPDs to be properly earthed to the chemical earthing arrangement considered using suitable size conductor	
5	SPDs to be installed within the FRP JB considered as a part of the scope. Mounting should be on DIN rail only available within the FRP JB.	
	Technical Specifications	
1	Connection Type	Series connection
2	Application Type	10/100/1000 Mbps LAN
3	Transmission Speed	1 Gbps
4	Application	Secondary 8 wire category 6

5	Connector	RJ 45
6	Nominal Surge Current	Core to Core: 350 A (8/20 µs) Core to Ground: 2 KA (8/20 µs)
7	Pulse discharge current	1 kA
8	Maximum Continuous operating voltage	± 5 V DC (± 57 V DC / PoE+)
9	Enclosure	IP20
10	Temperature (Ambient)	-10°C to 55 °C or above
11	Voltage Protection level	Core – core ≤ 20 V Core – Earth ≤ 700 V
12	SPD Compliance	IEC 61643-21 or equivalent BIS
13	Approvals	CE, UL Listed or equivalent BIS

5.1.3 **Power SPD**

5.1.3.1 SPD for Sub Distribution Panel – 230 VAC Rated

	Functional Requirement	
1	Power SPD to be used on the 230 VAC input power line of all the outdoor JBs even if not mentioned in the BOQ or elsewhere.	
2	Surge protection to be considered for both ends of the cable.	
3	SPDs to be properly earthed to the chemical earthing arrangement considered using suitable size conductor	
	Technical Specifications	
1	IEC test Classification	II / T2 or BIS Equivalent
2	Technology	L-N: MOV Technology & N-PE: GDT Technology
3	Pluggability	Pluggable for Safe and Easy Maintenance and have provision of testing respective plugs for preventive periodic health monitoring.
4	Nominal Voltage Un	240 / 415 V AC (TN-S / TT)
5	Maximum Continuous Operating Voltage	335 V AC
6	Nominal Discharge Current	20 kA
7	Maximum Discharge Current	40 kA
8	Short Circuit Current rating ISCCR	25 kA
9	Voltage Protection Level Up (L-N)	≤ 1.5 kV
10	Temporary Over Voltage UT (L-N)	415 V AC (5s / Withstand Mode) or better
11	Temporary Over Voltage UT (N-PE)	1200 V AC (200ms / Withstand Mode) or better
12	Response time	L-N: ≤25ns N-PE: ≤100ns
13	Mounting	DIN Rail

5.1.3.2 SPD for Sensitive Electrical & Electronic Equipment – 24 VAC/VDC

	Functional Requirement	
1	SPD to be used wherever a 24 VAC/VDC power supply is being used to power up field even if not mentioned in the BOQ or elsewhere.	
2	SPDs to be properly earthed to the chemical earthing arrangement considered using suitable size conductor	
3	Distance of SPD from the field device should not be more than 3 Meter	
	Technical Specifications	
1	IEC test Classification	T3 or equivalent BIS
2	Pluggability	Pluggable for Safe and Easy Maintenance and have provision of testing respective plugs for preventive periodic health monitoring.
3	Nominal Voltage	24V
4	Maximum continuous voltage Uc	34 V AC
5	Nominal Discharge Current	1 kA
6	Maximum Discharge Current	4 kA
7	Voltage Protection Level Up (L-N)	≤0.2kV
8	Temporary Overvoltage UT (L-N)	50V AC (120 min /withstand mode) or better
9	TOV behaviour at UT (L-PE)	50V AC (120 min / withstand mode) or better
10	Response Time (tA) (L-N)	≤25ns
11	Short Circuit Current ratting ISCCR	10 kA AC
12	Mounting	DIN Rail

5.1.4 **Active LED Display with intelligent controller**

	Functional Requirement	
1	These displays would be used in the production site entry areas and weighbridge areas only	
2	These would provide various type of information to drivers	
	Technical Specifications	
1	Type	LED, Red Colour
2	LED Intensity	5500mCD or higher
3	Visibility Range	Greater than 20 Meter
4	Refresh Rate	50Hz-100Hz
5	Display	should display text and graphic messages using Light Emitting Diode (LED) arrays on SMD technology
6	Display Support	true type fonts and adjustable based on the Operating system requirement
7	Size	24” X 6” or above

5.1.5 Passive Components (Copper & Optical)

5.1.5.1 24 Core, ADSS OFC Cable

	Functional Requirement
1	All passive network passive components should be from the same OEM and OEM to provide 25 years performance warranty against this.

2	RJ-45 Field Termination plug as per specifications provided to be used with the field device and not standard RJ45 plug.
3	LAN/ OFC Cable should NOT be laid together with Power cable. If cables are laid using conduit, then there should be separate conduit for LAN cable and power cable.
4	All the cables to be tagged either with wrap around labels or Cable flags using machine labelling. Handwritten labels are not allowed.
5	Wherever cables are laid underground, it must be laid within HDPE duct as per the specifications provided.
6	All CAT6 patch cords to be used should be pre-fabricated ones and not locally made at site except for the cable connecting the SPD output to the field device as Field Termination plug to be used on the device side.
	Technical Specifications
1	The cable should be lightweight cable and all-dielectric construction with aramid yarn for safe installation in high voltage overhead power lines
2	Should fulfil the requirements of ISO.IEC 11801 - 2nd Edition, type OS2, ITU-T REC G 652D spec IEC 60794-1-2 or equivalent BIS
3	Fibre Count: 24
4	Loose tube count: 6
5	Fibber count per tube: 4-6 Fiber per tube
6	RoHS (2011/65/EU) or BIS Equivalent
7	Max. Attenuation: At 1310 nm <= 0.38 dB/km, At 1550 nm <=0.25 dB/km, At 1625 nm <=0.25 dB/km
8	Outer Sheath: UV Stabilized Polyethylene (PE) / HDPE
9	Central Strength Member: Fibre Reinforced Plastic (FRP) 2.3mm
10	Core Wrapping: Water Blocking Tape & Yarn
11	Cable Diameter (D): 13 - 14 ± 0.5 mm
12	Mass (Nominal): 150 kg/km or lower
13	Maximum Tensile Strength: 3000 N
14	Crush Resistance: 3000N/10 CM
15	Min. Bending Radius (during Installation): 20 D;D-Outer Diameter
16	Water Penetration: 1M Head, 3M Samples 24H
17	Operating Temperature range: -10°C to +55°C or better
18	All the cable and connection accessories are from the same OEM

5.1.5.2 Double Jacket CAT6 UTP Outdoor Cable

	Functional Requirement
1	All passive network passive components should be from the same OEM and OEM to provide 25 years performance warranty against this.
2	RJ-45 Field Termination plug as per specifications provided to be used with the field device and not standard RJ45 plug.
3	LAN/ OFC Cable should NOT be laid together with Power cable. If cables are laid using conduit, then there should be separate conduit for LAN cable and power cable.
4	All the cables to be tagged either with wrap around labels or Cable flags using machine labelling. Handwritten labels are not allowed.
5	Wherever cables are laid underground, it must be laid within HDPE duct as per the specifications provided.

6	All CAT6 patch cords to be used should be pre-fabricated ones and not locally made at site except for the cable connecting the SPD output to the field device as Field Termination plug to be used on the device side.
	Technical Specifications
1	4 Pair Cable with integral cross -member pair separator for uniform characteristic impedance.
2	Category 6 Unshielded Twisted 4 Pair 100 Ω cable shall be compliant with ANSI/TIA/EIA-568-C.2-1/ROHS Additional ISO/IEC 11801 2ndEd. Transmission Performance Specification for 4 Pair 100Ω Category 6 Cabling
3	Category 6 UTP cables shall extend between the work area location and its associated telecommunications closet and consist of 4 pair, UTP cable jacket.
4	Conductor: Solid Copper
5	Conductor Diameter: 0.574, ± 0.01mm (23AWG)
6	Inner Jacket: LSZH/ PE/ PVC
7	Outer Jacket: PE –Black, Anti-Rodent, LSZH/ PE/ PVC
8	Max Temperature: -10°C to +60°C
9	**Mechanical Test**
10	Should have Pulling force more than 10 Kg.
11	**Electrical Test**
12	Conductor Resistance: <9.38Ω /100m
13	Resistance Unbalance 5% Max
14	Mutual Capacitance: < 5.6nF/100m
15	Capacitance Unbalance: 330pF/100m.
16	Characteristic Impedance: 100 +15 Ω conductor

5.1.5.3 CAT-6 Patch Cord

	Functional Requirement
1	All passive network passive components should be from the same OEM and OEM to provide 25 years performance warranty against this.
2	LAN/ OFC Cable should NOT be laid together with Power cable. If cables are laid using conduit, then there should be separate conduit for LAN cable and power cable.
3	All the cables to be tagged either with wrap around labels or Cable flags using machine labelling. Handwritten labels are not allowed.
4	All CAT6 patch cords to be used should be prefabricated ones and not locally made at site except for the cable connecting the SPD output to the field device as Field Termination plug to be used on the device side.
	Technical Specifications
1	Standardization: Compliant with Cat.6, Class E requirements: ISO/IEC 11801 2nd Edition Compliant with Cat.6 component standards IEC 60603-7-4 and 60603-7-5
2	Number of conductors: 8
3	Stranding: 24 AWG
4	Cable overall diameter: 6.0 ± 0.2mm max
5	Tube / Wire type: stranded conductor
6	Insulation: solid polyolefin
7	Plug: Feature cable retention, with enhanced pull strength. The plug is designed to ensure precision wire placement, providing superior performance.
8	Cat 6 patch cord plug to have round cable holder and strain relief boot to avoid bending

9	Jacket: LSZH with different colour options
10	Plug should be featured with colour ring options
11	Plug should have high repeatability cross talk performance
12	Should be ETL verified or equivalent BIS

5.1.5.4 Cat6 Field Termination Plug

	Functional Requirement
1	All passive network passive components should be from the same OEM and OEM to provide 25 years performance warranty against this.
2	RJ-45 Field Termination plug as per specifications provided to be used with the field device and not standard RJ45 plug.
3	LAN/ OFC Cable should NOT be laid together with Power cable. If cables are laid using conduit, then there should be separate conduit for LAN cable and power cable.
4	All the cables to be tagged either with wrap around labels or Cable flags using machine labelling. Handwritten labels are not allowed.
5	Wherever cables are laid underground, it must be laid within HDPE duct as per the specifications provided.
6	All CAT6 patch cords to be used should be pre-fabricated ones and not locally made at site except for the cable connecting the SPD output to the field device as Field Termination plug to be used on the device side.
	Technical Specifications
1	Standardization: Compliant with Cat.6, Class EA requirements: ISO/IEC 11801 2nd Edition backward Compliant with Cat.6 component standards IEC 60603-7-4 and 60603-7-5
2	Cable: UTP/STP
3	Number of conductors: 8
4	RJ45 Plug Metal covers/ housing: Zinc die-casting with nickel/ gold plated or Zinc Alloy
5	RJ45 Plug contacts: Phosphor bronze with nickel/ gold plated
6	RJ45 Jack Durability: 750 mechanical cycles or better as per IEC 60603-7-81
7	Operating Temperature: -10 degree C to +55 degree C
8	UL, RoHS Compliant

5.1.5.5 SM Fiber Patch Cord –Duplex (LC-LC)

	Functional Requirement
1	All passive network passive components should be from the same OEM and OEM to provide 25 years performance warranty against this.
2	All the cables to be tagged either with wrap around labels or Cable flags using machine labelling. Handwritten labels are not allowed.
3	All CAT6/ Fibre patch cords to be used should be pre-fabricated ones and not locally made at site except for the cable connecting the SPD output to the field device as Field Termination plug to be used on the device side.
	Technical Specifications
1	Cable Jacket: Low Smoke Zero halogen
2	It should be available with UPC and APC Connector
3	Compliances: RoHS, UL/ UTL/ BIS Equivalent

4	Fire resistance comply with low smoking (IEC 61304) Halogen free (IEC 60754-1) Flame retardant (IEC 60332.1C)
5	Tensile Strength - 70N or better
6	Connector durability more than 450 cycles

5.1.5.6 Rack Mount LIU, 24/48 Port Duplex, fully loaded

	Functional Requirement
1	All passive network components should be from the same OEM and OEM to provide 25 years performance warranty against this.
2	All the cables to be tagged either with wrap around labels or Cable flags using machine labelling. Handwritten labels are not allowed.
3	All CAT6/ Fibre patch cords to be used should be pre-fabricated ones and not locally made at site except for the cable connecting the SPD output to the field device as Field Termination plug to be used on the device side.
	Technical Specifications
1	Fiber optic patch panel: Fiber optic patch panel FMS Termination Drawer should have sufficient slots to accommodate 6/12/24 Port LC Adaptor Plates to meet the requirement of maximum 48 ports
2	Should have Slide type drawer structure
3	Height: 1 U Mounting (12 & 24 Ports)
4	Material: Cold Rolled Steel in surface coated by electrostatic epoxy powder
5	Slots: FMS should have sufficient slots to accommodate adaptor plates
6	Empty Slots of FMS should be covered with blank plates.
7	Splice Tray: Splice Tray of ABS, comply with UL 94V2 material should be supplied with LIU.
8	6/12/24 Port LC/SC Type Adaptor Plates (Single mode)
9	The adaptor plate should be pre-loaded with LC/SC Type Single mode Duplex Adaptors.
10	Port Density :6/12/24 LC/SC Single mode Ports
11	All LC adapters should be duplex type with shutter for protection. Adapters should be snap mount for easy insertion and removal.
12	Compliance: RoHS, UL or BIS Equivalent

5.1.5.7 RJ-45 Information Outlet, Dual Port

	Technical Specifications
1	Should be Keystone-type Faceplates available with 2 port configurations
2	Should be featured with shutter options, the screws not to be visible
3	Should support Work with both Flush and Wall mount box
4	Should support Operating Temperature: -10～+55; Storage Temperature: -10～+60;
5	Material: ABS, UL 94V-0; Spring: SUS304; Surface Finish: Polished
6	To be populated with 2 nos. Cat 6 UTP RJ 45 Keystone Jack as per specifications provided

5.1.5.8 24 Port Copper Patch Panel, fully loaded

	Technical Specifications
1	Patch panel should be modular design, to be populated with 24 nos. Cat 6 UTP RJ 45 Keystone Jack as per specifications provided

2	Each Ports should be with individual spring loaded shuttered/ hinge type cover for dust protection. Each port (jack) and individual replaceable.
3	Material: Should Be made of cold rolled steel and conform to TIA / EIA 568-C.2 Component Compliant
4	Should have integral rear cable management shelf.
5	Commercial Standards: ANSI/TIA 568-C.2 and IEEE 802.3bt Component Compliant FCC Subpart F 68.5 Compliant IEC-603-7 Compliant ISO 11801 Class E Compliant ETL Verified for Category 6 Component Compliance Or BIS Equivalent

5.1.5.9 Cat 6 UTP RJ 45 Keystone Jack

	Technical Specifications
1	RJ45 Jack of Category 6, for the establishing of transmission channels of class E with up to 4 plugged connections, complies with Category 6 requirements of the standards ISO/IEC 11801:2nd edition, EN 50173-1, DIN EN 50173-1: 2002 as well as ANSI/TIA 568-C.2 and IEEE 802.3bt compliant, de-embedded tested in acc. with IEC 60603-7 (603-7), interoperable and backwards compatible with Cat.5e and Cat.5. BIS Equivalent Compliance shall be considered.
2	Suitable for 1GBase-T applications in acc. with IEEE 802.3an as per industry standard
3	Compatible with RJ standard plugs (RJ11, RJ12, RJ45), PCB- and tool-based connection of installation cables AWG 24 – 22 (0.5 mm – 0.65 mm) and flexible cables AWG 26/7 – AWG 22/7.
4	IDC termination should feature nil crossover in acc. with EIA/TIA 568-A/B, gold-plated bronze contacts for >750 mating cycles, >200 insertion cycle
5	Material: RoHS complied
6	Housing material: Polycarbonate
7	Should be available with or without dust protection feature
8	Certified by 3P/ Intertek/ OSHA / UL / CE / Nationally Recognized Testing Laboratory
9	Electrical parameters of Keystone jack should be suitable as per the CAT6 cable selected

5.1.5.10 Pigtail LC Type

	Technical Specifications
1	Type: 9/125-micron or better fibre performance
2	Jacket Material: LSZH complying to IEC 61034-1 & 2, IEC-60332-1, IEC-60754-1 & 2
3	Operating Temperature: -10°C to +55°C
4	Connector Insertion Loss: 0.30dB (Max)
5	Attenuation: 1310/1550: $\leq$0.36 / $\leq$0.22 dB/KM

5.1.5.11 Inline 48 Fibre Optic Splice Enclosure

Functional & Technical Requirements

Sl.	Functional Requirement
1	To be used for Straight through application for jointing of Optical Fibre Cable.
2	Should be mounted on the pole using accessories

3	All passive network components along with accessories should be from the same OEM and OEM to provide 25 years performance warranty against this.

	Technical Specifications	
1	Type	Fiber Optic Joint closure shall be environmentally sealed enclosure for fiber management in the outside environment.
2	Size options	Shall be available for 48 fiber splice options.
3	Cable inlets	2 IN/ 2 OUT cable inlet options shall be provided.
4	Splice trays	4 nos. and splice trays to be hinged for access to any splice without disturbing other trays
5	Cable Handling	Closure shall be compatible with most common cable types.
6	Environment	The closure shall be suitable for usage in aerial, pedestal and underground environments. Shall be at least IP 65 rated for outdoor usages.
7	Compliant	Must be ROHS or BIS Equivalent

5.1.5.12 Dome Type Outdoor Fibre Optic Splice Enclosure

Functional & Technical Requirements

Sl.	Functional Requirement
1	To be used for Straight through or branching application near the JB
2	Can be kept in the Manhole or on the pole using accessories
3	All passive network components along with accessories should be from the same OEM and OEM to provide 25 years performance warranty against this.

	Technical Specifications	
1	Type	Fiber Optic Joint closure shall be of single ended environmentally sealed enclosure for fiber management in the outside environment.
2	Size options	Shall be available for 24 fiber /48 fiber splice options as per site conditions.
3	Sealings	Base and dome to be mechanically sealed with a clamp and O-ring system. Seals shall be easily operable and re-usable.
4	Cable inlets	Multiple cable inlet options as per site conditions shall be provided.
5	Splice trays	Splice trays to be hinged for access to any splice without disturbing other trays
6	Cable Handling	Closure shall be compatible with most common cable types.
7	Environment	The closure shall be suitable for usage in aerial, pedestal and underground (up to 5 meters) environments. Shall be at least IP 65 rated for outdoor usages.
8	Compliant	Must be ROHS compliant

5.1.6 40 MM HDPE Duct

Functional & Technical Requirements

	Functional Requirement
1	Wherever cables are laid underground, it must be laid within HDPE duct as per the specifications below.
2	LAN/ OFC Cable should not be laid together with Power cable. If cables are laid using conduit, then there should be separate conduit for LAN cable and power cable.

3	When taking multiple cables through a single HDPE Duct it should be ensured that there is always space available to take one more additional cable through it if required later.	
	Technical Specifications	
Sl.	**Parameter**	**Specification**
1	Outer Diameter	As per design considering passive components to be used in Project. To be industry standard as applicable.

5.1.7 Lightning Arrestor for Pole

Functional Requirements

Sl.	Functional Requirement
1.	Lightning arrestor to be installed on the CCTV and RFID poles.
2.	Lightning arrestor should be installed using an insulator on the pole so that there is no direct contact of it with the pole.
3.	Lightning arrestor to be grounded using dedicated earthing cable to the chemical earthing considered for lightning arrestor

Technical Specifications

Sl.	Parameters	Minimum Requirements
1	**Brush**	
	Material	Pure Copper/Copper Coated
2	**Body**	
	Material	Pure Copper/Copper Coated
3	Provides protection for medium height metal structures with high lightning risk	
4	Should Provide Body electropolished corrosion protection	
5	All specifications to be as per industry standard	

5.1.8 Chemical Earthing for Lightning Arrestor

Functional Requirements

Sl.	Functional Requirement
1.	To be provided near all the poles which have lightning arrestors installed
2.	Ground resistance value should be less than 5 Ohm
3.	Minimum 25 X 3 MM GI Strip to be used for ground connection to Pole

Technical Specifications

Sl.	Parameters	Minimum Requirements
1	Height	3000 mm
2	Material	GI Rod
3	Diameter	25 mm
4	Pointing	Pointed from Bottom
5	Earthing Should have GI rods meeting international standards for earthing	
6	Having electrical conductivity and corrosion resistance	
7	Should have Durable mild FRP/PP cover and body	

8	Compliant: ISI or equivalent
9	All specifications to be as per industry standard

5.1.9 Chemical Earthing

Functional Requirements

Sl.	Functional Requirement
1	To be provided near all the JBs which houses networking and system components
2	Ground resistance value should be less than 1 Ohm
3	Minimum 25 X 6 MM GI Strip to be used for ground connection to JB

Technical Specifications

Sl.	Parameters	Minimum Requirements
1	Height	3000 mm
2	Material	Copper Bonded GI Rod
3	Diameter	25 mm
4	Coating	90-200 Microns
5	Pointing	Pointed from Bottom
6	Earthing Should have Copper bonded rods meeting international standards for earthing	
7	Having electrical conductivity and corrosion resistance	
8	Should have Durable mild FRP/PP cover and body	
9	Compliant: ISI or equivalent	

5.1.10 IR Through Beam Sensors

Sl.	Functional Requirement
1	These are to be used where boom barriers are installed for identifying presence of objects
2	These will also be used in the weighbridge stabilizing sensor assembly
3	These shall be mounted inside special mounting arrangements whose specifications are provided in respective sections.
	Technical Specifications
1	Through beam IR Sensor
2	Range: Minimum 10 Meter
3	Sensor IP Ratings: IP67
4	Indicators: 2 LED Indicators on sensor top (Green & Amber)
5	Output Configuration: Solid-state complementary (SPDT), NPN or PNP
6	Construction: ABS Housing / Polycarbonate
7	Operating Conditions: −20 °C to +55 °C and 90% at +50 °C maximum relative humidity (non-condensing)

5.1.11 2 Core X 1 Sq. MM Armoured Cable

	Technical Specifications	
1	No of Cores	2 Cores
2	Size in Sq.mm.	1.0

3	Voltage Grade	1100 V
4	Operating Temp (max) in Deg. C	70
5	Conductor Material Properties	
	(i) Material	Electrolytic Grade Copper Stranded Class-2 to IS 8130 / 1984
	(ii) Dia. Of strands (mm)Approx.	0.25
6	Insulation Material Properties	
	(i) Material	The extruded PVC COMPOUND TYPE A as Per IS 5831
	(ii) Nominal Thickness in mm Approx.	0.8 mm
	(iii) Core Colour	Any
7	Armouring	
	(i) Material	Galvanized Steel Wire (as per IS-3975)
	(ii) Size of Armour (mm) Approx.	0.9
8	Rip cord	Non-metallic rip cord shall be provided inner sheath
9	Std. length of cable per drum (M)	250/500/1000 ±10%

5.1.12 3 Core X 1 Sq. MM Armored Cable

	Technical Specifications	
1	No of Cores	3 Cores
2	Size in Sq.mm.	1.0
3	Voltage Grade	1100 V
4	Operating Temp (max) in Deg. C	70
5	Conductor Material Properties	
	(i) Material	Electrolytic Grade Copper Stranded Class-2 to IS 8130 / 1984
	(ii) Dia. Of strands (mm)Approx.	0.25
6	Insulation Material Properties	
	(i) Material	The extruded PVC COMPOUND TYPE A as Per IS 5831
	(ii) Nominal Thickness in mm Approx.	0.8 mm
	(iii) Core Colour	Any
7	Armouring	
	(i) Material	Galvanized Steel Wire (as per IS-3975)
	(ii) Size of Armour (mm) Approx.	0.9
8	Rip cord	Non-metallic rip cord shall be provided inner sheath
9	Std. length of cable per drum (M)	250/500/1000 ±10%

5.1.13 3 Core X 2.5 Sq. MM Armoured Cable

	Technical Specifications	
1	No of Cores	3 Cores
2	Size in Sq.mm.	2.5
3	Voltage Grade	1100 V

4	Operating Temp (max) in Deg. C	70
5	Conductor Material Properties	
	(i) Material	Electrolytic Grade Copper Stranded Class-2 to IS 8130 / 1984
	(ii) Dia. Of strands (mm)Approx.	0.25
6	Insulation Material Properties	
	(i) Material	The extruded PVC COMPOUND TYPE A as Per IS 5831
	(ii) Nominal Thickness in mm Approx.	0.8 mm
	(iii) Core Colour	Any
7	Armouring	
	(i) Material	Galvanized Steel Wire (as per IS-3975)
	(ii) Size of Armour (mm) Approx.	0.9
8	Rip cord	Non-metallic rip cord shall be provided inner sheath
9	Std. length of cable per drum (M)	250/500/1000 ±10%

5.1.14 Design Guidelines for all Poles

NOTE: This section is applicable for all kind of GI Poles mentioned in the RFP if not otherwise mentioned specifically.

Design Codes: -

Design should comply to following Standards/Codes/ and Documents

- Design Code - EN40
- Deflection Criteria should be in line with EN40
- Basic Wind Speed shall be as per IS875-III

Material Grades: -

I. Pole shaft: GRADE 50 or Equivalent
II. Base plate: A572-50 or Equivalent
III. Anchor bolts: EN8 Grade

Type of Foundation

Manufacturer of Conical poles should design foundation with appropriate Grade of concrete should on the soil test report (SBC) report provided by the execution agency or minimum 10t/SBC for foundation and Anchor Bolts design. Steel anchor bolts are embedded in the foundation. Base plate is welded at bottom of pole shaft and pole is fixed to foundation through base plate to anchor bolts connection.

5.2 Specifications: Subsystem for RFID

5.2.1 Fixed Long Range UHF RFID Reader

Bidders are free to choose fixed long range UHF RFID Reader with separate Controller and Antenna or Integrated Controller and Antenna. Accordingly, compliances 2.1.1 or 2.1.2 to be filled and submitted.

5.2.1.1 Fixed Long Range UHF RFID Reader with Separate RFID Controller & External antenna

	Functional Requirement	
1	SI can use either RFID Controller with Antenna or Integrated RFID Reader as per their design.	
2	UHF RFID Reader/Antennae to be installed on a 6-Meter-high cantilever pole	
3	It should be capable of reading the RFID tag placed on the windshield of vehicle from this distance	
4	It is to be used to identify the vehicle reaching the point	
5	In case RFID Controller is being used then the controller to be placed inside a weatherproof JB and near to the antennae	
	Technical Specifications	
1.	Read Range	10 Meter or More
2.	Ports	Should support 4 or more mono static ports per reader with configurable dynamic channel switching
3.	Processor	600 MHz or better
4.	Memory	Persistent, Flash 128 MB; DRAM 128 MB or better, shall be able to hold at least 100,000 Tag data records
5.	Application	Dense tag environments
6.	Reader Housing	IP-53 or better
7.	Connectivity	10/100 BaseT Ethernet – RJ45 Optionally DB9/DB25/USB
8.	Operating Temp	-10°to +55° C
9.	ISO standard	ISO 18000-6C (EPC Class 1 Gen 2)
10.	Power Output	+10dBm to +33dBm or better
11.	Specific Absorption Ratings (Human Safety)	complies to FCC 47CFR2: OET Bulletin 65; EN 50364
12.	Humidity	5% to 95% non-condensing
13.	Reading accuracy on Continuous power “ON”	The device should have designed to be powered on throughout its life. The device should not hang or restart automatically due to whatever reason.
14.	Regulatory compliances	Safety: Safety UL 60950-01, IEC 60950-1, EN 60950-1 Other: ROHS, WEEE
	ANTENNA	
15.	Accessories	Antenna (Outdoor), mounting bracket and other installation accessories.
16.	Connectors	2xType N female for bistatic or 1x Type N female for monostatic
17.	Frequency and Gain	As permitted by regulatory in India
18.	3db Beam Width	70° in both phases or better
19.	Max Power	10 W or higher
20.	Axial Ratio	1dB typical
21.	Operating Temperatures	-10°C to +55°C
22.	Sealing	IP-67 or better
	RFID Reader Software	

23.	Software	From Same OEM

5.2.1.2 Fixed Long Range UHF RFID Reader with Integrated RFID Controller & antenna

	Functional Requirement	
1	SI can use either RFID Controller with Antennae or Integrated RFID Reader as per their design.	
2	UHF RFID Reader/Antennae to be installed on a 6-Meter-high cantilever pole	
3	It should be capable of reading the RFID tag placed on the windshield of vehicle from this distance	
4	It is to be used to identify the vehicle reaching the point	
5	In case RFID Controller is being used then the controller to be placed inside a weatherproof JB and near to the antennae	
	Technical Specifications	
1.	Read Range	10 Meter or More
2.	Ports	Integrated Unit
3.	Processor	Dual Core ARM7 Cortex-A9 or better
4.	Memory	4 GB eMMC (Flash) / 2 GB (RAM)
5.	Application	Dense tag environments
6.	Reader Housing	IP-65 or better
7.	Connectivity	Gigabit Ethernet (RJ45)
8.	Operating Temp	-10°C to +55°C
9.	ISO standard	ISO 18000-6C/63 - EPC C1G2
10.	Power Output	10 - 30 dBm, 1 dBm steps or better
11.	Specific Absorption Ratings (Human Safety)	FCC or equivalent
12.	Humidity	5% to 95% non-condensing
13.	Reading accuracy on Continuous power “ON”	The device should have designed to be powered on throughout its life. The device should not hang or restart automatically due to whatever reason.
14.	Regulatory compliances	FCC, ETSI, RoHS, WEEE
	ANTENNA	
15.	Accessories	Integrated Antennae
16.	Frequency and Gain	865 - 867 MHz or better
17.	3db Beam Width	H : 40°, V : 40° or better
	RFID Reader Software	
18.	Software	From Same OEM

5.2.2 Handheld RFID Reader

	Functional Requirement	
1	To be used for local operations in necessary conditions	
2	The Android terminal should connect to the network through the Wi-Fi APs being installed in required areas	
3	This also connects to the local printer via Bluetooth for receipt printing	
4	The application client shall be installed on the android terminal	
	Technical Specifications	
1	RFID Standards	EPC Class 1 Gen 2 / ISO 18000- 6c, ISO 18000-63

2	Read Rate	As fast as 700+ tags/sec
3	Nominal Read Range	20+ ft./ 6+ m
4	Frequency Range/ RF Output	865 - 868 MHz / 920 - 925 MHz / 902 - 928 MHz
5	Drop Specification	Minimum 4 ft./1.2 Meter
6	Operating Temp.	-10°C to 55°C
7	Storage Temp.	-10°C to 60°C
8	Sealing	IP52 or better
9	Charging	Cradle type charger from the same OEM to be provided
	Android Data Terminal	
10	Compatibility	Should be from same OEM as that of the RFID for complete compatibility
11	Display	5.0 in. colour HD (1280 x 720) or better; LED backlight;
12	Power	Rechargeable Li-Ion Standard battery: ≥ 3300 mAh/12.54 Wh
13	Expansion Slot	One 32 GB micro-SD slot or better
14	SIM	Optional 1 SIM slot
15	Network Connections	WLAN, WPAN, USB 2.0 hi-speed (host and Client) or integrated
16	Memory	2 GB RAM/16 GB Flash memory or better
17	Sealing	IP65 or better
18	Charging	Cradle type charger from the same OEM to be provided
	RFID Reader Software	
19	Software	From Same OEM

5.2.3 **FRP/MS Powder Coated Pole Mount JB**

Functional Requirements

Sl.	Functional Requirement
1.	These JBs are be installed on each of the poles for RFID Readers. RFID Readers would be kept within these JBs.
2.	SPDs also to be installed within this JB.
3.	The position of the box should be such that the CAT6 cable distance from the SPD to field device is not more than 3 Meter in any case.
4.	All cable entries and exit should be strictly through PG9 or suitable size glands and should be properly done so that the cable is tightly held by the gland and that JB portion remains waterproof.
5.	All the cable entries should be from bottom only
6.	Proper earthing to be done for the SPDs which are being installed inside the boxes
7.	The size of the JB needs to be decided by the bidder based on the size of the RFID reader and space required for other components like SPD, terminals etc.

Bidders are free to select FRP Or Power Coated JB. Accordingly compliances to be provided

5.2.3.1 FRP Pole Mount JB

In case FRP JB is used then the technical specification provided under “Specifications: Common Components” of the FRP JB and approved make to be used

5.2.3.2 MS Powder Coated Pole Mount JB

	Technical Specifications	
i)	Protection	IP-55 or better
ii)	Front Door	Lockable steel door with gasket sealing
iii)	Cable Entry	Through PG IP Glands
iv)	Construction	Welded Galvanized Steel Construction, minimum 1.2mm Thick
v)	Mounting	Pole Mount arrangement to be provided to suit Pole Diameter

5.2.4 **Network SPD, CAT6**

Refer section "Specifications: Common Components" for relevant specification

5.2.5 **CAT-6 Patch Cord**

Refer section "Specifications: Common Components" for relevant specification

5.2.6 **Cat6 Shielded Field Termination Plug**

Refer section "Specifications: Common Components" for relevant specification

5.2.7 **6 Meter GI Cantilever Pole for RFID Reader**

Design Guidelines:

Design Codes: -

Design should comply to following Standards/Codes/ and Documents

- Design Code - EN40
- Deflection Criteria should be in line with EN40
- Basic Wind Speed shall be as per IS875-III

Material Grades: -

IV. Pole shaft: GRADE 50 or Equivalent
V. Base plate: A572-50 or Equivalent
VI. Anchor bolts: EN8 Grade

Type of Foundation

Manufacturer of Conical poles should design foundation with appropriate Grade of concrete should on the soil test report (SBC) report provided by the execution agency or minimum 10t/SBC for foundation and Anchor Bolts design. Steel anchor bolts are embedded in the foundation. Base plate is welded at bottom of pole shaft and pole is fixed to foundation through base plate to anchor bolts connection.

	Technical Specifications
1.	The Conical/Polygonal pole and cantilever arm of 2 Meter should be designed to with stand maximum wind speed as per IS: 857 (Minimum 50 m/Sec). Certificate for the structural integrity of the pole shall be submitted to justify the pole dimensions.
2.	Pole shaft and cantilever have conical/polygonal cross section and shall be preferably continuously tapered with single longitudinal welding.

3.	Pole shaft shall be provided with a grade flange plate of suitable thickness with provision of fixing suitable no. of foundation bolts. This base plate shall be filleted welded to the pole shaft at two locations i.e., from inside & outside.
4.	Conical/Polygonal pole shall have approximately 500 MM door opening length at the elevation of 500 mm from base plate. The door shall be vandal resistant and shall be weatherproof to ensure safety of electrical connections inside the pole. The door shall be flush fit with locking facility. The pole shall be additionally reinforced with welded steel section, so that the section at door is unaffected and undue bucking of the cut section is prevented.
5.	Material of construction shall be:
A	Conical/Polygonal pole shaft - HT Steel Conforming to grade S355 with minimum plate thickness of 3 MM
B	Conical/Polygonal cantilever arm shaft - HT Steel Conforming to grade S355 with minimum plate thickness of 2.5 MM
C	Pole base plate - Fe 410 Conforming to IS 226/IS 2062 with minimum thickness of 16 MM
D	Pole foundation Bolt- EN 8 grade, GI
6.	Pole shall be hot dip galvanized as per IS 2629/IS2633/IS 4759 slandered with average coating thickness of 86 Micron. The galvanizing shall be done in single dipping.
7.	The pole shall be installed on a precast or cast in- SITU RCC foundation on studs with nuts & washers and with a set of four foundation bolt for greater rigidity basis the soil bearing test report of the actual site.

5.2.8 **Lightning Arrestor for Pole**

Refer section “Specifications: Common Components” for relevant specification

5.2.9 **Chemical Earthing for Lightning Arrestor**

Refer section “Specifications: Common Components” for relevant specification

5.3 **Specifications: Sub-System for Boom Barrier**

5.3.1 **Motorized Boom barrier with 3/3.5 Meter Arm, IP Based**

	Functional Requirement	
1	Boom barriers are being used for secured entry and exit of vehicles	
2	Each boom barrier will have 2 sets of IR through beam sensors on two separate sets of mounting arrangements as per specifications provided in this section	
3	Traffic light aspects shall provide visual indication to the drivers. System will turn the green light on once driver is allowed to enter through the boom barrier and the boom barrier will open.	
4	Boom barrier shall be IP based and to be monitored through NMS in the control room	
5	Manual push button station be provided from the same OEM for manual operation	
	Technical Specifications	
1.	Application	Outdoor
2.	IP Rating & Wind Speed Rating	IP 54
3.	Housing	**Barrier Housing Unit:** Powder Coated **Boom:** Powder Coated White with Red reflective strips preferably with SS304 / SECCbase trim

4.	Housing Dimension	Modular
5.	Protection	All Housing and internal parts shall be rust & corrosion free metals or alloys of high strength with suitable Epoxy coating as applicable.
6.	Boom Specifications	Boom should be preferably connected with Barrier in two parts to save the Barrier main unit with swing-away feature in case vehicle hit the Boom Arm.
7.	Intelligence	The barrier shall use a **BLDC High Torque** Drive in combination with standard interfaced Controller. It shall offer easy control setting. Possibility for integration via standard user interfaces.
8.	Interfaces	TCP/IP and RS485 interfaces
9.	Loop Detector	Should come with minimum 2 integrated Loop Detector
10.	Digital Inputs	Minimum 4
11.	Digital Outputs	Minimum 4
12.	Relay Outputs	At least 6
13.	Compliance & Safety	Compliance to CE. **Adherence to Safety Requirements of the** EMC Directive 2004/108/EC, Low Voltage Directive 2006/95/EC or better and The basic requirements of the Machinery Directive 2006/42/EC or better
14.	Power Supply	230+/- 10% VAC, 50 Hz.
15.	Maximum Power Consumption	Less than 310 watts
16.	Opening & Closing Time	<=1.0 seconds for Boom Length up to 3 Meters <=3.0 seconds for Boom Length Between 3 to 3.5 Meters
17.	Impact Detection	Should have in built impact detection feature so that the boom retracts in case impact is detected when closing
18.	Operating Temperature	0 Degree Celsius to + 55 Degree Celsius
19.	Safety	S/W for Detection of Presence of Vehicle in Loop or in the path of Infrared Safety Sensors available. Loops or Sensors to be used to prevent barriers from closing on the vehicle.
20.	Duty Cycle	100%. Barriers should work 24 Hrs*7 *365 days without any resting time.
21.	Integration	Shall function in integration with Smart cards, proximity reader-based access control systems etc
22.	Performance Requirement	MCBF- 5 Mil Cycles MTBF- 50,000 Hours MTTR- 30 Minutes
23.	Certificates Required	TUV certificate For Opening & Closing time Certification for Ingress Protection EMC Test report

5.3.2 **IR Through Beam Sensors**

Please Refer section “Specifications: Common Components” for relevant specification

5.3.3 **IR Beam Sensor Mounting Pole arrangement**

Functional & Technical Requirements

S.No	Functional Requirement
1	The IR through beam sensors is to be mounted inside these assembly so that the sensor remains inside and chances of damage to the sensor are avoided.
2	Two sets of these mounting arrangements to be used with each boom barrier, one set adjacent to the boom barrier and one after the boom barrier.
3	Proper fixing arrangement of the mounting arrangements to be done so that it is rigid and not prone to vibration and misalignment as otherwise the sensing would not happen.
	Technical Specifications
1.	Should be made up of 2-Meter-high MS/GI Square Tube of minimum size of 72X72 MM and 2 MM thick.
2.	There should be appropriately sized square baseplate of minimum thickness of 8 MM with 20 Deg. angle adjustment.
3.	The IR Beam Sensor shall be first mounted on a small mounting assembly with a 2-axis adjustable clamp which would help during the positioning of the sensor.
4.	The above-mentioned arrangement should then be placed inside the pole by cutting the section of the pole so that the sensor remains inside the pole and would not be damaged in case something hits the pole.
5.	The complete structure should be powder coated with exterior Grade PU coat.
6.	All the wires to be taken from inside hollow structure of the tube so that the wires are not visible from outside.
7.	The top of the mounting pole must be sealed, and it should not be left hollow from top.

5.3.4 **Polycarbonate/FRP/GRP JB, IP67/65, Min 75 X 75 MM**

This is to be used on the "IR Beam Sensor Mounting Pole arrangement" for doing the wire terminations. Suitable size PG glands to be used for cable entry.

Please Refer section "Specifications: Common Components" for relevant specification

5.3.5 **Manual Control Console (Boom Barrier, Traffic Signal)**

- A manual control station housing manual buttons to operate the boom barrier and traffic lights.
- The manual station should be from the same OEM supplying the boom barriers.

5.3.6 **Network SPD, CAT6**

Please Refer section "Specifications: Common Components" for relevant specification

5.3.7 **CAT-6 Patch Cord**

Please Refer section "Specifications: Common Components" for relevant specification

5.3.8 **Cat6 Shielded Field Termination Plug**

Please Refer section "Specifications: Common Components" for relevant specification

5.3.9 **Signal Light (Red & Green)**

Sl.	Functional Requirement
1.	Traffic lights in pair of "Red", "Amber" and "Green" to be installed before each boom barrier on

	the cantilever pole being used for mounting the RFID reader as per specifications provided in this sub section
2.	The lights to be driven by the system automatically once the vehicle is allowed to enter
3.	Even in case manually boom barrier is opened through the manual remote then also the traffic lights to work
4.	Both the Lights should preferably form a single unified unit for better aesthetics.

	Technical Specifications	
1.	Description-Two colour – Red and Green	Stop/Go -Red and Green Traffic Light
2.	Type	High Flux
3.	Housing	200MM/300MM-Standard
4.	LED	High bright LED's max up to 4 should be used as central source.
5.	Power consumption	14W or better
6.	MTBF	should be > 50,000 hours
7.	Visibility	100 meter in normal conditions
8.	Operating Temperature	0°C~+55°C
9.	Power input	24VDC or 230 V AC/50 Hz, as per solution requirement
10.	Certification	EN12368 Certified from EN certified lab or equivalent

5.3.10 **Active LED Display with intelligent controller**

Please Refer section “Specifications: Common Components” for relevant specification

5.3.11 **Polycarbonate/FRP/GRP JB, IP67/65, Min 75 X 75 MM**

This is to be used on the “5 Meter Pole” on which traffic light aspects will be mounted for doing the wire terminations. Suitable size PG glands to be used for cable entry.

Please Refer section “Specifications: Common Components” for relevant specification

5.3.12 **Cat-6 UTP Outdoor Armored, Double Jacket Cable**

Please Refer section “Specifications: Common Components” for relevant specification

5.3.13 **2 Core X 1 Sq. MM Armored Cable**

Please Refer section “Specifications: Common Components” for relevant specification

5.3.14 **3 Core X 1 Sq. MM Armored Cable**

Please Refer section “Specifications: Common Components” for relevant specification

5.3.15 **40 MM HDPE Duct**

Please Refer section “Specifications: Common Components” for relevant specification

5.4 **Specifications: Sub-System for Weighbridge Integration**

5.4.1 **IR Through Beam Sensors**

Please Refer section “Specifications: Common Components” for relevant specification

5.4.2 **Weighbridge Stabilizing Sensor Pole Arrangement**

Sl.	Functional Requirement
1.	This pole arrangement would be used alongside the weigh bridge platform to sense the correct position of vehicle
2.	The system would take inputs from this sensor arrangement to declare that the vehicle is at correct position and then only the weight should be captured
3.	The IR through beam sensors is to be mounted inside these assembly so that the sensor remains inside and chances of damage to the sensor are avoided.
4.	Proper fixing arrangement of the mounting arrangements to be done so that it is rigid and not prone to vibration and misalignment as otherwise the sensing would not happen.

	Technical Specifications
1	Should be made up of 2-Meter-high MS/GI Square Tube of minimum size of 72X72 MM and 2 MM thick.
2	There should be appropriately sized square baseplate of minimum thickness of 8 MM with 20 Deg. angle adjustment.
3	Each pole shall house three IR beam sensors, one at bottom, one at middle and one at bottom.
4	One face of the pole would be laser cut from top to bottom so that the three sensors along with the adjustable clamp could site inside the pole so that the sensors remain inside the pole and would not be damaged in case something hits the pole.
5	Each IR Beam Sensor shall be first mounted on a small mounting assembly with a 2-axis adjustable clamp which would help during the positioning of the sensor.
6	The top sensor would be aligned in such a way that the top sensor would form a cross beam with the bottom sensor of the opposite pole IR beam sensor. The middle sensor would form a straight beam with the middle sensor of the opposite pole IR beam sensor.
7	Three pair of such poles shall be placed along the weighbridge.
8	All these sensors shall be connected to a controller to then interface with the man less weigh bridge controller module.
9	The complete structure should be powder coated with exterior Grade PU coat.
10	All the wires to be taken from inside hollow structure of the tube so that the wires are not visible from outside.
11	The top of the mounting pole must be sealed, and it should not be left hollow from top.

5.4.3 **Polycarbonate/FRP/GRP JB, IP67/65, Min 75 X 75 MM**

This is to be used on the “IR Beam Sensor Mounting Pole arrangement” for doing the wire terminations. Suitable size PG glands to be used for cable entry.

Please Refer section “Specifications: Common Components” for relevant specification

5.4.4 **Intelligent Controller / PLC Controller for Weighbridge**

Bidders are free to choose between Intelligent Controller or PLC Controller.

5.4.4.1 Intelligent Controller for Weighbridge

Sl.	Parameters	Minimum Requirements
1	Usage	To connect/interface stabilizing sensors
2	Processor	8 Bit microcontroller or better as per design requirement
3	Connectivity	RS232
4	I/O	Minimum 16

5.4.4.2 PLC Controller for Weighbridge

Sl.	Parameter	Specifications
1	Programming Languages	Ladder Diagram (LD), Structured Text (ST), Continuous Function Chart (CFC), Sequential Function Chart (SFC), C Language
2	Instruction Processing Speed	
2.1	LD Instruction	25 ns or faster
2.2	MOV Instruction	0.15
2.3	Elementary Arithmetic for Integer	0.92-1.02
2.4	Elementary Arithmetic for Floating Point	1.69-1.85
3	Program Capacity	64k steps
4	Memory Capacity	
4.1	Data (D)	64k words (Including 30k user-defined, 30k software configuration and 4k special registered
4.2	Extension (FR)	64k words (user parameter storage
5	Max. Extension Modules	32 modules (max. 16 analog modules /4 communication modules)
6	Max. Number of Real Inputs/ Outputs	1024 points (input and output)
7	CPU Built-in Inputs/ Outputs	16 DI/ 12 DO
8	Input/ Output Devices	
8.1	X	1024 inputs (X0.0-X63.15
8.2	Y	1024 outputs (Y0.0-Y63.15)
9	Bit Devices	
9.1	M	8192 bits (M0-M8191)
9.2	S	2048 bits (S0-S2047)
10	Timer (T)	512 (T0-T511)
11	16-bit Counter ©	512 (C0-C511)
12	32-bit Counter (HC)	256 (HC255)
13	Pulse Output	Open collector: 3 axes, 200 kHz
14	Built-in Communication Port	USB, Ethernet, RS-485X2
15	Communication Protocol	CAN open
16	Latched Area	MRAM, no rewriting limit
17	CAN open DS301	
18	Connectable Slave Stations	Max. 64 Points
18.1	CPDO Data Capacity	Max. 200 bytes (Read & Write)

18.2	PDO Data Capacity	Max. 8 PDO (Read & Write) Max. 8 bytes for each PDO
19	Real-time Clock (RTC)	General Lithium Button battery (CR1620)
20	Self-Diagnosis Function	CPU error, built in memory error and more
21	Rated Input Current	
21.1	AS-PS02 /AS-PS02A/ AS-PS03C	110Vac-240Vac
21.2	CPU	24Vdc
21.3	Extension modules	

5.4.5 **RS232 Active Splitter**

Sl.	Specifications
1	Should have 1 In/2 Out configuration as minimum and should be active splitter
2	Shall be used to take the input from the weighbridge controller/ PLC and should split into two signals
3	Compliant: FCC / CE Certified

5.4.6 **Active LED Display with intelligent controller**

Refer section “Specifications: Common Components” for relevant specification

5.4.7 **CAT-6 Patch Cord**

Please Refer section “Specifications: Common Components” for relevant specification

5.4.8 **Cat6 Shielded Field Termination Plug**

Please Refer section “Specifications: Common Components” for relevant specification

5.4.9 **Cat-6 UTP Outdoor Armored, Double Jacket Cable**

Please Refer section “Specifications: Common Components” for relevant specification

5.4.10 **2 Core X 1 Sq. MM Armored Cable**

Please Refer section “Specifications: Common Components” for relevant specification

5.4.11 **40 MM HDPE Duct**

Please Refer section “Specifications: Common Components” for relevant specification

5.5 **Specifications: Sub-System for Public Address System (PAS)**

5.5.1 **Outdoor Horn Speaker, IP PA Amplifier, Control Desk, Armored Shielded PA Cable, PAS Central Software, PAS Central Server And PAS Operator Console – All From Same OEM except Armoured Shielded PA Cable**

	Functional Requirement
1	IP based PAS to be used for automated announcements or for paging announcements from command centre or from the local area
2	Each site will have multiple speakers connected to one IP amplifier
3	A local paging microphone (“Control Desk, Local”) shall also be provided for doing local announcements
	Outdoor Horn Speaker

	Technical Specifications	
1	Speaker – Minimum 30 Watts	
2	Protection – IP66 and preferably IK10	
3	Frequency Range – 350 to 10Khz	
4	Maximum Sound pressure level @1 m – 110 db or above	
5	Operating Temperature - -10 to + 55 C	
6	Construction – ABS Self Extinguishing	
	IP PA Amplifier	
	Technical Specifications	
1	**Amplifier: 120 Watt or above, Class D**	
2	Should have the capability to control individual PAS i.e. to make an announcement at select location (1:1) or multiple locations (1: many). The PAS should also support both, Live and Recorded inputs	
3	Native IP connectivity, no convertors to be used	
4	0 to 55 C Temperature rating for Amplifier	
5	Frequency Response: 70 Hz to 15000 Hz for Amplifier	
6	Minimum 2 Inputs and 1 Output relay contacts in Amplifier for connecting external beacon	
7	Speaker: Minimum 3 Speakers 30 W capacity per location	
8	Line Monitoring Facility for speakers	
9	180-240 V mains input supply	
10	Compliant: CB/CE/EN/UL and BIS/IEC	
	Control Desk	
	Technical Specifications	
1	Should have the capability to control individual PAS i.e. to make an announcement at select location (1:1) or multiple locations (1: many).	
2	Noise cancelling in built microphone with audio monitoring	
3	Frequency range – 200Hz – 16Khz	
4	Display – 8 lines X 14 characters or better	
5	Connectivity- IP Based, POE powered	
6	Amplifier – Inbuilt 2.5W or better class D	
7	Operating temperature - 0 to 50C	
8	It should have RJ-45 Information Outlet, Minimum Dual Port (1 Uplink and 1 downlink)	
	Armoured Shielded PA Cable	
	Technical Specifications	
1	No of Cores	2 Cores
2	Size in Sq.mm.	1.5
3	Voltage Grade	1100 V
4	Operating Temp (max) in Deg. C	60
5	Conductor Material Properties	
	(i) Material	Electrolytic Grade Copper Stranded Class-2 to IS 8130 / 1984
	(ii) Dia. Of strands (mm)Approx.	0.25
6	Insulation Material Properties	
	(i) Material	The extruded PVC COMPOUND TYPE A as Per IS 5831
	(ii) Nominal Thickness in mm	>=0.8

	(iii) Core Colour	Any
7	Overall Shielding	
	(i) Polyester tape	100% coverage, 25% overlap, 0.025mm thickness
	(ii) Aluminium Mylar tape	100% coverage, 25% overlap, 0.055mm thickness
	(iii) Drain wire	Annealed Tinned copper, 7/0.3mm
8	Armoring	
	(i) Material	Galvanized Steel Wire (as per IS-3975)
	(ii) Size of Armour (mm)	>=0.9
9	Rip cord	Non-metallic rip cord shall be provided inner sheath
10	Std. length of cable per drum (M)	250/500/1000 ±10%
11	Minimum bending radius	12 times of Overall Diameter
	PAS Central Software	
	Specifications	
1	The system shall deliver pre-recorded and live messages to the loudspeakers attached to them for public announcements.	
2	The system shall contain an IP based amplifier and uses power that could drive the speakers.	
3	The system shall also contain the control server that could be used to control/monitor all the components of the system that includes Controller, Calling Station & Amplifier.	
4	Central Server operating on Linux Debian 10 (64bit) 2 or more network interfaces 1Gbps or more data rate Compliance – UL 62368-1	
5	Integration with VMS and any other component if required	
	PAS Central Server	
	Technical Specifications	
1	Central Server operating on Linux Debian 10 (64bit)	
2	2 network interfaces	
3	1Gbps data rate	
4	Compliance – UL 62368-1	

5.5.2 **Cat-6 UTP Outdoor Armored, Double Jacket Cable**

Please Refer section “Specifications: Common Components” for relevant specification

5.5.3 **Cat6 Shielded Field Termination Plug**

Please Refer section “Specifications: Common Components” for relevant specification

5.5.4 **40 MM HDPE Duct**

Please Refer section “Specifications: Common Components” for relevant specification

5.6 Sub-System for CCTV

All CCTV Cameras (Dome, Bullet, PTZ etc.) shall be from same OEM. However, SVD camera can be from the same OEM as above or any other OEM

5.6.1 2MP Bullet Camera

	Functional Requirement	
1	Cameras to be installed on a 5/6 Meter Pole as per specifications provided and so required pole mount to be considered suitable for the camera and should be from the same camera OEM only.	
2	Cameras to be added in the central VMS	
3	Video feed to be stored for a period of 30 days. Recording resolution shall be 2MP @ 25FPS.	
4	For powering PTZ camera an external 24 V AC/DC power supply to be used	
5	SPD to be used both for network and 24 V line near the camera	
6	SPD's to be properly kept inside FRP JB and should be properly earthed	
	Technical Specifications	
1	Type of Camera	Outdoor Bullet
2	Image Sensor	1/2.8" or better progressive Scan CMOS
3	Signal System	PAL/NTSC
4	Resolution & frame rate	2MP (1920 × 1080) @ 25/30fps or better
5	Minimum Illumination	0.005Lux@ F1.6, AGC ON, 0 lux with IR or better
6	Imaging	1/3s to 1/100000s, Auto Gain Control, White Balance- Auto, Back Light Compensation, Multi zone Privacy Masking, HLC.
7	Signal to Noise Ratio	50 dB or more
8	Lens Type	2.7mm ~ 13.5mm
9	Focus	Motorized Vari Focal
10	Day & Night	True Day & Night High Performance Mechanical IR cut filter with auto switch, IR Source- Inbuilt Smart IR LED's with effective distance up to 30 Mtr or better with the help of External/ Integrated IR
11	Video Compression (Minimum)	H.265+, H.265, H.264+, H.264
12	Wide Dynamic Range	WDR (120db or more), HLC/BLC
13	Digital Noise Reduction	DNR (2D/3D) On/Off
14	Streaming	Triple streaming, configurable
15	Connectivity	LAN
16	Image Setting	Rotate Mode, saturation, brightness, contrast, sharpness adjustable through client software or web browser
17	Profile Management	User configuration - multiple user levels
18	Security	User Authentication, Water Marking/ Video Encryption
19	Onboard Storage	Camera should support built in Class-10 Micro SD/SDHC/SDXC Card slot up to 256 GB.
20	Recording Management	Format SD, overwrite, storage management, video to NAS device, remote archive access via FTP login

21	Edge based Video Analytics & Alarm Trigger	Motion detection, Camera Video Tampering alarm, Tripwire, Intrusion, scene change detection, region entrance /exiting detection, IP address conflict, Storage full, Storage error.
	Network Compatibility	
22	Network Protocol	TCP/IP, IPv4/IPv6, ICMP, HTTP, HTTPS, FTP, DHCP, DNS, DDNS, RTP, RTSP, NTP, UPnP, SMTP, QoS, UDP, SSL/TLS, PPPoE, ARP, SNMP
23	User Access	5 User Simultaneously or more
24	System Capability	It should support ONVIF (Profile S, Profile G and Profile T). The Quoted Model Should be listed on ONVIF Official website. The proposed CCTV OEM should not be backlisted/ suspended by ONVIF.
25	VMS	Camera shall support open-source VMS
26	Ethernet	1 RJ 45 10/100 Ethernet port
27	Audio In/ Out	Mini. 1 Input & 1 Output port for external Mic. & Speaker.
28	Alarm In/ out	Mini. 1 Input & 1 Output port for external sensors etc.
29	Power Input	Standard DC Jack
30	Power Requirement	12VDC ± 10%, PoE (IEEE802.3 af)
31	Power Consumption	Max 10 W
32	Enclosure	IP67 weatherproof
33	Operating Condition	-20°C to 60°C, humidity 95% (max) (non-condensing)
34	Standards	BIS or Equivalent Certification (UL, CE, FCC)

5.6.2 **2MP PTZ Camera**

	Functional Requirement	
1	Cameras to be installed on a 9/10 Meter Pole as per specifications provided and so required pole mount to be considered suitable for the camera and should be from the same camera OEM only.	
2	Cameras to be added in the central VMS	
3	Video feed to be stored for a period of 30 days. Recording resolution shall be 2MP @ 25FPS.	
4	For powering PTZ camera an external 24 V AC/DC power supply to be used	
5	SPD to be used both for network and 24 V line near the camera	
6	SPD's to be properly kept inside FRP JB and should be properly earthed	
	Technical Specifications	
1.	Image sensor	1/2.8" Progressive scan CMOS sensor
2.	Resolution	Minimum 2 Mega Pixel; 1920X1080 @ 25/30 FPS or better
3.	Lens	Focal Length: varifocal (3.95-7) mm~(177.7-300)mm or better equivalent to minimum 32x optical zoom, Focus Adjustment: Automatic, manual
4.	Iris Control	DC – IRIS, Automatic with manual override or P- Iris
5.	Minimum Illumination	0.005Lux@ F1.6, AGC ON, 0 lux with IR, or better
6.	IR range	IR 250-meter or higher
7.	Signal to Noise Ratio	>=50dB, Back light compensation ON/OFF selectable.
8.	Compression	H.265, H.264 High & Main profiles
9.	Wide Dynamic Range	120db or better

10.	3D Digital Noise Reduction	DNR (2D+3D) On/Off
11.	Day/Night Camera	Auto day/night configuration.
12.	Camera Features	image stabilization, HLC, BLC, 3D DNR
13.	Video Stream	Triple Streaming, configurable
14.	Shutter speed	1/30,000 sec ~ 1/5 sec or better
15.	Audio	Line level/external microphone input
16.	Pan Range and speed	360° continuous pan rotation, 200°/sec,
17.	Tilt Range and speed	-(20°-15°) to 90° (auto flip), 120°/sec, “Auto Flip” feature rotates camera 180° at bottom of tilt travel
18.	Alarm input	Minimum One Alarm Input & One Alarm Output
19.	Edge Storage	Camera should support built in Class-10 Micro SD/SDHC/SDXC Card slot up to 256 GB.
20.	Network protocols	TCP/IP, IPv4/IPv6, ICMP, HTTP, HTTPS, FTP, DHCP, DNS, DDNS, RTP, RTSP, NTP, UPnP, SMTP, QoS, UDP, SSL/TLS, PPPoE, SNMP
21.	Communication Interface	Ethernet RJ45 10M/100M
22.	Housing	Vandal resistant enclosure
23.	Power requirement	PoE+/ 24VAC
24.	Security access	Password protected, HTTPS, IEEE 802.X, IP Filtering
25.	Environmental Protection	IP66 or above
26.	Vandal Proof Certification	IK10 Housing
27.	Wiper	Yes
28.	Operating Temperature	-10 to 55° C Degrees.
29.	Operating Humidity	up to 95% RH condensing or better
30.	ONVIF Compliance	ONVIF Profile S, Profile G conformant, Profile T conformant and latest profile
31.	Certifications	CE, FCC, RoHS, UL or BIS Equivalent

5.6.3 **PTZ Joystick**

	Technical Specifications	
1	Keyboard Key panel	Electromechanical
2	Joystick	3-axis, vector-solving, with twisting, return to-center head
3	Keyboard Connector	RJ-45/RS232/RS485/RS422/USB
4	Keyboard Communication	Direct Mode, Network Mode
5	Direct Mode	Interface: RS232/RS485/ USB / RJ 45
6	Resolution	LCD, 75.2mm x 33.85mm or better
7	Network Mode	Interface: RJ45 DVR/Network Dome: IP Address/Port/Protocol

8	Power Supply	Power adapter, input 100V~240V 50Hz / 60Hz, Output DC12V/1000mA

5.6.4 **2MP Dome Camera**

	Functional Requirement	
1.	Cameras to be installed within the CCC facility	
2.	Cameras to be added in the central VMS	
3.	Video feed to be stored for a period of 60 days. Recording resolution shall be 2MP @ 25FPS.	
	Technical Specifications	
1.	Type of Camera	Indoor Dome
2.	Image Sensor	1/2.8” or better progressive Scan CMOS
3.	Signal System	PAL/NTSC
4.	Resolution & frame rate	2MP (1920 × 1080) @ 25/30fps
5.	Minimum Illumination	0.005Lux@ F1.6, AGC ON, 0 lux with IR or better
6.	Imaging	1/3s to 1/100000s, Auto Gain Control, White Balance- Auto, Back Light Compensation, Multi zone Privacy Masking, HLC.
7.	Signal to Noise Ratio	50 dB or more
8.	Lens Type	2.7mm ~ 13.5mm
9.	Focus	Motorized Vari Focal
10.	Day & Night	True Day & Night High Performance Mechanical IR cut filter with auto switch, IR Source- Inbuilt Smart IR LED’s with effective distance up to 30 Mtr or better with the help of External/ Integrated IR.
11.	Video Compression (Minimum)	H.265+, H.265, H.264+, H.264
12.	Wide Dynamic Range	WDR (120db or more), HLC and BLC
13.	Digital Noise Reduction	DNR (2D/3D) On/Off
14.	Streaming	Triple streaming, configurable
15.	Connectivity	LAN
16.	Image Setting	Rotate Mode, saturation, brightness, contrast, sharpness adjustable through client software or web browser
17.	Profile Management	User configuration – multiple user levels
18.	Security	User Authentication, Water Marking/ Video Encryption
19.	Onboard Storage	Camera should support built in Class-10 Micro SD/SDHC/SDXC Card slot up to 256 GB.
20.	Recording Management	Format SD, overwrite, storage management, video to NAS device (NFS/SMB/CIFS)
21.	Edge based Video Analytics & Alarm Trigger	Motion detection, Camera Video Tampering alarm, Tripwire, Intrusion, scene change detection, region entrance /exiting detection, IP address conflict, Storage full, Storage error.

22.	**Network Compatibility**	
23.	Network Protocol	TCP/IP, Ipv4/Ipv6, ICMP, HTTP, HTTPS, FTP, DHCP, DNS, DDNS, RTP, RTSP, NTP, UpnP, SMTP, QoS, UDP, SSL/TLS, PPPoE, ARP,SNMP
24.	User Access	5 User Simultaneously or more
25.	System Capability	It should support ONVIF (Profile S, Profile G,Profile T and latest profile). The Quoted Model Should be listed on ONVIF Official website. The proposed CCTV OEM should not be backlisted/ suspended by ONVIF.
26.	VMS	Camera shall support open source VMS
27.	Ethernet	1 RJ 45 10/100 Ethernet port
28.	Audio In/ Out	Mini. 1 Input & 1 Output port for external Mic. & Speaker.
29.	Alarm In/ out	Mini. 1 Input & 1 Output port for external sensors etc.
30.	Power Input	Standard DC Jack
31.	Power Requirement	12VDC ± 10%, PoE (IEEE802.3 af)
32.	Power Consumption	6 – 9 W
33.	Enclosure	IP67 weatherproof & IK10
34.	Operating Condition	-20°C to 60°C, humidity 95% (max) (non-condensing)
35.	Standards	UL, CE, FCC or BIS Equivalent

5.6.5 **Network SPD, CAT6**

Please Refer section “Specifications: Common Components” for relevant specification

5.6.6 **CAT-6 Patch Cord**

Please Refer section “Specifications: Common Components” for relevant specification

5.6.7 **Cat6 Shielded Field Termination Plug**

Please Refer section “Specifications: Common Components” for relevant specification

5.6.8 **FRP/GRP Pole Mount JB, Min. (250HX250WX120D) MM**

Please Refer section “Specifications: Common Components” for relevant specification

5.6.9 **5/6 Meter GI Straight Pole for CCTV Cameras**

Functional Requirements

	Functional Requirement
1	This pole shall be used to mount the fix type (bullet or box) camera as per the locations suggested by OMC.
2	Other than the above all the entry/exit, weighbridge areas will have a camera mounted on this pole.
3	The height of the pole (5Meter or 6 Meter) will be decided based on the location it is getting installed.

Technical Specifications

	Technical Specifications
1	The Conical/Polygonal pole should be designed to with stand maximum wind speed as per IS: 857 (Minimum 50 m/Sec). Certificate for the structural integrity of the pole shall be submitted to justify the pole dimensions.
2	Pole shaft and cantilever have conical/polygonal cross section and shall be preferably continuously tapered with single longitudinal welding suitable to accommodate 2 Nos. fixed cameras.
3	Pole shaft shall be provided with a grade flange plate of suitable thickness with provision of fixing suitable no. of foundation bolts. This base plate shall be filleted welded to the pole shaft at two locations i.e., from inside & outside.
4	Conical/Polygonal pole shall have approximately 500 MM door opening length at the elevation of 500 mm from base plate. The door shall be vandal resistant and shall be weatherproof to ensure safety of electrical connections inside the pole. The door shall be flush fit with locking facility. The pole shall be additionally reinforced with welded steel section, so that the section at door is unaffected and undue bucking of the cut section is prevented.
5	Material of construction shall be:
A	Conical/Polygonal pole shaft - HT Steel Conforming to grade S355 with minimum plate thickness of 3 MM
B	Pole base plate - Fe 410 Conforming to IS 226/IS 2062 with minimum thickness of 16 MM
C	Pole foundation Bolt- EN 8 grade, GI
6	Pole shall be hot dip galvanized as per IS 2629/IS2633/IS 4759 slandered with average coating thickness of 86 Micron or more. The galvanizing shall be done in single dipping.
7	The pole shall be installed on a precast or cast in- SITU RCC foundation on studs with nuts & washers and with a set of four foundation bolt for greater rigidity basis the soil bearing test report of the actual site.

5.6.10 **10 Meter GI Straight Pole for PTZ Cameras**

Compliances:

	Technical Specifications
1.	The Conical/Polygonal pole should be designed to with stand maximum wind speed as per IS: 857 (Minimum 50 m/Sec). Certificate for the structural integrity of the pole shall be submitted to justify the pole dimensions.
2.	Pole shaft and cantilever have conical/polygonal cross section and shall be preferably continuously tapered with single longitudinal welding suitable to accommodate 2 Nos. fixed cameras.
3.	Pole shaft shall be provided with a grade flange plate of suitable thickness with provision of fixing suitable no. of foundation bolts. This base plate shall be filleted welded to the pole shaft at two locations i.e., from inside & outside.
4.	Conical/Polygonal pole shall have approximately 500 MM door opening length at the elevation of 500 mm from base plate. The door shall be vandal resistant and shall be weatherproof to ensure safety of electrical connections inside the pole. The door shall be flush fit with locking facility. The pole shall be additionally reinforced with welded steel section, so that the section at door is unaffected and undue bucking of the cut section is prevented.
5.	Material of construction shall be:
A	Conical/Polygonal pole shaft - HT Steel Conforming to grade S355 with minimum plate thickness of 4 MM
B	Pole base plate - Fe 410 Conforming to IS 226/IS 2062 with minimum thickness of 16 MM
C	Pole foundation Bolt- EN 8 grade, GI
6.	Pole shall be hot dip galvanized as per IS 2629/IS2633/IS 4759 slandered with average coating thickness of 86 Micron or more. The galvanizing shall be done in single dipping.

7.	The pole shall be installed on a precast or cast in- SITU RCC foundation on studs with nuts & washers and with a set of four foundation bolt for greater rigidity basis the soil bearing test report of the actual site.

5.6.11 **Lightning Arrestor for Pole**

Please Refer section "Specifications: Common Components" for relevant specification

5.6.12 **Chemical Earthing for Lightning Arrestor**

Please Refer section "Specifications: Common Components" for relevant specification

5.6.13 **Cat-6 UTP Outdoor Armored, Double Jacket Cable**

Please Refer section "Specifications: Common Components" for relevant specification

5.6.14 **40 MM HDPE Duct**

Please Refer section "Specifications: Common Components" for relevant specification

5.7 **Specifications: Sub-System for Speed Violation Detection (SVD)**

All CCTV Cameras (Dome, Bullet, PTZ etc.) shall be from same OEM. However, SVD camera can be from the same OEM as above or any other OEM.

Speed Violation Detection (SVD)–Video based

Speed Violation Detection solution should be state-of-the-art video-based speed violation detection solution. It should work independently without needing any external sensors like Radar or Laser etc. SVD system should automatically capture images of vehicle from backside with license plate numbers and perform OCR (Optical Character Recognition) on images to convert them into text format. The proposed system should have valid certification from Govt. Accredited agency/ lab (like ARAI) for Speed detection accuracy.

Sl.	Functional Requirement
1.	SVD system to be installed in areas where chances of speeding are more
2.	Locations shall be finalized by OMC
3.	Each location will have one SVD camera mounted on a 6 Meter Cantilever pole as per specification provided in this sub-section
4.	There would be pole mount JB as per specification provided in this sub-section
5.	Network connectivity (through OFC cable and using Media Converter) shall be extended from the nearest Network JB location
6.	Power connection shall be extended from the nearest Network JB location

5.7.1 **SVD cum ANPR Camera**

	Technical Specifications	
1.	Image Sensor	3 MP or above, 1/1.8 Global Shutter CMOS or better
2.	Resolution	1920 x 1080 or better
3.	Lens	Vari-focal, Remote focus, Auto Iris
4.	Focal Length	f = 15 ~ 40 mm or better

5.	Aperture	F1.4~ F1.8 or better
6.	Field of View	12° ~ 35° (Horizontal) or better
		9° ~ 26° (Vertical) or better
		15° ~ 46° (Diagonal) or better
7.	Day/Night Mode	Removable IR-Cut filter for day & night function
		Preferably Headlight filter design for Anti-Glare
8.	Minimum Illumination	0.06 lux (color) or better
		0 lux (with IR on)
9.	Pan/Tilt/Zoom Functionalities	ePTZ: 30 X digital zoom or above
10.	On-Board Storage	Slot type: MicroSD/SDHC/SDXC card slot
		seamless Recording
11.	S/N Ratio	50 dB or above
12.	Dynamic Range	50dB or above
13.	Video Compression	H.265, H.264, MJPEG
14.	Maximum Streams	3 simultaneous streams or better
15.	Maximum Frame Rate	60 fps @ 1920 x 1080 30 fps @ 2048 x 1536
	Network	
16.	Users	Live viewing for up to 10 clients
17.	Protocols	IPv4, IPv6, TCP/IP, HTTP, HTTPS, UPnP, RTSP/RTP/RTCP, IGMP, CIFS/SMB, SMTP, FTP, DHCP, NTP, DNS, DDNS, PPPoE, CoS, QoS, SNMP, 802.1X, UDP, ICMP, ARP, TLS
18.	Interface	10 Base-T/100 Base-TX/1000 Base-T Ethernet (RJ-45)
19.	ONVIF	Supported & Model should be available on ONVIF portal
	Alarm and Event	
20.	Alarm Triggers	Manual trigger, digital input, periodical trigger, system boot, recording notification, audio detection, MicroSD card life expectancy
21.	Alarm Events	Event notification using digital output, HTTP, SMTP, FTP, NAS server and MicroSD card File upload via HTTP, SMTP, FTP, NAS server and MicroSD card
22.	IP Camera Connectors	RJ-45 cable connector for Network/PoE
		connection *1
		DC 12V/AC 24V power in *1
		Digital input *1
		Digital output *1
23.	Power Input	AC/DC 24V
24.	Power Consumption	Max. 12W (Camera)
25.	Humidity	90%
26.	Safety Certifications	IP Camera: CE, LVD, FCC Class B, VCCI, UL or equivalent BIS

5.7.2 **External IR Illuminator**

	Technical Specifications
1.	Type: External IR illuminator with high performance & sufficient no. of LEDs with high brightness for working in mining environment having dust, fog, night operation, rain, etc.
2.	Wavelength: ≥850 nm (Infrared)

3.	Illumination Range: minimum 50 mtrs
4.	Environment Protection: IP66 or better
5.	Auto Adjustable/ Adjustable angle to appropriately focus at the number plate. Beam Angle: multiple options- 10 degree (standard), 15, 30, 45 degrees
6.	Surge level: Common mode 6KV, Differential mode: 3 KV or use external Surge Level
7.	Certifications: CE, FCC, RoHS, Eye Safety test report as per IEC62471:2006
8.	Protection function: Transient over peak suppression or use external Surge Level
9.	Housing material: Die-casting aluminium alloy
10.	User Interface: RS485 / Input/Output Port
11.	Eye safety certificate/ Equivalent Test report to be submitted for IR Illuminator.

5.7.3 **Local Processing Unit (LPU) for ANPR & SVD**

	Technical Specifications
1.	Local Processing Casing: The housing(s) should be capable of withstanding vandalism and harsh weather conditions and should meet IP66, IK10 standards (certified).
2.	Local Processing Unit shall be of min. 7th Generation with core i7 CPU
3.	Storage: The system should be equipped with appropriate storage capacity for 7 days with 24X7 recording, and with overwriting capability (FIFO). The images should be stored in tamper proof format only. Storage Capacity: min 1TB SDD
4.	Operating System: Linux/ Windows
5.	It should have 2 nos. LAN, SATA port
6.	It shall support Intel® UHD Graphics/ Intel® Iris X Graphics/ NVIDIA GeForce RTX
7.	It should support 32 GB DDR4 RAM or higher
8.	Display Port- 1 no. VGA, 1 no. HDMI/DVI-D
9.	It shall support Secondary Storage 2×2.5" SATA HDD/SSD Bay
10.	It shall support multiple USB 3.0 ports
11.	Power- Voltage Input: DC6~48V AC Input: External Adapter (Option), Voltage Input: 100VAC~240VAC@50~60Hz
12.	Temperature- 10 °C ~ 60 °C
13.	Certifications: BIS or Equivalent (CE, FCC)
14.	It shall withstand vibrations as per 5 grms / 5 ~ 500Hz /in work status (SSD) 1 grms / 5 ~ 500Hz / in work status (HDD)
15.	It shall withstand shock as per 50 g peak acceleration (duration 11ms) (SSD) 20 g peak acceleration (duration 11ms) (HDD)

5.7.4 **1Gbps Media Converter**

	Technical Specifications	
	Parameters	**Minimum Specifications**
1.	Fiber Connector	LC type
2.	Fiber Mode	Single Mode
3.	Copper UTP Port	1G, RJ-45
4.	Support Distance	10 KM
5.	Wavelength	1310nm
6.	Operating Temperature	0°C to +60°C

7.	Humidity	5%~90% Non-condensing
8.	Certifications	BIS or Equivalent (CE, FCC)

5.7.5 **Speed Detection Software Module**

The objective of SVD with ANPR system is to capture number plates of vehicles moving above the permissible speed limit.

The SVD System shall also enable monitoring of vehicle flow at deployed locations for detection of speed violations and generate alerts for the same. The system shall be able to detect violations of over-speeding of vehicles captured by the SVD Alert camera. All violation transactions shall be stored along with the time-stamped image(s) for evidence. Alerts for the same shall be dispatched to the control room on near real-time basis. The system shall also be able to export the violation transactions to command control server for further processing.

	Functional Requirement
1.	The system shall be designed to work for 24x7 unattended operations
2.	The system should be capable of detecting violations of over-speeding by using video detection processing (locally at LPU) only and without the need for any physical sensors like induction loops, pressure sensors, IR sensors, radars, lasers, etc.
3.	The system should be able to detect over-speeding in both day and night-time with good accuracy.
4.	Speed Detection a) The system should detect the speed of all vehicles in the video feed from the Speed Camera and extract their license plate numbers online in real-time. b) The system should display the recognized license plate number along with the detected speed of the vehicle and store the same in the database for each transaction.
5.	The system should be able to detect the speed of multiple vehicles traveling in different lanes covered in the camera view simultaneously.
6.	The system should compare the speed computed for each vehicle with the pre-defined speed limit for the camera/ stretch and signal violation when the speed limit is exceeded.
7.	The system would dispatch alerts for all violations detected to the control room in near real-time. The details of each violation transaction shall include Type of Violation a) Details of Violation: vehicle speed and/or vehicle direction b) License Plate Number along with thumbnail of the License Plate c) At least 2 Timestamped Snapshot(s) of the Violation for Evidence d) 5-10 seconds video for evidence e) Camera Location and Site Details
8.	The system shall provide option to configure different speed limits for different cameras / stretches depending on their location in the Mines
9.	The system shall provide option to configure different speed limits for different time-periods.
10.	The system shall incorporate suitable alerts at the control centre in the event of camera power loss or network link loss.
11.	Apart from Hot-list and Violation Detection, all Speed Detection Cameras shall be configurable for live viewing and recording, if necessary, on the central Video Management Software as per user requirement.
12.	Same camera should be used for both - ANPR along with Vehicle Speed detection.
13.	ANPR camera used to do ANPR along with Vehicle Speed detection. Both the analytics software should be loaded on the local LPU.
14.	System should detect no parking detection.

15.	The system should be able to capture the number plate in night with the help of an external IR illuminator with Eye Safety test report/ equivalent certification against the head light glare of the approaching vehicle and provide good performance.
16.	The system design should be based on open architecture and should have unrestricted scope for scalability and integration with similar surveillance systems in use or likely to be used by the employer.
17.	The system usage shall have role-based access with following features protected with individual passwords. All logins should be logged. These logs should be non-tamper-able. a) Administrator – Full access to all functionalities b) Operator – Access to all functionalities (including recorded events) except system configuration Viewer – Access only to reports / Live screen
18.	The system design should be such that the user shall be able to configure either or both the following functional modules (Hot-list Detection and Violation Detection) on the same set of hardware (cameras as well as computing equipment).
19.	The system should be able to handle multiple vehicles simultaneously i.e., if there are more than one vehicle in the camera view the system should be able to detect all of them, extract their license plate numbers and perform OCR on the license plate characters.
20.	The system should be able to detect speed of each and all vehicles in the camera view and tag them along with their license plate numbers simultaneously.
21.	The System shall store JPEG images of vehicle as well as of thumbnail of the license plate for each vehicle.
22.	The system shall store the vehicle license number into a relational SQL database (MSSQL, PostgreSQL, MySQL, Oracle, etc.) along with date timestamp and site location details.
23.	The system shall be capable of reading different kinds of plates varying in size, fonts, single row/double row, square and rectangular plates as well as plates with dark characters on light background and reverse.
24.	The saved images of the vehicle should have tamper proof water marking of date and time of capture.
25.	The system Graphical User Interface should be at least in English
26.	The system should provide advanced and smart searching facility of License Plates from the database to search for records of wrongly recognized vehicles up to 1- and 2-character distance from the entered number plate.
27.	Alert Generation
28.	a) The system should have option to input certain license plates according to the hot listed categories by authorized personnel.
29.	b) The system should have option to add new hot-list category by authorized personnel.
30.	c) The system should be able to generate automatic alarms to alert the control room personnel for further action, in the event of detection of any vehicle falling in the Hot-listed categories.
31.	d) On detection of any vehicle in the Hot-list categories, the system should generate alert at the control room within less than 2-3 seconds (subject to network availability).
32.	e) For all Hot listed vehicle transactions, the system should also be able to store a video few seconds before and after the transaction.
33.	In case system reads number plate wrongly, the system shall provide option to the authorized user(s) to manually correct the same. The system shall records Audit Trails of all such edit operations.
34.	It should be possible to upgrade analytics like “Wrong direction Movement”, “Average Speed Detection” in the same set of installation.
35.	Compliant: CERTIN / SOC Certified

5.7.6 **ANPR Software Module**

	Functional Requirement

1	**Vehicle Detection and Video Capture Module**
A	The System should automatically detect a vehicle in the camera view using video detection and activate license plate recognition. Suitable external IR Illuminator with Eye Safety test report/ equivalent certification should be used in conjunction with ANPR camera for detection of number plates during night-time.
2	**License Plate Detection**
A	The System shall automatically detect the license plate in the captured video feed in real-time.
B	The system shall perform OCR (optical character recognition) of the license plate characters (English alpha-numeric characters in standard fonts).
C	The System shall store JPEG image of vehicle and license plate and enter the license plate number into Postgre SQL database along with date time stamp and site location details.
D	System should be able to detect and recognize the English alpha numeric License plate in standard fonts and formats of all vehicles including cars, HCV, and LCV.
E	The system should be able to process and read number plates of vehicles with speed of 180 km/hr and above.
F	The system shall be robust to variation in License Plates in terms of font, size, contrast and color and should work with good accuracy.
G	The system should do processing locally on the LPU installed at the ANPR camera location/ junction, to avoid any time lag and performance issue due to network disconnection, bandwidth constraints, etc.
3	**Color Detection**
A	The system shall detect the color of all vehicles in the camera view during daytime and label them as per the predefined list of configured system colors. The system will store the color information of each vehicle along with the license plate for each transaction in the database.
B	The system shall have options to search historical records for post event analysis by the vehicle color or the vehicle color with license plate and date time combinations.
4	**Alert Generation**
A	The system should have option to input certain license plates according to the hot listed categories .
B	The system should be able to generate automatic alarms to alert the control room personnel for further action, in the event of detection of any vehicle falling in the Hot listed categories.
5	**Vehicle Log**
A	The system shall enable easy and quick retrieval of snapshots, video and other data for post incident analysis and investigations.
B	The system should provide advanced and smart searching facility of License Plates. There should be an option of searching number plates almost matching with the specific number entered (up to 1- and 2-character distance).
6	**Vehicle Make Detection Module**
A	System should be able to identify the make of the vehicle coming in the field of view of the camera with good accuracy.
7	**Vehicle Classification module (Optional)**
A	System should be able to classify the vehicle into LMV, HMV and 2-wheelers.
8	**Central Management**
A	The Central Management Module shall run on the ANPRS Central Server in control booth. It should be possible to view records and edit hotlists from the Central Server.
B	The system should have reading accuracy of minimum 90% on vehicles and above which are visible by human eye for English alphanumeric number plates..
C	The proposed system should have the capability to transfer the data to Central Command Centre through proper encryption in real time.

D	System Should have capability to generate alerts / alarm If any vehicle changes its designated route.

5.7.7 **Network SPD, CAT6**

Please Refer section “Specifications: Common Components” for relevant specification

5.7.8 **Power SPD, 230 VAC**

Please Refer section “Specifications: Common Components” for relevant specification

5.7.9 **6U Pole Mount JB**

Sl.	Functional Requirement
1.	Specifically, to be used for SVD application and to be pole mounted on the 6 Meter cantilever pole for SVD
2.	Power would be drawn from the nearest location so UPS is not provisioned for this
3.	LPU and all other components to be kept inside this JB

	Technical Specification	
1.	Dimension	6U 580mm Width x 400mm Depth or higher
2.	Protection	IP-55 or higher
3.	Front Door	Lockable steel door with gasket sealing, 2 Fan option for hot air execution
4.	Cable Entry	Through PG IP Glands
5.	Rail Mounting	2 pair heavy duty vertical mounting rail for equipment mounting, Height as per Rack Unit
6.	Cooling Option	2 AC/DC fan Provision mounted on Front Door
7.	Load Bearing Capacity	Up to 35 -50 KG or better
8.	Construction-	Welded Galvanized Steel Construction as per industry standard
9.	Power Distribution Unit	6 Socket 5 & 15 AMP Horizontal
10.	Cable Management	Horizontal Metal & PVC
11.	Fix Shelf	1 or more
12.	Other Features	Available in Cold Rolled Steel/ Galvanized Steel/ Stainless Steel Protection Rating IP55 or better Fan cooled cabinet through single fan, dual fan option Aluminum wire mesh filter 100mm X 200mm to prevent level of harmful dust entering cabinet Fan hood on front door with Louvers to eliminate cabinet hot air

5.7.10 **Rack Mount LIU, 12 Port Duplex, fully loaded**

Please Refer section “Specifications: Common Components” for relevant specification

5.7.11 **Cat6 Shielded Field Termination Plug**

Please Refer section “Specifications: Common Components” for relevant specification

5.7.12 **Cat-6 UTP Outdoor Armored, Double Jacket Cable**

Please Refer section “Specifications: Common Components” for relevant specification

5.7.13 **2 Core X 1 Sq. MM Armored Cable**

Please Refer section “Specifications: Common Components” for relevant specification

5.7.14 **Chemical Earthing**

Please Refer section “Specifications: Common Components” for relevant specification

5.7.15 **6 Meter Cantilever Pole with 2 Meter Arm**

Please Refer section “Specifications: Common Components” for relevant specification

5.7.16 **Lightning Arrestor for Pole**

Please Refer section “Specifications: Common Components” for relevant specification

5.7.17 **Chemical Earthing for Lightning Arrestor**

Please Refer section “Specifications: Common Components” for relevant specification

5.8 **Specifications: Sub-System for Variable Message Display (VMD)**

5.8.1 **VMD, Full Color with Controller**

	Functional Requirement	
1	VMD boards shall be mostly installed in the parking/waiting areas	
2	Network connectivity (through OFC cable and using Media Converter) shall be extended from the nearest Network JB location	
3	Dedicated UPS as per the power requirement need to be provisioned for the same as a part of VMD BOQ and this UPS is not separately considered in the RFP BOQ.	
	Technical Specifications	
1	Size	Minimum 1.9 M x Minimum 1.5 M
2	LED Configuration	RGB 3 in 1 SMD
3	Pixel Pitch	7mm or better
4	Pixel Density	Minimum 22,500 dots per sqm or higher
5	Brightness (Calibrated)	5,500 cd/m² or better
6	Refresh Rate	>1,920 Hz or better
7	Maximum Power Consumption	825 w/sqm or lower
8	Vertical Viewing Angle	H 140°/ V 90° or better

9	Dimming Capability	256 levels adjustable
10	IP rating	Front IP65 / Rear IP54 or better
11	Operating Temperature Range	-20 to +50 Degrees C or better
12	Safety Certifications (Mandatory to submit along with the bid)	BIS or Equivalent (CE, FCC, RoHS)
		FCC Certification for Compliance to FCC For Electro Magnetic Emission which may not cause harmful interference and must not accept any interference received Under Standard: FCC CFR Title 47 Part 15 Subpart B:2015 Class A, cispr 22:2008, ANSI C63.4:2014, ICES-003 Issue 6:2016: Class A or BIS or Equivalent Certification
		QMS 9001:2008
13	Power Input	100 ~ 240 VAC
14	Mounting the LED display	F Type
15	Data Transfer Method	Optical fibre /LAN connectivity to be provided by client wherever available. Else connectivity will be through GSM. Suitable GSM router as and where required will be provided by SI at each location with slots for minimum 3G/4G/LTE, IP Pass-through Sim cards with failover option (Sim Cards to be provided by the SI)
16	Remote Control	Should be able to remotely configure, manage and feed content Central remote location over IP Should be able to play the selective contents at different LED Screens as per the requirement Should provide an easy-to-use playlist format for scheduling of content, images, videos etc. The Hardware for the central server has to be provided by the client along with the proposed solution
17	Grey Scale Processing	12 Bit or better
18	Contrast Ratio	3000:1 or better
19	Access for Maintenance	Rear
20	Display Size (W x H)	Minimum 2 M x 1.5 M
21	Surge protection	Class C Optional or External Surge Protector
22	IP Level	IP 65 Front / IP56 Rear
B	**LED Controller**	
23	Signal Input	DVI / HDMI /VGA with resolution capability of 1920 x 1200 or better
24	Signal Output	RJ45
25	Maximum Load Capacity	2.3 Million Pixels
26	Input Voltage	100~240 VAC
27	Operating Temperature	5~55 Deg C
28	Support for	Brightness Sensor
29	Playback	Synchronous preferred, however support for Asynchronous
C	**Media Player**	

30	Media Player with built in Playout software	Should Support minimum output resolution equal to resolution of the LED wall or higher & should be compatible to cloud of reputed manufacturers
31	Processor	Suitable
32	OS	Windows 10 or higher
33	Internal drive	120GB Solid State Drive Minimum
34	Output	HDMI for Graphics
35	Operating System Video	At least should support MPEG-4, WMV, MOV, AVI,MP2
36	Audio	MP3, WMA, AAC
37	Image	JPEG, PNG, BMP, G
38	Text	Selectable Fonts
39	Internet	HTML, XML Files, RSS newsfeeds
40	Others Video Zones	1 or more
41	Network	Ethernet 1000/100/10 (RJ45) and Wi-Fi
D	**Content Management Server with Software for (Outdoor Display) System**	
42	Signage & Content Manager (Software & Hardware)	To be able to create playlists and send them over the network to 100 media players or more for playout based on schedule and sequencing. This software to be loaded on suitable hardware to be supplied by the vendor
43	License support	The license of the software should support management of all the outdoor LED wall which have been quoted in the bid
44	Playlist Automation	Flexible scheduling based on day, date and time; Playlist Scheduling; Emergency Override
45	Content Distribution	Scalable, simultaneous publishing, at least 100 simultaneous subscribers
46	Content Management	Design simplified user interfaces
47	Central Management	Central Management of all screens and content
48	Central Dashboard	Central dashboard for ease of monitoring of screens operations
E		**Auto Brightness Sensor**
49	Rated voltage	5V
50	Operating temperature	-10℃~55℃
51	Operating humidity	0~99%
52	Brightness range	0~65535 lux or better
53	Cable	5m
54	Features	Monitor the ambient brightness to achieve automatic brightness adjustment of LED display
		Asynchronous
		Outdoor use proofing

		No external power supply required
F	**Rack Power Distribution Unit:** Refers here to the Junction Box which has to be as per solution offering. Junction Box specifications are separately mentioned also so that need to be referred.	
55	Front Door	2 hinges with rack
56	Clamps	To be bolted on Pole
57	Earthing	Earthing studs to be provided
58	Cable points	Cable entry/exit points to be provided
59	Size	13U or as per requirement
60	AC Input	380V/220V
61	Surge protection	Class C (Optional) or External Surge Protector

5.8.2 **Mounting Structure, 5 Meter, Unipole T-Type**

	Technical Specification
1	Mounting structure: Use minimum 5Mtrs. High Cylindrical GI Pole (Class B) or suitable structure with 4.5 mtr. Minimum vertical clearance under the VMD board from the Road surface.
2	The mounting shall be capable of withstanding roadside vibrations at site of installation.
3	It shall be provided with suitable walkway for maintenance access.
4	The side interior and rear of enclosures are provided in maintenance free finish. All enclosure are flat and wipe clean.
5	For Structural safety, structural safety certificate shall be provided from qualified structural engineers.
6	Wind Load: WL9 as per EN12966 to withstand high wind speeds and its own load - HT Steel Conforming to grade S355
7	Pole Base plate - Fe 410 Conforming to IS 226/IS 2062
8	Foundation Bolt- EN 8 grade or better
9	Pole shall be hot dip galvanized as per IS 2629/IS2633/IS 4759 provided with average coating thickness of 80 Micron or higher . The galvanizing shall be done in single dipping.
10	The pole shall be installed cast in- SITU RCC foundation on studs with nuts & washers and with adequate number of foundation bolts for greater rigidity basis the soil bearing test report of the actual site.

5.8.3 **Outdoor Junction Box for UPS and Other items**

	Technical Specification	
1	Size	Suitable size as per site requirements to house the field equipment.
2	Cabinet Material	GI with powder coated (Antirust coating)
3	Material Thickness	Min 1.2 mm
4	Number of Locks	Two Point Lock
5	Protection	IP 55, Junction Box design should ensure to keep the temperature within suitable operating range for equipment's and should also avoid intentional water splash and dust intake. With built-in redundant fan and filter assembly inherent in the design. Junction Box design should ensure to keep the Operating temperature range of 10° C to 55° C.
6	Mounting	Either on the Mounting structure or on ground on a raised concrete plinth of 1.5 feet or as per the site condition.
7	Other Features	Rain Canopy, Cable entry with glands, proper earthing and Fans/any other accessories as required for operation of equipment’s within junction box.

8	Additional	Pocket to keep papers/file on inner side of the door LED light with limit switch to switch on the light once door is open. Additionally, a power off switch also to be available on the LED light.

5.8.4 **Network SPD, CAT6**

Please Refer section “Specifications: Common Components” for relevant specification

5.8.5 **Power SPD, 230 VAC**

Please Refer section “Specifications: Common Components” for relevant specification

5.8.6 **Lightning Arrestor for Pole**

Please Refer section “Specifications: Common Components” for relevant specification

5.8.7 **Chemical Earthing for Lightning Arrestor**

Please Refer section “Specifications: Common Components” for relevant specification

5.8.8 **Cat-6 UTP Outdoor Armored, Double Jacket Cable**

Please Refer section “Specifications: Common Components” for relevant specification

5.8.9 **3 Core X 2.5 Sq. MM Armored Cable**

Please Refer section “Specifications: Common Components” for relevant specification

5.8.10 **Chemical Earthing**

Please Refer section “Specifications: Common Components” for relevant specification

5.8.11 **40 MM HDPE Duct**

Please Refer section “Specifications: Common Components” for relevant specification

5.9 **Specifications: Field Network Switch Sub-System**

5.9.1 **Industrial Grade PoE Switch, 8 Port, Redundant Power Input**

	Technical Specifications
A	**GENERAL**
1	Shall have 2* 100/1000 Base SFP Single mode ports (Populated with 2x1G SM module from same OEM),10 KM Support with LC connectors, 8 No’s of 10/100/1000 BaseT(X) copper ports (RJ45 connectors)
2	IPv6 Ready
3	8 IEEE 802.3af and IEEE 802.3at PoE+ standard ports
4	Advanced PoE management function
5	DHCP Option 82 for IP address assignment with different policies
6	IGMP snooping and GMRP for filtering multicast traffic from industrial Ethernet protocols
7	IEEE 802.3ad, LACP for optimum bandwidth utilization
8	Lock port to restrict access to authorized MAC addresses
9	Multi-port mirroring for online debugging

10	RMON for efficient network monitoring and proactive capability
11	QoS (IEEE 802.1p/1Q) and TOS/DiffServ to increase determinism
12	Configurable by web browser
13	Works with network management software
B	**Cyber-security Features**
14	User passwords with multiple levels of security protect against unauthorized configuration Command line interface (CLI) for quickly configuring major managed functions
15	SSH/HTTPS is used to encrypt passwords and data
16	Lock switch ports with 802.1x port-based network access control so that only authorized clients can access the port
17	Disable one or more ports to block network traffic
18	802.1Q VLAN allows you to logically partition traffic transmitted between selected switch ports VLAN Unaware: Supports priority-tagged frames to be received by specific devices
19	Secure switch ports so that only specific devices and/or MAC addresses can access the ports
20	Radius/TACACS+ allows you to manage passwords from a central location
21	SNMPv3 provides encrypted authentication and access security
C	**PROTOCOLS**
22	IGMPv1/v2/v3, GMRP, GVRP/ MVRP, SNMPv1/v2c/v3, DHCP Server/Client, DHCP Option 66/67/82, BootP, TFTP, SNTP, SMTP, RARP, RMON, HTTP, HTTPS, Telnet, SSH, Syslog, SNMP Inform, LLDP
D	**FLOW CONTROL**
23	IEEE 802.3x flow control, Back pressure flow control (Optional)
E	**SWITCH PROPERTIES**
24	Priority Queues 4
25	IGMP Groups 256
26	MAC Table Size: 8 K
27	Jumbo Frame Size: minimum 8.9 KB
28	Packet Buffer Size: 1 Mbit
29	Max. Number of Available VLANs more than 200
30	VLAN ID Range VID 1 to 4094
31	Alarm Contact 1 relay outputs with current carrying capacity of 1 A @ 24 VDC
32	LED Indicators: PWR1, PWR2, FAULT, STATE, 10/100/1000M
F	**ENVIORNMENTAL**
33	Operating Temperature: -10 TO 55 Degree
34	Humidity 5 to 95 %(non-condensing)
35	Mounting: DIN-Rail mounting, wall mounting (with optional kit)
36	Housing: Metal, IP30 protection
G	**INPUT VOLTAGE**
37	Input Voltage: 48 VDC (46 to 57 VDC), redundant dual inputs
38	Switch shall be supplied with 2 nos. 240-Watt Power Supply from day 1
H	**Standard and Certifications**

39	Shock: IEC 60068-2-27 Freefall: IEC 60068-2-32 Vibration: IEC 60068-2-6 Or equivalent BIS

5.9.2 **1G SFP Module for Uplink Ports – If required as per design and to be part of fiber installation**

	Technical Specification (Minimum)
1	Digital Diagnostic Monitor Function
2	1000BaseLX port with LC connector for 10 km transmission or more
3	0 to 55°C operating temperature range
4	IEEE 802.3z compliant
5	Differential LVPECL inputs and outputs
6	TTL signal detect indicator
7	Hot pluggable LC duplex connector
8	Class 1 laser product, complies with EN 60825-1
9	Safety: CE, FCC, TÜV (EN 60825), UL 60950-1, or equivalent BIS

5.9.3 **SM Fiber Patch Cord –Duplex (LC-LC)**

Please Refer section “Specifications: Common Components” for relevant specification

5.9.4 **CAT-6 Patch Cord**

Please Refer section “Specifications: Common Components” for relevant specification

5.10 **Specifications: Sub-System for Local Control Room**

This facility typically would have the DG Set (outside), UPS, PC, Printer, Weighbridge Controller/ PLC etc.

Sl.	Functional Requirement
1	These are the facility provided for controlling the individual locations where systems are getting installed such as “Vehicle Entry”, “Weighbridge” etc.
2	These shall be mostly Porta Cabins or similar facilities
3	The operator would sit in this facility only
4	The Desktop with Power supply shall be installed behind the Display
5	The power distribution for the system components to be done by the SI within the facility

5.10.1 **Desktop with Power Supply**

To be Provided by OMC

5.10.2 **24" FHD Monitor**

To be Provided by OMC

5.10.3 **Keyboard & Mouse**

To be Provided by OMC

5.10.4 **Desktop QR Code Reader**

	Technical Specifications	
A	**Physical Characteristics**	
1	Supported Host Interfaces	USB, RS232, Keyboard Wedge, TGCS (IBM) 46XX over RS485
B	**Regulatory**	
2	User Indicators	Good decode LEDs, rear view LEDs, beeper (Adjustable tone and volume)
3	Environmental	EN 50581:2012 RoHS 2011/65/EU (2015/863) - EN 50581:2012, IEC 63000 REACH 1907/2006
4	Electrical Safety	IEC 62368-1 2nd ed. EN 62368-1:2014/AC:2015 UL/IEC 60950-1, 2nd ed. CAN/CSA C22.2 No.60950-1, 2nd ed.
5	LED Safety	IEC 62471:2006 (Ed.1.0) EN 62471:2008 (LED)
6	EMI/RFI	FCC 47 CFR Part 15B, ICES-003, EN55032, EN55024, EN55035, VCCI, and SABS
C	**Symbol Decode Capability**	
7	1D	Code 39, Code 128, Code 93, Codabar/NW7, Code 11, MSI Plessey, UPC/EAN, I 2 of 5, Korean 3 of 5, GS1 DataBar, Base 32 (Italian Pharma)
8	2D	PDF417, Micro PDF417, Composite Codes, TLC-39, Aztec, DataMatrix, MaxiCode, QR Code, Micro QR, Han Xin, Postal Codes, securPharm, DotCode, Dotted DataMatrix
9	OCR	OCR-A, OCR-B, MICR, US currency
D	**Imaging Characteristics**	
10	Graphics Format Support	Images can be exported as bitmap, JPEG or TIFF
11	Image Quality	109 PPI on a 4.1 in. x 5.8 in./A6 sized document
E	**User Environment**	
12	Operating Temperature	0.0° C to 40.0° C or higher
13	Storage Temperature	-20.0° C to 60.0° C
14	Humidity	5% to 95% RH, non-condensing
15	Drop Specification	Designed to withstand multiple drops at 1.2 m
16	Environmental Sealing	IP50 or above

5.10.5 **8 Port PoE Indoor Switch**

	Functional Requirements
1	This switch shall be placed inside the local control room in a 6U Indoor rack.
2	All the indoor IP devices to be connected to this switch.
	Technical Specifications
1.	Switch Should Support 8 10/100/1000BASE-T PoE , 2 SFP ports
2.	switch should support Operating Temperature -0 to 40 °C
3.	Switch Should Support Min. 20 Gbps Switching Capacity and Maximum 64 Byte, Packet Forwarding Rate is 14.88 MPPS, 8K MAC address table.
4.	Switch Should Support IEEE 802.3af & at compliance (for PoE ports) and minimum 75W Power Budget.
5.	Switch Should Support IGMP Snooping v1, v2 and MLD snooping v1/v2

6.	Switch Should Support 4K VLAN ID's, Min 256 static VLAN
7.	Switch Should Support Port Mirroring One to one/Many to One,
8.	Switch should support Quality of Service (QoS), 802.1p, Strict, Weighted Round Robin (WRR), Bandwidth Control.
9.	Switch Should Support IP interfaces, Static routing for inter-VLAN Communication
10.	Switch should be supplied with the all necessary components like Power supply, Power cord, Console Cable, Rack-mount kit, Installation Guide, etc. and necessary software image file to fulfil all above mention feature set from day 1.

5.10.6 **3" Thermal Printer**

	Technical Specifications	
A	**PRINTER SPECIFICATIONS**	
1.	Resolution	203 dpi/8 dots per mm
2.	Memory	16MB SDRAM, 16MB Flash
3.	Print Width	50 mm to 80 mm
4.	Max Print Speed	60 mm/s or faster
5.	Sensors	Black Mark, Gap, Media Out sensing
6.	Battery Capacity and Type	Minimum 2550 mAh (7.4V), rechargeable Li-ion battery
B	**ENVIRONMENT AND RESISTANCE**	
7.	Operating Temp.	-10°C to 50°C
8.	Storage Temp.	-20°C to 60°C
9.	Printing Length per Charge	Minimum of 500 labels x 8.5 in. length, 13% density
10.	Printhead Reliability	50KM abrasion resistance (scratch failure mode by foreign particle is excluded)
11.	Drop Specification	1.2 m to concrete
12.	IP Rating	IP50 or above
13.	Soft Case	Add an extra layer of protection for harsh environments with a soft case. When inserted into the case, the printer is IP54-rated for resistance to windblown water and dust. Includes a shoulder strap.
14.	Shoulder Strap	Hooks to the soft case or printer for easy over-the- shoulder carrying (shoulder strap is included with the Soft Case).
15.	AC to USB Adapter	Use AC to USB Adapter to charge your printer along with USB Cable
C	**AGENCY APPROVALS**	
16.	Emissions	EN55032, ETSI EN 301 489 -1 / -17 or equivalent BIS
17.	Susceptibility	EN55035, ETSI EN 301 489 -1 / -17 or equivalent BIS
18.	Safety	IS 13252, IEC 60950 or equivalent BIS
D	**COMMUNICATION AND INTERFACE**	
19.	Bluetooth	Bluetooth 2.1+EDR/4.1
20.	USB Port	USB 2.0 type-C connector

21.	NFC Tag	Passive NFC tag
22.	Charging Method	USB and/or docking charging
23.	Low Power Mode	Support power saving
24.	MFi (iOS support via Bluetooth)	MFI -Certified
25.	User Interface	OLED Screen, Control Buttons (Power, Config, Feed)
E	**BARCODE SYMBOLOGY**	
26.	Linear Barcodes	Code 39, Code 93, UCC/EAN128 (GS1-128), Code 128, Coda bar, Interleaved 2-of-5, UPC-A and UPC-E 2, 5-digit add-on and composite, EAN-8, EAN-13, 2, 5 digit add-on and composite
27.	2D Barcodes	PDF417, MicroPDF417, Maxi Code, QR Code, GS1/ Data Bar (RSS) family, Aztec, MSI/Plessey

Note: The selected bidder shall provide and maintain the thermal printers. However, the consumables like papers, ink etc. shall be reimbursed as per actuals by OMC.

5.10.7 **Wi-Fi AP**

Functional Requirements

Sl.	Functional Requirement
1.	Wi-Fi APs to be used to provide wireless network to the handheld devises in use
2.	Wherever handheld devices would be used, Wi-Fi AP to be used there
3.	Access Point should support in-built BLE from day-1
4.	Access Point should have 2x2: MIMO (802.11ax ready) and minimum 1.7Gbps aggregate bandwidth

5.10.8 **RJ-45 Information Outlet, Dual Port**

Please Refer section “Specifications: Common Components” for relevant specification

5.10.9 **CAT-6 Patch Cord**

Please Refer section “Specifications: Common Components” for relevant specification

5.10.10 **ACDB with 1 RCCB, 6 DP MCB**

Sl.	Functional Requirement
1	AC Distribution board shall be used for power distribution to various systems and JBs
2	DG Power shall be fed to the UPS and UPS outgoing shall be provided to the ACDB

	Technical Specifications
1	Double Door Distribution Boards IP 43- IK09 (or higher) metal door (dust protected) as per IS 8623-1&3, IEC 61439-1&3 suitable for flush mounting

2	fully insulated copper busbars, shrouded neutral bars, earth bars, cement spill protector, color- coded interconnecting wire set, cable ties, blanking plates and circuit identifications label
3	1 no. RCBO's/RCCB's in the distribution board
4	1 main DP MCB of suitable capacity
5	6 no. DP MCB of suitable capacity for electrical distribution
6	Miniature Circuit Breaker MCB's for circuit protection against overload and short circuit current fault suitable for 240/ 415 volts 50cycles AC supply with breaking capacity of 10kA

5.10.11 **PVC Perimeter Trunking complete with accessories**

Functional Requirements

Sl.	Functional Requirement
1	PVC Perimeter Trunking to be run across the wall of the control room to run the power and network cable
2	Power points (through modular type switch board) to be installed on these

Technical Specifications

Sl.	Specifications
1.	A mid-size feeder and distribution trunking that can be subdivided to carry power and data.
2.	Larger sizes can also accommodate wiring accessories
3.	Single or divided compartment options
4.	Fabricated data slow bends

5.10.12 **Modular type Switch Board,**

2 nos. combined 5/15A socket & switches to install on PVC trunking.

5.11 **Specifications: Sub-System for Outdoor Junction Box**

5.11.1 **Outdoor Junction Box**

	Technical Specifications	
1.	Size	Suitable size as per site requirements to house the field equipment. Minimum size: 800mm(H) x 600mm(W) x 300mm(D)
2.	Cabinet Material	GI with powder coated (Antirust coating)
3.	Material Thickness	Min 1.2 mm
4.	Number of Locks	Two Point Lock
5.	Protection	IP 55, Junction Box design should ensure to keep the temperature within suitable operating range for equipment's and should also avoid intentional water splash and dust intake. With built-in redundant fan and filter assembly inherent in the design. Junction Box design should ensure to keep the Operating temperature range of 10° C to 50° C.

6.	Mounting	To be mounted on a Base stand made up of powder coated MS Angle Profile with minimum height of 600 MM and should be covered from all sides with GI/MS powder coated sheet of minimum 1.2 MM thickness. The height of the stand to be selected based on the surface gradient to ensure that in case of water logging the logged water should not enter the JB.
7.	Cabling	All cabling to be brought from the bottom through double compression glands to ensure that the IP rating is not compromised.
8.	Form Factor	Rack Mount/DIN Rail
9.	Other Features	Rain Canopy, Cable entry with glands, proper earthing and Fans/any other accessories as required for operation of equipment's within junction box.
10.	Additional	Pocket to keep papers/file on inner side of the door LED light with limit switch to switch on the light once door is open. Additionally, a power off switch also to be available on the LED light.

5.11.2 **Electrical, Control & Signal Wiring complete with PDU, Switchboards, Raceways, Terminals, RCCD, MCB's, Networking elements and all other required accessories**

Functional Requirements

Sl.	Functional Requirement
1.	Cabling to be properly structured within the JB
2.	All safety aspects like use of RCCD, SPD, MCB in the input power line to be installed
3.	All the cables to be tagged either with wrap around labels or Cable flags using machine labelling. Handwritten labels are not allowed.
4.	All power distribution shall be done through PDU only.

5.11.3 **PLC Controller**

Sl.	Parameter	Specifications
1	Programming Languages	Ladder Diagram (LD), Structured Text (ST), Continuous Function Chart (CFC), Sequential Function Chart (SFC), C Language
2	Instruction Processing Speed	
2.1	LD Instruction	25 ns or faster
2.2	MOV Instruction	0.15
2.3	Elementary Arithmetic for Integer	0.92-1.02
2.4	Elementary Arithmetic for Floating Point	1.69-1.85
3	Program Capacity	64k steps
4	Memory Capacity	
4.1	Data (D)	64k words (Including 30k user-defined, 30k software configuration and 4k special registered
4.2	Extension (FR)	64k words (user parameter storage
5	Max. Extension Modules	32 modules (max. 16 analog modules /4 communication modules)
6	Max. Number of Real Inputs/ Outputs	1024 points (input and output)
7	CPU Built-in Inputs/ Outputs	16 DI/ 12 DO

8	Input/ Output Devices	
8.1	X	1024 inputs (X0.0-X63.15
8.2	Y	1024 outputs (Y0.0-Y63.15)
9	Bit Devices	
9.1	M	8192 bits (M0-M8191)
9.2	S	2048 bits (S0-S2047)
10	Timer (T)	512 (T0-T511)
11	16-bit Counter ©	512 (C0-C511)
12	32-bit Counter (HC)	256 (HC255)
13	Pulse Output	Open collector: 3 axes, 200 kHz
14	Built-in Communication Port	USB, Ethernet, RS-485X2
12	Communication Protocol	CAN open
16	Latched Area	MRAM, no rewriting limit
17	CAN open DS301	
17	Connectable Slave Stations	Max. 64 Points
17.2	CPDO Data Capacity	Max. 200 bytes (Read & Write)
17.3	PDO Data Capacity	Max. 8 PDO (Read & Write) Max. 8 bytes for each PDO
18	Real-time Clock (RTC)	General Lithium Button battery (CR1620)
19	Self-Diagnosis Function	CPU error, built in memory error and more
20	Rated Input Current	
20.1	AS-PS02 /AS-PS02A/ AS-PS03C	110Vac-240Vac
20.2	CPU	24Vdc

5.11.4 **DIN Rail Mount LIU, 6/12 Port Duplex**

DIN Rail Mount LIU for Junction Point	
Sl.	**Description**
1	DIN Rail Mount LIU should have High quality cold rolled steel plate and powder coated.
2	Should have 35mm standard DIN rail mountable to support standard 35mm DIN rail application
3	Should have knock-out features to provide multi cable entrance to allow cable to enter from different directions
4	Should have splicing protector holder included to provide better splicing point and fiber protection
5	Only bending insensitivity pigtails to be used with these.
6	6 Ports to be fully loaded as a minimum

5.11.5 **SM Fiber Patch Cord –Duplex (LC-LC)**

Please Refer section “Specifications: Common Components” for relevant specification

5.11.6 **Cat6 Shielded Field Termination Plug**

Please Refer section “Specifications: Common Components” for relevant specification

5.11.7 **Chemical Earthing**

Please Refer section “Specifications: Common Components” for relevant specification

5.12 Specifications: Sub-System Ariel ADSS OFC Laying

5.12.1 24 Core, ADSS OFC Cable

Please Refer section “Specifications: Common Components” for relevant specification

5.12.2 Poles for OFC Laying along with Installation

	Technical Specifications
1	The Conical/Polygonal/circular pole and cantilever arm should be designed to with stand maximum wind speed as per IS: 875 (Minimum 50 m/Sec)
2	Pole shaft should have conical/circular cross section.
3	Pole shaft shall be provided with a grade flange plate of suitable thickness with provision of fixing suitable no. of foundation bolts.
4	Material of construction shall be:
A	Conical/round pole shaft - HT Steel Conforming to grade S355 with minimum 2.5 MM thick sheet.
B	Pole base plate - Fe 410 Conforming to IS 226/IS 2062
C	Pole foundation Bolt- EN 8 grade
5	Pole shall be hot dip galvanized as per IS 2629/IS2633/IS 4759 standard with average coating thickness of 86 Micron. The galvanizing shall be done in single dipping.
6	Minimum dimensions: Bottom section: 135 MM, Top Section: 75 MM. In case of round pole min. diameter to be 114 MM. Base Plate: Square Plate of 225 MM of 12 MM Thick Plate Height of the Pole: Min. 6 meters above the ground
7	4 nos. Anchor bolt of size M20 X 600 MM to be provided with each pole basis the soil bearing test report of the actual site.
8	SI can use direct burial type poles too for this purpose subject to meeting all the structural and environmental conditions of the location.

5.12.3 Manhole

Functional Requirements

Sl.	Functional Requirement
a)	For the underground section of cable laying Manhole to be used for jointing of cables on lengths as per drum size
b)	Otherwise, Manhole to be used near the JB to place the FOSC and for the branching of fibre cable

Technical Specifications

Sl.	Parameter	Specifications
1	Inner Dimension	a. Suitable size of 600mm x 600mm x 900mm b. Or as per site requirements to house the Fiber Cable and FOSC

2	Material	Pre-cast RCC
3	Compliant	ISI Compliant
4	Cover Dimension	Suitable to manhole dimension
5	Cover Material	Cast Iron or Concrete as per approval from OMC

5.12.4 **Inline 48 Fibre Optic Splice Enclosure**

Please Refer section “Specifications: Common Components” for relevant specification

5.12.5 **Dome Type Outdoor Fibre Optic Splice Enclosure**

Please Refer section “Specifications: Common Components” for relevant specification

5.12.6 **OFC ADSS Cable Assembly for Suspension & Tension accessories**

ADSS Cable Installation	
Sl.	**Description**
1	Special care must be taken in order to not exceed the maximum pulling tension, the minimum bending radius and the maximum crush or impact resistance. It is also essential to avoid all jacket damage, since this can expose the strength yarns and significantly reduce the reliability of the cable. The IEEE Guide to the Installation of Overhead Transmission Line Conductors to be referred for additional relevant information about installation practices.
2	During the installation process, the cable should not experience sags, bends or twists that produce a bend radius smaller than the specified minimum bend radius.
3	Proper installation equipment to be used for the installation of cable.
	Cable Hardware
4	Typical cable hardware should consist of Tangent Clamps, Suspension Grips, and Tension Grips. Hardware is designed for specific cable designs. Only use hardware recommended for a given cable design, and never re-use hardware. It is important that SI carefully installs the hardware without any damage to the cable jacket. Any cable jacket damage must be immediately reported, and if necessary, the cable must be replaced by SI.
5	A Tangent Clamp shall be used as cable attachment hardware only on spans less than 100 meters (350 feet) when the angle of change, either horizontal or vertical, is less than 15°. The tangent clamp to hold the cable in the air at the pole without gripping the cable.
6	An AGS (Armour Grip Suspension) to be used for any span length with an angle change, either horizontal or vertical, of less than 25°. An AGS Suspension Grip shall be used for in-line structures if the span is greater than 100 meters (350 feet).
7	Tension Grips (Fibre Optic Dead ends) to be used in several instances. A tension grip shall be installed at each end of the cable length to attach to the structures. Two tension grips are used at angle changes of 25° or greater, either horizontal or vertical. If the structures are in-line but have a vertical difference greater than 20°, tension grips shall be used to distribute the cable through the incline/decline.
	Cable Loop Holder
8	Proper loop holder to be used to hold slack cables.
9	It should be made of GI Material and to be mounted on the poles with the use of proper mounting accessories.
10	Cable loop holder to be used every 1 KM (maximum).
11	30 feet of slack cable to be kept as a minimum in each Cable loop holder.
	Splicing

12	Splicing should be performed on the ground. The splice can then be stored aerially (recommend at least 6 meters off the ground), or underground in a hand hole or manhole.
13	Sufficient length of cable ends should allow the cable to descend the structure and enter a splicing vehicle or splicing area. Each splice should have at least a small storage loop to allow the splice to be removed from the base of the pole to the splicing equipment if it cannot be located close by. 2-3 meters of cable shall be discarded from each pulling grip end to remove damaged or stressed cable.
14	Each cable end should have at least 30 meters or more from the tension attachment, depending on the tower or pole size. Be sure to account for at least 3 meters of cable for the splicing operation.

5.13 Specifications: Sub-System for 2 KVA UPS

5.13.1 2 KVA UPS with 1 Hours Backup on full Load

	Technical Specifications	
1	Power rating (VA/Watt/KVA)	2000VA/1600W/2KVA
A	**Input**	
2	Nominal input voltage	230V
3	Input voltage range at full load (half load)	160 – 280 V (110-280 V)
4	Input frequency	40-70 Hz auto-selecting
5	Input connection	IEC 60320 C20
B	**Output**	
6	Nominal output voltage	230V (220V, 240V user selectable)
7	Output frequency	50/60 Hz ± 3 Hz (On Mains) 50/60 Hz ± 0.1 Hz (On Battery)
8	Topology	Double-conversion online
9	Waveform type	Pure sinewave
10	Efficiency: Double conversion mode (typical)	Up to 88%
11	Efficiency: ECO mode (typical)	Up to 95%
12	Output connections	(4) India socket/ IEC Socket
C	**Battery and Runtime**	
13	Battery type	Sealed maintenance free valve regulated lead acid battery (leak proof)
D	**Communications and management**	
14	Interface ports	Serial RS-232, USB (type B), Intelligent Smart-Slot SNMP Card to be provided with UPS
15	Control panel	LED indicators, multi-function LCD, status and display console
E	**Physical**	
16	Rack height (U)	2U
17	Colour	Color to be as per OEM. However preferred is RAL7010.
F	**Environment**	

18	Operating temperature	0°C to 40°C
19	Relative humidity	0 to 95% non-condensing
20	Protection class	IP 20
G	**Conformance**	
21	Regulatory approvals	BIS or Equivalent Certification

5.13.2 **3.5 KVA, Portable/Stationary Silent DG, Diesel**

DG shall be provided by OMC. SI to consider required items/components to take the power to the ACDB.

5.14 **Specifications: Sub-System for 5 KVA UPA**

5.14.1 **5 KVA UPS with 1 Hours Backup on full Load**

	Technical Specifications	
1	Capacity (in kVA / kW)	>5 KVA, 0.9 or Better O/P power factor
2	Technology and Capability	a) Active Power Factor Correction (APFC) in converter to improve Input Power Factor > 0.98
3	Input facility -Phases / Wires	1 Phase IN & 1 Phase Out
4	Input Voltage Range	110 – 280 V AC
5	Input Frequency Range	40 to 70 Hz
6	Input Power Factor	> 0.98 on Full Load
7	Generator Compatibility	Compatibility to genset supply required
8	Input Protection (Thru In-built 1P MCB)	Should be provided at the input of the UPS suitable for the full rated capacity of the UPS
9	Nominal Output voltage	220/ 230/ 240VAC (Selectable)
10	Output Voltage Regulation	+/- 1% static and +/- 5% at 100% load step
11	Nominal Output Frequency	50 / 60 Hz
12	Output Frequency Regulation	+/- 0.10 Hz (Free Running / Self Clocked Mode)
13	Output Wave Form	Pure sine wave
14	Output Voltage Distortion (THDu)	<= 3% for Linear load
15	Crest Factor	3 : 1 On Full Load (Minimum)
16	Output Short circuit Protection	Electronic / Fused
17	Transfer Time (Inverter to Bypass / Bypass to Inverter)	< 4 ms (Synchronized Mode)
18	Automatic By-pass (In-built)	To be provided
19	Overall Efficiency (AC to AC) - Online (Double Conversion)	>= 90% at Full Load >= 98% in Green ECO mode
20	Green Mode / Eco Mode	Shall be provided in each UPS (All ratings) to choose Higher Efficiency Mode of Operation
21	Measurements (On LCD)	Input: Voltage / Frequency Output: Voltage / frequency

		Battery: Remaining time / Voltage Load: Percentage / kW
22	Fault Indication (On LCD)	Charger Failure Battery Failed Battery Low Overload
23	Indications (LED/LED)	AC indicator/Battery Mode of Operation / Bypass feeding the load / UPS Fault
24	Audible Alarms	Battery Low beep / DC Fault beep/ UPS Overload beep/ o/p short circuit fault beep/ Shutdown beep
25	Backup Required	60 Min back up at 0.8 PF and 1.75 ECV.
26	Battery Bank Voltage	Vendor to Specify
27	Batteries Type	Sealed Maintenance Free (SMF) - 12V Cells
28	Battery recharge time (After complete discharge) to 90% capacity	8-10 hours
29	USB Port	Shall be present in the UPS
30	Emergency Power Off	Should be provided as standard in the UPS
31	Remote Monitoring	To be provided with access to user using a mobile app compatible with IOS/Android.
32	SNMP Card	To be provided
33	Interface to BMS (Building Management System)	ModBus Card for connecting to UPS to BMS thru RS485 & monitoring thru BMS option shall be available.
34	Interface to DCS (Distributed Control System)	Relay I/O Card or PFC (Potential free contacts) for connecting to UPS to DCS / PLC / SCADA system for communicating UPS operating status option shall be available
35	Scheduled Shutdown	The UPS NMC shall be capable for scheduling a shutdown.
36	Cold Start	UPS should start up On AC Supply (Mains) without DC Supply (Batteries) On DC Supply (Batteries) without AC Supply (Mains)
37	Automatic Restart	UPS should start up automatically on mains resumption after battery low shutdown
38	Operating Temperature	0 to 40 deg C
39	Storage Temperature	-15 to 50 deg C
40	Operating Humidity	0% ~ 95%RH (No Condensing)
41	Operating Elevation	0 - 1000 m
42	Type of Cooling	Natural Convection Cooling through air vents
43	Noise Level	< 60 dbA at 1-meter distance
44	Form Factor	5 kVA: Rack/ Tower mountable
45	Air Filters (mandatory)	UPS should have internal anticorrosion air filters for dust filtration
46	Product Certificates	BIS or Equivalent Certification OEM should have own centralized Help Desk (24 X 7 support) with Toll Free Number.

5.14.2 **5 KVA Silent DG with AMF Panel, Stationary**

DG shall be provided by OMC. SI to consider required items/components to take the power to the ACDB.

5.15 **Specifications: System Components**

5.15.1 **A4 LaserJet, MFP, Monochrome**

Sl.	Parameter	Description
1	Print Technology	Laser Printer
2	Print Speed	14 ppm
3	Connectivity	USB
4	Paper Handling	Paper (laser, plain, photo), envelopes, labels, cardstock, transparencies, postcards
5	Paper Size	A4, A5, A6, B5, C5, postcards
6	Monthly Duty Cycle	Up to 2000 Pages
7	Print Quality	Up to 600 x 600 dpi
8	Connectivity	Windows XP, Windows 7, Windows 8

Note: The selected bidder shall provide and maintain the thermal printers. However, the consumables like papers, ink etc. shall be reimbursed as per actuals by OMC.

5.15.2 **3 Core X 2.5 Sq. MM Armored Cable**

Please Refer section “Specifications: Common Components” for relevant specification

5.15.3 **24 Core, ADSS OFC Cable**

Please Refer section “Specifications: Common Components” for relevant specification

5.15.4 **UHF RFID Tags, Tamper proof**

Sl.	Functional Requirement
1	These tags shall be provided to each driver after assigning these in the system
2	Placement of tags on all the vehicles should be uniform

	Technical Specifications	
1	Power Supply	Tags are Passive
2	Frequency	UHF 860 MHZ to 960 MHZ as per EPC Gen 2 standards
3	Protocol	EPC Gen 2, ISO 18000-6C
4	Material	Plastic substrate with printed antenna
5	Physical printing of Tag ID on the Tag	The Tag ID shall be physically printed on the Tag using the Hexadecimal numbering system and shall be adequately clear for easy visual recognition
6	Relative Humidity	95% condensing
7	Operating Temperature	0°C to 50°C ambient
8	Storage Temperature	0°C to 50°C

9	Location	The RFID Tag shall be installed at a fixed location on the inside of the Windshield of the vehicle (*location to be optimized for each class of vehicle during trials)
10	Installation mechanism	The RFID Tag shall have a self-adhesive backing with which it can be fixed to inside of the windshield. The adhesive shall be such that i) It allows reliable and accurate reading of the Tag by the Transceiver located at a specified distance ii) The RFID chip and/ or the antenna get irreparably damaged when an attempt is made to remove the installed Tag from the windshield by any means. After such an attempt, the Tag shall become inoperable
11	Tag Memory (minimum)	Unique Tag ID – 64 bits, EPC memory – 240 bits
12	Dimensions (including the substrate/ backing)	Maximum area occupied on the windshield shall be 50 Sq. cm.

5.15.5 **Desktop UHF RFID Reader & Writer**

	Technical Specifications	
1	Processor	ARM9, 400MHz or better
2	Memory	Flash 128MB; DRAM 32 MB or better
3	Operating System	Linux 2.6 or equivalent
4	API Support	Windows — .NET, C and Java SDK Android -Java Linux— C and Java SDK
5	Air Protocols	ISO/IEC18000-6B, 6C 1 EP C ClGen2
6	Frequency	USA: 902 MHz-928MHz (FCC part 15), EU: 665-868MHz (ET& EN 302208)
7	Output Power	25dBm±ldB (MAX) adjustable
8	Channel bandwidth	<200KHz
9	Work Mode	Fixed/hop frequency optional
10	Antenna	Built-in circular polarization antenna
11	Communications	RJ45, USB
12	Power supply	DC 5V14A
13	Housing Material	ABS
	Operational Environment	
14	Operating Temp.	-10 to +50 deg
15	Storage Temp.	-10 to +60 deg
16	Humidity	5-95% non-condensing
17	IP Protection	IP54 or above

5.15.6 **Video Wall, 55" Displays**

	Technical Specifications	
1.	Overview Display	The displays shall utilize direct LED lit LCD panel/ DLP technology with a “Typical” lifetime rating of ≥100K hours, The screens shall be able to align physically auto organise the position on the videowall. Total 4 panels in 2X2 (CXR) configuration to be provided.

		All panels shall be of 55" diagonal size with bezel-less design to have seamless technology with 0.88 mm gap or less between two panels
2.	Native Resolution per Panel	1920 x 1080 or better
3.	Aspect Ratio	16:9, Color temperature upto 10500 K can also be set
4.	Backlight	Direct LED with 500 Nits of brightness or more and ≥100K Hours lifetime of LED minimum
5.	Brightness	The "Typical" Luminance specification must be 500 Cd/m2 (nits) or higher with a "Typical" Static Contrast Ratio of 1100:1 or greater in normal operation.
6.	Viewing angle	Each display shall utilize a high contrast screen (anti-glare) with sizes of 55" diagonal. The screen shall have a H 178°/V 178° viewing angle or greater with a screen "haze" value of 28% or greater for wide viewing angles for operators.
7.	Automatic colour and brightness adjustment.	Each LCD Panel/ DLP must have built-in option or controller option, to automatically control light and colour sensors to keep display performance, such as luminance and colour, uniform in time across the entire display wall. The sensors must measure both brightness and colour.
8.	Input signal flexibility	The LCD panel/ DLP shall have digital input connectivity options, including, but not limited to, HDMI, full Display Port and IP inputs supporting up to Quad HD resolutions at 60fps or higher. Each LCD panel/ DLP shall have the ability to "loop-through" any selected digital input signal via a DP1.2 connection
9.	Connectivity	1x DP1.2 , 1x HDMI2.0 , 2x USB
10.	OEM Certification	EMC, CE, CB, UL, Class A EMC or BIS Equivalent
11.		The Display Modules, Display Mount, Display Controller & Software should be from a single OEM.
12.	Signal cropping	Each LCD panel/ DLP shall have signal "cropping" capabilities allowing a single image to be displayed across the entire video wall array
13.	Remote Management	The control of the wall shall be possible via a network. All LCD panels/ DLP shall have their own IP address, and the control software can access all of them at the same time. The available features shall be: On/Off, Brightness and Colour, Input control
14.	EMC Protection	LCD Panel/DLP Display should comply with EMC (Electro-Magnetic Compatibility) Standard Class A. Bidder can propose LCD/DLP type display.
15.	Safety	EN 60950-1: 2006 + A11: 2009 + A1: 2010 + A12: 2011 + A2: 2013 OR BIS Equivalent Auto sensing of physical alignment of video wall
16.	RoHS	EN 50581: 2012 (Optional)

5.15.7 **Video Wall Controller with Software**

	Technical Specifications	
1	CPU	Intel® Xeon®/ i5/ i7
2	Memory	min. 32 GB RAM and expandable up to 64 GB

3	Hard Disk	Support up to minimum 6 HDD Std.: 500 GB , can be upgraded on request
4	Cooling	Should be equipped with dual FAN for cooling
5	Network	2x 1Gb/s LAN
6	Outputs	Up to 4 FHD displays
7	Inputs	4x HDMI inputs; H.264 inputs from cameras at least 8 Full HD inputs @30 Hz simultaneously can be shown
8	Graphics Card	4 channel Graphic card; Each port of graphics card should support minimum 3840x2160 @60Hz
9		GPU Memory 5GB GDDR5 per Graphics Card to have flicker free and smooth graphics
10		3840x2160@60Hz
11		Memory Bandwidth Up to 200GB/s per Graphics Card
12	Operating System	Windows 10 or higher / Windows 10 or higher 64-bit IoT Enterprise edition/ Win Server 2008 or equivalent
13	Output	DP/DVI/HDMI
14	Protocols Supported	H.264, MPEG2/4, MxPEG, MJPEG, H.263, Screen Scrapping Screen Scrapping via Freeware Software like VNC is not at all acceptable
15	Operating Conditions	100-240V ,10-5A, 50/60Hz, Redundant Power supply
16	Operating Temperature	0° to 40°C
17	Humidity	Humidity: 10 – 90% non-condensing
18	Regulation Compliance	UL, CB, FCC, CE, IEC-60950, IEC-62368 or BIS Equivalent
19	Software	The software should be able to preconfigure various display layouts and access them at any time with a simple mouse click or schedule/timer based.
20	Software	The software should be able display multiple sources anywhere on video wall in any size. Key features of Video Wall management Software • Central configuration database • Browser based user interface • Auto-detection of network sources • Online configuration of sources, displays and system variables
21	Software	Video Wall Control Software shall allow commands on wall level or cube level or a selection of cubes: • Switching the entire display wall on or off. • Setting all projection modules to a common brightness target, which can be either static (fixed) or dynamic to always achieve maximum (or minimum) common brightness between projection modules. • Fine-tune colour of each cube
22	Software	Should support Multiple clients / Consoles to control the Wall layouts
23	Software	The Software should be able to share layouts b/w available different videowalls on same network as well as preview of sources on the workstation

24	Software	Software should enable the user to display multiple sources (both local & remote) up to any size and anywhere on the display walls (both local & remote).
25	Software	The software should be able to create layouts and launch them as and when desired
26	Software	The Display Wall and sources (both local & remote) should be controlled from Remote PC through LAN without the use of KVM Hardware.
27	Software	Software should support display of Alarms
28	Software	The software should provide at least 2 layers of authentication
29	Software	Software should be able to Save and Load desktop layouts from Local or remote machines
30	Software	All the Layouts can be scheduled as per user convince. Software should support auto launch of Layouts according to specified time event by user
31	Software	It should be possible to create layouts comprising of screen scrapped content of Workstations, DVI inputs, Web sources, URLs configured as sources. Layouts can be pre-configured or changed in real time Can be pre-configured or changed in real time
32	Software	It should be possible to schedule specific Layout based on time range It should be possible to share the layouts over LAN/WAN Network with Display in meeting room or on Remote Workstations connected on LAN/WAN Network
33	Software	It should be possible to create two separate Tickers which run concurrently. These can be positioned at top or bottom and can run independently
34	Software	The system should have the capabilities of interacting (Monitoring & Control) with various applications on different network through the single Operator Workstation. It shall be possible to launch layouts, change layouts in real time using Tablet
35	Software	The control of the wall shall be possible via a network. All cubes shall have their own IP address, and the control software can access all of them at the same time. The available features shall be: On/Off, Brightness and Colour, Input control Separate hardware server for monitoring features Wall or Panel On/Off, Brightness and Colour, Input control, health monitoring. Also, software have feature to show maximum, minimum and current brightness / colour values of all the projectors.
36	Software	Central setup & Connection management, Central configuration database, fully distributed & modular component technology, Browser based UI, Auto-detection of network sources
37	Software	Online configuration of sources, backup & restore, Scheduled backup, fully features web services-based API covering all legacy and encrypted communications
38	Modules	The Display Modules, Display Controller & Software should be from a single OEM

5.15.8 **Workstation with Dual Screen**

Sl.	Parameter	Description
1	Processor	Core i7 or higher, 4.0 GHz
2	RAM	Minimum 16 GB
3	Memory	250 GB SSD / SATA at 7200 RPMS
4	Interface	Ethernet Ports X 2 Nos., USB Ports X 4 Nos.

5	Power	230 V AC
6	Operating System	Licensed Windows OS
7	LED Monitor	Dual Display with 24 Inch monitor
8	Keyboard	104 keys or better
9	Network Card	1Gbit/s network card
10	Antivirus	Enterprise level pre-loaded antivirus

5.15.9 **L3 Distribution Switch**

	Technical Specifications
1	**Architecture**
	Shall be modular chassis-based/ fixed port based L3 switch, 19" Rack Mountable
	Shall have dual power supplies from Day 1
	The switch should have minimum 24x10/100/1000BASE-T RJ-45 ports and 4 SFP+ fixed 1000/10000 SFP+ ports
	The switch should support Stacking functionality with min 80Gbps stacking bandwidth
	Should have 1x RJ-45 serial console port and 1x RJ-45 out-of-band management port
	Should support minimum 30K entries (IPv4), 15K entries (IPv6) routing entries and 32K MAC address entries
	Shall have switching capacity of min 288 Gbps
	The Switch should have preferably modular operating system
2	**Quality of Service (QoS)**
	The Switch should classify traffic using multiple match criteria based on Layer 2, 3, and 4 information; applies QoS policies such as setting priority level and rate limit to selected traffic on a per-port or per-VLAN basis
	The switch should support IEEE 802.1p priority tag based on IP address, IP Type of Service (ToS), Layer 3 protocol, TCP/UDP port number, source port, and DiffServ
3	**Resiliency and high availability**
	Shall have the capability to extend the control plane across multiple active switches making it a virtual switching fabric, enabling interconnected switches to perform as single Layer-2 switch and Layer-3 router.Single IP management upto 4 switches.
	IEEE 802.1D Spanning Tree Protocol, IEEE 802.1w Rapid Spanning Tree Protocol and IEEE 802.1s Multiple Spanning Tree Protocol
	IEEE 802.3ad Link Aggregation Control Protocol (LACP)
	Ring protocol support to provide sub-100 ms recovery for ring Ethernet-based topology
	Virtual Router Redundancy Protocol (VRRP) to allow a group of routers to dynamically back each other up to create highly available routed environments
	Graceful restart for OSPF, IS-IS and BGP protocols
	Bidirectional Forwarding Detection (BFD) for OSPF, IS-IS and BGP protocols
	The switch should support Uplink Failure Detection
4	**Ipv6 Feature**
	The switch should support Dual stack (Ipv4 and Ipv6)

	The switch should support Ipv6 ACL/QoS
	The switch should support static, RIPng, OSPFv3 routing protocols from day one
	The switch should have RA guard, DHCPv6 protection, dynamic Ipv6 lockdown, and ND snooping
5	**Layer 2 switching**
	Shall support up to 4,000 port or IEEE 802.1Q-based VLANs
	Shall support GARP VLAN Registration Protocol or equivalent feature to allow automatic learning and dynamic assignment of VLANs
	Shall have the capability to monitor link connectivity and shut down ports at both ends if uni-directional traffic is detected, preventing loops
	Shall support IEEE 802.1ad QinQ and Selective QinQ to increase the scalability of an Ethernet network by providing a hierarchical structure
	Internet Group Management Protocol (IGMP),Multicast Listener Discovery (MLD) snooping
	IEEE 802.1AB Link Layer Discovery Protocol (LLDP)
	Multicast VLAN to allow multiple VLANs to receive the same IPv4 or IPv6 multicast traffic;Should support Vxlan,EVPN from day-1.
	Should support Multicast Source Discovery Protocol (MSDP)
6	**Layer 3 Features (any additional licenses required shall be included)**
	Static Routing for IPv4 and IPv6
	RIP for IPv4 (RIPv1/v2) and IPv6 (RIPng)
	OSPF for IPv4 (OSPFv2) and IPv6 (OSPFv3)
	IS-IS for IPv4 and IPv6 (IS-ISv6)
	Border Gateway Protocol 4 with support for IPv6 addressing
	Policy-based routing
	Unicast Reverse Path Forwarding (uRPF)
	Dynamic Host Configuration Protocol (DHCP) client, Relay and server
	PIM Dense Mode (PIM-DM)/Sparse Mode (PIM-SM), and Source-Specific Mode (PIM-SSM) for IPv4 and IPv6 multicast applications
	MPLS capability including MPLS VPNs and MPLS Traffic Engineering (MPLS TE)
7	**QoS & Security**
	Access Control Lists for both IPv4 and IPv6 for filtering traffic to prevent unauthorized users from accessing the network
	Port-based rate limiting and access control list (ACL) based rate limiting
	Congestion avoidance using Weighted Random Early Detection (WRED)
	Powerful QoS feature supporting strict priority (SP) queuing, weighted round robin (WRR), weighted fair queuing (WFQ), weighted deficit round robin (WDRR) and weighted random early discard (WRED)
	IEEE 802.1x to provide port-based user authentication with multiple 802.1x authentication sessions per port
	Media access control (MAC) authentication to provide simple authentication based on a user's MAC address

	Dynamic Host Configuration Protocol (DHCP) snooping to prevent unauthorized DHCP servers
	Shall support Port security
8	**Management Features**
	Configuration through the CLI, console, Telnet/SSHv2 and Web browser management interfaces
	SNMPv1, v2, and v3 and Remote monitoring (RMON) support
	sFlow (RFC 3176) or equivalent for traffic analysis
	FTP, TFTP, and SFTP support
	Port mirroring to duplicate port traffic (ingress and egress) to a local or remote monitoring port. Shall support minimum four mirroring groups
	RADIUS/TACACS+ for switch security access administration
	Network Time Protocol (NTP) or equivalent support
	Shall have Ethernet OAM (IEEE 802.3ah) management capability
9	**Environmental Features**
	Shall provide support for RoHS and WEEE (Optional) regulations
	Operating temperature of 0°C to 45°C
	Safety and Emission standards including UL 60950-1; IEC 60950-1; VCCI Class A; EN 55022 Class A

5.15.10 **L2 Access Switch, 24 Port**

	Technical Specifications
1	**Architecture**
	Shall be 19" Rack Mountable Stackable or Integrated solution
	Switch shall have 24 Nos. of 10/100/1000 Base-T POE+ Ports and 4 nos. 1/10G SFP+ ports support.
	Shall have one Console (RJ-45/Serial) Port
	Shall have switching capacity of 128 Gbps
	Shall have up to 95 million pps switching throughput
	Shall support Stacking functionality
	Shall support minimum 370W POE+ budget and minimum 4MB packet buffer
2	**Ipv6 feature**
	Ipv6 host enables switches to be managed in an Ipv6 network
	Dual stack (Ipv4 and Ipv6) transitions from Ipv4 to Ipv6, supporting connectivity for both protocols
	MLD snooping forwards Ipv6 multicast traffic to the appropriate interface
	Ipv6 ACL/QoS supports ACL and QoS for Ipv6 network traffic
	Ipv6 Static routing
3	**High Availability and Resiliency**
	The Switch should have the capability to extend the control plane across multiple active switches making it a virtual switching fabric, enabling interconnected switches to perform as single Layer-2 switch and

	Layer-3 Switch . The Fabric should be managed by a single IP Address. Should support eight switch in a stack.
	The connected servers or switches should be attached using standard LACP for automatic load balancing and high availability.
	IEEE 802.1D Spanning Tree Protocol, IEEE 802.1w Rapid Spanning Tree Protocol and IEEE 802.1s Multiple Spanning Tree Protocol
	IEEE 802.3ad Link Aggregation Control Protocol (LACP)
	Shall support 24 Groups of up to 8 ports in a link aggregation
4	**Management**
	Configuration through the CLI, SSL, console, SSH, SNMPv3 and Web Management
	SNMPv1, v2, and v3 and Remote monitoring (RMON) support
	sFlow (RFC 3176) or equivalent for traffic analysis
	Management security through multiple privilege levels
	FTP, TFTP, and Secure FTP support
	Port mirroring to mirror ingress/egress ACL-selected traffic from a switch port or VLAN to a local or remote switch port
	RADIUS/HWTACACS for switch security access administration
	Network Time Protocol (NTP) or equivalent support
	Shall have Ethernet OAM (IEEE 802.3ah) management capability
5	**Multicast**
	The Switch should support IGMP Snooping to allow multiple VLANs to receive the same Ipv4 multicast traffic
	The Switch should support Multicast Listener Discovery (MLD) enables discovery of Ipv6 multicast listeners; supports MLD v1 and v2
	The Switch should support Internet Group Management Protocol (IGMP) and Any-Source Multicast (ASM) to manage Ipv4 multicast networks; supports IGMPv1, v2, and v3
6	**Layer 2 features**
	Shall support minimum 16K MAC address table
	Shall support up to 1,000 port or IEEE 802.1Q-based VLANs
	Shall support GVRP or equivalent feature to allow automatic learning and dynamic assignment of VLANs
	Shall have the capability to monitor link connectivity and shut down ports at both ends if uni-directional traffic is detected, preventing loops
	Shall support IEEE 802.1ad QinQ and Selective QinQ to increase the scalability of an Ethernet network by providing a hierarchical structure
	Shall support Internet Group Management Protocol (IGMP)
	Shall suppor Multicast Listener Discovery (MLD) snooping
	Shall suppor IEEE 802.1AB Link Layer Discovery Protocol (LLDP)
	The switch shall support minimum 64 instances of MSTP
	Shall support Voice VLAN feature to automatically assigns VLAN and priority to devices like IP phones

7	**Layer 3 Routing**
	Static Routing for IPv4
	Static Routing for IPv6
	Shall support RIPv1/RIPv2, OSPFv2 and OSPFv3
	Shall support Dynamic Host Configuration Protocol (DHCP) client and Relay
	Shall support Proxy ARP to allow normal ARP operation between subnets
	Switch shall support 1K Routing table
8	**Environmental Features**
	Shall provide support for RoHS and WEE (optional) regulations
	Shall have features to improve energy efficiency like variable-speed fans, shutoff unused ports etc.
	Operating temperature: 0°C to 45°C
	Operating relative humidity: 10% to 90%, noncondensing
	Safety and Emission standards including UL 60950-1; IEC 60950-1; VCCI Class A; EN 55022 Class A
9	**Security**
	Access Control Lists for Layer 2 to Layer 4 traffic filtering
	Shall support standard ACL, VLAN ACL, port ACL, and IPv6 ACL
	Powerful QoS feature supporting strict priority (SP) queuing, weighted round robin (WRR) and SP+WRR
	Shall support applying QoS policies on a port, VLAN, or whole switch, to set priority level or rate limit selected traffic
	IEEE 802.1x to provide port-based user authentication with multiple 802.1x authentication sessions per port
	Media access control (MAC) authentication to provide simple authentication based on a user's MAC address
	Dynamic Host Configuration Protocol (DHCP) snooping to prevent unauthorized DHCP servers
	STP BPDU port protection to prevent forged BPDU attacks
	STP Root Guard to protect the root bridge from malicious attacks or configuration mistakes IP Source guard to prevent IP spoofing attacks
	IP Source guard to prevent IP spoofing attacks
	Dynamic ARP protection blocking ARP broadcasts from unauthorized hosts

5.15.11 **Servers (LMS Software, RFID, VMS)**

The specifications mentioned below are minimum and if additional resources are required as per the application requirement, then SI need to consider the same within these BOQ line item of Servers and no additional server could be asked.

The connectivity requirements between the Servers and Storage need to be considered by SI. We have assumed that the L3 Switch should be sufficient for the purpose but if anything, additional is required then additional cards on the Switch may be considered.

SI must consider necessary OS, Database and Virtualization as per application requirement.

Bidder to provide server sizing from each of the application OEM on their letterhead duly signed by OEMs authorized signatory.

Compliances:

	Technical Specifications	
1	Processor	The server should have 2 nos. of Intel Xeon/ AMD EPYC latest Generation Processor. 64-bit x86 processor fully binary compatible to 64/32-bit applications. Number of cores on a single die/socket will be treated as a single processor. Database Server: 2 x 16-core, minimum 2.4 GHz clock rate.
2	Memory	Minimum 64GB latest DDR memory using minimum 16GB DIMMs or higher. Advanced ECC with multi-bit error protection. The memory should have native capability of identifying and reporting the geniuses of the memory installed in the server.
3	HDD Controller	12 Gbps SAS/NVMe RAID Controller supporting RAID 0, 1, 5 and 6 with minimum 2GB battery backed up Cache
4	HDD	2 x 1.92TB SSD Hot Swap or Higher
5	Network Controller	Network Controller: Minimum 4 x 1 Gbps ports & 2 x 10/25 Gbps ports with 10 Gbps transceiver.
6	Fiber Channel HBA	Support for 16Gb and 32Gb FC HBA
7	Bays	Minimum 8 Hot Swap drive bays
8	System Chassis	Rack Mount, 2U (max), Redundant Hot Swappable Power Supply with platinum efficiency
9	OS Certification	Certification for latest Server version of Windows and Linux.
10	System Management	a) Monitoring ongoing management, service alerting, reporting and remote management with embedded dedicated Gigabit out of band management port. Remote Management of Server over LAN & WAN with SSL encryption, Virtual Media and virtual folder with required advanced license, Remote KVM, Server Health logging, Directory Services compliance (AD or LDAP), REST/XML API, dynamic/group management of power, licenses including firmware or self-updating firmware system, Configuration backup, zero touch repository manager, Syslog (local / remote).
		b) Management software should support integration with popular virtualization platform management software like Vcentre, SCVMM and Red Hat RHEV.
		c) Offered Server platform must be ready for container workload deployment
11	Security	1) UEFI Secure Boot and Secure Start support 2) Security feature to ensure servers do not execute compromised firmware code 3) Tamper-free updates – components digitally signed and verified 4) Secure Recovery – recover critical firmware to known good state on detection of compromised firmware 5) Ability to rollback firmware 6) TPM (Trusted Platform Module) 2.0
12	Serviceability	a) System should support embedded remote support to transmit hardware events support. The server should support monitoring and recording changes in the server hardware and system configuration. It assists in diagnosing problems and delivering rapid resolution when system failures occur. Should provide remote firmware update functionality. b) Should help provide proactive notification of actual or impending component failure alerts on critical components like CPU, Memory and HDD. c) Solution should be provided for monitoring & analysis feature to predict, prevent

		and auto-resolve problems and by providing automating case creation and log file submission for the problems that can't be auto-resolved. d) Should provide silicon-based hardware root of trust, automatic secure BIOS recovery, cryptographically signed firmware updates.
13	IDC Ranking	OEM should be ranked within top 3 as per IDC report for any one of the previous four quarter in India for server.

5.15.12 **Central Storage, Approx. 300 TB**

	Technical Specifications	
1	Form Factor	Rack 2U or higher
2	Controller	The proposed NAS should be configured with minimum single controller/Processor.
3	Processor	Intel® Xeon-Silver 4208 (2.1GHz/8-core/85W) Processor or better
4	Cache /Memory	NAS must be with minimum 64 GB ECC RAM and upgrade up to 128 GB or higher.
5	Internal storage capacity	1. Support for SAS/SATAIII 3.5'' HDD or SSD. 2. Offered NAS solution must support at-least 60 bay 7.2K RPM HDD slot and should be at least 300 TB usable capacity from day one after RAID 5. 3. For OS and DB if installed on NAS then that should be on SSD drives including the OS of the NAS.
6	Front/Back-end ports	1. Minimum 2 x 1G Ethernet Ports. 2. Minimum 2 x 10G SFP+ Ports 3. Two or more USB 3.0 Ports.
7	RAID	Must Support for RAID Levels: 0, 1, 5, 6
8	Functionality /Features and Protocols support	1. The NAS must support Amazon S3 / Google Drive / Dropbox Cloud / Azure / One Drive Sync of Shares. 2. The NAS must support snapshots to have multiple file version to recover modified data. 3. The NAS must support Replication of volume with Snapshot retention feature. 4. The NAS must support CIFS, NFS and FTP protocol.
9	Authentication Support	NAS must support Windows AD authentication.
10	License	The storage system should provide features for NAS quota management, user management, CIFS & NFS protocols for windows and Linux users. All required licences (if any) should be included for the same from day one.
11	Network Client Type Support	Windows and Linux.
12	Operating system	Windows storage server 2016/2019 or OEM proprietary operating system.
13	Management	Must support GUI.
14	Cables, Driver's connectors and accessories	Must come with require accessories, cable and connector from day one.
15	Power Supply	Dual Redundant Hot-Swappable Power Supplies

5.15.13 **42U Network Rack**

	Technical Specifications	
1	Basic Structure	Rack frame with welded structure and made of nine folded CRCA sheet steel with thickness of 1.5 mm having load bearing capacity of minimum 1000 Kgs
2	Plinth & Castors	The plinth should also have provision to mount castors (4 Nos.) and Levelling Feet – (4 Nos.) simultaneously. This is required for the facility of moving the rack while installation process and then resting the same rigidly at the final location. When the rack is resting on the levelling feet, castors should not touch the ground surface. (All castors should be without any brake or any other locking mechanism)
3	Front Door	Front door – Front Perforated Door with dual Cam Lock for security purpose. This door should have provision to get mounted on Right or Left side of the rack front. This means that it should be possible to change the door configuration from Left to Right at site. It should also be possible to open this door by 180 Degrees to ensure proper approach to front of rack.
4	Rear Door	Rear door should be completely perforated to facilitate the air circulation at the maximum without offering any resistance to the same. Ideally, it should be possible to remove it easily and should have centre handle lock for the security purpose. Rear doors should have provision to mount fan trays.
5	Side panel	Side Panels should be removable type
6	Space	Height – The Rack should Provide 42U Usable Space.
		Width – The rack should be 800mmW with 19” mounting provision
		Depth – The rack should be at least 1000mmD. Usable Depth should be not less than 970mm
7	Load Bearing Capacity	Load carrying capacity of rack should be 850 Kg.
8	Mounting Provisions	Mounting rails (for Standard 19” mounting) should be made up of steel. (Minimum 2.0mm thickness) and should be of Multi-fold design for enhanced loading capacity and rigidity. It should have unique U Marking along with U locator notch. U Number Markings should be clearly visible even after mounting of the equipment.
9	Cable Management	1U Cable Managers to be supplied. Cable Managers should have Metal Hoops
10	Heat Management	Minimum of 4 Nos. 90 CFM Fans to be provided on top side of the panel.
11	Powder Coating Details	Thickness of powder coating should be 60 microns or more. Preferably in black color
12	Thickness of Material	The structure and all its components should be made from CRCA Steel Material – at least 1.2mm thick
13	Shelving Options	The rack should be provided with 1 Heavy Duty Shelf of 727mmD
14	Power Management	Vertical power distribution units provided should have 12 outlets of 5/15 amp capacity. These should be split in to two internal circuits so as to avoid overloading of the interconnection cables inside the unit. All cables used should be of ISI grade with 2.5sq mm cross sectional area. All the connecting ends must be tinned so as to avoid any loose wire strands. Rack should have the appropriate mounting provision for the multiple of these PDUs at the rear of the rack. Each Rack should have 2 Nos PDU per Rack

5.15.14 **24 Port Copper Patch Panel, fully loaded**

Please Refer section “Specifications: Common Components” for relevant specification

5.15.15 **CAT-6 Patch Cord**

Please Refer section “Specifications: Common Components” for relevant specification

5.15.16 **2MP Dome Camera**

Functional Requirements

Sl.	Functional Requirement
1	Cameras to be installed within the CCC facility
2	Cameras to be added in the central VMS
3	Video feed to be stored for a period of 60 days. Recording resolution shall be 2MP @ 25FPS.

Technical Specifications

Please Refer CCTV Sub-System for relevant specification

5.15.17 **2MP PTZ Camera**

Functional Requirements

Sl.	Functional Requirement
1	Cameras to be installed outside the CCC facility on one of the walls and so required wall mount to be considered suitable for the camera and should be from the same camera OEM only.
2	Cameras to be added in the central VMS
3	Video feed to be stored for a period of 60 days. Recording resolution shall be 2MP @ 25FPS.
4	For powering PTZ camera an external 24 V AC/DC power supply to be used
5	SPD to be used both for network and 24 V line near the camera
6	SPD’s to be properly kept inside FRP JB and should be properly earthed

Technical Specifications

Please Refer CCTV Sub-System for relevant specification

5.15.18 **Fire Alarm & Suppression System**

	Technical Specifications	
1	Control Panel	The primary function of the control panel shall be to automatically respond to the operation of one or more detectors to give fire alarm and to indicate area (zone) from where the devices are activated. Required specifications of Control Panel are
2		2 Zone / 4 Zone Microprocessor based Master Control Panel as per IS: 2189-2008. On activation it should initiate Audio alarm as well as visual signal on the control panel.
3		2 Zone / 4 Zone Main Control Panel should be latest microprocessor technology based and as per IS:2189-2008.
4		The panel should be compatible with all type of standard conventional detectors.
5		The Panel should have a manual OFF switch for manual operation in case of continuous fault alarm.

6		The Panel should have 2 or more zones and zone disable switches accordingly to the number of zones.
7		On activation it should initiate Audio alarm (The sound characteristic of the alarm should be continuous and similar throughout the protected premises) as well as visual signal on sector/zonal panel of the control panel.
8		Each zone can be connected with 20 conventional detectors.
9		Control Panel should have inbuilt SMPS with spike/ transient reduction circuit, to avoid any false alarming in case of transient/abrupt voltage fluctuations.
10		Control Panel should have Test Certificate with details like Model No., Serial No., Zones, etc.
11		The Panel should have feature of continuous uninterrupted power supply in case of External Power supply failures. The battery backup with built battery charger for not less than 12 hours normal working.
12		Panel should be compatible for installation of external Auto-dialer – both PSTN and GSM types.
13		The Panel should have approvals listing of BIS or Equivalent (UL /LPCB/ FM/ VdS).
14	Power supply	The fire panel shall operate from a 230 v + / - 10 % 50Hz mains supply and in case of power failure shall automatically switch over to a built-in sealed maintenance free (SMF) battery with a switch over time of less than 100 ms
15	Display / Indication	Master Control Panel should have audible and visual indications of system status as under Ø LCD display showing system status Ø System ON indication (ON – OFF indicators) Ø Fault status LED indication Ø Low Battery / AC power off indications
16	Number of Zone	Minimum 2 zones with Zone Isolation facility and loop voltage cut off. iv. The panel should have facility to isolate/open individual zones
17	Battery back up	Battery backup of minimum 10 hours duration in normal working condition and 20 minutes in alarm activated condition (All hooters activated) thereafter.
18		Battery should be of sealed maintenance free (SMF) type with capacity of 7Ah or more.
19		Panel should have in built battery charger with over charging and deep discharging protection.
20		Battery Low visual warning with audible tone.
21	Smoke detectors	The System should have smoke detectors of both ionization type (below false ceiling) and optical type (above false ceiling) conforming to the IS: 2189-2008. Both ionization and optical type smoke detectors will be installed in the ratio 2:1. (Note: If Ionization sensors are not available in market Optical sensors are to be used in lieu).
22		Smoke detector should have LED, which should flash periodically to indicate that the detector is in proper working mode and glow continuously if smoke is detected. iii. Smoke detectors should have approvals/ listing of BIS or Equivalent (UL/LPCB/ FM/ VdS.)
23	External Hooters	External hooters (150 db) (sounders) of fire alarm system should be electronic hooters/horns/electric bell having a frequency range of 500 to 1000 Hz. iv. Sound from the hooters on activation of the Fire Detection and Alarm System should be clearly audible up to 500 meters.
24	Response indicators (RI)	Response indicators with LED indicators to indicate activation of a detector installed inside rooms / cabins and above false ceiling or generally hidden

25	Manual Call Points (MCP)	The Manual Call Point (MCPS) should be break glass type with hammer or thumb press type.

5.15.19 **Access Control System**

Functional Requirements

Sl.	Functional Requirement
1	The Access Control System shall be deployed with the objective of allowing entry and exit to and from the premises to authorized personnel only.
2	Biometric based access control shall be provided for the Server Room and CCC.
3	Both CCC and Server room may have double leaf doors.
4	An access control system consisting of a central PC, intelligent controllers, power supplies and all associated accessories is required to make a fully operational online access control system.
5	Enclosure for the Access Controller to be provided by OEM.
6	Access control shall be provided for doors. These doors shall be provided with electromagnetic locks and shall operate on fail-safe principle.
7	The fire alarm supplier shall make potential free contacts available for releasing the locks in a fire condition especially for entry to CCC and DC.
8	Entry to the restricted area could also be possible by showing a proximity card near the reader and exit shall be using a push button installed in the secure area.
9	The system shall monitor the status of the doors through magnetic reed contacts.
10	SI to provide minimum 50 Access Cards per CCC location as a part of scope.

Technical Specifications

Sl.	Specifications
1	Proposed Access Control System should have a dedicated controller which shall share data with the access control software. The controller should support TCP/IP protocol for communication and configuration. If any expansion modules are connected, the controller needs to encrypt the data with AES-256 encryption formats.
2	The controller should support a minimum of 2 doors locally in an open architecture.
3	Should support TSL 1.2, AES-256, OSDP encryption.
4	Credential Capacity: Min. 200000
5	The System should support existing 125KHz Proximity Cards.
6	Configurable system for user defined access policy for each access point
7	Record, report and archive each and every activity (permission granted and / or rejected) for each access point.
8	User defined reporting and log formats
9	Fail safe operation in case of no-power condition and abnormal condition such as fire, theft, intrusion, loss of access control, etc.
10	Day, Date, Time and duration-based access rights should be user configurable for each access point and for each user.
11	One user can have different policy / access rights for different access points.
12	The system should support Attendance Management too.

5.15.20 **Rodent Repellent System**

Sl.	Functional Requirement

1	The entry of rodents and other unwanted pests shall be controlled at the Integrated command and control centre using non-chemical, non-toxic devices.
2	Ultrasonic pest repellents shall be provided in the false flooring and ceiling to repel the pests without killing them. However, the MSI shall conduct periodic pest control using chemical spray once in a quarter as a contingency measure to effectively fight pests.
3	The system proposed is to protect all the equipment's, areas with relevant type of high frequency sound producing device called satellites or transducers. Once powered up these transducers produce very high frequency variable sound waves (above 20 KHz) continuously which irritate the rodents and are forced to evacuate the place.
4	The system shall cover minimum of 1000 sq.ft. area per controller & shall be able to connect minimum 8 transducers per controller. The transducers shall cover minimum 200 sq.ft. of area. The devices can be tested periodically by means of a test switch provided on the Main console
5	The satellites or Transducers shall be ceiling mounted low profile units that produce high decibel sound waves at very high frequency not less than 20 KHz.
6	No looping is permitted while connecting the satellites to the main controller. Every satellite connected to the controller shall have a dedicated connection with the controller
7	The controller shall support minimum 8 Transducers and shall come with a pair of stands and brackets. The controller is installed in the Server Room and the transducers in the problematic areas i.e. above and below false ceiling and below false flooring.
8	Controller Features: 1000 Sq. Feet of Area Coverage per system/ Controller, Shall drive more than 8 Transducers with minimum @200sft coverage each, LCD display with on-board controls for changing parameters.

5.15.21 **Water Leak Detection System**

Sl.	Functional Requirement
1	Water leak detection System should be designed to protect the Airconditioned premises and to alert the personnel about the leak in the AC systems. The system should be capable of interfacing to Water leak detection sensors, condensation sensors & I/O modules.
2	Events should be clearly reported on LCD/LED display with full English language description of the nature of the fault in the panel. SI should make detailed working drawings and coordinate them with other agencies at site. Water Leak Detection systems should be integrated with BMS if any.
3	The control panel should be a microprocessor based 4/8 zone multiplex controller. The system should be programmed, armed or disarmed through a control keypad. The control keypad should have a 16-character LCD display for viewing various events
4	The system should have 4/8 zones and all the detectors should be connected through a 2-core cable.
5	The system should be totally tamper proof and should activate an alarm if the control panel is opened, the sensors tampered with or if the system cables are cut even in the disarmed state.
6	The system should log minimum 250 events.

5.15.22 **10 KVA UPS in N+1 Configuration with 30 Min Backup**

	Technical Specifications
1	Transformer less, IGBT Rectifier & IGBT Inverter Modular Hot Scalable UPS System of 10 kVA UPS in N+1 architecture with 30 Min back up.
2	Each 10 kVA UPS Frame shall be of modular architecture with 3 phase sub power modules
3	Battery along with rack and connecting accessories to be provided for min 30 Minutes back up at full load.
4	Each 10 kVA UPS shall be provided with Phase Sequence Correction at Input i.e. Incase of Phase reversal at Input, UPS shall continue to operate in Double Conversion Mode of operation without going to battery mode.

5	Back-feed Protection shall be provided at Input and Bypass with individual UPS Frame
A	**Modes of Operation:**
6	• Normal: The UPS system shall continuously supply power to the critical load as per IEC 62040-3 Class 1 Online Mode of Operation. The UPS shall be UL certified (Certificate to be submitted)
7	• Battery: Upon failure of the utility AC power source, the critical load shall be supplied by the inverter, which, without any interruption, shall obtain its power from the battery.
8	• Recharge: Upon restoration of the utility AC power source (prior to complete battery discharge), the PFC rectifier shall power the inverter and simultaneously recharge the battery.
9	• Static bypass: The static bypass switch shall be used to transfer the load to the bypass without interruption to the critical power load. This shall be accomplished by turning the inverter off. Automatic re-transfer or forward transfer of the load shall be accomplished by turning the inverter on.
10	• Maintenance bypass: In maintenance bypass the load is supplied with unconditioned power from the bypass input included in the UPS.
11	• Static Bypass Mode with Power Factor Improvement & Harmonic Mitigation: UPS shall be capable to mitigate Harmonics (THDI) to < 5% and Power Factor Improvement to 0.99 at full load while UPS is operating in Static Bypass Path. The Efficiency achieved in this mode shall be ≥ 98% from 50% Loading to 100% Loading condition
12	PCB's which are required for the function of UPS shall be 100% conformally coated.
C	**System input**
13	• Nominal input voltage rating: 380 V / 400 V / 415 V 3-phase
14	• Input voltage window at 400 V: 340 V to 460 V
15	• Earthing principle: [TN-S] [TN-C] [TT] or [IT].
16	• Input frequency range: 40-70 Hz
17	• Input power factor: 1. 0.99 at load >25% 2. 0.95 at load >15%
18	• Total harmonic distortion (THDI): < 3% at 100 % rated Load
D	**System output**
19	• Nominal output voltage rating: 400 V 3-phase
20	• Output voltage tolerance: +/- 1% for symmetrical loads
21	• Dynamic load response: 1. +/- 5% after 2 ms 2. +/- 1% after 50 ms
22	• Output frequency: 50 Hz.
23	• Output voltage harmonic distortion: <5% at 100% non-linear load
24	• Overload capability: 1. 150% for 1 minute (normal operation). 2. 125% for 10 minutes (normal operation). 3. 110% Continuous at Bypass Operation. In case vendor does not meet, next higher rating shall be provided to meet the requirement.
25	• Short Circuit Handling Capability of the Inverter: 250% of nominal current for 1000 milliseconds.
26	• Output power factor: 1.0 i.e. kVA = kW.
27	• Audible noise at full load: Not more than 65 dBA at 100% load
E	**System AC-AC efficiency**:
28	• Greater than equal to i.e. ≥ 96 % in Online Double Conversion at 50% load to 75% Loading condition.
29	• Greater than equal to i.e. ≥ 98.5 % in Static Bypass at 50% load to 100% Loading condition along with PF Correction to 0.99 at Input & Harmonic Correction (THDI) to < 5% at Input.
F	**Mechanical**

30	• The cabling section shall be large enough to accept Copper and Aluminum cables as well. Incase Aluminum Cable termination is not possible, vendor to provide separate cube/box with input & output breakers & busbars with each UPS module.
31	• Each UPS shall be provided with minimum IP20 ingress protection.

5.15.23 **62.5 KVA Silent DG with AMF Panel, Stationary**

DG shall be provided by OMC. SI to consider all the provisions in the Main Incoming Panel and LT Panel for taking the input of the DG for further distribution.

5.15.24 **Variable Message Sign Board Central Software**

	Technical Specifications	
1	Alarms	System shall have Door Open sensor to Inform Control room during unauthorized access.
2		System shall have LED Pixel failure detection alarm
3		System's Refresh Frequency should not be less 90 Hz. No visible flicker to naked eye.
4		System's Communication (connectivity) is Wired & GPRS based wireless technology with 3G upgradable to 4G/ 5G capability.
5	Self-Test	System shall have Self-test diagnostic feature to test for correct operation.
6		Display driver boards can test the status of all display cells in the sign even when diodes are not illuminated
7		All periodic self-test results are relayed to the CCC in real time to update the status of the VMD
8	Display Functionality	The system shall have capability to divide VMD screen into multi parts to display diverse form of information like video, text, still images, advertisements, weather info, city info etc.
9		It shall be Capable of controlling and displaying multiple font types with flexible size and picture sizes suitable as per the size of the VMD.
10		It shall be Capable of controlling brightness & contrast through software.
11		It shall be Capable to continuously monitor the operation of the Variable Message Display board, implemented control commands and communicate information to the Traffic Monitoring Centre via communication network
12		Real time log facility – log file documenting the actual sequence of display to be available at central control system.
13		Multilevel event log with time & date stamp.
14		Access to system only after the authentication and acceptance of authentication based on hardware dongle with its log.
15		Report generation facility for individual/group/all VMDs with date and time which includes summary of messages, dynamic changes, fault/repair report and system accessed logs, link breakage logs, down time reports or any other customized report.
16		Configurable scheduler on date/day of week basis for transmitting pre-programmed message to any VMD unit.
17		Various users can access the system using single sign on and shall be role based. Different roles which could be defined (to be finalized at the stage of SRS) could be Administrator, Supervisor, Officer, Operator, etc.

18		Ease of configuration, ongoing health monitoring, and failure detection are vital to the goals of scalability, availability, and security and must be able to match the growth of the environment
19		System use open standards and protocols to the extent possible
20		System shall have Facility to export reports to excel and PDF formats.
21	Remote Monitoring	All VMD are connected/configured to Central Software for remote monitoring through network for two-way communication between VMD and control Room to check system failure, power failure & link breakage.
22		Remote Diagnostics to allow identifying reason of failure up to the level of failed individual LED.
23		The system shall be capable to display warnings, traffic advice, route guidance and emergency messages to motorists from the CCC in real time.
24		The system shall be also be capable to display warnings, traffic advice, route guidance and emergency messages to drivers by using local PC/Laptops. The system shall display graphical representation of the lanes with directional arrows and colour such as green, yellow, red for depicting density of traffic
25		The System shall be able to display failure status of any LED at CCC.
26		The System supports Display characters in true type fonts and adjustable based on the Operating system requirement.
27		The CCC workstation can communicate with the VMD controller through the network. It shall send out command data to the Variable Message Display controller and to confirm normal operation of the signboard. In return, the CCC workstation shall receive status data from the VMD controller.
28		VMD controllers continuously monitor the operation of the VMD via the provided communication network.
29		Operating status of the Variable Message Display shall be checked periodically from the SCCC.
30		It shall be capable of setting an individual VMD or group of VMD's to display either one of the pre-set messages or symbols entered into the computer via the control computer keyboard or by another means.
31		It shall be capable of being programmed to display an individual message to a VMD or a group of VMD's at a pre-set date and time.
32		A sequence of a minimum of 10 messages/pictures/ pre-decided sign or group of signs shall be possible to assign for individual VMD or group of VMD's.
33		It stores information about the time log of message displayed on each VMD. The information stored shall contain the identification number of the VMD, content of the message, date and time at which displayed message/picture starts and ends.
34		The central control workstation can perform regular tests (pre-set basis) for each individual VMD. Data communication shall be provided with sufficient security check to avoid unauthorized access.

5.15.25 **Video Management System (VMS)**

	Technical Specifications
A	**General**
1	The Video Management System shall be a fully distributed solution, designed for limitless multi-site and multiple server installations requiring 24/7 surveillance with support for devices from different vendors.

	The Video Management System shall offer centralized management of all devices, servers and users and must empower a flexible rule-based system driven by schedules and events. The bidder shall provide 10% additional licenses than the actual requirement for future expansion requirement.
2	VMS shall support IP cameras (all the features & functionalities) from at least ten (10) major camera brands with API level Integration.
3	The offered VMS should have capability to integrate with 2500+ camera models with API level Integration.
4	To ensure interoperability, VMS should be different from the camera make offered by the bidder
5	VMS shall support installation and ability to run on virtualized windows servers
6	VMS manufacturer shall provide their SDK (or any other integration means) libraries and documentation) to ensure a seamless integration with any other system
7	VMS shall be open to any standard storage technologies integration.
8	VMS shall have the possibility to integrate external Video Analytics systems.
9	The VMS system shall be a scalable client – server architecture built using well known operating systems
10	The VMS system shall enable recording to be done at the aggregation sites and shall allow the local Control center to import selected video's on demand.
11	To facilitate the VMS system architecture, the BIDDER shall ensure that sufficient capacity is designed into the data communications & telecommunications infrastructure to deliver the required functionality, along with the ability to allocate and reserve resources (including bandwidth).
12	The VMS data communications and telecommunications network shall use a suitable transport medium and associated cabling and data transmission infrastructure that will support real-time video display of cameras at the nominated operations centers. The type of transmission network shall be determined by the BIDDER.
13	The VMS system shall be compatible to single and multiple processor servers.
14	VMS should support ONVIF S, G, T Profile supported by IP Devices
15	VMS should be full time/ contributing or affiliated to full/ User/contributing member only
16	The VMS system device drivers shall be stored separately to the central core application to ensure any instability in 3rd party SDKs do not affect the core application.
17	The VMS management server shall be able to intelligently scan an IP network for new devices (cameras or servers) along with automatic model detection.
18	VMS should have ability to easily display live video in multiple display formats.
19	The VMS system shall provide an integrated secure, scalable and easily accessible software-based solution for the management of the existing & future physical security infrastructure
20	The VMS system shall provide a powerful and efficient management interface for all the security systems across all monitored sites.
21	The Video Management System shall be a fully distributed solution, designed for limitless multi-site and multiple server installations requiring 24/7 surveillance with support for devices from different vendors. The Video Management System shall offer centralized management of all devices, servers and users and must empower a flexible rule-based system driven by schedules and events.
22	The Video Management System shall contain recording servers used for recording video feeds and for communicating with cameras and other devices. The recording servers shall process the recordings and playback the video streams.
23	The management server shall allow access to a system manager from where the administrator can configure and manage all servers, cameras and users.
24	VMS OEM should have technical support Centre in India.

25	The Video Management System shall allow an unlimited number of cameras to be connected to each recording server and an unlimited number of recording servers to be connected to each management server across multiple sites, if required.
26	The Video Management System shall support a versatile rule system including scheduled or event-driven actions with numerous options including support to time profiles.
27	The Video Management System shall include automatic camera discovery.
28	The Video Management System shall support archiving for optimizing recorded data storage through unique data storage solutions by combining performance and scalability with cost efficient long-term video storage.
29	The Video Management System shall incorporate fully integrated matrix functionality for distributed viewing of any camera in the system from any computer with the client viewer.
30	The Video Management System shall incorporate intuitive map functions allowing for multilayered map environment. The map functionality shall allow for the interactive control of the complete surveillance system, at-a-glance overview of system integrity, and seamless drag-and-drop integration
31	The Video Management System shall support full two-way audio between clients and remote devices. Two-way audio integration shall support the following features and functions:
32	The Video Management System software shall provide fast evidence export by exporting in video to various formats, including video from multiple cameras in encrypted native database format with an included viewer.
33	The Video Management System shall show full awareness of the system through audit logs and shows user activity through comprehensive logs.
34	The Video Management System shall include support for a framework data module designed to integrate multiple third party Video Content Analysis (VCA) solutions seamlessly into client viewer environments.
35	The Video Management System shall include a Software Development Kit (SDK) that offers important capabilities for integrating the Video Management System with third party software and applications.
36	The Video Management System shall include a stand-alone viewer application to be included with video exported from the client viewer application. The viewer application shall allow recipients of the video to browse and playback the exported video without installing separate software on their computers.
37	The Video Management System shall include support for Active Directory to allow users to be added to the system. Use of Active Directory requires that a server running Active Directory, acting as a domain controller, to be available on the network.
38	The Video Management System shall be designed to support each component on the same computer for efficiency in smaller systems, or each component on separate systems for large system deployments.
39	Edge Storage
40	Edge storage shall secure that when a lost or broken connection is back up, the data stored on the camera's internal storage shall be retrieved and stored in the media database.
41	Edge storage shall secure that after recovery from a malfunction it shall be possible to play back and view the video, and audio recorded by the device, while the malfunction persisted
B	**Bookmarking**
42	A bookmarking feature shall be included in the Video Management System, allowing the client viewer users to mark incidents on live and/or playback video streams.
43	Optimized Video Archiving
44	Administrators shall be able to select a storage container for each device and move a device from one storage container to another or move all recordings inclusive archives to the new storage container, or delete them all.
45	Administrators shall be provided with an overview of the defined storage containers, their archives with path, and free and used space on the drives for each device, including the used storage space in the recording database, and in archives.

C	**Multi-streaming Support**
46	The recording server must accept, display and record individual streams of video from each camera that supports it, for example, display a stream in H.264/H.265 format and record another stream in MPEG4 format. The intent of this functionality shall be providing independent streams of video from the camera to the server with different resolution, encoding and frame rate.
47	Multi-streaming support shall allow the system to be configured with H.264/H.265 with a high frame rate for live viewing and shall allow the system to be configured with high resolution H.264/H.265 at low frame rates for recording and playback.
D	**SNMP Support**
48	The system shall act as an SNMP agent which can generate an SNMP trap as a result of rule activation in addition to other existing rule actions.
49	The system shall be able to utilize Microsoft Windows SNMP Service for triggering of SNMP traps.
E	**NAT Firewall Support**
50	The system shall support port forwarding, which must allow clients from outside of a Network Address Translation (NAT) firewall to connect to recording servers without using a VPN.
51	Each recording server shall be mapped to a specific port and this port must be forwarded through the firewall to the recording server's internal IP address.
F	**System Security**
52	HTTPS connections from devices to recording server that support HTTPS connections.
53	Encrypted communication between the recording server and services that retrieve streaming data
54	Encrypted communication between the management server and the recording server.
55	HTTPS connections from recording server to VMS clients, SDK clients and services that support HTTPS connections
G	**Alarms Support**
56	The alarm support shall allow for continuous monitoring of the operational status and event-triggered alarms from servers, cameras and other devices.
57	The alarm support shall provide a real-time overview of alarm status, or technical problems, while allowing for immediate visual verification and troubleshooting.
H	**Matrix Functionality**
58	The system shall include an integrated matrix solution for distributing video to any computer with the client viewer installed. A computer on which the matrix-triggered images can be shown must be known as a matrix recipient.
59	The client viewer shall provide remote users with a comprehensive suite of features:
60	It shall be possible to view live video from cameras on the surveillance system from 1 to 100 per view.
61	It shall be possible to playback recordings from cameras on the surveillance system, with a selection of advanced navigation tools, including an intuitive timeline browser.
62	It shall be possible to create and switch between an unlimited number of views, each able to display video from up to 100 cameras from multiple servers at a time. The system shall allow views to be created which are only accessible to the user, or to groups of users based on 37 different layouts optimized for 4:3, 4:3 Portrait, 16:9 and 16:9 Portrait display ratios.
63	It shall be possible to access views of cameras on any PC with a client viewer application installed.
64	It shall be possible to use multiple screens as well as floating windows for displaying different views simultaneously.
65	It shall be possible to quickly substituting one, or more of a view's cameras with other cameras.
66	It shall be possible to view images from several cameras in sequence in a single camera position in a view – a so called carousel.
67	It shall be possible to view video from selected cameras in greater magnification and/or higher quality in a designated hotspot.

68	It shall be possible to receive and send video through the matrix functionality.
69	It shall be possible to control PTZ cameras.
70	It shall be possible to use digital zoom on live as well as recorded video.
71	It shall be possible to activate manually triggered events.
72	It shall be possible to activate external outputs (e. g. lights and sirens).
73	It shall be possible to use sound notifications for attracting attention to detected motion.
74	It shall be possible to get quick overview of sequences with detected motion.
75	It shall be possible to get quick overviews of alerts.
76	It shall be possible to quickly search selected areas of video recording for motion.
77	It shall be possible to skip gaps during playback of recordings.
78	It shall be possible to configure and use several different joysticks.
79	It shall be possible to print images, with optional comments.
80	It shall be possible to copy images for subsequent pasting into word processors, email, etc.
81	It shall have ability to encrypt video while exporting (Options of 56 bit, 128 bit and 256 bit encryption)
82	It shall be possible to use pre-configured as well as customizable keyboard shortcuts to speed up common actions.
83	It shall be possible to insert overlay buttons, for example, for activation of speakers, events, outputs, movement of cameras etc.
84	It shall be possible to use a sequence function that lists thumbnail images representing recorded sequences from an individual camera or all cameras in a view.
85	It shall be possible to use a forced playback mode allowing the user to playback recorded video from inside the 'live' mode while viewing 'live' video.
86	The client viewer shall support the use of 3-axis USB joysticks for control of pan, tilt, zoom and auxiliary camera functions.
87	The client viewer shall support the use of multimedia control devices, which are capable of emulating keystrokes, for the efficient review of recorded video.
88	The client viewer shall support the use of keyboard shortcuts for control of standard features. It shall allow the user to program numerical keyboard shortcuts for camera views. The shortcut number shall be displayed with the view description in the live and playback displays. The shortcut shall allow the user to change views with 2 to 3 keyboard entries.
89	The client viewer shall support GPU based video decoding to improve video rendering performance and up to 75% reduction in CPU load of the workstation running Client software. The use of GPU based video rendering shall also make client ready for 4K/UHD camera technology.
90	Provide the ability to use both NVIDIA GPU and Intel CPUs at the same time and automatically load balance the requests for optimal performance
91	The operator shall have the ability to use digital zoom where the zooming is performed in the image only on any number of cameras simultaneously. This functionality shall be the default for fixed cameras. The use of digital zoom shall have no affect on recording, or other users.
I	**Map Functions**
92	Built-in map function in the client viewer shall provide an intuitive overview of the system and shall offer integrated access to all system components.
93	Map function shall be able to use standard graphical file formats including BMP, GIF, JPEG, JPG, PNG, TIF, TIFF, and WMP, etc.
94	It shall be possible to use any number of layered maps, and it shall be possible to easily drag-and-drop and point-and-click definition of cameras, servers, microphones, speakers, I/O devices, hot-zones, and PTZ camera presets.
95	Hot zones shall be allowed for intuitive navigation between different map levels.

96	Map function shall support instant camera preview when moving the mouse pointer over a specific camera.
97	Map function shall support central overview of the surveillance system via an alarm list containing alarm indicators of high, medium or low prioritized alarms. Further more the alarms shall be categorized by the following states; new, in progress, on hold, or closed. Alarms must be possible to acknowledge by right-clicking elements on maps.
J	**Remote Client Viewer**
98	The web-based remote client viewer shall offer live view of up to 16 cameras, including PTZ control with joystick, fisheye (360 degrees) cameras and event/output activation. The playback function shall give the user concurrent playback of up to 16 recorded videos with date, alert sequence, or time searching.
99	The web-based remote client viewer shall offer quick overviews of sequences with detected motion.
100	The web-based remote client viewer shall be able to generate and export evidence in AVI (movie clip) and JPG (still image) formats.
101	The system shall support the use of separate networks, VLANs, or switches for connecting the cameras to the recording servers providing physical network separation from the clients, and facilitate the use of static IP addresses for the devices.
102	The system shall support H.264, MPEG-4 (Part 2), and MJPEG compression formats for all analog cameras connected to encoders, and all IP cameras connected to the system.
103	The system shall support dual-streaming cameras and shall cover the following compression formats: H.264, MPEG-4 (Part 2) and MJPEG.
104	The recording server shall utilize high performance ISCSI, SCSI, SAS and SSD disk drives for online recording storage and shall allow the use of lower cost SATA drives for the RAID arrays for online archive storage. Use of online archiving shall ensure that data always is readily available.
105	The system shall allow the frame rate, bit rate and resolution of each camera to be configured independently for recording. The system shall allow the user to configure groups of cameras with the same frame rate, bit rate and resolution for efficient set-up of multiple cameras simultaneously.
106	The recording server(s) shall have the ability to support multiple Network Interface Cards (NIC) and shall support connection to the cameras on a network separate from the client viewer, management server and system manager.
107	The recording server shall have the ability to accept the full frame rate supplied by the cameras, while recording a lower frame rate yet still shall make the higher frame rate available to the clients for live viewing.
K	**Remote Mobile App**
108	Shall be available on internet as an application for compatible smartphone and Tablets
109	Shall support Android as well as Apple IOS softwares, with respective smart phones
110	Full screen video supported, cameras shuffle from left to right or right to left supported
111	Digital pinch to zoom supported
112	Control of PTZ from mobile app
113	Use of the mobile device's camera as a camera in the VMS
114	Mobile Video Push: Provide mobile client capability for mobile device users to use their mobile device cameras as cameras in the VMS.
L	**System Capacities: Provide the following maximum capacities, constrained only by the physical performance capabilities of installed server hardware and network infrastructure:**
115	Unrestricted devices.
116	Unrestricted client software users.
117	Unrestricted mobile devices.
118	Unrestricted client PCs or laptops.
119	Unrestricted servers.

120	Unrestricted sites.
121	Unrestricted system rules.
122	Unrestricted media storage.
123	The failover support should be as per OEM application design
124	The VMS should be mandatory provided with unlimited number of Client Licenses without any cost
M	**3rd Party System Integration**
125	Access Control should be integrated thru VMS Access Control Module or thru SDK/API integration.
126	FAS System to be integrated thru API/SDK or thru Bacnet Over IP Protocol Plugin with VMS
127	BMS System to be integrated thru API/SDK or thru Bacnet Over IP Protocol Plugin with VMS
128	VMS manufacturer shall provide their SDK without any additional charges (or any other integration means) libraries and documentation) to ensure a seamless integration with any other system.

5.15.26 **Speed Violation Detection System Central Application**

Please Refer “Speed Detection Software module” Under “Specifications: Sub-System for Speed Violation Detection (SVD)”

5.15.27 **Anti-Virus Software**

Sl.	Specification
A	**Antivirus Protection**
1	Must offer comprehensive client/server security by protecting enterprise networks from viruses, Trojans, worms, hackers, network viruses, mixed threat attack from multiple entry points, and spyware.
2	Have the capability to detect all in-the-wild viruses and Antivirus Engine should be certified with reputed ICSA Labs, AV Test, AV Comparatives
3	Must have the capability to detect and block files with malicious executable content and embedded/compressed executables that use real-time compression algorithms.
4	Ordinary Users should not be able to modify AV settings except for those in special groups as deemed necessary by the Administrators.
5	Update Managers: Should have the capability to create multiple update servers to distribute updates load in large network environment that reduce bandwidth consumed during definition updates.
B	**Vulnerability Scan**
6	Must have capability to scan and report vulnerabilities present in installed applications.
7	Must provide summarized view of vulnerabilities as per severity. i.e. High, Medium and Low.
8	Must have capability to schedule vulnerability scan periodically in order to get latest reports of vulnerabilities present in the network.
C	**Patch Management**
9	Must have capability to scan missing patches for Microsoft applications. For example: Windows, Office, Internet Explorer.
D	**Device Control**
10	Must have the capability to grant allow, block, read-only access to various devices.
11	Must have the capability to grant access rights for storage devices such as USB, CD/DVD, Card Reader, Floppy Drive etc.
12	Must have the capability to completely block USB Interfaces to deny access to all USB devices (except Keyboard and Mouse and mass storage devices)

13	Must have the capability to support NTFS & FAT formatted devices for authorization.
14	Provision to add whitelisted Wi-Fi SSID in Device Control Wi-Fi configuration. Endpoints will only able to connect to whitelisted Wi-Fi SSID
15	Must have the capability to exclude USB devices based on serial number
E	**Data Loss Prevention**
16	Must have the capability to report the activity on various data transfer channels such as removable devices, network share, clipboard
17	Must have capability to monitor printing activity on each endpoint.
18	Must have capability to block printing activity on each endpoint.
19	Must have the capability to monitor and control print screen operation.
F	**File Activity Monitoring**
20	Must have the capability to monitor activities related to file handling such as copy, delete, move on local drives, removable drives and network drives.
21	Must have the capability to monitor certain file types.
22	Must have the capability to exclude certain files/folders/paths from monitoring procedures.
G	**Asset Management**
23	Must have the capability to collect system and hardware information related to remote endpoints.
24	Must have the capability to obtain a summary report of various software's/updates installed on endpoints.
25	Must have the capability to track software changes happening on endpoints i.e. applications installed/uninstalled.
26	Must have the capability to track hardware changes happening on endpoints. E.g. RAM Changed, Processor changed, etc.
H	**Web Security and Web Filtering**
27	Must have the capability to block user access to malicious and phishing websites from configured endpoints.
28	Must have the capability to block user access to websites based on their categories e.g. Social Networking, News, etc.
29	Must have the capability to block entire domain or a particular website/URL
I	**Application Control**
30	Must be able to block applications based on application categories. E.g. Download Managers, File sharing applications, Games, etc.
31	Must have ability to add custom applications to the blocked application list.
32	Must have capability to collect list of all installed applications in the network.
33	Provision to block applications based on application name.
J	**Groups and Policies**
34	Must have the capability to create multiple user groups as per organizational structure.
35	Must have the capability to assign different policy configuration to each group.
36	Must have the capability to import group structure from Active Directory.
37	Must have the capability to import/export groups and policies.
J	**Client Deployment**
38	Must have the capability to deploy the Client software using multiple mechanisms:
39	Client uninstallation should only be done by administrator.
K	**Server Deployment**

40	Must have the facility to deploy the EPS Server on cloud-based servers on Microsoft Azure and AWS Platform
41	Must support installation of EPS server on dynamic (DHCP) IP address.
L	**Management Features**
42	Must provide a secure GUI or Web-based management console to give administrators access to all clients and servers on the network for client administration.
43	Should have role-based administration capability.
M	**Notification, Reporting and Logging**
44	Must provide email and sms notification for various critical events such as virus outbreak, ransomware incidents, license getting expired.
45	Must have the capability to generate a graphical as well as tabular reports.
46	Must have capability to export reports in multiple formats such as PDF and CSV.

5.15.28 **Network Management System**

Sl.	Requirement
1	For effective operations and management of IT Operations, there is a need for an industry-standard Network Monitoring System (NMS). Given the expanse and scope of the project, NMS becomes very critical for IT Operations and SLA Measurement. Some of the critical aspects that need to be considered for operations of IT setup of are: a) Network Fault Management b) Network Performance Management c) Server Performance Monitoring d) Centralized and unified Dashboard The bidder shall provide 20% additional licenses than the actual requirement for future expansion requirement.
2	The Monitoring Solution should provide Unified Architectural design offering seamless common functions including but not limited to: Event and Alarm management, Auto-discovery of the Network environment, Correlation and root cause analysis, reporting and analytics
3	There should be a tight integration between infrastructure metrics and logs to have the single consolidated console of Infrastructure & security events.
4	The solution must provide discovery & inventory of heterogeneous physical network devices like Layer-2 & Layer-3 switches, Routers and other IP devices and do mapping of LAN & WAN connectivity with granular visibility up to individual ports level. The operator should be able to build correlation rules in a simple GUI based environment where the Operator should be able to correlate cross domain events
5	The solution shall provide future scalability of the whole system without major architectural changes.
6	The monitoring solution should have the ability retain raw data (without averaging) for more than Six Months.
7	All the required modules should be from same OEM and should be tightly integrated for single pane of glass view of enterprise monitoring
8	The platform must provide complete cross-domain visibility of IT infrastructure issues
9	The platform must consolidate monitoring events from across layers such as Network, Server, Application, Database, Camera, UPS etc.
10	The solution should support single console for automated discovery of enterprise network components e.g., network device, servers, virtualization, cloud, application, and databases
11	The solution must support custom query-based widget with multiple visualization methods including Chart, Gauge, Grid, Top N list etc. to visualize and represent collected data with ease.
12	The solution must support out of the box data widgets for Metric, Log, and network flow data with multiple visualization methods such as gauge, grid, charts, Top N etc.

13	The solution should provide superior view of infrastructure health across system, networks, application and other IT Infrastructure components into a consolidated, central console
14	The solution must provide agentless and agent-based method for managing the nodes and have the capability of storing events / data locally if communication to the management server is not possible due to some problem. This capability will help to avoid losing critical events.
15	The agents should capable of setting polling interval of 5 Seconds or less with low overhead on target server infrastructure
16	The NMS admin console must provide the ability to start, stop and restart the agent on target server infrastructure and the agent should provide collection capabilities not limited to just KPIs but also support collecting raw logs as well as packets.
17	The NMS should provide event correlation platform/engine and thus must filter, correlate & process, the events that are created daily from network devices. It should assist in root cause determination and help prevent flooding of non-relevant console messages.
18	The proposed solution should provide out of the box root cause analysis with multiple root cause algorithms inbuilt for root cause analysis. It should also have a strong event correlation engine which can correlate the events based on event pairing, event sequencing etc.
19	The Platform must include an event correlation automatically fed with events originating from managed elements, monitoring tools or data sources external to the platform. This correlation must perform event filtering, event suppression, event aggregation and event annotation.
20	The proposed solution should provide alert console with alert summary such as no. of correlated alert, network alert, server alert, virtualization alert, cloud alert, application alert etc.
21	The system must have provision to overlay alert on reported metric to understand alert triggering behavior across multiple drill down pages

5.16 **6U Wall Mount Indoor Rack**

	Technical Specifications
1	Depth- 500/600 mm, Welded Frame Structure made of 1.2mm CRCA sheet
2	Load Bearing Capacity: Minimum 20Kg
3	Front toughened glass door (4mm thick) with 0.8mm MS frame with lock
4	Cable entry provision at top & bottom (cable gland shall be used for termination of cables, unused openings shall be sealed properly)
5	Sufficient perforation provided for ventilation at all sides
6	Surface Finish: EC Dip Coat Primed and Powder Coated
7	Cable Manager 1U MS/PVC- Horizontal
8	Fans as per requirement
9	19” mountable, 1U, Universal power socket design to fit both round & flat socket with built in surge protection & overload circuit breaker, 5 AMP AC power distribution channel made of Metal/ high flame retardant & insulating material, CE/ISI approved with 6 no’s sockets (1 No’s), Copper earthing Kit (19” copper Bar), & equipment

5.17 **Presentation Type Barcode Scanner**

Sl.	**Functional Requirement**
1	For the man less type weighbridges this kind of scanner would be kept before the boom barrier.
2	This shall be useful in cases when the RFID tag is not getting read properly and for access the driver

	could show the QR code printed on the slip to the scanner for opening of boom barrier in case it is authorized.
3	The scanner should automatically read the QR code as soon as it is presented and should not require any kind of external intervention like button pressing and all.
4	Cable from the PC to the scanner should be laid through a dedicated HDPE duct till the scanner.
5	Scanner shall be mounted on a pole or similar structure with a proper housing with rain canopy and other environmental protection in which the scanner shall be kept.

	Technical Specifications
1	Supported Host Interfaces: RS232/USB
2	User Indicators: Good decode LEDs, beeper
3	Graphics Format Support: bitmap, JPEG or TIFF
4	Operating Temperature: 0.0° C to 50.0° C
5	Drop Specification: Designed to withstand multiple drops at 5.0 ft. / 1.5 m to concrete
6	Environmental Sealing: IP52 or better

5.18 **2-4 Meter Pole with housing for Barcode Scanner**

Sl.	**Functional Requirement**
1	Height of the pole to be between 2-4 Meter or more based on the average seating height of driver so that the driver can present the QR code to the scanner easily.
2	A proper housing for the scanner should be mounted on the top of the pole to protect the scanner from rain, sunlight and dust (as much as possible)

Sl.	**Technical Requirement**
1	Pole shall be hot dip galvanized as per IS 2629/IS2633/IS 4759 slandered with average coating thickness of 86 Micron. The galvanizing shall be done in single dipping.
2	The pole shall be installed on a precast or cast in- SITU RCC foundation on studs with nuts & washers and with a set of four foundation bolt for greater rigidity basis the soil bearing capacity of the actual site.

5.19 **Emergency Call Box**

	Functional Requirement
1	ECBs to be installed one each at parking and stockyard
2	They shall mostly be mounted on a pole in a housing with a canopy which is to be provided by the bidder along with the ECB.
3	The unit shall preferably have a single button which when pressed, shall connect to the Command and Control Centre or to the nearest/any of the control room having the local control console.

4	These should also be capable of being used for Public Address.
5	The PA control desk to be used for communicating with ECB
	Technical Specifications
1	Construction: Cast Iron/Steel Foundation, Sturdy Body for equipment
2	Call Button: Watertight Large backlit Rectangular Push Button, Visual Feedback for button press and call indication
3	Connectivity: Ethernet
4	Sensors: For tempering/ vandalism
5	IP66 as per EN 60529, IK09 Protection EN 62262
6	Operating Temperature 0 to 60° C
7	Speaking Distance minimum 5 ft
8	Inbuilt Class D Amplifier, 99db SPL
9	Minimum 3 Inputs and 2 Output relay contacts
10	ECB should be able to make calls to the PA system
11	Transmission Bandwidth 16000 Hz
12	Front panel: stainless steel of minimum 3 mm
13	Software Client for making/receiving Calls to ECB
14	Automatic Volume Control, Call recording