ALIGARH SMART CITY LIMITED

https://etender.up.nic.in

1. **Chief Executive Officer, Aligarh Smart City Limited, Aligarh invites online Proposals on two stage system for the following works:**

NIT Reference No.	Name of Project/ Work(s)	Estimated cost Amount in INR	Bid Security /(Earnest Money) in INR	Cost of Document/ Tender Fee in INR	Period of Completion
Tender No: **14**/ASCL/ 2018 -19 dated 3/12/2018	Request for Proposal for Selection of Master Systems Integrator (MSI) for Implementation of Integrated Command & Control Center (ICCC) and E- Governance Based Smart City Solutions at Aligarh	Rs. 170 crore (Rupees One hundred seventy crore only) including GST & other taxes	Rs. 2.90 crore (Rupees Two crore ninety Lakh Only)	Rs. 25,000/- (Rupees Twenty five Thousand)	12 Months of Implementation and 60 Months of O&M. (12+60 = 72 months)

2. **Important data of RFP is as mentioned below:**

Name of Project/Work(s)	Availability of Tender on-line for bidding		Last Date & Time for on-line Submission of Bids	Date & Time of opening of tender	
	From	To		Technical Bid	Financial Bid
Request for Proposal for Selection of Master Systems Integrator (MSI) for Implementation of Integrated Command & Control Center (ICCC) and E- Governance Based Smart City Solutions at Aligarh	05-12-2018 1100 hrs	26-12-2018 1700 hrs	26-12-2018 1700 hrs	27-12-2018 1500 hrs	To be intimated later

3. **A Pre-Bid meeting is as mentioned below:**

Date & Time	17-12--*2018; Time: 1100 hrs.*
Venue	*Aligarh Smart City Ltd. Office, Room no 108, Sewa Bhawan, Near Ghanta Ghar Lal Diggi Road, Aligarh, Uttar Pradesh 202001,India*
Last date for clarification	*Queries / Clarifications are to be send through e-mail on aligarhsmartcityltd@gmail.com latest by 5:00 PM on* 14.12.*2018. No query/clarification will be entertained after this.*

4. For additional details such as estimated cost, important date, detailed information, qualification and eligibility criteria, visit website *https://etender.up.nic.in* for downloading of RFP

5. For participating in the above e-tender, the bidders shall have to get them registered with *https://etender.up.nic.in* and get user ID, password, Class 3, digital signatures Certificate (DSC) is mandatory to participate in the e-tendering process. For any clarification/ difficulty/ regarding e-tendering process bidders can contact helpdesk on the phone numbers mentioned in the Website.

6. The bidders should keep checking the website for any addenda/corrigenda and the bidder should incorporate the same in their bid documents. No addenda/corrigenda shall be published in the news paper.

Chief Executive Officer

ALIGARH SMART CITY

REQUEST FOR PROPOSAL FOR SELECTION OF MASTER SYSTEM INTEGRATOR FOR IMPLEMENTATION OF INTEGRATED COMMAND & CONTROL CENTER AND e-GOVERNANCE BASED SMART CITY SOLUTION AT ALIGARH

VOLUME-I: INSTRUCTIONS TO BIDDER

RFP Number: 14/ASCL/2018-19 : Date: 5/12/2018

Invited by:
Aligarh Smart City Limited (ASCL)
Aligarh
Uttar Pradesh.

Disclaimer

The information contained in this Request for Proposal document ("**RFP**") whether subsequently provided to the bidders, ("**Bidder/s**") verbally or in documentary form by Aligarh Smart City Limited (henceforth referred to as "**ASCL**" in this document) or any of its employees or advisors, is provided to Bidders on the terms and conditions set out in this Tender document and any other terms and conditions subject to which such information is provided.

This RFP is not an agreement and is not an offer or invitation to any party. The purpose of this RFP is to provide the Bidders or any other person with information to assist the formulation of their financial offers ("**Bid**"). This RFP includes statements, which reflect various assumptions and assessments arrived at by ASCL in relation to this scope. This Tender document does not purport to contain all the information each Bidder may require. This Tender document may not be appropriate for all persons, and it is not possible for the Chief Executive Officer, ASCL and their employees or advisors to consider the objectives, technical expertise and particular needs of each Bidder. The assumptions, assessments, statements and information contained in the Bid documents, may not be complete, accurate, adequate or correct. Each Bidder must therefore conduct its own analysis of the information contained in this RFP and to seek its own professional advice from appropriate sources.

Information provided in this Tender document to the Bidder is on a wide range of matters, some of which may depend upon interpretation of law. The information given is not intended to be an exhaustive account of statutory requirements and should not be regarded as a complete or authoritative statement of law. ASCL accepts no responsibility for the accuracy or otherwise for any interpretation of opinion on law expressed herein.

ASCL and their employees and advisors make no representation or warranty and shall incur no liability to any person, including the Bidder under law, statute, rules or regulations or tort, the principles of restitution or unjust enrichment or otherwise for any loss, cost, expense or damage which may arise from or be incurred or suffered on account of anything contained in this RFP or otherwise, including the accuracy, reliability or completeness of the RFP, and any assessment, assumption, statement or information contained therein or deemed to form part of this RFP or arising in any way in this Selection Process. ASCL also accepts no liability of any nature whether resulting from negligence or otherwise howsoever caused arising from reliance of any Bidder upon the statements contained in this RFP. ASCL may in its absolute discretion, but without being under any obligation to do so, can amend or supplement the information in this RFP.

The issue of this Tender document does not imply that ASCL is bound to select a Bidder or to appoint the Selected Bidder (as defined hereinafter), for implementation and ASCL reserves the right to reject all or any of the Bidders or Bids without assigning any reason whatsoever.

The Bidder shall bear all its costs associated with or relating to the preparation and submission of its Bid including but not limited to preparation, copying, postage, delivery fees, expenses associated with any Proof of Concept (PoC), demonstrations or presentations which may be required by ASCL or any other costs incurred in connection with or relating to its Bid. All such costs and expenses will remain with the Bidder and ASCL shall not be liable in any manner whatsoever for the same or for any other costs or other expenses incurred by a Bidder in preparation for submission of the Bid, regardless of the conduct or outcome of the Selection process.

Table of Contents

Disclaimer 2
Glossary 7
Definitions 12
1. Introduction 15
1.1. About the Aligarh Smart City Limited 15
1.2. Introduction to Aligarh Smart city Project 15
1.3. Fact Sheet 19
2. Instructions to the Bidder 21
2.1 Instructions for Online Bid submission 21
2.2 General 23
2.3 Eligible Bidders 24
2.4 Proposal Preparation Cost 25
2.5 Pre-Bid Meeting 26
2.6 Conflict of Interest 27
2.7 Compliant Bids/Completeness of Response 27
2.8 Right to amendment of the project scope 27
2.9 ASCLs rights to terminate the selection process 28
2.10 Right to Accept/Reject any proposal 28
2.11 Bidder to Inform 29
2.12 Bid Formats 29
2.13 Language of the Bid 31
2.14 Hand written documents, Erasures or Alterations 31
2.15 Earnest Money Deposit (EMD) / Bid Security 31
2.16 Bid Prices 32
2.17 Firm Prices 33
2.18 Amendment of the RFP Document 33
2.19 Inspection of Site and sufficiency of RFP 33
2.20 Deviations and Exclusions 34
2.21 Total Responsibility 34
2.22 Key Personnel 34
2.23 Inclusion of MSMEs in Project Delivery 35
2.24 Right to vary quantity 35
2.25 Withdrawal, Substitution and Modification of Bids 36
3 Selection Criteria 37
3.1 Opening of Bids 37
3.2 Preliminary Examination of Bids 37
3.3 Clarification on Bids 38
3.4 Evaluation Process 38
3.4.1. Stage 1: Pre-Qualification 38
3.4.2. Stage 2: Technical Evaluation 39
3.4.3. Stage 3: Commercial Evaluation 39
3.4.4. Successful bidder evaluation 40
3.5 Pre-Qualification criteria 40
3.6 Technical Bid Evaluation Criteria 46
3.6.1. Technical Bid Evaluation Criteria 46
3.6.2. Technical Demonstration of Proof of Concept during evaluation period 59
3.6.3. Key Personnel Criteria 59
3.7 Conditional bids/Offers by the bidders 60

3.8 Late Tender bids 60
3.9 Bid Validity Period....60
3.10 Address for Communication 60
3.11 Opening of Bids....60
3.12 Clarification of Bids 60
3.13 Right to accept any Bid and reject any or all Bids....61
3.14 Non-Conforming bids....61
3.15 Confidentiality....61

4 Award of Contract 62

4.1 Notification of Award....62
4.2 Performance Bank Guarantee 62
4.3 Signing of Contract....62
4.4 Rejection criteria....62
4.5 Concessions permissible under statutes....64
4.6 Taxes 64
4.7 Audit, Access and Reporting 64
4.8 Terms of Payment....66
4.9 Records and Information 66
4.10 Right to vary the scope of Work 66
4.11 Fraud and corruption 67
4.12 Conflict of Interest 68
4.13 Subcontracting....68
4.14 Quality standards and pre-eligibility OEM criteria 69

Annexure 1 –Pre-Qualification Bid check list 70

Annexure1.1. Indicative Check-list for the Documents to be included in the Pre-Qualification Bid....70
Annexure 1.2. Pre-Qualification Bid Cover Letter 71
Annexure1.3. Particulars of the bidders (required for Sole/Lead Bidder and all Consortium Members).73
Annexure 1.4. Format for Power of Attorney for signing the Bid 75
Annexure1.5. Declaration of Non-Blacklisting 77
Annexure1.6. Declaration for Consortium Member:....78
Annexure1.7. No Deviation Certificate 79
Annexure1.8. Total Responsibility Certificate....80
Annexure1.9. Self-certificate for Project execution experience (In Bidding Entity's Letter Head) 81

Annexure 2 – Formats of Technical Bid....82

Annexure 2.1. General Instructions for the Technical Bid 82
Annexure 2.2. Technical Bid Checklist 84
Annexure 2.3. Technical Bid Covering Letter....85
Annexure 2.4. Curriculum Vitae (CV) of Team Members 87
Annexure 2.5. Credential Summary....89
Annexure 2.6. Bidder's Experience- Client Citations 90
Annexure 2.7. Project Plan 91
Annexure 2.8. Manpower Plan 92
Annexure 2.9. Format for sharing details of the Resources/Personnel to be deployed 94
Annexure 2.10. Format for specifying Compliance to the benchmark / minimum Specifications 95
Annexure 2.11. Format for Authorization Letters from OEMs....96
Annexure 2.12. Anti-Collusion Certificate 97
Annexure 2.13. Overview of Proposed Solution 98
Annexure 2.14. Proposed Bill of Material....99
Annexure 2.14.1. Proposed Bill of material for CAPEX....99
Annexure 2.14.2. Proposed Bill of material for OPEX....108
Annexure 2.15. Details of additional components 110
Annexure 2.15.1. Additional Bill of Quantity 110

Annexure 3 – Formats of Price Bid....111

Annexure 3.1. Price Bid - Format 1 111
Annexure 3.2. Price Bid - Format 2 – Unit Rates 113
Annexure 3.2.1. Price Component for Capex – Unit Rates 113
Annexure 3.2.2. Price Component for Opex – Unit Rates 114
Annexure 3.3. General instructions 115

Annexure 4 -Format for EMD 116

Annexure 5- Performance Bank Guarantee 118

Annexure 6- Non-Disclosure Agreement 120

Annexure 7- Format of Agreement between Bidder and their Parent Company / 100% own subsidiary / Sister Concern Company (As the case may be) 123

Annexure 8- Format of Parent Company / 100% own subsidiary / Sister Concern Company Guarantee (As the case may be) 126

Annexure 9 - Consortium Agreement 129

Annexure 10 - Format for Power of Attorney for Lead bidder of Consortium 132

Important Dates

S. No.	Activity	Deadline
1	Release of RFP	05/12/2018
2	Last date of receipt of queries on RFP	16/12/2018: 1700 hrs.
3	Pre-bid Meeting date	17/12/2018 : 1100 hrs.
4	Last date for submission of Bids	26/12/2018 : 1700 hrs.
5	Date of opening of Technical bids	27/12/2018 1500 hrs.
6	Date of opening of Commercial bids	To be notified later

Glossary

Sr. No.	Term/Acronyms	Description
1.	AAA	Authentication, Authorization, and Accounting
2.	ABD	Area Based Development The Area Based Development (ABD) is considered to be an innovative approach enabling breakthrough in sustainable growth.
3.	ANPR	Automated Number Plate Recognition
4.	AP	Access Point
5.	B2C	Business to Citizen
6.	Bid	Offer by the Bidder to fulfil the requirement of the Authority for an agreed price. It shall be a comprehensive technical and commercial response to the RFP published which would be accompanied all supporting documents as mandated in the RFP
7.	BOM	Bill of Material
8.	CCTV	Closed Circuit Television
9.	ICCC	Integrated Command and Control Centre which acts as a nerve where from all the operation & management of the Smart city would be undertaken. The Smart City will have multiple smart solution components. These Smart solutions will be monitored & managed
10.	Consortium	A consortium consists of multiple members (not more than three parties- Lead Bidder + 2 Consortium members) entering into a
		Agreement for a common objective of satisfying the ASCL requirements & represented by lead member of the consortium, designated as a "Lead Bidder". Also, the solely responsibility for successful execution of the entire project will be that of the defined Lead bidder. The consortium members shall support lead bidder for their work scope to execute the project successfully. The consortium members should have relevant
11.	DBA	Database Administrator
12.	DC	Data Centre is a specific infrastructure which consists of the IT components including but not limited to servers, storage, networking components, security components etc. and other non IT components including but not limited to access control, AC, main power, backup power etc. to support the operation of the datacentre

13.	Deliverables	Products, infrastructure, services & support as agreed to be delivered by the Bidder as per the scope of work defined in the RFP, Implementation and the Maintenance phases and includes all documents related to the user manual, technical manual, design, process and operating manuals, service mechanisms, policies and guidelines (such as security related, data migration related), inter alia payment and/or process related etc.,
14.	DR	Disaster Recovery site which is a failback site which becomes live when datacenter becomes offline
15.	Effective Date	The date on which the Contract Agreement for this RFP comes into
16.	EMD	Earnest Money Deposit
17.	EMS	Enterprise Management System
18.	e- Procurement	Refers to the electronic tendering system of the Authority
19.	FPS	Frames Per Second
20.	FRS	Facial Recognition Software
21.	G2C	Government to Citizens
22.	GI Pipes	Galvanized iron Pipes
23.	GIS	Geographical Information System is a system designed to capture, store, manipulate, analyse, manage, and present spatial or geographic data. The GIS platform that will be commissioned as a part of this project will be integrated with all the services & solution to provide the city administrators with visual tool to take faster & efficient decision
24.	Go UP	Government of Uttar Pradesh
25.	GPRS	General Packet Radio Service
26.	GPS	Global Positioning System
27.	GSM	Global Systems for Mobile Communications
28.	GUI	Graphical User Interface
29.	HO	Head Office
30.	ICT	Information and Communication Technology
31.	IDS	Intrusion Detection System
32.	IOE	Internet of Everything
33.	IP	Internet Protocol
34.	IPS	Intrusion Prevention System
35.	ITIL	Information Technology Infrastructure Library
36.	Iota	Internet of Things
37.	LAN	Local Area Network

38.	LED	Light Emitting Diode
39.	LOI/LOA	Letter of Intent/Letter of Award
40.	MoU	Memorandum of Understanding
41.	NNA	Nagar Nigam Aligarh
42.	NOC	A Network Operations Center (NOC) is defined as the place from which the networks are supervised, monitored and maintained. It typically has a network operations center, a room containing visualizations of the network or networks that are being monitored, workstations at which the detailed status of the network can be seen, and the necessary software to manage the networks.
43.	Node	Network aggregation points consisting of L3/L2 switches
44.	Non-Compliance	Means failure/refusal to comply the terms and conditions of the
45.	Non-Responsive	Means failure to furnish complete information in a given format and manner required as mandated in the tender documents or non-submission of tender offer in given forms / pro forma or not following procedure mentioned in this tender or any of required details or documents is missing or not clear or not submitted in the prescribed format or non- submission of tender fee on EMD
46.	O&M	Operations & Maintenance period in which the bidder would provide the services as per the terms & conditioned mentioned in the RFP document including the Service Level Agreements (SLA) defined in the
47.	OEM	Original Equipment Manufacturer is a company that produces parts and equipment that may be marketed by another party. OEM refers to the organizations who manufactures the products and not to the party who distributes or resells the same
48.	OFC	Optical Fiber Cable
49.	OS	Operating Systems
50.	PA System	Public Address System
51.	Pop	Points of Presence
52.	PTZ	Pan Tilt Zoom
53.	Required Consents	The consents, waivers, clearances and licenses to use Authority Intellectual Property Rights, rights and other authorizations as may be required to be obtained for the software and other items that DIT, GoI their nominated agencies are required to make available to Bidder pursuant to this Agreement;
54.	RFP	Request for Proposal

55.	RLVD	Red Light Violation Detection
56.	ROW	Right of Way
57.	RPO	Recovery Point Objective (RPO) describes the interval of time that might pass during a disruption before the quantity of data lost during that period exceeds the Business Continuity Plan's maximum allowable threshold or "tolerance." RPO limits how far to roll back in time, and defines the maximum allowable amount of lost data measured in time from a failure occurrence to the last valid backup.
58.	RTO	The Recovery Time Objective (RTO) is the duration of time and a service level within which a business process must be restored after a disaster in order to avoid unacceptable consequences associated with a break in business continuity. RTO is related to downtime and represents how long it takes to restore from the incident until normal operations are available to users
59.	SLA	Service Level Agreement (SLA) is a commitment between a service provider and a client relating to a project which is well defined in advance and based on which the quality of services are defined. SLA also define the penalty which would be levied on the service provider in case of a service goes below the threshold/ accepted level. Particular aspects of the service – quality, availability, responsibilities – are agreed between the service provider and the service user. The most common component of SLA is that the services should be provided to the customer as agreed upon in the contract.
60.	MSI	Master System Integrator (Bidder) A Master Systems Integrator is a company that specializes in bringing together supporting organizations, component subsystems in whole and ensuring that those subsystems function together as per the scope of work and within the defined SLAs of the RFP. The term MSI in this RFP context also refers to the prospective bidder for this RFP and can be used interchangeably in the RFP document
61.	Successful Bidder	The bidder who is qualified (as per the pre-qualification criteria of the RFP) to participate in the bidding process and is finally declared are the winner of the bidding process as per the bid evaluation process defined in the RFP and is awarded the contract to execute the project as per the project scope
62.	URL	Uniform Resource Locator
63.	VA	Video Analytics
64.	VaMS	Variable Message System
65.	VCA	Video Content Analytics

66.	VMS	Video Management Software/System
67.	WAN	Wide Area Network
68.	Server Room	Sever room shall refer to the area of the datacentre which consists of the IT components including but not limited to servers, storage, networking components, security components etc.

Definitions

#	Term	Definition
1.	**Agreement/ Contract**	The Agreement entered between Authority and the Master Systems Integrator including all attachments, schedules, annexure thereto and all documents incorporated by reference therein and all amendments, corrigendum /corrigenda, changes thereto
2.	**Authority**	The use of term Authority in the RFP means "Aligarh Smart City Limited" board/committee
3.	**Bidder**	The use of the term "Bidder" in the RFP means the Single Service Provider / firm or the Lead Member of the consortium of firms not exceeding 3 who participate in the bidding process.
4.	**Bid/Proposal**	Offer by the Bidder to fulfil the requirement of the Client/Authority under the RFP/Contract for an agreed price. It shall be a comprehensive technical and commercial response to the RFP
5.	**Breach**	A breach by Bidder of any of its obligations under this RFP.
6.	**Client**	Refers to Aligarh Smart City Limited (ASCL)
7.	**Confidential Information**	All information including Departmental data (whether in written, oral, electronic or other Format) which relates to the technical, financial and business affairs, dealers, suppliers, products, developments, operations, processes, data, trade secrets, design rights, know-how, plans, budgets and personnel of each department and its affiliates which is disclosed to or otherwise learned by the other Party in the course of or in connection with this RFP (including without limitation such information received during negotiations, location visits and meetings in connection with this RFP);
8.	**Consortium**	The consortium consist of multiple members (not more than 3 parties including the lead bidder) entering into a Consortium Agreement for a common objective of satisfying the Authority's requirements & represented by Lead Member of the consortium

#	Term	Definition
9.	**Control**	In relation to any business entity, the power of a person to secure a) by means of the holding of shares or the possession of voting power in or in relation to that or any other business entity, or b) by virtue of any powers conferred by the articles of association or other document regulating that or any other business entity, that the affairs of the first mentioned business entity are conducted in accordance with that person's wishes and in relation to a partnership, means the right to a share of more than one half of the assets, or of more than one half of the income, of the partnership;
10.	**Deliverables**	Products, infrastructure and services agreed to be delivered by the Bidder in pursuance of the agreement as defined more elaborately in the RFP Implementation and the Maintenance phases and includes all documents related to the user manual, technical manual, design, process and operating manuals, service mechanisms, policies and guidelines (such as security related, data migration related), inter alia payment and/or process related etc., source code and all its modifications;
11.	**e-procurement Portal**	Means the electronic tendering system of the Authority
12.	**Procurement**	The date of commencement of Operations and Maintenance phase after the successful completion of Implementation Phase (FAT and acceptance of the overall solution by the Authority)
13.	**Intellectual Property Rights**	Intellectual property rights include patents, copyright, industrial design rights, trademarks, plant variety rights, trade dress, geographical indications
14.	**Month**	The Month shall mean calendar month & Week shall mean calendar week
15.	**Operating Cost**	Operating Cost is the cost incurred by Authority after the Go-Live of the project
16.	**Parties**	Authority and Bidder for the purposes of this RFP and "***Party***" shall be interpreted accordingly.
17.	**Performance Bank Guarantee**	Unconditional guarantee provided by the Bidder from a Nationalized/Scheduled Commercial Bank in favour of the Authority for 10% of the Total Project Cost.
18.	**Project Implementation**	Project Implementation as per the testing standards and acceptance criteria prescribed by Authority or its nominated agencies;
19.	**Request for Proposal/ RFP Document**	Written solicitation that conveys to the Bidder, requirements for products/ services that the Authority intends to buy and implement

#	Term	Definition
20.	**Service Level**	The level of service and other performance criteria which will apply to the Services delivered by the Bidder;
21.	**SLA**	Performance and Maintenance SLA executed as part of Master Service Agreement; as specified in Volume III
22.	**Software**	Software designed, developed / customized, tested and deployed by the Bidder for the purposes of the Project and includes the source code (in case of Bespoke development) along with associated documentation, which is the work product of the development efforts involved in the Project and the improvements and enhancements effected during the term of the Project, but does not include the third party software products (including the COTS products used for the product), proprietary software components and tools deployed by the Bidder;
23.	**Successful Bidder**	The bidder who is qualified & successful in the bidding process and is given the award of Contract and will be referred to as Master Systems Integrator (MSI)
24.	**Operations and Maintenance**	Operations and Maintenance services for the software, hardware and other IT and Non-IT infrastructure installed as part of the project after Phase wise Go-Live and for a period of 5 years from the date of phase wise Go-Live. Warranty period of the product supplied under project i.e. hardware, software, IT/Non-IT etc., will be considered after phase wise Go-Live only.

1. Introduction

1.1. About the Aligarh Smart City Limited

Aligarh Smart City Limited (ASCL) is the special purpose vehicle created under the Aligarh Municipal Corporation to deliver City Smart City Applications and Citizen Services.

1.2. Introduction to Aligarh Smart city Project

The Ministry of Housing and Urban Affairs (Mo HUA), Government of India (GoI) has initiated Smart Cities Mission (SCM), under which select cities will be developed as smart cities with a focus on improving citizen services with ICT intervention. Smart Cities Mission is an urban renewal and retrofitting programme by the Government of India with a mission to develop 100 cities all over the country making them citizen friendly, sustainable and investment destination. Under the smart city scheme, Government has emphasized to improve the basic civic amenities of the cities on one hand and the provision of modern technological advances for ease of living on the other hand.

The Smart City Proposal for Aligarh envisions to implementing a number of projects categorized into Area Based Development (ABD) projects and Pan City components. The ABD projects focuses on physical infrastructure components, whereas the Pan City components focuses on the ICT interventions in the city. The component as being undertaken as part of the Pan City Proposal is as under:

Pan City Development:

To achieve Aligarh's vision for a smart city, large numbers of measures are required to implement. Considering the priorities echoed by city stakeholders during the consultative process and practical feasibility, the vision of Aligarh Smart city is as under:

The vision was designed to meet the aspirations of the citizens of Aligarh including the development parameters for next 30 years, through continuous engagement with the elected representatives, Experts of Aligarh Muslim University, urban planners, stakeholders, NGO's and citizens of Aligarh.

"MUKAMMAL ASHIYAN ALISHAN ALI-e-GARH"

MUKAMMAL ASHIYAN:

This represents a high quality of city life, which has smooth access to basic infrastructures, is clean & green, energy efficient and environmental friendly and has peaceful atmosphere.

The city will have improved infrastructure services, better management of liquid and solid waste, better-managed traffic, and road spaces with improved public realm for more social interactions.

ALISHAN:

This represents sound economy, which can be achieved through promotion of lock and hardware industry. ALI-e-GARH: Represents ICT initiatives for improvement in Govt. service delivery to citizens through e-governance, improved traffic management and better public utility services.

Aligarh City has envisaged the Vision to transform the city into a world-class lock and hardware city with improved livability by making the city clean, green and agile; equipped with basic infrastructure services and integrating all municipal services and bringing them to a common ICT platform.

Goals and sub goals to accomplish the city vision:

G1 : Mukamal Ashiyan
SG1: Smart Infrastructure For A Healthy Future
Provide 24*7 electricity with 10% of the energy from solar. Undertake a solar rooftop program to increase share of renewable energy in energy consumption within city.
Provide 24*7 water supply and augmentation through surface water sources, 100% house connections and NRW reduction.
Redevelopment of storm water drainage system, reuse of wastewater, rainwater harvesting.
Provision of sewerage system including STP, faucal sludge and Septage management
SG2: clean, sanitized and livable Aligarh
Improving the SWM facilities covering source segregation, maintaining of d2d collection in the whole town, upgrading the capacity of waste to compost plant.
Smart solutions like GPS based vehicle-tracking system, E Rickshaws, RFID Bins for improving collection efficiency and better monitoring, in-situ waste composting machines.
Improving community and public sanitations.
Rejuvenate and protect water bodies as ‘life spaces’.
SG3: transforming mobility, improving lives

Improve mobility by providing dedicated footpaths and cycle track, with required facilities for senior citizen, children and differently abled persons and Non-Motorized Traffic Zones to reduce traffic congestion, all these will help in pedestrian safety.
Reduce congestion through Junction improvements, development of multi-level car parking.
Ensure public realm by creating pedestrian zone, converting limited/no Vehicular Access Zone with one-way strategy for reduced congestion and differently abled friendly access ways.
Ensure decongestion on roads near bus stands by redeveloping the existing bus stands, railway over bridge, railway station remodeling
LED Street Lighting, Surveillance system, Smart poles for smart solutions in Traffic Management.
SG4: Inclusive Economic Development
Development of under-utilized land parcels for creating multipurpose facilities such as commercial centers.
Ensure access to affordable housing and urban services to people living in 8 slum areas.
Creation of MSI zones along 6 designated roads/ locations.
Weekly local markets, night bazaars, morning haats for promotion of local economy.
G2 : Alishan Aligarh
SG1: Promoting Innovation, Enabling Future
Technological enhancement through incubation centers.
Upgradation of Common Facility centers.
Testing center, Research, and Development (R&D) Center.
Encouraging industrial growth by setting up on-line business single window clearance system.
Official website for promoting business online.
Encouraging schools and colleges of Aligarh to conduct industrial visits to view the locks and hardware industries
SG2: Advanced, Accessible & Adaptable Aligarh
Develop City's iconic Exhibition Ground as Cultural, Recreational cum Commercial center of the city with development of facilities like drive in theatre, jogging tracks, markets, cultural fests etc.
The dispersal of recreational facilities within the city area can be done through development of areas

along water bodies with facilities such as jogging tracks, food courts.
Organizing Aligarh Fest including Hardware Exhibition, Numaish & Cultural shows on a frequent basis.
G3: Ali-e-Garh
SG1: Accelerating Towards A Smarter Future
Ensuring e-Governance for all municipal services and integration with GIS and real time data through data capturing, digitization, inter-linkages and attribute giving and service delivery.
ICT platform for implementation of the policy for integration of various municipal services, making the system G2G & G2C.
Support engagement of citizens and empower citizens to understand, evaluate and analyze information using digital technology
SG2: Transparent ICT- Led Governance
Toll-free number, mobile app and website for monitoring and grievance redress of all basic services by 2018
Setting up on-line business single window clearance system
Biometric attendance system for the employees of ASCL

Aligarh has prepared RFP and is approved by board for MSI by using integrated approach; there is one tender for implementing all the smart solutions from Single Master System integrator. There are following components in tender as below:

a) Implementation:

i. ITMS with ANPR, RLVD cameras
ii. Environment sensor
iii. City surveillance Cameras with Face Recognition System
iv. Variable Message System
v. Public announcement System
vi. Emergency Call box
vii. E-Governance implementation with ERP
viii. GIS based solution
ix. Mobile app for Aligarh
x. Integrated Command and control Centre
xi. Data Centre on site and Disaster Recovery as a service on cloud with active-passive mode

xii. Creation of ASCL fiber Network for Connectivity

b) Integration:

i. All existing and upcoming future solution to be integrated with Integrated command and control center

1.3. Fact Sheet

S. No.	Item	Description
1.	Name of the Assignment	Request for Proposal for Selection of Master Systems Integrator (MSI) for Implementation of Integrated Command & Control Center (ICCC) and E-Governance Based Smart City Solutions at Aligarh
2.	Method of Selection	The method of selection is QCBS. The weightage given to the Technical and Financial scores will be 70% and 30% respectively. The Contract will award to the bidder scoring maximum marks in technical and financial evaluations as per the qualifying criteria. QCBS evaluation formula: Quality and Cost based Selection (QCBS) method shall be used for evaluation of the bids, as per the formula given below: The scores will be calculated as: $B_b = 0.7*T_b + (0.3)*(C_{min}/C_b * 100)$ Where, a) B_b = overall score of bidder under consideration (calculated up to two decimal points) b) Tb = Technical score for the bidder under consideration c) C_b = Price quoted by the bidder under consideration d) C_{min}= Lowest price among the financial proposals under consideration .
3.	Availability Of RFP Documents	Download from https://etender.up.nic.in
4.	RFP date	05/12/2018
5.	RFP Number	14/ASCL/2018-19 dated 5/12/2018

S. No.	Item	Description
6.	Last date and time for submission of Proposal (Proposal Due Date)	26/12/2018 : 1700 hrs. On-line on e-procurement Portal: https://etender.up.nic.in
7.	Date, time and Venue of Pre-Bid Meeting	17/12/2018 : 1100 hrs. Venue : Room No. 108, Sewa Bhawan, Church Compound, Civil Lines, Aligarh – 202001, Uttar Pradesh
8.	Last date and time for receiving Pre bid queries/clarifications	16/11/2018 : 1700 hrs.
9.	Date , time and venue of opening of Pre-qualification and technical proposals on e-procurement platform	27/12/2018 : 1500 hrs. Venue : Room No. 108, Sewa Bhawan, Church Compound, Civil Lines, Aligarh – 202001, Uttar Pradesh
10.	Date , time and Venue of opening of financial proposal	To be intimated to the technically qualified bidders at a later date
11.	Bid Document Fee (Non-refundable)	Indian Rupees 25,000 (Indian Rupees Twenty Five Thousand only) inclusive of Taxes, in form NEFT/RTGS/Net banking at Aligarh smart city limited, Account no.-0294001100000818 IFSC: PUNB0001000 ,MICR:202024002
12.	Bid Security / EMD (Refundable)	INR 2.9 Crore (INR 2,90,00,000/-) (Indian Rupees two Crores 90 Lakhs only)
13.	Performance Bank Guarantee	10% of Total Contract Value
14.	For any enquiries and clarifications, please contact:	Email: aligarhsmartcity@gmail.com, Contact (Mob.):9711007971 (Mr. Mohit)
15.	Validity of the Proposal	Bidder proposals shall remain valid for a period of 180 days from last date of submission of Bid.
16.	Currency	Currency in which the Bidders may quote the price and will receive payment is Indian Rupees only.

Important Note: Proposals/Bids submitted without Bid Document fee and Bid Security shall summarily be rejected

2. Instructions to the Bidder

2.1 Instructions for Online Bid submission

1. Instructions to the Bidders to submit the bids online through the Public Procurement Portal for e Procurement at https://etender.up.nic.in
2. Possession of valid Digital Signature Certificate (DSC) and enrollment/registration of the contractors/bidders on the e-Procurement/e-tender portal are prerequisite for e-tendering.
3. Bidder should register for the enrollment in the e-Procurement site using the "Online Bidder Enrollment" option available on the home page. Portal enrollment is generally free of charge. During enrollment/registration, the bidders should provide only valid and true information including valid email id. All the correspondence shall be made directly with the contractors/bidders through email id as registered.
4. Bidder need to login to the site through their user ID/ password chosen during enrollment/registration.
5. Then the Digital Signature Certificate (Class II or Class III Certificates with signing key usage) issued by SIFY/TCS/ nCode/ eMudra or any other Certifying Authority recognized by Controller of Certifying Authorities (CCA) India on eToken /Smartcard, should be registered.
6. The registered DSC only should be used by the bidder in the transactions and should ensure safety of the same.
7. Contractor/Bidder may go through the tenders published on the site and download the tender documents/schedules for the tenders.
8. After downloading / getting the tender document/schedules, the Bidder should go through them carefully and then submit the documents as required, otherwise bid will be rejected.
9. Any clarifications may be sought online through the tender site, through the contact details or during pre-bid meeting if any. Bidder should take into account the corrigendum if any published before submitting the bids online.
10. Bidder may log in to the site through the secured login by the user id/ password chosen during enrolment/registration and then by submitting the password of the e- Token/Smartcard to access DSC.
11. Bidder may select the tender in which he/she is interested in by using the search option and then move it to the 'my tenders' folder.
12. From my tender folder, he may select the tender to view all the details uploaded there.
13. It shall be deemed that the bidder has read and understood all the terms and conditions before submitting the offer. Bidder should go through the tender schedules carefully and upload the documents as asked; otherwise, the incomplete bid shall stand rejected.
14. Bidder, in advance, should get ready the bid documents to be submitted as indicated in the tender document/schedule and ordinarily it shall be in PDF/xls/rar/jpg/dwf formats. If there is

more than one document, all may be clubbed together and provided in the requested format. Bidders Bid documents may be scanned with 100 dpi with black and white option. It is advisable that each document to be uploaded through online for the tenders should be less than 2 MB. If any document is more than 2MB, it can be reduced through zip/rar and the same if permitted may be uploaded. The file size being less than 1 MB the transaction uploading time will be very fast.

15. The Bidders can update well in advance, the documents such as certificates, annual report details etc., under "My Space option" and these can be selected as per tender requirements and then send along with bid documents during bid submission. This will facilitate the bid submission process faster by reducing upload time of bids.
16. Bidder should submit the EMD in hard copy. The Financial bid should be submit only online. The Financial bid submitted in hard copy shall be treated as nonresponsive and eligible for rejection. The hard copy should be posted/couriered/given in person to the Tender Inviting Authority, within bid submission due date and time as indicated in the tender. Scanned copy of the instrument should be uploaded as part of the offer.
17. While submitting the bids online, the bidder shall read the terms and conditions and may accept the same to proceed further to submit the bid packets.
18. The bidder has to select the payment option as offline to pay the Tender FEE/ EMD as applicable and enter details of the instruments.
19. The details of the DD/any other accepted instrument, physically delivered, should tally with the details available in the scanned copy and the data entered during bid submission time, otherwise submitted bid shall not be acceptable or liable for rejection.
20. The bidder has to digitally sign and upload the required bid documents one by one as indicated. Very act of using DSC for downloading the bids and uploading their offers shall be deemed to be a confirmation that they have read, understood and agreed with all clauses of the bid document including General conditions of contract without any exception.
21. The bidder has to upload the relevant files required as indicated in the cover content. In case of any irrelevant files, the bid may be rejected.
22. The bidder shall submit the price bid in the given format and upload after filling the relevant columns. The Priced-bid/BOQ template shall not be modified / replaced by the bidder; else the bid submitted is liable to be rejected for the tender.
23. The bidders are advised to submit the bids through online e-tendering system to the Tender Inviting Authority (TIA) well before the bid submission due date and time (as per Server System Clock). The TIA shall not be held responsible for any delay or the difficulties faced during the submission of bids online by the bidders.
24. After the bid submission (i.e. after Clicking "Freeze Bid Submission" in the portal), the acknowledgement number indicated by the system should be printed by the bidder and kept as a record of evidence for online submission of bid for the particular tender and also be used as entry pass to participate in the bid opening.

25. The time settings fixed in the server side and displayed at the top of the tender site, shall remain valid for all actions of requesting, bid submission, bid opening etc., in the e-Tender system. The bidders should follow such time during bid submission.
26. All the data being entered by the bidders would be encrypted using Public Key Infrastructure (PKI) encryption techniques to ensure the secrecy of the data. The data entered is not retrievable by unauthorized persons during the bid submission and until the time of bid opening by any person.
27. Any bid document that is uploaded to the server is subjected to symmetric encryption using a system generated symmetric key. Further this key is subjected to asymmetric encryption using buyers/bid openers' public keys. Overall, the uploaded tender documents become readable only after the tender opening by the authorized bid openers.
28. The confidentiality of the bids is maintained with the use of Secured Socket Layer (SSL) 128 bit encryption technology. Data storage encryption of sensitive fields is done.
29. The bidder should logout of the tendering system using the normal logout option available at the top right hand corner and not by selecting the (X) exit option in the browser.
30. For any queries regarding e-Tendering process, the bidders may contact at address as provided in the tender document. In Parallel, for any further queries, the bidders are advised to send a mail to aligarhsmartcityltd@gmail.com

2.2 General

1. While every effort has been made to provide comprehensive and accurate background information, requirements and envisaged solution(s) specifications, Bidders must form their own conclusions about the solution(s) needed to meet the Authority's requirements. Bidders and recipients of this RFP may wish to consult their own legal advisers in relation to this RFP.
2. All information supplied by Bidders as part of their bids in response to this RFP, may be treated as contractually binding on the Bidders, on successful award of the project by the Authority on the basis of this RFP.
3. No commitment of any kind, contractual or otherwise shall exist unless and until a formal written contract has been executed by or on behalf of Authority. Any notification of preferred bidder status by Authority shall not give rise to any enforceable rights by the Bidder. Authority may cancel this public procurement at any time prior to a formal written contract being executed by or on behalf of Authority.
4. Bids shall be received by the Authority on the e-Procurement portal https://etender.up.nic.in/ before the time and date specified in the schedule of the tender notice. In the event of the specified date for the submission of tender being declared a public holiday by the Government of Uttar Pradesh, the offers will be received up to the appointed time on the next working day. The Authority may, at its discretion, extend this deadline for submission of offers by issuing corrigendum and uploading the same on e-Procurement portal.
5. Telex, cable or facsimile offers will be rejected.

2.3 Eligible Bidders

Bids may be submitted by either of the following categories of bidders only:

The Bidder can be either a Single Master Systems Integrator (MSI) or a Consortium of companies/ corporations as described below.

1. Sole Bidder

The Sole Bidder must be a Master systems Integrator (MSI) company which has the capabilities to deliver the entire scope as mentioned in the RFP. The Sole Bidder cannot bid as a part of any other consortium bid under this RFP.

2. Consortium of Firms

Bids can be submitted by a consortium of firms. A consortium should not consist of more than 2 parties (including the Lead Bidder). One of the Firms would be designated as a "Lead Bidder". The Lead bidder and consortium partners shall be jointly and severally responsible for complete scope and ensuring the delivery of products and services mentioned in all volumes/Parts of this RFP. The list of Consortium Members needs to be declared in the bid which cannot be changed by the bidder later. Any change in the consortium member will need to be approved by Authority.

1. A Bidder applying individually or as consortium member shall not be entitled to submit another application either individually or as a member of any other consortium, as the case may be.
2. Consortium members must provide a Joint Venture Agreement (JVA) covering above points and showing their intention to enter into such an Agreement at the time of Award of Contract.
3. A Bidding Consortium is required to nominate a Prime Member. The formation of the consortium including identification of Prime member and role and responsibilities of each member shall be supported by Power of Attorney signed by all the members on a stamp paper of INR 100/-.
4. The successful bidder (SI) shall require to enter into agreement with all member of Consortium Members specifying following points in the Agreement. These points shall also be captured in JVA
    i. Identity Prime Member and Power of Attorney in favor of Prime Member.
    ii. Roles and responsibilities of each consortium partner, the identification of the lead partner, and providing for joint and several liability for each partner.
    iii. All consortium members would be maximum of 3 members including the Lead Bidder and would be available throughout the Contract Period.
    iv. The Lead Bidder shall have a minimum share of 51% in the Consortium and other Bidders shall have minimum of 20% share in the Consortium.
    v. Each member of the Consortium shall be jointly and severally liable for the due implementation, operation and maintenance of the Project.
    vi. The role and responsibility of any member must be commensurate with the technical/financial capabilities that such member is contributing towards meeting the qualification criteria. Each consortium member is liable to contribute resources in terms of knowledge, skills and trained manpower commensurate with its role and responsibilities during the Contract Period.

vii. The Consortium Agreement must also state that the period of the Agreement would coincide with the Contract period. Consortium must continue to be in existence during the period of the contract and that any change will be subject to approval of the Authority (ASCL) only.

viii. The final contract between the consortium members (The Consortium Contract) would be available for legal vetting and open to suggestions by the ASCL. ASCL will suggest binding corrections if it finds that such contract does not meet its requirements and interests as per the RFP in letter and spirit.

ix. The Agreement should be on stamp paper and notarized. The signatories must be duly authorized.

x. Any modification in roles and responsibilities between consortium members during Contract Period shall be allowed only after approval from ASCL. Any changes and deviation of roles and responsibilities of consortium members during the execution, operation and maintenance of this Project without prior approval of Authority shall be viewed seriously by the ASCL as it can affect an important public service. Such unilateral action by the MSI shall entitle ASCL to take appropriate action including considering it an Event of Default under this Contract leading to consequences including termination with appropriate notice.

xi. Any Dispute arising during Contract Period between the Consortium Member shall be resolved amicably without adversely impacting Project Implementation and Operation. If in ASCL's opinion, Dispute between Consortium members adversely impacting implementation and operation of the Project then Authority may its sole discretion in the interest of the Project (a) Terminate the Contract after due process and/or (2) Provide a binding solution.

xii. In case ASCL Intends to proceed for Termination on account of MSI Event of Defect and /or unresolved disputes between the Consortium Members, both the Consortium Members shall be jointly and severally liable for Implementation, Operation and Maintenance of project at Agreed prices and payment terms specified in this RFP till Authority or any new agency appointed by it takes over the Project

xiii. ASCL reserves the right to reject the Bid in case of change in the constitution of the consortium after the submission of Bid and before the execution of the Agreement

2.4 Proposal Preparation Cost

1. The bidder is responsible for all costs incurred in connection with participation in this process, including, but not limited to, costs incurred in conduct of informative and other diligence activities, participation in meetings/discussions/presentations, preparation of proposal, in providing any additional information required by ASCL to facilitate the evaluation process, and in negotiating a definitive Contract or all such activities related to the bid process. The department will in no case be responsible or liable for those costs, regardless of the conduct or outcome of the bidding process.

2. This Bid Document does not commit the ASCL to award a contract or to engage in negotiations. Further, no reimbursable cost may be incurred in anticipation of award. All materials submitted by the Bidder shall become the property of ASCL and may be returned at its sole discretion.

2.5 Pre-Bid Meeting

1. A prospective Bidder requiring any clarification on the RFP Document may submit his queries, via email, to the following e-mail id on or before 16/12/2018 till 1700 hrs Email Id for submission of queries: aligarhsmartcityltd@gmail.com

2. ASCL will host a Pre-Bid Meeting for queries (if any) by the prospective bidders. The representatives of the bidders may attend the pre-bid meeting at their own cost. The purpose of the pre-bid meeting is to provide a forum to the bidders to clarify their doubts / seek clarification or additional information necessary for them to submit their bid. Date, Time and Venue for the Pre-Bid Meeting :

   Pre-Bid conference will held on 17/12/2018 at 1100 hrs

   Venue for Pre-Bid conference: Aligarh Smart City Limited, Room No. 108, Sewa Bhawan, Church Compound, Civil Lines, Aligarh – 202001, Uttar Pradesh.

The queries should necessarily be submitted in the following format:

Request for Clarification			
Name and Address of the Organization submitting request		**Name and Position of Person submitting request**	**Contact Details of the Organization / Authorized Representative**
			Tel: Mobile: Fax: Email:
Sr. No	**RFP Document Reference (Volume, Section No., Page No.)**	**Content of the RFP requiring clarification**	**Clarification Sought**
1			
2			

Queries submitted post the above mentioned deadline or which do not adhere to the above mentioned format may not be responded to. All the responses to the queries (clarifications / corrigendum) shall be made available on the website: https://etender.up.nic.in/

1. At any time before the deadline for submission of bids, the ASCL, may, for any reason, whether at its own initiative or in response to a clarification requested by a prospective Bidder, modify the RFP Document by an addendum.

2. The bidders are advised to visit https://etender.up.nic.in/ on regular basis for checking necessary updates. ASCL also reserves the rights to amend the dates mentioned in this RFP for bid process.

3. In order to afford prospective Bidders reasonable time in which to take the amendment into account in preparing their bids, the ASCL may, at its discretion, extend the last date for the receipt of Bids.

2.6 Conflict of Interest

1. A "Conflict of Interest" is any situation that might cause an impartial observer to reasonably question whether Master System Integrator actions are influenced by considerations of your firm's interest at the cost of Government. The Master System Integrator agrees that it shall hold the ASCL's interest paramount, without any consideration for future work, and strictly avoid any Conflict of Interest with other assignments of a similar nature. In the event the Master System Integrator foresees a Conflict of Interest, the Master System Integrator shall notify ASCL forthwith and seek its approval prior to entering into any arrangement with a third party which is likely to create a Conflict of Interest.
2. Bidders shall not have a conflict of interest that may affect the Selection Process or the scope (the "Conflict of Interest"). Any Bidder found to have a Conflict of Interest shall be disqualified.
3. ASCL requires that the Bidder provides professional, objective, and impartial advice and at all times hold the ASCL's interests paramount, avoid conflicts with other assignments or its own interests, and act without any consideration for future work.
4. The Master System Integrator shall disclose to ASCL in writing, all actual and potential Conflicts of Interest that exist, arise or may arise (either for the System Integrator or its team) during the term of the Agreement as soon as it becomes aware of such a conflict.

2.7 Compliant Bids/Completeness of Response

1. Bidders are advised to study all instructions, forms, terms, requirements and other information in the RFP documents carefully. Submission of the bid shall be deemed to have been done after careful study and examination of the RFP document with full understanding of its implications.
2. Failure to comply with the requirements of this RFP may render the bid non-compliant and the Bid may be rejected. Bidders must:
   a) Include all documentation specified in this RFP, in the bid
   b) Follow the format of this RFP while developing the bid and respond to each element in the order as set out in this RFP
   c) Comply with all requirements as set out within this RFP

2.8 Right to amendment of the project scope

1. ASCL retains the right amend the scope of work or amend the program for service delivery at any time and without assigning any reason. ASCL makes no commitments, express or implied, that the full scope of work as described in this RFP will be commissioned.
2. The bidder's technical and commercial proposals received in this process may result in ASCL selecting to engage with the bidders' in further discussions, seeking clarifications and negotiations toward execution of a contract including finalization of the scope elements. The commencement of such negotiations does not, however, signify a commitment by the ASCL to execute a contract or to continue negotiations. ASCL may terminate negotiations at any time without assigning any reason.

2.9 ASCLs rights to terminate the selection process

1. ASCL may terminate the RFP process at any time and without assigning any reason. ASCL makes no commitments, express or implied, that this process will result in a business transaction with anyone.
2. This RFP does not constitute an offer by ASCL.
3. The bidder's participation in this process may result in ASCL selecting the bidder to engage in further discussions and negotiations toward execution of a contract. The commencement of such negotiations does not, however, signify a commitment by the ASCL to execute a contract or to continue negotiations. ASCL may terminate negotiations at any time without assigning any reason.

2.10 Right to Accept/Reject any proposal

1. Notwithstanding anything contained in this RFP, ASCL reserves the right to accept or reject any Proposal and to annul the Selection Process and reject all Proposals, at any time without any liability or any obligation for such acceptance, rejection or annulment, and without assigning any reasons therefore.
2. Besides other conditions and terms highlighted in the RFP Document, bids may be rejected under following circumstances:

   a. General rejection criteria

   i. Conditional Bids;

   ii. If the information provided by the Bidder is found to be incorrect / misleading / fraudulent/incomplete at any stage / time during the Tendering Process;

   iii. Any effort on the part of a Bidder to influence the bid evaluation, bid comparison or contract award decisions;

   iv. Bids received after the prescribed time & date for receipt of bids;

   v. Bids without page number and signature of person (s) duly authorized on required pages of the bid;

   vi. Bids without power of attorney/ board resolution or its certified true copy.

   b. Pre-Qualification rejection criteria

   i. Bidders not complying with the Eligibility Criteria given in this RFP ;

   ii. Revelation of prices in any form or by any reason before opening the Commercial Bid;

   iii. Failure to furnish all information required by the RFP Document or submission of a Bid not substantially responsive to the RFP Document in every respect;

   c. Technical rejection criteria

   i. Technical Bid containing commercial details;

   ii. Revelation of Prices in any form or by any reason before opening the Commercial Bid;

   iii. Failure to furnish all information required by the RFP Document or submission of a Bid not substantially responsive to the RFP Document in every respect;

iv. Bidders not quoting for the complete scope of work as indicated in the RFP Documents, addendum /corrigendum (if any) and any subsequent information given to the Bidder;

v. Bidders not complying with the Technical and General Terms and conditions as stated in the RFP Documents;

vi. The Bidder not confirming unconditional acceptance of full responsibility of providing services in accordance with the scope of work and Service Level Agreements of this RFP;

d. Commercial Rejection Criteria

i. Incomplete price Bid;

ii. Price Bids that do not conform to the RFP's price bid format;

iii. Total price quoted by the Bidder does not include all statutory taxes and levies applicable;

iv. If there is an arithmetic discrepancy in the commercial Bid calculations the Technical Committee shall rectify the same. If the Bidder does not accept the correction of the errors, its Bid may be rejected.

3. Misrepresentation/ improper response by the Bidder may lead to the disqualification. If the Bidder is the Lead Member of a consortium, then the entire consortium may be disqualified / rejected. If such disqualification / rejection occurs after the Proposals have been opened and the highest ranking Bidder gets disqualified / rejected, then ASCL reserves the right to consider the next best ranked Bidder, or take any other measure as may be deemed fit in the sole discretion of ASCL, including annulment of the Selection Process.

2.11 Bidder to Inform

The Bidder shall be deemed to have carefully examined the Terms & Conditions, Scope, Service Levels, Specifications, and Schedules of this RFP. If bidder has any doubts/clarifications as to the meaning of any portion of the Conditions or the specifications, he shall, before the last date and time for Submission of Pre-Bid Queries, and submit them to Authority in writing in order that such doubt may be removed or clarifications are provided.

2.12 Bid Formats

a) Pre-Qualification Bid Format

#	Documents to be submitted	Format
1.	Pre-Qualification Checklist	As per format mentioned in Annexure 1.1
2.	Bid Cover Letter and Particulars of organizations	As per format mentioned in Annexure 1.2
3.	Particulars of the bidders	As per format mentioned in Annexure 1.3
4.	Power of attorney / board resolution to the authorized Signatory of the Bid	As per format mentioned in Annexure 1.4
5.	Declaration of non-blacklisting	As preformat mentioned in Annexure 1.5

#	Documents to be submitted	Format
6.	Declaration for consortium	As preformat mentioned in Annexure 1.6
7.	No deviation certificate	As per format mentioned in Annexure 1.7
8.	Total responsibility certificate	As per format mentioned in Annexure 1.8
9.	Consortium agreement (if applicable)	As per format mentioned in Annexure 9
10.	E.M.D. of INR 2,90,00,000/-	As per format mentioned in Annexure 4
11.	Performance Bank Guarantee	As per format in Annexure 5
12.	Bid Document fee (Non-refundable)	INR 25,000 (Twenty Five Thousand only)- inclusive of taxes
13.	Company Incorporation/Registration certificate	Copy of certificate of Incorporation
14.	Certificate(s) from the statutory auditor/CA towards average annual Turnover of the entity/entities over the last three (3) financial years (FY 2015-16, 2016-17 and 2017-18)	Details of annual turnover with documentary evidence
15.	Certificate(s) from the statutory auditor/CA towards positive net worth for the last three (3) financial years (FY 2015-16, 2016-17 and 2017-18)	Details of net worth with documentary evidence
16.	Bidder has to provide all past experience-client citation asked in pre-qualification criteria in section 3.5	As per format mentioned in section 2.6 of Annexure 2
17.	PAN documents	Copy of PAN documents
18.	GST registration	Copy of GST registration

b) Technical Bid Format

#	Checklist Item	Format
1.	Technical Bid Checklist	As per format mentioned in Annexure 2.2
2.	Technical Bid Covering Letter	As per format mentioned in Annexure 2.3
3.	Proposed CVs	As per format mentioned in Annexure 2.4
4.	Credential summary	As per format mentioned in Annexure 2.5
5.	Project Citations and Self-certifications, as applicable	As per format mentioned in Annexure 2.6

#	Checklist Item	Format
6.	Project plan and manpower plan	As per format mentioned in Annexure 2.7, 2.8 & 2.9
7.	Compliance to benchmark/minimum specifications	As per format mentioned in Annexure 2.10
8.	Format for Authorization	As per format mentioned in Annexure 2.11
9.	Manufacturers'/Producers' Authorization Form Anti-Collusion certificate	As per format mentioned in Annexure 2.12
10.	Detailed proposed solution	As per format mentioned in Annexure 2.13
11.	Proposed Bill of Material	As per format mentioned in Annexure 2.14
12.	Non-disclosure agreement	As per format mentioned in Annexure 6

c) Commercial Bid Format

The Bidder must submit the Commercial Bid is the formats specified in Section 7 of Annexure 3

S. No.	Parameter	Format
1	Total Price Summary	As per format mentioned in Annexure 3.1
2	Price component for CAPEX	As per format mentioned in Annexure 3.2.1
3	Price component for OPEX	As per format mentioned in Annexure 3.2.2

2.13 Language of the Bid

The bids prepared by the Bidder and all subsequent correspondence and documents relating to the bids exchanged by the Bidder and client shall be written in English language. Any printed literature furnished by the Bidder, written in another language, shall be accompanied by an accurate English translation, in which case, for purposes of interpretation of the Bid, the English translation shall govern.

2.14 Hand written documents, Erasures or Alterations

The offers containing erasures or alterations will not be considered. There should be no hand-written material, corrections or alterations in the offer. Filling up of the information using terms such as "OK", "noted", "as given in brochure/manual" is not acceptable and may lead to the disqualification of the Bid.

2.15 Earnest Money Deposit (EMD) / Bid Security

1. The Bidding Documents can be downloaded after paying requisite fee i.e. INR 25,000/- (Indian Rupees Twenty Five Thousand Only) through e-payment mode, payable to "Aligarh Smart City Limited" from website: https://etender.up.nic.in. The cost of bidding document is non-refundable.
2. The bidders should have the necessary portal enrolment with his/her own Digital Signature Certificate (DSC).

3. The bidder should also pay EMD of INR 2,90,00,000 (Rupees Three Crores Ninty Lakhs only) shall be in the form of NEFT/RTGS/Net Banking or Unconditional irrevocable Bank guarantee of any nationalized with validity of 180 days and 90 days of claim period in case of the Bank Guarantee.
4. No interest will be payable by the ASCL on the Earnest Money Deposit.
5. Bidder must submit a self-attested copy of Challan issued by Bank / documentary proof in the office of Chief Executive Officer, Aligarh Smart City Limited, in respect of e-payment made for the deposit of Bid Security. The Technical Bid will be opened after checking this challan/ documentary proof submitted by the bidder.
6. In case bid is submitted without EMD or Bid fees as mentioned above then ASCL shall reject the bid without providing opportunity for any further correspondence to the bidder concerned and the Bids shall be treated as non-responsive.
7. The EMD of unsuccessful Bidders will be returned by the Authority, without any Interest, as promptly as possible on acceptance of the Proposal of the Selected Bidder or when the Authority cancels the Bidding Process.
8. The Selected Bidder's EMD will be returned, without any interest, upon the Selected Bidder signing the Agreement and furnishing the Security Deposit / Performance Guarantee in accordance with the provision thereof
9. The decision of ASCL regarding forfeiture of the EMD and rejection of bid shall be final & shall not be called upon question under any circumstances.
10. The EMD may be forfeited:
    - If a Bidder withdraws their bid or increases their quoted prices during the period of bid validity or its extended period, if any; or
    - In the case of a successful bidder, if the Bidder fails to sign the Contract or to furnish Performance Bank Guarantee within specified time
    - During the bid process, if a Bidder indulges in any such deliberate act as would jeopardize or unnecessarily delay the process of bid evaluation and finalization.
    - During the bid process, if any information found wrong / manipulated /fraudulent information in the bid.

2.16 Bid Prices

The Bidder shall indicate in the proforma prescribed, the unit rates and total Bid Prices for the product and services, it proposes to provide under this RFP. Prices should be shown separately for each item as detailed in this document.

The Bidder shall prepare the Bid based on details provided in the RFP document. It must be clearly understood that the Scope of Work is intended to give the Bidder an idea about the order and magnitude of the work and is not in any way exhaustive and guaranteed by the Authority. The Bidder shall carry out all the tasks in accordance with the requirement of the RFP document & with due diligence. It shall be the responsibility of the Bidder to fully meet all the requirements and objectives of the RFP. If during the course of execution of the project any minor revisions to the work requirements

like technical specifications, equipment sizing, etc. are to be made to meet the goals of the Project; such changes shall be carried out within the proposed price. If any deviation has a major impact on the Project Cost, the Authority shall take appropriate decision and such decisions would be binding on the Bidder.

2.17 Firm Prices

Prices quoted in the Bid must be firm and shall not be subject to any modifications, on any account whatsoever. The Bid Prices shall be indicated in Indian Rupees (INR) only.

The Price Bid should clearly indicate the price quoted without any ambiguity whatsoever and should include all applicable taxes, duties, fees, levies, and other charges as may be applicable in relation to the activities proposed to be carried out. Should there be a change in applicable taxes, the actual taxes on the date of billing would prevail.

Prices in any form or by any reason before opening the Price Bid should not be revealed, failing which the offer shall be liable for rejection. If price change is inevitable due to any factor external to the bidders, the bidders may be given chance to submit revised Bids in a separate sealed cover. Decisions of the Authority shall be final in this regard.

2.18 Amendment of the RFP Document

At any time prior to the submission of bids, Authority for any reason whatsoever, may, modify any element of the RFP Document by issuing a corrigendum. For the sake of interpretation, the content of any corrigenda issued by the Authority shall be read as a part of the original RFP Document. In each instance in which provisions of the Corrigenda contradict or are inconsistent/ inapplicable with the provisions of the RFP, the provisions of the Corrigenda shall prevail and govern, and the contradicted or inconsistent/inapplicable provisions of the RFP shall be deemed amended accordingly.

The Authority may in its sole discretion consider extension of deadlines for submission of the bids, in order to allow prospective bidders reasonable time to take the amendment into account while preparing their bids. All the communications with regards to the clarifications / corrigendum shall be uploaded in the website https://etender.up.nic.in .

It shall be the responsibility of the prospective bidder(s) to check the Authority's website and e-procurement portal from time to time for any amendment in the RFP document. In case of failure to get the amendments, if any, Authority shall not be responsible.

2.19 Inspection of Site and sufficiency of RFP

Bidder is expected to work out their own rates based on the detailed description of scope of work, the specifications, SLA conditions, etc. and should judiciously arrive at the bidding price. The Bidder shall be deemed to have satisfied itself before Bid submission as to correctness and sufficiency of its bid. The rates quoted by bidder shall cover all its obligations under the RFP necessary for proper execution of the project including O&M.

If necessary, before submitting its Bid the Bidder should inspect and examine various sites and its surroundings and shall satisfy itself about form and nature of the Sites (including camera locations), means of access to the Sites, and in general, obtain all necessary information which may influence or affect Project implementation and operationalization. No extra charges consequent on any misunderstanding or otherwise shall be allowed.

2.20 Deviations and Exclusions

Bids shall be submitted strictly in accordance with the requirements and terms & conditions of the RFP. The Bidder shall submit a No Deviation Certificate as per the format mentioned in Annexure 1.7. The bids with deviation(s) are liable for rejection.

2.21 Total Responsibility

Bidder should issue a statement undertaking total responsibility for the defect free operation of the proposed solution as per the format mentioned in Annexure 1.8

2.22 Key Personnel

Authority has identified certain key positions and minimum qualifications for each of the positions that should be part of project team of the bidder (hereby referred to as "key personnel"). Details of these key positions are provided in Section 2.7, 2.8,& 2.9

d) Initial Composition; Full Time Obligation; Continuity of Personnel

Bidder shall ensure that each member of the Key Personnel devotes substantial working time as per the staffing schedule/ manpower plan to perform the services to which that person has been assigned as per the bid.

Bidder shall not make any changes to the composition of the Key Personnel and not require or request any member of the Key Personnel to cease or reduce his or her involvement in the provision of the Services during the defined term of the engagement unless that person resigns, is terminated for cause, is long-term disabled, is on permitted mandatory leave under Applicable Law or retires.

In any such case, the Authority's prior written consent would be mandatory.

e) Evaluations

Bidder shall carry out an evaluation of the performance of each member of the Key Personnel in connection with the Services at least once in each Contract Year. Bidder shall provide reasonable written notice to Authority of the date of each evaluation of each member of the Key Personnel. Authority shall be entitled to provide inputs to the bidder for each such evaluation. Bidder shall promptly provide the results of each evaluation to Authority, subject to Applicable Law.

f) Replacements

In case any proposed resource resigns, then the Bidder has to inform Authority within one week of such resignation.

Bidder shall promptly initiate a search for a replacement to ensure that the role of any member of the Key Personnel is not vacant at any point in time during the contract period, subject to reasonable extensions requested by Bidder to Authority.

Before assigning any replacement member of the Key Personnel to the provision of the Services, Bidder shall provide Authority with:

a. A resume, curriculum vitae and any other information about the candidate that is reasonably requested by Authority; and

b. An opportunity to interview the candidate.

The bidder has to provide replacement resource of equal or better qualification and experience as per the requirements of this RFP

If Authority objects to the appointment, Bidder shall not assign the individual to that position and shall seek an alternative candidate in accordance with the resource requirements of this RFP.

The bidder needs to ensure at least 4 weeks of overlap period in such replacements. Authority will not be responsible for any knowledge transition to the replacement resource and any impact/escalation of cost incurred by the bidder due to resource replacement.

g) High Attrition

If in the first 6 month period from the Contract Effective Date and in any rolling 12 months period during the Term of contract, 15 percent or more of the members of the Key Personnel cease or reduce their involvement in the Services for any reason other than with Authority's prior written consent, Bidder shall:

a. provide Authority with a reasonably detailed explanation as to the reasons for such change, including, where applicable and permitted, notes from any exit interviews conducted by Bidder with any departing member of the Key Personnel; and

b. if such change to Key Personnel has or is likely to have any material adverse impact on the provision of the Services or any substantial part thereof, undertake, at its own costs, such remediation acts as are reasonably necessary in order to improve the retention of the Key Personnel including making reasonable changes to the human resources policies and procedures applicable to the Key Personnel (including those related to compensation, benefits and other conditions so that they are competitive with the market) as may be necessary to ensure that such policies and procedures comply with Good Industry Practice.

2.23 Inclusion of MSMEs in Project Delivery

Bidders are encouraged to include Micro, Small and Medium Enterprises (MSMEs) in the delivery of the project.

2.24 Right to vary quantity

1. At the time of award of contract, the quantity of goods, works or services originally specified in the bidding documents may be increased. It shall be without any change in the unit prices or other terms and conditions of the Bid and the bidding documents.

2. If the Authority does not procure any subject matter of procurement or procures less than the quantity specified in the bidding documents due to change in circumstances, the bidder shall not be entitled for any claim or compensation except otherwise provided in the bidding document.

3. Repeat orders for extra items or additional quantities may be placed, if it is provided in the bidding document, on the rates and conditions given in the contract if the original order was given after inviting open competitive bids. Delivery or completion period may also be proportionally increased.

4. During the course of implementation and detailed due diligence it may be required to vary the quantity and location of the field devices to suit the overall smart city requirements. The MSI/consortium should be required to provision and supply such field devices and the backend resources at the unit rates quoted in the tender response. Such escalations/additions may go up to 25% of the specified BOQ.

2.25 Withdrawal, Substitution and Modification of Bids

1. A Bidder may withdraw its Bid or re-submit its Bid (technical and/ or financial) as per the instructions/ procedure mentioned at e-Procurement website
2. Bids withdrawn shall not be opened and processed further.

3 Selection Criteria

3.1 Opening of Bids

The Bids shall be opened by Authority in presence of those Bidders or their representatives who may be present at the time of opening.

The representatives of the bidders are advised to carry the identity card or a letter of authority from the bidder firms to identify that they are bona fide representatives of the bidder firm, for attending the opening of bid.

There will be three bid-opening events:

1. **Set 1 (RFP Document fee & Bid Security/EMD) and Set 2 (Pre-Qualification bid)**
2. **Set 3 (Technical bid)**
3. **Set 4 (Price bid)**

The venue, date and time for opening the Pre-qualification bid and technical bid are mentioned in the Fact sheet.

The date and time for opening of price bid would be communicated to the qualified bidders.

Bids received within the prescribed closing date and time will be opened on the e-procurement platform, on the date, time and at the address mentioned in the RFP Document.

a. Technical bid of only those Bidders shall be opened who meet the Pre-Qualification requirements.

b. Price Bid of only those Bidders shall be opened who obtain minimum 70 marks in the technical evaluation.

c. In case, none of the bidder achieves the min. qualifying Technical marks, the Technical Evaluation Committee may revise the min. qualification marks to 60 in the interest of this RFP finalization. Tender Evaluation Committee's decision in this regard shall be final and binding on the Bidder.

3.2 Preliminary Examination of Bids

Authority shall examine the bids to determine whether they are complete, whether the documents have been properly signed and whether the bids are generally in order. Any bids found to be nonresponsive for any reason or not meeting any criteria specified in the RFP, shall be rejected by Authority and shall not be included for further consideration.

Initial Bid scrutiny shall be held and bids will be treated as non-responsive, if bids are:

a. Not submitted in format as specified in the RFP document

b. Received without the Power of Attorney

c. Found with suppression of details

d. With incomplete information, subjective, conditional offers and partial offers submitted

e. Submitted without the documents requested

f. Non-compliant to any of the clauses mentioned in the RFP

g. With lesser validity period

h. EMD not submitted as per the requirement / lesser EMD validity period

i. If the Bidder gives wrong information in the Bid.

j. Canvassing in any form in connection with the Bid.

k. Bids submitted after due date and time.

l. Bids submitted by Print out/Telex/Telegram/Fax/e-mail.

m. Erasure and/or over writing is/are Not permissible

n. Bids not signed by authorized signatory

3.3 Clarification on Bids

During the bid evaluation, Authority may, at its discretion, ask the Bidder for any clarification(s) of its bid. The request for clarification and the response shall be in writing, and no change in the price or substance of the bid shall be sought, offered, or permitted. Clarifications shall be obtained only in the pre-historic information like bidders credentials etc.

3.4 Evaluation Process

Authority shall constitute a Tender Evaluation Committee to evaluate the responses of the bidders. The Tender Evaluation Committee shall evaluate the responses to the RFP and all supporting documents/documentary evidence. Inability to submit requisite supporting documents/documentary evidence by bidders may lead to rejection of their bids.

The decision of the Tender Evaluation Committee in the evaluation of bids shall be final. No correspondence will be entertained outside the process of evaluation with the Committee. The Tender Evaluation Committee may ask for meetings or presentation with the Bidders to seek clarifications or confirmations on their bids.

The Tender Evaluation Committee reserves the right to reject any or all bids. Each of the responses shall be evaluated as per the criteria and requirements specified in this RFP.

The steps for evaluation are as follows:

3.4.1. Stage 1: Pre-Qualification

1. Authority shall validate the Set 1 “RFP Document fee & Bid Security/Earnest Money Deposit (EMD)”.
2. If the contents of the Set 1 are as per requirements, Authority shall open the “Pre-Qualification Bid”. **Each of the Pre-Qualification condition mentioned in the document is MANDATORY**. In case, the Bidder does not meet any one of the conditions, the bidder shall be disqualified.
3. Bidders will be informed of their qualification/disqualification based on the Pre-Qualification criteria through Email and Phone and subsequently, the Bid Security amount shall be returned to the respective disqualified Bidders after the submission of Performance Bank Guarantee by the successful Bidder. Bids of only those bidders who meets the Pre-Qualification criteria, shall be considered for further evaluation i.e. Stage – 2: Technical Evaluation
4. Technical and Price bids for those bidders who don’t pre-qualify will not be opened. Price bid will not be opened for those bidders, who don’t qualify the technical evaluation. Bid Security amount

shall be retuned for those who don't qualify the financial evaluation stage after Performance Bank Guarantee is submitted by successful bidder.

3.4.2. Stage 2: Technical Evaluation

1. "Technical bid" will be evaluated only for the bidders who succeed in Stage 1.
2. Authority (or Committee approved by the Authority) will review the technical bids of the short-listed bidders to determine whether the technical bids are substantially responsive. Bids that are not substantially responsive are liable to be disqualified at Authority's discretion.
3. The bidders' technical solutions proposed in the bid document shall be evaluated as per the requirements specified in the RFP and technical evaluation framework as mentioned in the RFP
4. The Bidders shall make a presentation to the Authority/ Committee appointed by the Authority to supplement their bids which include the following
   - Approach & Methodology including Project Experience
   - Proposed Solutions
   - Manpower – Technical Resources
   - Proof of Concept of proposed solution
5. The Authority envisages to have proof of concept / technical demonstration to evaluate the technology & system performance for getting city business outcome; During the Demonstration/Proof-of-Concept (PoC) at technical evaluation stage, the Evaluation Committee will give special attention to verify the quality, robustness and appropriateness of the proposed Solutions/Equipment. If any brand / products are found un-suitable, Bidder may get disqualified or may be asked to replace the product with better products, meeting the tender requirements, without any change in commercial bid. Bidder may demonstrate local setup or existing deployments over network/cloud.
6. The Authority will notify the date and venue for conducting such proof of concept / technical demonstration to the prospective bidders.
7. Each Technical Bid will be assigned a technical score out of a maximum of 100 Points.
8. Each Technical Bid will be assigned a technical score out of a maximum of 100 marks. Only those bidders who get min Technical score of 70% (and minimum 60% in each section of the Technical Evaluation Framework as given in the RFP) will qualify for commercial evaluation stage. Failing to secure minimum marks shall lead to rejection of the Bid.

3.4.3. Stage 3: Commercial Evaluation

1. All the technically qualified bidders will be notified to participate in Commercial Bid opening process.
2. The commercial bids for the technically qualified bidders shall then be opened on the notified date and time and reviewed to determine whether the commercial bids are substantially responsive. Bids that are not substantially responsive are liable to be disqualified at Authority's discretion.

3. Commercial Bids that are not as per the format provided in the RFP shall be liable for rejection.
4. The bid price shall include all taxes and levies and shall be in Indian Rupees and mentioned separately

The Authority or any other government agency shall not have any liability of paying any taxes (including GST)/charges/levies as part of this project. The bidder has to quote their Price duly factoring all these costs over the project duration**.**

If there is any discrepancy in the Price Bid, it will be dealt as per the following:

1. If, in the price structure quoted for the required Product and Services, there is discrepancy between the unit price and total price (which is obtained by multiplying the unit price by the quantity), only the total price/cost as quoted in the table in the Price Bid Format 1 shall prevail. The unit prices quoted in the Price Bid Format 2 shall be considered only in case of any deviations/modifications in the scope of the work in due course.
2. If there is a discrepancy between words and figures, the amount in words shall prevail.

3.4.4. Successful bidder evaluation

Quality and Cost based Selection (QCBS) method shall be used for evaluation of the bids, as per the formula given below:

The scores will be calculated as:

$B_b = 0.7*T_b + (0.3)*(C_{min}/C_b * 100)$

Where,

a) B_b = overall score of bidder under consideration (calculated up to two decimal points)

b) Tb = Technical score for the bidder under consideration

c) C_b = Price quoted by the bidder under consideration

d) C_{min}= Lowest price among the financial proposals under consideration

3.5 Pre-Qualification criteria

The bidder achieving the highest overall score will be invited for negotiations for awarding the contract. In case of a tie where two or more bidders achieve the same highest overall score, the bidder with the higher technical score will be invited first for negotiations for awarding the contract. In case of a tie on the technical scores and highest overall scores, the Cb will be calculated to the third place of decimal and the bidder with lesser Cb will be invited for negotiations for awarding the contract. Pre-Qualification Criteria

The bidder must possess the requisite experience, strength and capabilities in providing services necessary to meet the requirements as described in the RFP document. Keeping in view the complexity and volume of the work involved, following criteria are prescribed as the eligibility criteria for the bidder interested in undertaking the project. The bidder must also possess technical know-how and financial ability that would be required to successfully provide System Integration, Operation and Maintenance services sought by ASCL for the entire contract duration. The bids must be complete in all respect and should cover entire scope of work as stipulated in the bid document. This invitation to bid is open to all bidders who qualify the eligibility criteria as given below:

#	Eligibility Criteria	Document Proof	Name to be given to the PDF file to be uploaded
1.	**Company Profile** The Sole/ Lead Bidder (in case of Consortium) shall be in operations for a period of at least five (5) years as on published date of RFP. In case of a Consortium, in addition, each member other than Lead Bidder shall be in operations for a period of at least three (3) years as on published date of RFP. Maximum two (2) numbers of consortium members excluding the Prime Bidder will be considered. (Lead member + 2 consortium Partners).	**For Sole/Lead Bidder** • Copy of Certificate of Incorporation / Registration under Companies Act 1956/2013 or any equivalent act • Memorandum and Articles of Association • GST Registration Certificate • Copy of purchase orders showing at least 10 years of operations or Certified true copy of relevant extracts of balance sheet and PL statements for last 10 years **For Consortium members other than lead bidder** • Copy of Certificate of Incorporation / Registration under Companies Act, 1956/2013 or any equivalent act • GST Registration Certificate • Consortium agreement clearly stating the roles and responsibilities of each member • Copy of purchase orders showing at least 5 years of operations or Certified true copy of relevant extracts of balance sheet and PL statements for last 5 years	**PQ_1**

#	Eligibility Criteria	Document Proof	Name to be given to the PDF file to be uploaded
2.	**Company Financial Profile** The Bidder/Consortium shall have an average annual turnover of INR 500 Crores over the last three (3) consecutive Financial Years and this is to be derived only from ICT/IT Infrastructure/System, Integration Services/ IT, ITES, e Governance services projects. If the bidder has different divisions then the turnover only should be derived from ICT/IT Infrastructure/System, Integration Services/ IT, ITES, e Governance services division. In case of Consortium, at least 60% of the turnover criteria shall be met by the Lead Bidder and the remaining may be fulfilled by the other Consortium partners.	• The Sole Bidder or the Lead Bidder and all other members of consortium: • Audited statement for last 3 financial years of sole bidder • Audited statement for last 3 financial years of lead bidder & member companies • Certificate from the Statutory Auditor/ CA Certificate on turnover details from the "specific business areas" over the last 3 financial years	**PQ_2**
3.	**Financials- Net worth** The entire Consortium partner (including sole/lead bidder and other consortium partners) should have positive net worth as per the audited consolidated financial statements in each of the last three (3) financial years.	• Audited and Certified Balance Sheet and Profit/Loss Account of last 3 Financial Years should be enclosed • Certificate from the Statutory auditor/ CA clearly specifying the net worth of the firm	**PQ_3**
4.	**Local Presence** The Sole Bidder or the Lead Bidder of consortium, in case of a Consortium, should have office in the Aligarh, Uttar Pradesh or should furnish an undertaking that the same would be established within 45 days of signing	Undertaking to open Office in Aligarh Or Copies of any two of the followings: Property Tax / Electricity / Telephone Bill / CST Registration /Lease agreement.	**PQ_4**

#	Eligibility Criteria	Document Proof	Name to be given to the PDF file to be uploaded
	the contract, if project is awarded		
5.	**Key Certifications** The Bidder (any member of cnsortium) shall have any one of te following three (3) Certifications valid at the time of Bidding along with CMMi level 3 or better: • ISO 9001:2008 • ISO 20000:2011 for IT Service Management or equivalent certification • ISO 27001:2013 for Information Security Management System or equivalent certification AND CMMI level 3 or above	The Sole Bidder or any of Consortium members: Copies of valid certificates AND For CMMi Level 3 or above Copies of valid certificates In case the Bidder is in the process of re-certification of CMMi Level 3 or above; then the copy of expired certificate and present assessment certificate from duly authorised CMMi Auditor to be enclosed	**PQ_5**
6.	**Company Standings** As on date of submission of the proposal, the Bidder (all members of the consortium as applicable) shall not be blacklisted by any State/ Central Government Department or Central /State PSUs. /world bank. (check in blacklisting letter)	Undertaking by the authorized signatory of bidder (In case of Consortium to be provided by each member) as per format given in Annexure1.5	**PQ_6**
7.	**ICT components** "The Bidder (any member in case of consortium) shall have successfully executed below mentioned projects with cumulative value of INR 150 crore in last five (5) years (excluding civil work): a) Data Center including Servers-Storage Infrastructure establishment (Min cut- off value of successfully executed cumulative projects in this segment is INR 10 Crores) b) Experience in installation of min.	Documentary evidence (Copy of completion/ Ongoing client certificate and Work Order/ Contract) Note: Details on the supporting document is provided below as point 1	**PQ_7**

#	Eligibility Criteria	Document Proof	Name to be given to the PDF file to be uploaded
	500 outdoor cameras (with 300 outdoor camera in a single project) (Min cut- off value of successfully executed cumulative projects in this segment is INR 20 Crores) c) ICCC/Command and control center (Min cut- off value of successfully executed cumulative projects in this segment is INR 5 Crores) d) Intelligent traffic management (Min cut- off value of successfully executed and cumulative value projects in this segment is INR 10 Crores) e) e-Municipality/ e-Governance project (Min cut- off value of successfully executed cumulative projects in this segment is INR 5 Crores) f) GIS solution & integration with smart solutions experience (Min cut-off value of successfully executed cumulative projects in this segment is INR 5 Crores)		

Important Note:

1. For all the project experience, following documentary evidences are required:
    - Work order/ Contract clearly highlighting the scope of work, Bill of Material and value of the contract/order.
    - Completion Certificate issued & signed by the authorized signatory of the client entity on the entity's Letterhead
    - Citations
2. In case project is on-going a certificate from the Charted Accountant/Statutory Auditor has to be provided mentioning that 80% of Capex is complete.
3. In case the experience shown is that of the bidder's parent / 100% own subsidiary /sister concern company, than the following additional documents are required:
    - Certificate signed by the Company Secretary/statutory Auditor/2 Board of Directors of the

bidder certifying that the entity whose experience is shown is parent/100% own subsidiary /sister concern Company.

- Shareholding pattern of the bidding entity as per audit reports.

4. The proposed project will be considered for evaluation only if its scope covers following under the individual component:
   - Command & Control Center (CCC): Assignment in which CCC comprising of Control Room / Command and Control Room Software and Control, Management (Video wall) room, Operations room, Contact center/helpdesk are built.
5. For International project if the original client certificate and other documents are in language other than English than a translated copy duly confirmed by Indian embassy/ One of the board of directors of the lead bidder/ consortium member shall be submitted along with bid document
6. For projects where fee has been received in any currency other than Indian Rupees, than the foreign currency conversion rate available on Reserve Bank of India's portal as on the date of publication of the tender document shall be used for conversion of amount in foreign currency to Indian Rupees equivalent.
7. Bidders are allowed to submit experience in terms of technical qualification of their holding (parent) company or 100% own subsidiary company or sister concern only.
   - a 'holding company', in relation to one or more other companies, means a company of which such companies are 100% own subsidiary companies; and
   - a '100% own subsidiary company' in relation to any other company (that is to say the holding company), means a company in which the holding company— (a) controls the composition of the Board of Directors; or (b) exercises or controls more than one-half of the total share capital at its own
   - a 'sister concern' in relation to Bidder Company, means a company whose holding company is same as bidder's holding company and holding company (a) controls the composition of the Board of Directors; or (b) exercises or controls more than one-half of the total share capital at its own
8. In case where the bidder is dependent upon the technical experience of the 100% own subsidiary company or the parent company or the sister concern, with a view to ensure commitment and involvement of the parent/ 100% own subsidiary /sister company for successful execution of the contract, the participating bidder should enclose (i) an Agreement (as per format enclosed at Annexure 7 of this Volume) between the bidder and its parent / 100% own subsidiary /Sister concern company for fulfilling the obligation and deployment of expert during implementation phase for the Track/Component for which the experience is being used and (ii) Guarantee (as per format enclosed at Annexure 8 of this Volume) from the parent/ 100% own subsidiary /sister concern company in favour of ASCL.

3.6 Technical Bid Evaluation Criteria

The Bidder's technical solution proposed in the Technical Evaluation bid shall be evaluated as per the evaluation criteria in the following table.

S No.	Evaluation Criteria	Total Marks
A	Sole bidder/Lead Bidder Profile	10
B	Project Experience	40
C	Approach & Methodology & technical presentation	15
D	Relevant Manpower Deployment	15
E	Proof of Concept	20
Technical Score		100

Notes:

- Bidder to submit work order and end client work in-progress (minimum 80% Project completion) / completion certificate as a supporting documents for each Project.
- Project citations of only up to one level of sub-contracting will be considered for evaluation.

Important: Qualification criteria for Technical Evaluation and progression to commercial evaluation stage:

- Minimum 70% (70 marks) of the overall technical score total

Note: Authority (or a nominated party) reserves the right to check/validate the authenticity of the information provided in the Pre-qualification and Technical Evaluation criteria and the requisite support must be provided by the Bidder.

The following sections explain how the Bidders shall be evaluated on each of the evaluation criteria:

3.6.1. Technical Bid Evaluation Criteria

#	Technical Evaluation Criteria	Technical Evaluation parameter	Points	Name to be given to the PDF file to be uploaded
A. ``Sole Bidder/ Lead Bidder Profile (10 Marks)				
A1	Annual Turnover	Average annual turnover from "Specific Business Areas" as mentioned below in **Note** under column "Required Supporting documents" for Sole bidder or Lead bidder (in	6	TQ_1

#	Technical Evaluation Criteria	Technical Evaluation parameter	Points	Name to be given to the PDF file to be uploaded
		case of consortium) and consortium partners over the last three (3) Financial years. Out of total value of turnover; at least 60% should be from the lead bidder In case of sole bidder 100% turnover to be from sole bidder. Marks shall be allotted as given below: • More than RS. 901 Cr. = 06 marks • More than RS. 701 Cr. – RS. 900 Cr.= 04 marks • More than RS. 500 Cr. – RS. 700 Cr.=02 marks • Less than 500 cr. Not eligible to bid		
A2	Certifications	The Bidder (any member of consortium) shall have to submit following Certifications valid at the time of Bidding: •ISO 9001:2008 •ISO 20000:2011 for IT Service Management or equivalent certification •ISO 27001:2013 for Information Security Management System or equivalent certification • Any 1 certificate = 1 mark • Any 2 certificate = 2 marks • All above three (3) certificates = 2.5 marks For CMMI certification: • CMMI level 3 = 1 mark • CMMI level 5 = 1.5 marks	4	TQ_2
B.	**Project Experience (40 Marks)**			

#	Technical Evaluation Criteria	Technical Evaluation parameter	Points	Name to be given to the PDF file to be uploaded
B1	Experience in establishment and management of ICCC(Integrated command and control center)	The Bidder (any member in case of consortium) shall have successfully executed projects in last five (5) years (excluding civil work): Each project should include any three(03) of following components from below list- 1) Data Center/ Data Recovery 2) Network/LAN/WAN with more than 50 locations 3) Command and control center and Security Operations Centre / Network Operation Centre 4) Laying of fiber network for min. 100 KMs. Marks shall be allotted as below: • Number of Projects 4 or more = 10 marks • Number of Projects 3 = 8 marks • Number of Projects 2 = 5 marks The cumulative value of project should not be less than 100 Cr.	*10*	TQ_3
B2	Experience in implementation of ITMS (Intelligent traffic management system)	"The Bidder (any member in case of consortium) shall have successfully executed projects in last five (5) years. Each project should include any of the three(03) components from below list- 1. Variable Message Sign Board 2. ITMS including ANPR, RLVD/SVD 3. Emergency Call Box and PA System, Mobile App/Desktop Portal for Citizen Services, and Kiosk based government/citizen services 4. Adaptive Traffic Control System Number of projects implemented. Marks will be allotted as follows: • No. of successfully executed projects 4 or more = 5 marks	*5*	TQ_4

#	Technical Evaluation Criteria	Technical Evaluation parameter	Points	Name to be given to the PDF file to be uploaded
		• No. of Successfully executed projects 3 = 3 Marks • No. of Successfully executed projects 2 = 1 Marks The cumulative value of project should not be less than INR 60 Cr and each project should be at least 10 Cr.		
B3	CCTV surveillance system	The Bidder (any member in case of consortium) shall have successfully executed minimum 500 outdoor CCTV surveillance systems or ANPR solution (with one project having minimum 300 outdoor cameras) during last five (5) years. Markings • Number of cameras implemented 901 & above = 5 marks • Number of cameras implemented 801 to 900 = 4 marks • Number of cameras implemented 701 to 800 = 3 marks • Number of cameras implemented 601 to 700 = 2 marks • Number of cameras implemented 500 to 600 = 1 marks	5	TQ_5

#	Technical Evaluation Criteria	Technical Evaluation parameter	Points	Name to be given to the PDF file to be uploaded
B4	e- Governance / e-Municipal services	The Bidder (any member in case of consortium) shall have successfully implemented/ integrated minimum two (02) project related to e-governance which include at least one (01) ULB /e-municipal services (excluding CCTV system) and cumulative value of min INR 5 crores per project during last 5 years. • 08 or more projects:10 Marks • 05-07 Projects: 08 Marks • 03-04 Projects : 06 Marks • 02 Projects: 04 Marks	10	TQ_6
B5	Smart Solution Integration	The Bidder (any member in case of consortium) shall have demonstrable expertise & project implementation experience in integration of following smart features with a centralized system: GIS system/ smart parking/ Smart Street lighting/ environmental sensors/ ERP/ traffic enforcement system/ SCADA/ e-Challan/ Solid Waste Management/ Water Grid / smart education/Smart Classroom/ Digital library/solar/sewerage management/ Smart Health/smart pole/asset management during last five (5) years Marking: • Integration of 10 or more smart features: 5 marks • Integration of 07 to 09 smart features: 3 marks • Integration of 04 to 06 smart features: 1 mark	*5*	TQ_7

#	Technical Evaluation Criteria	Technical Evaluation parameter	Points	Name to be given to the PDF file to be uploaded
B6	Experience on working with GIS Platform.	The Bidder (any member in case of consortium) shall have demonstrable expertise & project implementation experience of GIS platform and integration with minimum 01 (one) e-governance project .The cumulative value of project should be min five (5) crore • 3 or more project : 5 mark • 2 project: 3 mark • 1 project: 1 mark	*5*	TQ_8
C.	**Approach & Methodology & Solution proposed (15 Marks)**			
C1	Approach & Methodology	Detailed Approach and Methodology including: 1. Understanding of the project 2.Proposed solution and network architecture 3. Proposed sizing for server and storage in DC and DR. 4.Strategy to ensure implementation of project within stipulated timelines 5. Approach for lying of fiber across the city. 6. Approach for integration of various ICT systems with ICCC. 7. Approach towards the scalability, Interoperability and modularity features of the project considering future expansion and new applications or systems that may be envisaged or developed in future. 8. Identification of major risks and their mitigation plan 9. Approach and Measures for Information security of the complete solution from various threats including hacking attempts, internal threats, etc. 10. Clarity and details provided in un-priced BOQ, make and model of the proposed	10	TQ_9

#	Technical Evaluation Criteria	Technical Evaluation parameter	Points	Name to be given to the PDF file to be uploaded
		component/solution and referencing of the qualifying functional/technical specification on the product/solution datasheet or literature. 11. Detailed project plan and approach and methodology for project execution and Implementation Plan and resource deployment plan. 12. Strategy to maintain all the SLAs and handling change requests		
C2	Technical Presentation	1. Bidder can suggest innovative ideas, operations excellence and cost optimization best practices in Approach and Methodology. 2. Technical Presentation in front of the Evaluation Committee. 3. Key learnings from similar projects and how do you propose to incorporate them in execution of this assignment	5	TQ_10
D.	**Resource/Manpower Deployment(max 15 marks)**			
D1	Project Manager	a. Educational Qualification: • BE / B. Tech / MCA with 12 years of relevant experience b. Certification: • PMP Above 2 criteria are minimum requirements for the Project Manager. c. MBA/ M. Tech = 0.75 marks d. relevant Work experience of >=15 years of relevant experience = 0.75 marks e. Project/Program Project management experience in large system integration Project of value >= 100 crores = 0.75 marks	3	

#	Technical Evaluation Criteria	Technical Evaluation parameter	Points	Name to be given to the PDF file to be uploaded
		f. Project/Program Project management experience in Smart City/ safe city implementation Project = 0.75 marks		
D2	Datacenter expert:	a. Educational Qualification • BE / B. Tech in IT/computer Science with 10 years of relevant experience. Above Criteria is min. requirement for Data Center Expert. b. relevant Work experience of >= 12 years of experience = 0.5 marks c. Certification: • Any professional certification that relates to Cloud computing / DC-DR, preferably CCNA, CCNP, DCDC(BICSI), CBCI, CBCP, etc. = 0.5 marks d. Datacenter / DR implementation Experience in ICT implementation Project of value > 20 crores = 1 mark	2	
D3	Command Center Expert	a. Educational Qualification: • Bachelor's Degree in Engineering with 10 years of relevant experience. Above Criteria is min. requirement for Command Center Expert. b. relevant Work experience of >= 12 years of experience = 0.5 marks c. Certification: • Any professional certification that relates to Enterprise Architectural solutions = 0.5 marks d. Work experience in designing/ maintaining of Command Center / Network Operating	2	

#	Technical Evaluation Criteria	Technical Evaluation parameter	Points	Name to be given to the PDF file to be uploaded
		Centre Projects (with more than 10 years of relevant experience) = 1 mark		
D4	ITMS & ATCS expert	a. Educational Qualification: • Bachelor's Degree in Engineering/MCA with 6 years of relevant experience. Above Criteria is min. requirement for ITMS and ATCS Expert. b. relevant Work experience of >= 8 years of experience = 0.25 marks c. Certification: Relevant certification in the field of ITMS & ATCS = 0.25 marks d. Work experience as ITMS & ATCS expert (with more than 6 years of relevant experience) of project more than 10 Cr = 0.50 marks	1	
D5	Surveillance Expert	a. Educational Qualification: • Bachelor's Degree in Engineering/MCA with 6 years of relevant experience. Above Criteria is min. requirement for Surveillance Expert. b. relevant Work experience of >= 8 years of experience = 0.50 marks c. Work experience as Surveillance expert (with more than 6 years of relevant experience) of project more than 20 Cr. = 0.50 mark	1	

#	Technical Evaluation Criteria	Technical Evaluation parameter	Points	Name to be given to the PDF file to be uploaded
D6	IT expert	a. Educational Qualification: • Bachelor's Degree in Engineering/MCA with 6 years of relevant experience. Above Criteria is min. requirement for IT Expert. b. relevant Work experience of >= 8 years of experience = 0.5 marks c. Work experience as IT/ ICT application expert (with more than 6 years of relevant experience) of project more than 20 Cr.= 0.5 marks	1	
D7	Network Expert	a. Educational Qualification: • BE/ B.Tech/ MCA with minimum 6 years of relevant experience b. Certification: • Relevant certification Networks like CCNP, CCNA, etc. The above 2 criteria are min. requirements for Network Expert. c. Work experience of >= 8 years of experience = 0.5 marks d. Work experience as Network expert of project more than 20 Cr.= 0.5 marks	1	

#	Technical Evaluation Criteria	Technical Evaluation parameter	Points	Name to be given to the PDF file to be uploaded
D8	Database Expert	a. Educational Qualification. • Bachelor's Degree in Engineering/MCA with 6 years of relevant experience. Above Criteria is min. requirement for Database Expert. b. Work experience of >= 8 years of experience = **0.25** marks c. Certification: • Relevant certification in database administration like MCSA:SQL, etc. = **0.25** marks d. Work experience as Database expert (with more than 6 years of relevant experience) of project more than 10 Cr. = 0.5 marks	1	
D9	GIS Expert	a. Educational Qualification: • Education: Full time M. Tech/B. Tech/B.E. / MCA./BCA/B.Sc. b. Total Experience: At least 10 years c. Should have experience of 5 years or more as GIS solution expert in large projects of similar nature	1	
D10	e-Governance Expert	a. Educational Qualification: • Education: Full time B.Tech/B.E./MCA. b. relevant work Experience: At least 8 years c. Should have experience of more than 5 years as e- Governance solution expert in similar nature	1	

#	Technical Evaluation Criteria	Technical Evaluation parameter	Points	Name to be given to the PDF file to be uploaded
D11	Cyber Security Expert	a. Educational Qualification: • Bachelor's Degree in Engineering/MCA with 6 years of relevant experience. Above Criteria is min. requirement for Cyber Security Expert. b. Work experience of >= 8 years of experience = 0.25 marks c. Certification: • Relevant certification in cyber security like CISSP etc. = 0.25 marks d. Work experience as cyber security expert (with 6 years or more of relevant experience) of project more than 5 Cr. = 0.5 marks	1	
E. Demonstration of proof of Concept (20 marks)				
	Bidders will be required to do the Demo / POC of a minimum of 10 use cases.	Assessment to be based on a dedicated demonstration of the capabilities as per the requirements (in the Technical Proposal submitted by the bidder. Bidder will be informed one (01) week advance to establish setup for infrastructure for Demo / POC at Aligarh.	20	

Important Notes:

1. For all the project experience, following documentary evidences are required:
   - Work order/ Contract clearly highlighting the scope of work, Bill of Material and value of the contract/order.
   - Completion Certificate issued & signed by the authorized signatory of the client entity on the entity's Letterhead
   - Citations
2. In case project is on-going a certificate from the Charted Accountant/Statutory Auditor has to be provided mentioning that 80% of Capex is complete.
3. In case the experience shown is that of the bidder's parent / 100% own subsidiary /sister concern company, than the following additional documents are required:
   - Certificate signed by the Company Secretary/statutory Auditor/2 Board of Directors of the

bidder certifying that the entity whose experience is shown is parent/100% own subsidiary /sister concern Company.

- Shareholding pattern of the bidding entity as per audit reports.

4. For International project if the original client certificate and other documents are in language other than English than a translated copy duly verified by Indian embassy shall be submit with bid document
5. For projects where fee has been received in any currency other than Indian Rupees, than the foreign currency conversion rate available on Reserve Bank of India's portal as on the date of publication of the tender document shall be used for conversion of amount in foreign currency to Indian Rupees equivalent.
6. Bidders are allowed to submit experience in terms of technical qualification of their holding (parent) company or 100% own subsidiary company or sister concern only.
   - a 'holding company', in relation to one or more other companies, means a company of which such companies are 100% own subsidiary companies; and
   - a '100% own subsidiary company' in relation to any other company (that is to say the holding company), means a company in which the holding company— (a) controls the composition of the Board of Directors; or (b) exercises or controls more than one-half of the total share capital at its own
   - a 'sister concern' in relation to Bidder Company, means a company whose holding company is same as bidder's holding company and holding company (a) controls the composition of the Board of Directors; or (b) exercises or controls more than one-half of the total share capital at its own
7. In case where the bidder is dependent upon the technical experience of the 100% own subsidiary company or the parent company or the sister concern, with a view to ensure commitment and involvement of the parent/ 100% own subsidiary /sister company for successful execution of the contract, the participating bidder should enclose (i) an Agreement (as per format enclosed at Annexure 7 of this Volume) between the bidder and its parent / 100% own subsidiary /Sister concern company for fulfilling the obligation and deployment of expert during implementation phase for the Track/Component for which the experience is being used and (ii) Guarantee (as per format enclosed at Annexure 8 of this Volume) from the parent/ 100% own subsidiary /sister concern company in favour of ASCL.
8. Authority (or a nominated party) reserves the right to check/validate the authenticity of the information provided in the Pre-qualification and Technical Evaluation criteria and the requisite support must be provided by the Bidder.
9. Minimum absolute technical score to qualify for commercial evaluation is 70 marks out of total 100 marks and the bidder should get minimum of 50% of marks in each of above mentioned Technical Evaluation Criteria.
10. In case, none of the bidder achieves the min. qualifying marks, the Technical Evaluation Committee may revise the min. qualification marks in the interest of this RFP finalization. The Technical Evaluation Committee's decision in this regard shall be final and binding on the Bidder.

3.6.2. Technical Demonstration of Proof of Concept during evaluation period

Objective of Technical Demonstration of POC for City Command Centre Software is to evaluate the technology & system performance for getting city business outcome;

During the Demonstration/Proof-of-Concept (PoC) at technical evaluation stage, the Technical Committee will give special attention to verify the quality, robustness and appropriateness of the proposed Solutions/Equipment and Integrated Operations Platform. If any brand / products are found un-suitable, Bidder may get dis-qualified or may be asked to replace the product with better brands meeting the tender requirements, without any change in commercial bid.

A. System Demonstration	Integrated Operations Platform Software
B. Demo Material and Set up	Demo Material – Department scope: a) Power Source b) Space for installing server and workstation Demo Material – OEM/SI Scope: Demo Setup (OEM/SI scope) at Site:
C. Performance Evaluation	Live demo and integration services
D. Suggestive Technology Selection Criteria	to be informed later

Note: The Proof of Concept/ Technical Demonstration is to be presented by the named resources (Project Manager & Solution Architect) as mentioned in the section 3.6.3. Non-compliance to this will lead to deduction in marks allocated toward PoC/Technical Demonstration.

3.6.3. Key Personnel Criteria

MSI shall provide adequate number of personnel, each responsible for a specific role within the project. MSI shall provide clear definition of the role and responsibility of each individual personnel.

MSI shall have a defined hierarchy and reporting structure for various teams that shall be part of the project. MSI has to provide the list of proposed Resources for the Project. Any changes in Resource deployment will have to be approved by the Authority.

indicates the minimum qualification required for Key Positions identified for this project. However, MSI shall independently estimate the teams size required to meet the requirements of Service Levels as specified as part of this tender.

Please refer Technical qualification criteria for minimum qualification required for Key Positions identified for this project. However, Bidder shall independently estimate the teams size required to meet the requirements of Service Levels as specified as part of this tender.

All the proposed positions shall be Onsite throughout the entire project implementation phase as per bill of material-CAPEX. Manpower plan for Implementation Phase to be provided as per format provided in annexure 2.8

The Bidder shall also propose manpower to be deployed during the Operation & Maintenance phase. All the proposed positions shall be Onsite throughout the entire project implementation phase as per bill of material-OPEX. Manpower plan for Operation & Maintenance Phase to be provided as per format provided in annexure 2.8

Any additional or support manpower shall be estimated and should be accounted for in the Commercial proposal by the selected bidder, so that, the project as per the scope defined and agreement are fulfilled and the project objectives are met.

3.7 Conditional bids/Offers by the bidders

The Bidder should abide by all terms and conditions specified in the RFP Document. Conditional bids/offers shall be liable for disqualification.

3.8 Late Tender bids

Any bid received by client after the deadline for submission of bid prescribed by the Authority, will be summarily rejected.

3.9 Bid Validity Period

Bids shall be valid for a period of 180 days (One hundred and eighty days) from the last date of submission of the bids. A Bid valid for shorter period may be considered as non-responsive. In exceptional circumstances, at its discretion, Authority may solicit the bidder's consent for an extension of the validity period. The request and the responses thereto shall be made in writing or by fax or email.

3.10 Address for Communication

Bids should be addressed to the Authority at below given address:
Aligarh Smart City Limited (ASCL)
Room No. 108, Sewa Bhawan,
Church Compound, Civil Lines,
Aligarh – 202001, Uttar Pradesh
Email: aligarhsmartcityltd@gmail.com

3.11 Opening of Bids

Bids received within the prescribed closing date and time will be opened on the e-procurement platform, on the date, time and at the address mentioned in the RFP Documents.

- Technical bid of only those Bidders shall be opened who meet the Pre-Qualification requirements.
- Price Bid of only those Bidders shall be opened who obtain minimum 70 marks in the overall technical evaluation.
- In case, none of the bidder achieves the min. technical qualifying marks, the Technical Evaluation Committee may revise the min. qualification marks in the interest of this RFP finalization. Evaluation Committee's decision in this regard shall be final and binding on the Bidder.

3.12 Clarification of Bids

To assist in the scrutiny, evaluation and comparison of bids, Authority may, at its discretion, ask some or all bidders for clarifications with regards to their Bid. The request for such clarifications and the

response will necessarily be in writing (by letter / fax / email). Failure of a Bidder to submit additional information or clarification as sought by Authority within the prescribed period will be considered as non-compliance and the Proposal may get evaluated based on the limited information furnished along with the bids.

3.13 Right to accept any Bid and reject any or all Bids

Authority reserves the right to accept or reject any Bid, and to annul the RFP process and reject all bids at any time prior to award of contract, without thereby incurring any liability to the affected Bidder(s) or any obligation to inform the affected Bidder(s) of the grounds for such action.

Bid should be free of over writing. All erasures, correction or addition must be clearly written both in words and figures (if applicable) and attested.

In the event of any assumptions, presumptions, key points of discussion, recommendation or any points of similar nature are submitted along with the Bid, Authority reserves the right to reject the Bid and forfeit the EMD.

If there is any discrepancy in the price bid, it will be dealt as per the following:

a. If, in the price structure quoted for the required Product and services, there is discrepancy between the unit price and total price (which is obtained by multiplying the unit price by the quantity), only the total price/cost as quoted in the table in the Price Bid Format 1 shall prevail. The unit prices quoted in the Price Bid Format 2 shall be considered only in case of any deviations/modifications in the scope of the work in due course.

b. If there is an error in a total corresponding to the addition or subtraction of subtotals, the subtotals shall prevail and the total shall be corrected.

c. If there is a discrepancy between words and figures, the in words shall prevail.

d. If there is such discrepancy in an offer, the same shall be conveyed to the bidder with target date up to which the bidder has to send his acceptance and if the bidder does not agree to the decision of Authority, the bid is liable to be disqualified.

3.14 Non-Conforming bids

A bid may be construed as a non-conforming bids and ineligible for consideration:

a. If it does not comply with the requirements of this RFP.

b. If a bid does not follow the format requested in this RFP or does not appear to address the particular requirements of the solution.

3.15 Confidentiality

All the material/information shared with the Bidder during the course of this procurement process as well as the subsequent resulting engagement following this process with the successful bidder, shall be treated as confidential and should not be disclosed in any manner to any unauthorized person under any circumstances. The employees of the successful Lead bidder and Consortium members who are proposed to be deployed on the project need to furnish a Non-Disclosure Agreement (NDA).

4 Award of Contract

4.1 Notification of Award

Authority will notify the Successful Bidder via letter / fax /email of its intent of accepting the bid. Within 7 days of receipt of the Letter of Intent (LOI) issued by the Authority, the Successful Bidder shall be required to sign the LOI and return the same to the address specified above as a token of acceptance of the LOI.

4.2 Performance Bank Guarantee

As a condition precedent to execution of the Agreement, the Successful Bidder shall ensure submission of the requisite unconditional irrevocable Bank Guarantee, in the prescribed Format within 15 days of receipt of the LOI as a Performance Bank Guarantee (PBG) for the services to be performed under the resultant Agreement. The Bank Guarantee shall be equivalent to 10 % of the Total Project Cost and must be issued by a Nationalized/Scheduled Commercial Bank. The Performance Bank Guarantee shall be valid upto 60 days beyond the term of the resultant Agreement, and shall be renewed and maintained as necessary by the Master systems Integrator (MSI) for the term of the resultant Agreement, and extensions if any.

The Performance Bank Guarantee may be liquidated by the Authority as penalty/liquidated damages resulting from the MSI failure to complete its obligations under the resultant Agreement. The Performance Bank Guarantee shall be returned by Authority to the Bidder within 120 days of the term/expiration of the resultant Agreement after applicable deductions as per the Agreement, if any.

4.3 Signing of Contract

Subsequent to Authority notification to the Successful Bidder by way of an LOI, acceptance of the LOI and submission of the Performance Guarantee, the Successful Bidder shall execute the Agreement with the client. Failure of the Successful Bidder to furnish the Performance Guarantee or execute the Agreement within the prescribed time shall cause the EMD of the Successful Bidder to be liquidated. In such event, client shall negotiate with the next eligible bidder. The Successful Bidder will be liable to indemnify client for any additional cost or expense, incurred on account of failure of the Successful Bidder to execute the Agreement.

Notwithstanding anything to the contrary mentioned above, the Authority at its sole discretion shall have the right to extend the timelines for execution of Agreement on the request of the Successful Bidder, provided the same is bonafide.

The Draft Agreement between the Authority and the Successful Bidder has been given in Volume III: Master Service Agreement (MSA) & Service Level Agreement (SLA) of this RFP.

4.4 Rejection criteria

Besides other conditions and terms highlighted in the RFP Document, bids may be rejected under following circumstances:

A. General rejection criteria

a) Conditional Bids;

b) If the information provided by the Bidder is found to be incorrect / misleading / fraudulent at any stage / time during the RFP Evaluation Process;

c) Any effort on the part of a Bidder to influence the bid evaluation, bid comparison or contract award decisions;

d) Bids received after the prescribed time & date for receipt of bids;

e) Bids without signature of person (s) duly authorized on required pages of the bid;

f) Bids without power of attorney and board resolution letter or its certified true copy.

g) Bids received without submission of the prescribed Bid document fee and EMD.

h) Bidder tries to influence the bid evaluation process by unlawful/corrupt/fraudulent means at any point of time during the bid process

i) In case any bidder submits multiple bids or if common interests are found in two or more bidders, the bidders are likely to be disqualified, unless additional bids/bidders are withdrawn upon notice immediately

j) If any of the Lead Bidder or Consortium Partner is also consortium member in any other bid, then all the affected bids shall be disqualified

B. Pre-Qualification rejection criteria

a) Bidders not complying with the Eligibility Criteria given in this RFP ;

b) Revelation of prices in any form or by any reason before opening the Price Bid;

c) Failure to furnish all information required by the RFP Document or submission of a Bid not substantially responsive to the RFP Document in any aspect;

C. Technical rejection criteria

a) Technical Bid containing Price details;

b) Revelation of Prices in any form or by any reason before opening the Price Bid;

c) Failure to furnish all information required by the RFP Document or submission of a Bid not substantially responsive to the RFP Document in any aspect;

d) Bidders not quoting for the complete scope of work as indicated in the RFP Documents, addendum /corrigendum (if any) and any subsequent information given to the Bidder;

e) Bidders not complying with the Technical and General Terms and conditions as stated in the RFP Documents;

f) The Bidder not confirming unconditional acceptance of full responsibility of providing services in accordance with the scope of work and Service Level Agreements of this RFP

D. Price Bid Rejection Criteria

a) Incomplete Price Bid;

b) Price Bids that do not conform to the RFP 's Price Bid Format;

c) If there is an arithmetic discrepancy in the Price Bid calculations the RFP Evaluation Committee shall rectify the same. If the Bidder does not accept the correction of the errors, its Bid may be rejected.

4.5 Concessions permissible under statutes

Bidder, while quoting against this RFP, must take cognizance of all concessions permissible, if any, under the statutes and ensure the same is passed on to the Authority, failing which it will have to bear extra cost. In case Bidder does not avail concessional rates of levies like customs duty, excise duty, sales tax, etc. client will not take responsibility towards this. However, the Authority may provide necessary assistance, wherever possible, in this regard.

4.6 Taxes

The Bidders shall fully familiarize themselves about the applicable domestic taxes (such as GST, value added or sales tax, service tax, income taxes, duties, fees, levies etc.) on amounts payable by client under the Agreement. All such taxes must be included by Bidders in the Price Bid.

4.7 Audit, Access and Reporting

This following details the audit, access and reporting rights and obligations of Authority and/or its nominated agency and the Master systems Integrator and its subcontractors, agents, supplier etc. This Schedule is in addition to, and in derogation of, the audit rights and process provided in the RFP.

A. Audit Notice and Timings

a. As soon as reasonably practicable after the Effective Date, the Parties shall use their best endeavours to mutually agree to a timetable for routine audits (Other than those mentioned as part of the mandatory requirements for successful delivery and acceptance of the System) during the Project Implementation Phase and the Operation and Maintenance Phase. Authority shall conduct routine audits in accordance with such agreed timetable and shall not be required to give the Master systems Integrator any further notice of carrying out such audits.

b. Authority may conduct unscheduled audits at its own discretion if it reasonably believes that such unscheduled audits are necessary as a result of a misconduct or an act of fraud by the Master systems Integrator, a security violation, or breach of confidentiality obligations by the Master systems Integrator, provided that the requirement for such an audit is notified in writing to the Master systems Integrator a reasonable period time prior to the audit (taking into account the circumstances giving rise to the reasonable belief) stating the reasons for the requirement.

c. Except as provided in para a & b above, audits shall be conducted with adequate notice of 2 weeks to the Master systems Integrator.

B. Access

The Master systems Integrator shall provide to Authority and/ or its nominated agency reasonable access to employees, subcontractors, suppliers, agents and third party facilities as detailed in the RFP, documents, records and systems reasonably required for audit and shall provide all such persons with routine assistance in connection with the audits and inspections. Authority or its nominated agency shall

have the right to copy and retain copies of any relevant records. The Master systems Integrator shall make every reasonable effort to co-operate with them.

C. Audit Rights

Authority and/or its nominated agency shall have the right to audit and inspect suppliers, agents, subcontractors and third party facilities (as detailed in the RFP), data center, documents, records, procedures and systems relating to the provision of the services, but only to the extent that they relate to the provision of the services, as shall be reasonably necessary to verify:

a. The security, integrity and availability of all data processed, held or conveyed by the [Master systems Integrator] on behalf of Authority and documentation related thereto;

b. That the actual level of performance of the services is the same as specified in the SLA;

c. That the Master systems Integrator has complied with the relevant technical standards, and has adequate internal controls in place; and

d. The compliance of the Master systems Integrator with any other obligation under the Agreement.

e. Unless otherwise provided in the RFP, Security audit and implementation audit of the system shall be done once each year, the cost of which shall be borne by Authority.

For the avoidance of doubt the audit rights under this Schedule shall not include access to (i) the Master systems Integrator's profit margins or overheads, (ii) any Confidential Information relating to the Master systems Integrator's employees, or (iii) minutes of its internal Board or Board committee meetings including internal audit, or (iv) such other information of commercial-in-confidence nature which are not relevant to the Services associated with any obligation under the Agreement.

D. Audit rights of Subcontractors, Suppliers and agents

a. The Master systems Integrator shall use reasonable endeavours to achieve the same audit and access provisions as defined in this Schedule with subcontractors, suppliers and agents who supply labour, services, equipment or materials related to performance of obligations by Master systems Integrator under this Agreement. Without prejudice to its other obligations under the Agreement, the Master systems Integrator shall inform Authority and/or its nominated agency prior to concluding supply/ subcontract agreements of any failure to achieve the same rights of audit or access.

b. REPORTING: The Master systems Integrator will provide quarterly reports to Authority and/or its nominated agency regarding any specific aspects of the Project and in context of the audit and access information as required by Authority or its nominated agency.

E. Action and review

a. Any change or amendment to the systems and procedures of the Master systems Integrator, where applicable arising from the audit report shall be agreed within thirty (30) calendar days from the submission of the said report.

b. Any discrepancies identified by any audit pursuant to this Schedule shall be immediately notified to Authority or its nominated agency and the Master systems Integrator Project Manager who

shall determine what action should be taken in respect of such discrepancies in accordance with the terms of this Agreement.

4.8 Terms of Payment

a. The request for payment shall be made to the Authority in writing, accompanied by invoices describing, as appropriate, the services performed, and by the required documents submitted pursuant to conditions of the contract and upon fulfilment of all the obligations stipulated in the Contract.

b. Due payments shall be made promptly by the Authority, generally within sixty (60) days after submission and acceptance of an invoice or request for payment by MSI

c. The currency or currencies in which payments shall be made to the MSI under this Contract shall be Indian Rupees (INR) only.

d. All remittance charges shall be borne by the MSI.

e. In case of disputed items, the disputed amount shall be withheld and shall be paid only after settlement of the dispute.

f. Any penalties/ liquidated damages, as applicable, for delay and non-performance, as mentioned in this RFP document, shall be deducted from the due payments of the respective milestones.

g. Taxes, as applicable, shall be deducted / paid, as per the prevalent rules and regulations

h. Payments to MSI, after successful completion of the target milestones (including specified project deliverables), shall be made as mentioned in section 5.14 of Volume II of the RFP.

4.9 Records and Information

For the purposes of audit in accordance with this Schedule, the System Integrator shall maintain true and accurate records in connection with the provision of the services and the System Integrator shall handover all the relevant records and documents upon the termination or expiry of this Agreement.

4.10 Right to vary the scope of Work

A. Right to vary the scope of the work at the time of award

The Authority reserves its right to make changes to the scope of the work at the time of execution of the resultant Agreement. If any such change causes an increase or decrease in the cost of, or the time required for the MSI's performance of any part of the work under the Agreement, whether changed or not changed by the order, an equitable adjustment (if required) shall be made in the Contract Value or time schedule, or both, and the Agreement shall accordingly be amended. Any claims by the MSI for adjustment under this Clause must be asserted within thirty (30) days from the date of the SI's receipt of the client changed order.

B. Cost Control

a. Bill of Quantities

The Bill of Quantities will contain the requisite items and their estimated quantities for the project work to be done by the MSI.

b. Changes in the Quantities

a. The MSI is bound to execute all the supplemental works that are found essential, incidental and inevitable during execution of project works.

b. The payment of rates for any supplemental items beyond the quantities estimated in the BoQ will be regulated as under:

   i. For quantities in excess of the proposed BoQ, the Authority/PMO or any authorized official/agency nominated by the Authority shall validate the requirements and necessity of variations in quantity or extra items after due diligence, based on site conditions and work contingencies.

   ii. The recommendations of the PMO or any authorized official/ agency nominated by the Authority will be submitted to the Authority for its consideration and necessary approval.

   iii. For variation in quantities excess or less of the proposed quantity in BoQ, the unit rates quoted by the bidder in his Price Bid under Format 2 of Annexure 3 on mutually agreed terms and conditions shall be applicable.

c. Extra (New) Items

a. Extra items of work shall not vitiate the contract. The reimbursement for extra items shall be validated by the Project Management Office (PMO) and cleared by the Authority. The MSI shall be bound to execute extra items of work as directed by the Authority. The rates for extra items shall be worked out based on the unit rates quoted by the Bidder in Price Bid/as per mutually agreed terms and conditions.

b. For new items which are beyond the scope of the BoQ, the Project Management Office (PMO) or any authorized official/ agency shall validate the requirements and necessity of such new/extra items after due diligence, based on site conditions and work contingencies.

c. The bidder shall submit in writing well in advance at least 14 days before the Authority a statement of extra items if any that they need to initiate during the course of project works.

d. Payment Certificates

a. The Bidder shall submit to the Authority monthly statements of the estimated value of the work completed less the cumulative amount certified previously.

b. The value of work executed shall be determined by the Authority.

c. The value of work executed shall comprise the value of the quantities of the items in the Bill of Quantities completed.

d. The Authority may exclude any item certified in a previous certificate or reduce the proportion of any item previously certified in any certificate in the light of later information.

4.11 Fraud and corruption

Authority requires that Bidder must observe the highest standards of ethics during the entire process of RFP evaluation and during execution of the contract. In pursuance of this policy, client defines, for the purpose of this provision, the terms set forth as follows:

a. “Corrupt practice” means the offering, giving, receiving or soliciting of anything of value to influence the action of the Authority in contract executions.

b. "Fraudulent practice" means a misrepresentation of facts, in order to influence a procurement process or the execution of a contract, to the Authority, and includes collusive practice among bidders (prior to or after Proposal submission) designed to establish Proposal prices at artificially high or non-competitive levels and to deprive the Authority of the benefits of free and open competition.

c. “Unfair trade practices” means supply of services different from what is ordered on, or change in the Scope of Work which is given by the Authority in Vol 2 of the RFP.

d. “Coercive Practices” means harming or threatening to harm, directly or indirectly, persons or their property to influence their participation in the execution of contract.

Authority shall reject the Bid proposal for award of contract, if it determines that the Bidder recommended for award, has been found to have been engaged in corrupt, fraudulent of unfair trade practices. Once the contract is signed and if it is noticed that the MSI has indulged into the Corrupt / Fraudulent / Unfair / Coercive practices, it will be a sufficient ground for client for termination of the contract and initiate black-listing of the MSI.

4.12 Conflict of Interest

a. A bidder shall not have a conflict of interest that may affect the Selection Process or the Solution delivery (the “Conflict of Interest”). Any Bidder found to have a Conflict of Interest shall be disqualified. In the event of disqualification, Authority shall forfeit and appropriate the EMD, if available, as mutually agreed genuine pre-estimated compensation and damages payable to Authority for, inter alia, the time, cost and effort of Authority including consideration of such Bidder’s Bid, without prejudice to any other right or remedy that may be available to Authority hereunder or otherwise.

b. Authority requires that the bidder provides solutions which at all times hold Authority’s interests paramount, avoid conflicts with other assignments or its own interests, and act without any consideration for future work. The bidder shall not accept or engage in any assignment that would be in conflict with its prior or current obligations to other clients, or that may place it in a position of not being able to carry out the assignment in the best interests of Authority.

4.13 Subcontracting

The bidder would not be allowed to sub-contract work, except for the following:

a. Fiber optic network build, other cabling and fixtures work, and all civil work during implementation

b. Facility Management Staff at Command Control Center

Sub-contracting shall be allowed only with prior written approval of Authority. However, even if the work is sub-contracted, the sole responsibility of the work shall lie with the lead bidder. The lead bidder shall be held responsible for any delay/error/non-compliance etc. of its sub-contracted vendor. The details of the sub-contracting agreements (if any) between both the parties would be required to be submitted to Authority.

4.14 Quality standards and pre-eligibility OEM criteria

For the below OEM criteria, either a public documentation or Self-certification on OEM letterhead to be provided as a proof of compliance:

a) All quoted OEM should have quality standard certifications like ISO 9001-2008, ISO 14001, ISO 27001, CMMI 3 certification wherever applicable to ensure only quality OEM participation, as on date of RFP release.

b) OEM for the Command Control Software Platform should have a registered office in India and should be directly present for last 3 years, from date of RFP publication. They should also have a development center in India.

c) OEM for Command Control Software should have deployed at least one Smart City solution in India or globally.

d) OEM for the all active network, security, compute, storage should have a registered office in India and should be directly present for last 3 years, from date of RFP publication. They should also have a development center in India.

e) The Bidder shall quote only one specific make and model from only one specific OEM, for each of the goods. Providing more than one option shall not be allowed. All goods quoted by the Bidder must be associated with item code and names and with printed literature describing configuration and functionality. Any deviation from the printed specifications should be clearly mentioned in the offer document by the Bidder.

f) The OEM for all active components should give a declaration that products or technology quoted are not end of- sale till 18 months from the date of RFP release and are not end-of-support till 5 years from date of RFP release.

g) The proposed OEM should not have been blacklisted by any State / Central Government Department or Central /State PSUs.

h) Each of the proposed OEMs should have existing capability and infrastructure to provide 24x7x365 technical support with Indian Toll or Toll-Free call in numbers.

i) OEM should have spare depot across India for hardware replacement.

j) The Goods and Services to be supplied installed and/or performed by the Bidder conforming to the RFP requirements.

Adequate supporting documents pertaining to the above points, along with a summary compliance table, should be submitted in the technical proposal by the Bidder.

Annexure 1 –Pre-Qualification Bid check list

Annexure1.1. Indicative Check-list for the Documents to be included in the Pre-Qualification Bid

#	Documents to be submitted	Submitted (Y / N)	Documentary Proof (Page No.)
1.	Bid Cover Letter and Particulars of organizations		
2.	Power of attorney / board resolution to the authorized Signatory of the Bid		
3.	Consortium agreement (if applicable)		
4.	E.M.D. of INR 2,90,00,000/-		
5.	Bid Document fee of INR 25,000/-		
6.	Particulars of the bidders (As per section annexure 1.3)		
7.	Copy of Certificate(s) of Incorporation		
8.	Certificate(s) from the statutory auditor/CA towards average annual Turnover of the entity/entities over the last three (3) financial years (FY 2015-16, 2016-17 and 2017-18)		
9.	Certificate(s) from the statutory auditor/CA towards positive net worth for the last three (3) financial years (FY 2015-16, 2016-17 and 2017-18)		
10.	Certified copies of valid PAN documents		
11.	Pre-Qualification Covering letter (criteria as per sec 3.5)		
12.	Pre-qualification bid checklist		
13.	Brief Company Profile of Lead Bidder and Consortium member if applicable as per annexure 1.3.of volume I of RFP		
14.	• Copy of Certification of Incorporation/Registration Certificate • PAN card • GST registration		
15.	Audited financial statements for the last three financial years and Certificate from the Statutory Auditor/ CA		
16.	Consortium Agreement (in case of consortium bidding)		
17.	Total Responsibility Certificate		
18.	Valid Certification		

Annexure 1.2. Pre-Qualification Bid Cover Letter

(*To be submitted on the letterhead of the Bidder)*

To

Chief Executive Officer,
Aligarh Smart City Limited
Room No. 108, Sewa Bhawan,
Church Compound, Civil Lines,
Aligarh – 202001, Uttar Pradesh

Subject: RFP FOR SELECTION OF MASTER SYSTEM INTEGRATOR FOR IMPLEMENTATION OF INTEGRATED COMMAND & CONTROL CENTER AND E-GOVERNANCE BASED SMART CITY SOLUTION AT ALIGARH

Ref: Tender No :<No> Dated<DD/MM/YYYY>

Sir/ Madam,

Having examined the RFP, the receipt of which is hereby duly acknowledged, we, the undersigned, offer to provide the professional services as required and outlined in the RFP FOR SELECTION OF MASTER SYSTEM INTEGRATOR FOR IMPLEMENTATION OF INTEGRATED COMMAND & CONTROL CENTER AND E-GOVERNANCE BASED SMART CITY SOLUTION AT ALIGARH.

We attach here to our responses to pre-qualification requirements, Technical and Price Bids as required by the RFP. We confirm that the information contained in these responses or any part thereof, including the exhibits, and other documents and instruments delivered or to be delivered client is true, accurate, verifiable and complete. This response includes all information necessary to ensure that the statements therein do not in whole or in part mislead the department in its short-listing process.

We fully understand and agree to comply that on verification, if any of the information provided here is found to be misleading the selection process, we are liable to be disqualified from the selection process or termination of the contract during the project, if selected to do so.

We agree for unconditional acceptance of all the terms and conditions set out in the RFP Document and also agree to abide by this RFP response for a period of 180 days from the date fixed for bid submission. We hereby declare that in case the contract is awarded to us, we shall submit the performance bank guarantee bond in the form prescribed in the RFP.

We agree that you are not bound to accept any RFP response you may receive. We also agree that you reserve the right in absolute sense to reject all or any of the bids and also all or any of the products/ services specified in the RFP response.

It is hereby confirmed that I/We are entitled to act on behalf of our company/ corporation/ firm/ organization and empowered to sign this document as well as such other documents, which may be required in this connection.

Dated this Day of 2018

(Signature) (In the capacity of)

(Name)

Duly authorized to sign the RFP response for and on behalf of:

(Name and Address of Company) seal/stamp of Bidder

Witness Signature:

Witness Name:

Witness Address:

Annexure 1.3. Particulars of the bidders (required for Sole/Lead Bidder and all Consortium Members)

#	Description	Details (to be filled by the bidder)
1.	Name of the company	
2.	Title of the Project	
3.	State whether applying as Sole Firm or Lead member of a consortium	
4.	Official address	
5.	Phone No. and Fax No.	
6.	Corporate Headquarters Address	
7.	Phone No. and Fax No.	
8.	Web Site Address	
9.	Details of Company's Registration (Please enclose copy of the company registration document)	
10.	Name of Registration Authority	
11.	Registration Number and Year of Registration	
12.	GST/CST/LST/VAT registration No. (as applicable)	
13.	Permanent Account Number (PAN)	
14.	Company's Revenue for last 3 years (Year wise) as on 31st March, 2018	
15.	Company's Profitability for the last 3 years (Year wise) as on 31st March,2018	
16.	If Lead Member, state the following details of other member firms: i) Name of firm: ii) Details of Company's Registration iii) Official address and principal place of business	

Contact Details of officials for future correspondence regarding the bid process:

Details	Authorized Signatory	Secondary Contact
Name		
Title		
Company Address		
Phone /Fax		
Mobile		
Email		

Financial Turnover:

Name of the Bidder/Consortium member			
Financial Capability	Overall turnover (in INR crores)	FY 2015-16	
		FY 2016-17	
		FY 2017-18	

Annexure 1.4. Format for Power of Attorney for signing the Bid

(On INR 100.00 Non judicial Stamp Paper and duly notarized)

KNOW ALL MEN BY THESE PRESENTS,

We _____ *(name of the firm and address of the registered office)* do hereby irrevocably constitute, nominate, appoint and authorize Mr./ Ms. *(name)*,_____ son/daughter/wife of _____ and presently residing at _____, who is presently employed with us and holding the position of _____, as our true and lawful attorney *(hereinafter referred to as the "Attorney")* to do in our name and on our behalf, all such acts, deeds and things as are necessary or required in connection with or incidental to submission of our application for qualification and submission of our bid for the Project proposed by the _____ (the "client") including but not limited to signing and submission of all applications, bids and other documents and writings, participate in pre-applications and other conferences and providing information/ responses to the client, representing us in all matters before the client, signing and execution of all contracts including the Agreement and undertakings consequent to acceptance of our bid, and generally dealing with the client in all matters in connection with or relating to or arising out of our bid for the said Project and/ or upon award thereof to us and/or till the entering into of the Agreement with the client.

AND we hereby agree to ratify and confirm and do hereby ratify and confirm all acts, deeds and things done or caused to be done by our said Attorney pursuant to and in exercise of the powers conferred by this Power of Attorney and that all acts, deeds and things done by our said Attorney in exercise of the powers hereby conferred shall and shall always be deemed to have been done by us.

IN WITNESS WHEREOF WE, _____, THE ABOVE NAMED PRINCIPAL HAVE EXECUTED THIS POWER OF ATTORNEY ON THIS DAY OF_____.

For _____

(Signature, name, designation and address)

Witnesses:

1. (Notarized)

2.

Accepted

(Signature, Name, Title and Address of the Attorney)

Notes:

- The mode of execution of the Power of Attorney should be in accordance with the procedure, if any, laid down by the applicable law and the charter documents of the executant(s) and when it is so required, the same should be under common seal affixed in accordance with the required procedure.
- Wherever required, the Bidder should submit for verification the extract of the charter documents and documents such as a board or shareholders' resolution/ power of attorney in favour of the

person executing this Power of Attorney for the delegation of power hereunder on behalf of the Bidder.

- In case the bid is signed by an authorized Director / Partner or Proprietor of the Bidder, a certified copy of the appropriate board resolution / document conveying such authorization to client may be enclosed in lieu of the Power of Attorney.

Annexure1.5. Declaration of Non-Blacklisting

(On INR 100.00 Non judicial Stamp Paper and duly notarized)

Declaration for Lead Bidder:

Place

Date

To,

Chief Executive Officer
Aligarh Smart City Limited
Room No. 108, Sewa Bhawan,
Church Compound, Civil Lines,
Aligarh – 202001, Uttar Pradesh

Subject: Self Declaration of not been blacklisted in response to the RFP for Selection Of Master System Integrator For Implementation Of Integrated Command & Control Center And E-Governance Based Smart City Solution At Aligarh.

Ref: RFP No. **<<…..>> dated << …..>>**

Dear Sir,

We confirm that our company or firm, _____,is currently not blacklisted in any manner whatsoever by any Government (Central / State / PSU/ World Bank/Asian Development Bank) Organization in India in India on any ground including but not limited to indulgence in corrupt practice, fraudulent practice, coercive practice, undesirable practice or restrictive practice.

(Signature of the Lead Bidder)

Printed Name

Designation

Seal

Date:

Place:

Business Address:

Annexure1.6. Declaration for Consortium Member:

(On INR 100.00 Non judicial Stamp Paper and duly notarized)

{Place}

{Date}

To,

Chief Executive Officer
Aligarh Smart City Limited
Room No. 108, Sewa Bhawan,
Church Compound, Civil Lines,
Aligarh – 202001, Uttar Pradesh

Subject: Self Declaration of not been blacklisted in response to the RFP for Selection of Master System Integrator for Implementation Of Integrated Command & Control Center And E-Governance Based Smart City Solution at Aligarh.

Ref: RFP No. **<<…..>> dated << …..>>**

Dear Sir,

We confirm that our company or firm, _____,is currently not blacklisted in any manner whatsoever by any Government *(*Central / State / PSU/ World Bank/Asian Development Bank) Organization in India in India on any ground including but not limited to indulgence in corrupt practice, fraudulent practice, coercive practice, undesirable practice or restrictive practice.

(Signature of the Consortium Member)

Printed Name

Designation

Seal Date:

Place: Business Address:

Annexure1.7. No Deviation Certificate

(To be provided on the Company letter head)

Place

Date

To,

Chief Executive Officer
Aligarh Smart City Limited
Room No. 108, Sewa Bhawan,
Church Compound, Civil Lines,
Aligarh – 202001, Uttar Pradesh

Subject: Self Declaration for No Deviation in response to the RFP for Selection of Master System Integrator for Implementation of Integrated Command & Control Center and E-Governance Based Smart City Solution at Aligarh.

Ref: RFP No. **<<…..>> dated << …..>>**

Dear Sir,

This is to certify that our offer is exactly in line with your tender enquiry/RFP (including amendments) no. _____ dated _____. This is to expressly certify that our offer contains no deviation either Technical (including but not limited to Scope of Work, Business Requirements Specification, Functional Requirements Specification, Hardware Specification and Technical Requirements Specification) or Commercial in either direct or indirect form.

(Authorized Signatory)

Printed Name

Designation

Seal

Date:

Place:

Business Address:

Annexure1.8. Total Responsibility Certificate

(To be provided on the Company letter head)

Place

Date

To,

Chief Executive Officer
Aligarh Smart City Limited
Room No. 108, Sewa Bhawan,
Church Compound, Civil Lines,
Aligarh – 202001, Uttar Pradesh

Subject: Self Declaration for Total Responsibility in response to the RFP for Selection of Master System Integrator for Implementation Of Integrated Command & Control Center and E-Governance Based Smart City Solution at Aligarh.

Ref: RFP No. **<<…..>> dated << …..>>**

Dear Sir,

This is to certify that we undertake the total responsibility for the defect free operation of the proposed solutions as per the requirement of the RFP for the duration mentioned in all the volumes of the RFP.

(Authorized Signatory)

Printed Name

Designation

Seal

Date:

Place:

Business Address:

Annexure1.9. Self-certificate for Project execution experience (In Bidding Entity's Letter Head)

This is to certify that <Name of the Bidding entity> has been awarded with < Name of the Project > as detailed under:

#	Description	Details (to be filled by the bidder)
	Name of the Project	
	Client's Name, Contact no. and Complete Address	
	Contract Value for the bidder (in Indian Rupees)	
	Current status of the project (Completed/Ongoing)	
	Activities completed by bidding entity as on bid submission date (N.B Only relevant activities as sought in the Criteria to be included)	
	Value of Work completed for which payment has been received from the client	
	Date of Start	
	Date of Completion	

(Authorized Signatory)
Signature:

Name:

Designation:

Bidding entity's name

Address:

Seal:

Date:

Annexure 2 – Formats of Technical Bid

Annexure 2.1. General Instructions for the Technical Bid

Bidders have to submit a very structured and organized Technical Bid, which will be analysed by the Technical/Evaluation Committee for compliances with regards to the requirements of the project. Since the Price Bid shall be opened for only those bidders who qualify the minimum criteria for technical bid evaluation, the quality and completeness of the information submitted by the Bidder will matter a lot while finalizing the technical scores.

Bidder is expected to divide its proposal in following five Sections / Documents:

A. Bidder's Competence to execute the project

This document should bring about the capability of the bidder to execute this project. Some of the required documents are as follows:

- Experience of Bidder in Executing Projects as mentioned in Section 3.6 in required Formats and supporting documents;
- Details of IT, Surveillance Domain Manpower in the firm;
- Other parameters as required

B. Proposed Team for the Project

As specified in the Technical Bid Evaluation Framework, client will give high importance on the quality and competence of the technical manpower proposed for the project. Bidder are required to propose separate resources for different skill-sets (during Design, Project Implementation & Post-Implementation). Following documentation is expected in this section:

- Overall Project Team (for Design, Project Implementation & Maintenance phases)
- Escalation Chart for the entire Project Duration
- Summary Table giving Qualification, Experiences, Certifications, Relevance
- Detail of the proposed resources in the Format attached

C. Technical Solution Proposed for the Project

Broad areas to be covered in the Technical Solution documentation are given below:

1. Describe the proposed Technical Solution in a structured manner. Following points should be captured in the same:
   i. Clear articulation of the design, technical solution and various components proposed in the bid including make/model of equipment with sizing of infrastructure (including diagrams and calculations wherever applicable) proposed.
      a. Justifications for selection of the proposed technology over other available options.
      b. Extent of compliance to technical requirements specified in the scope of work

c. Technical Design and clear articulation of benefits to ASCL and other associated project stakeholders w.r.t. various components of the solution offered vis-à-vis other options available.

d. Strength of the Bidder to provide services including examples or case-studies of similar solutions deployed for other clients.

e. Specific emphasis on fulfilling the requirement of analytics and artificial intelligence as specified in the RFP

f. Detailed Bill of Material for the solution proposed

ii. The overall technical solution should be structured in following sub-sections, which are being evaluated by Technical Committee for technical scores:

a. City Surveillance System

b. Integration of various components with ICCC

c. Environmental Sensors

d. Variable Message Displays

e. Network Connectivity

f. Data Center (DC)

g. Data Recovery Center (DRC)

h. Integrated Command & Control Center (ICCC)

2. Provide detailed approach and methodology for Pre-Implementation, Implementation & Post-Implementation periods.

3. Clearly articulate the Strategy and Approach & Methodology for installation, Configuration & Operationalization of all the key components of the project

4. Approach & Methodology for Management of SLA Requirements specified in the RFP.

5. Insight on Implementation of different Best Practices like ITIL, BS7799, Security Policy, etc.

6. Detailed Project Plan with timelines, resource allocation, milestones etc. in for supply, installation and commissioning of the physical and IT components for the project.

D. Compliance Table to the Technical requirement /Specifications.

The Volume II of this RFP has specified the benchmark / minimum specifications for various components. Bidder is expected to give a comprehensive compliance sheet for the Product and services proposed by them. The Format to be used for this compliance matrix is as given in Annexure -2.

All above mentioned documents shall have an index page with page numbers specified for all the key information / headers. (Not applicable for last document type).

IMPORTANT NOTE: The Bidders shall submit the Technical Solution Proposed and compliance to the min. specifications for the Project. The Bids submitted without these documents are liable to be rejected. The Technical/Evaluation Committee's decision shall be final and binding on all.Format for submitting details on experience of Bidder (in case of Consortium please provide the details of lead member and other members separately)

Annexure 2.2. Technical Bid Checklist

#	Checklist Item	Compliance (Yes/No)	Page No. and Section No. in the Bid
1	Technical Bid Letter		
2	Credential summary		
3	Project Citations and Self-certifications, as applicable		
4	Detailed proposed solution		
5	Project plan and manpower plan		
6	Proposed CVs		
7	Compliance to Requirement (Technical / Functional Specifications)		
8	Proposed Bill of Material		
9	Manufacturers'/Producers' Authorization Form Anti-Collusion certificate of OEM		
10	Non-disclosure agreement		
11	Signed copy of all pages of Vol-I, Vol-II and Vol-III of RFP by authorized signatory.		
12	Declaration by OEM's for products quoted is not end of sale at time of bid submission		
13	Document supporting to OEM eligibility criteria		
14	Compliance to Requirement (Technical / Functional Specifications)		
15	Technical Bid Check-List		

Annexure 2.3. Technical Bid Covering Letter

(*To be submitted on the letterhead of the Bidder)*

To

Chief Executive Officer
Aligarh Smart City Limited
Room No. 108, Sewa Bhawan,
Church Compound, Civil Lines,
Aligarh – 202001, Uttar Pradesh

Subject: RFP for Selection Of Master System Integrator For Implementation Of Integrated Command & Control Center And E-Governance Based Smart City Solution At Aligarh.

Ref: Tender No :<No> Dated<DD/MM/YYYY>

Sir/ Madam,

I (in case of single bidder) or We, <<name of the undersigned Bidder and consortium members>>, having read and examined in detail all the bidding documents in respect of "RFP for Selection Of Master System Integrator For Implementation Of Integrated Command & Control Center And E-Governance Based Smart City Solution At Aligarh" do hereby propose to provide our services as specified in the bid submitted by us.

It is hereby confirmed that I / We are entitled to act on behalf of our company / corporation / firm / organization and empowered to sign this document as well as such other documents, which may be required in this connection.

We declare that all the services shall be performed strictly in accordance with the RFP documents.

We confirm that the information contained in this response or any part thereof, including its exhibits, and other documents and instruments delivered or to be delivered to Authority, is true, accurate, verifiable and complete. This response includes all information necessary to ensure that the statements therein do not in whole or in part mislead the department in its evaluation process. We also confirm that we shall not attract conflict of interest in principle.

We hereby declare that in case the contract is awarded to us, we shall submit the contract Performance bank guarantee in the form prescribed at Annexure 5 of the RFP Volume I.

We hereby declare that our bid is made in good faith, without collusion or fraud and the information contained in the bid is true and correct to the best of our knowledge and belief.

We understand that our bid is binding on us and that you are not bound to accept a Bid you receive. This bid is valid for 180 days after opening of technical bid. We shall extend the validity of the bid if required by Authority.

Thanking you,

Yours sincerely,

(Signature of the Lead Bidder)

Printed Name

Designation

Seal

Date:

Place:

Business Address:

Annexure 2.4. Curriculum Vitae (CV) of Team Members

Name:					
1.	Proposed position or role	(only one candidate shall be nominated for each position)			
2.	Date of Birth		Nationality		
3.	Education	Qualification	Name of School or College or University	Degree Obtained	Year of Passing
4.	Years of Experience				
5.	Areas of Expertise and no. of years of experience in this area	*(as required for the Profile)*			
6.	Certifications and Train intended				
7.	Employment Record	Employer	Position	From	To
		[Starting with present position and last 2 firms, list in reverse order, giving for each employment: dates of employment, name of employing organization, positions held.]			
8.	**Detailed Tasks Assigned**	(List all tasks to be performed under this project)			
Relevant work undertaken that best illustrates the experience as required for role					
	Project 1				
	Name of assignment				

	Name of assignment	
	Year	
	Location	
	Employer	
	Main project features	
	Position held	
	Activities performed	
Project 2		
	Name of assignment	
	Year	
	Location	
	Employer	
	Main project features	
	Position held	
	Activities performed	

Annexure 2.5. Credential Summary

S. No.	Project Name	Client Name	Client Type	Project Value (In INR)	Project Components	Documentary evidence provided (Yes or No)	Project Status (Completed or Ongoing or Withheld)
1.							
2.							
3.							
4.							
5.							

- Client type – Indicate whether the client is Government or PSU or Private
- Project Components – Indicate the major project components like application development for security surveillance, command and control center, Maintenance, Hardware procurement and deployment, DC setup and maintenance, Facility management services, provisioning manpower, IT support and maintenance
- Documentary evidence provided – Indicate the documentary evidence provided with the detailed project credential like work order or purchase order or completion certificate or letter of appointment
- Project Status – Completed (date of project completion) or Ongoing (project start date)

Annexure 2.6. Bidder's Experience- Client Citations

Prime Bidder or Consortium member is requested to furnish the credentials in the following format for both Pre-qualification and Technical criterion. All credentials should be followed by relevant documentary proof.

Name of the Project & Location	
Client's Name and Complete Address	
Narrative description of project	
Contract Value for the bidder (in Indian Rupees)	
Date of Start	
Date of Completion	
Activities undertaken by prime bidder or consortium member	

Note: In case project is on-going a certificate from the Charted Accountant/Statutory Auditor has to be provided mentioning that 80% of Capex is complete

Annexure 2.7. Project Plan

A **Detailed Project Plan** covering break-up of each phase into the key activities, along with the start and end dates must be provided as per format given below.

Activities Wise Timeline							
S. No.	Detailed work breakdown structure	Month Wise Program					
		1	2	3	4	5	……
	Project Plan						
1	Activity 1						
1.1	Sub-Activity 1						
1.2	Sub-Activity 2						

Note: The above activity chart is just for the purpose of illustration. Bidders are requested to provide detailed activity & phase wise timelines for executing the project with details of deliverables & milestones as per their bid.

Annexure 2.8. Manpower Plan

I. Till Go-Live Implementation (For 12 Months)

Activities Wise Timeline									
S. No.	Role	Month wise time to be spent by each personnel (in days)						Total	
		1	2	3	4	5	……		
1.									Onsite
2.									Onsite
3.									Onsite
4.									Onsite
5.									Onsite
6.									Onsite
7.									Onsite
8.									Onsite

II. After Go-Live implementation (Operation & Maintenance)

(For 60 Months)

Activities Wise Timeline									
S. No.	Man Power detailed breakup	Month wise time to be spent by each personnel (in days)						Total	
		Year 1	Year 2	Year 3	Year 4	Year 5	……		
1									Onsite/Offsite
2									Onsite/Offsite
3									Onsite/Offsite
4									Onsite/Offsite
5									Onsite/Offsite

6									Onsite/Offsite
7									Onsite/Offsite
8									Onsite/Offsite
9									Onsite/Offsite

Annexure 2.9. Format for sharing details of the Resources/Personnel to be deployed

Sl. No.	Name of the resource	Proposed Role	Highest Degree	Certifications (e.g., PMP or ITIL or TOGAF or CCNP etc.)	Relevant Experience related to (In Years)	Please mention 2 relevant projects handled	Total Experience (In Years)
1.							
2.							
3.							
4.							
5.							
6.							
7.							
8.							
9.							
10.							

Annexure 2.10. Format for specifying Compliance to the benchmark / minimum Specifications

Bidder is required to submit compliance to the required benchmark / minimum specifications for various components specified in the RFP

This compliance would be needed in two Formats – 1) Summary table given below for all the items, 2) Compliance tables for each of the line item against the benchmark specifications specified in the Volume II of this RFP.

1) Summary Table of the Compliance of Requirements

#	Component	Unit OF Measurement	Quantity Proposed	Make & Model	Compliance to Required Specifications? (Yes / No)
1.	.....				
2.	.....				
3.	.....				

2) Detailed compliance tables for each of the above mentioned items against the benchmark specifications specified in the Volume II of this RFP

Name of the Equipment:

#	Parameter	Minimum Specification / Requirement mentioned in the RFP	Compliance (Yes / No)	Remarks (If compliance is No) – state clearly if the deviation is having a +ve or –ve impact
1.	.....			
2.	.....			
3.	.....			

Annexure 2.11. Format for Authorization Letters from OEMs

Date: dd/mm/yyyy

To

Chief Executive Officer
Aligarh Smart City Limited
Room No. 108, Sewa Bhawan,
Church Compound, Civil Lines,
Aligarh – 202001, Uttar Pradesh

Subject: Authorization Letter to M/s. ---------- for the participation in the Bid for ….

Ref: Tender No :<No> Dated<DD/MM/YYYY>

Sir,

We _____, (name and address of the manufacturer) who are established and reputed manufacturers of _____ having factories at _____ (addresses of manufacturing / development locations) do hereby authorize M/s _____ (name and address of the Bidder) to bid, negotiate and conclude the contract with you against the above mentioned RFP for the equipment / software manufactured / developed by us.

We herewith certify that the above mentioned equipment / software products will be supplied to M/s_____ [*name of the bidder*] as part of the subject project and we hereby undertake to support these equipment / software for the duration of minimum 10 years from the date of submission of the bid.

We also confirm that the offered system will not be end of life for min 18 months from the date of bid submission.

Yours faithfully,

For and on behalf of M/s _____(Name of the manufacturer)

Signature :

Name :

Designation :

Address :

Date :

Note:

1) This letter of authority should be on the letterhead of the concerned manufacturer and should be signed by an authorized signatory of the manufacturer. The same would need to be submitted by the Bidder as a part of Technical Bid.

Annexure 2.12. Anti-Collusion Certificate

[Certificate should be provided by Lead Bidder on letter head]

Anti-Collusion Certificate

We hereby certify and confirm that in the preparation and submission of our Bid for Request for RFP for Selection Of Master System Integrator For Implementation Of Integrated Command & Control Center And E-Governance Based Smart City Solution At Aligarh against the RFP Tender No :<No> Dated<DD/MM/YYYY> issued by Authority, We have not acted in concert or in collusion with any other Bidder or other person(s) and also not done any act, deed or thing, which is or could be regarded as anti-competitive. We further confirm that we have not offered nor will offer any illegal gratification in cash or kind to any person or organization in connection with the bid.

(Signature of the Lead Bidder)

Printed Name

Designation

Seal

Date:

Place:

Business Address:

Annexure 2.13. Overview of Proposed Solution

Structure of Proposed Solution:-

Bidders are required to provide a detailed approach & methodology to execute the entire project. Bidders are advised to comply with the below provided headers/Approach components while detailing out their solution

Sl. No	Item
1	Understanding of the project and conformity to volume II : Functional Requirement and High level Architecture of the proposed solution as per requirements of the RFP
2	Proposed deployment architecture for on-premise DC and cloud DR to meet the functionalities as given in RFP and Proposed Network Architecture covering ICCC viewing center, CCC platform on-premise DC & cloud DR to meet the functionalities as given in RFP
3	Proposed security solution to safeguard against various threats including hacking attempts, cyber-crime, internal/ external threats etc.
4	Proposed solution for design & development of SOPs and KPIs, also please list down all the SOPs & KPIs identified for the solution.
5	Identification of major risks for the projects and also propose suitable mitigation plan for each of identified risks.
6	Methodology, tools and Technologies to create, monitor & maintain all the SLAs and managing change requests
7	Proposed structure for: 1. Project Strategy 2. Project Management 3. Risk Management 4. Resource Plan 5. Project Governance Model
8	What will be the approach towards the scalability, interoperability and modularity features considering the future expansion of the projects? (The response to this question shall be given considering growth of Smart Cities as well as new applications or systems that may be envisaged/developed in future)
9	Approach towards testing and quality
10	How SLAs mentioned under this RFP will be measured? What tools will be used for SLA measurement?
11	Proposed solution ensures the fool proof security to the system from various threats including hacking attempts, internal threats, etc. Please explain in detail approach towards the security of the overall solution from external and internal threats
12	What are the key learning from the similar projects and how do you propose to incorporate them in executing this assignment.
13	Assessment of Manpower deployment, Training and Handholding plan a. Deployment strategy ofManpower b. Contingency management c. Mobilization of existing resources and additional resources as required d. Training and handholdingstrategy

Annexure 2.14. Proposed Bill of Material

The Bidder should provide the proposed Bill of Material (BoM) here. Bidders are required to mention the details of the make/brand and model against each line item, wherever applicable. The bid can be considered non-responsive in the absence of any such details and the bids will be summarily rejected. Once the bidder provides this information in the submitted bid, the bidder cannot change it with any other component / equipment etc. of lower specifications / performance; it can only be upgraded at the time of actual deployment/installation. The Bidder shall quote only one specific make and model from only one specific OEM, for each of the goods. Providing more than one option shall not be allowed

***The list of items mentioned hereunder is indicative. The Bidder shall consider the components and quantity to fulfill the RFP and project requirements in totality. The BoM shall comply with the FRS and TRS given in Vol.2 of the RFP

Annexure 2.14.1. Proposed Bill of material for CAPEX

Schedule A : Adaptive Traffic Control System (ATCS)						
#	**Item Description**	**UOM**	**Qty**	**Make /Brand**	**Model Details**	**Full compliance with RFP**
1	ATCS Traffic Controller	Nos.	20			
2	Countdown timer	Nos.	74			
3	Vehicle Detector Camera (thermal)	Nos.	74			
4	Galvanized Cantilever/ standard Poles	Nos.	As per solution requirements			
5	Traffic Light Aspects – Red	Nos.	74			
6	Traffic Light Aspects – Amber	Nos.	74			
7	Traffic Light Aspects – Green	Nos.	206			
8	Pedestrian lamp heads – Stop & Walk Man	Nos.	148			
9	Pedestrian buttons for visually impaired users	Nos.	148			
10	ATCS Centralize Software (DC & DR)	Lot	2			
11	Edge level ruggedized Switches for junction	Nos.	As per solution requirements			
12	UPS with Batteries with Outdoor Junction Box	Nos.	As per solution requirements			

13	Removing of existing poles, pole Foundations, Aspects, Damaged Cables, and Existing Controller & Shifting to the location as per guideline of ASCL Authority.	Traffic Junctions	5			
14	Installation of ATCS system along with various accessories including but not limited to traffic junction poles, pole Foundations, Earthling, Aspects, Cables, Controller & Shifting to the location as per guideline of ASCL Authority.	Traffic Junctions	20			
Schedule B : General Surveillance System						
#	**Item Description**	**UOM**	**Qty**	**Make /Brand**	**Model Details**	**Full compliance with RFP**
1	PTZ Cameras System with Complete mounting accessories	Nos.	63			
2	Fixed Cameras along with Complete mounting accessories (for general surveillance)	Nos.	227			
3	Fixed Cameras along with Complete mounting accessories (for Face Recognition System)	Nos.	10			
4	Video Management System for recording and viewing of all types of proposed cameras (1 each for DC & DR)	Lot	2			
5	Video Analytics software for specific cameras (1 each for DC & DR)	Lot	2			
6	Edge level ruggedized Switches for junction	Nos.	As per solution requirements			
7	Face Recognition software with required licenses (Online & Offline both)	Lot	1			

8	Drones with camera System, complete accessories and controlling software	Nos.	3			
9	UPS with Batteries with Outdoor Junction Box	Nos.	As per solution requirements			
10	Galvanized Poles with small pole JB	Nos.	As per solution requirements			
11	Edge level ruggedized Switches for junction	Nos.	As per solution requirements			
12	Networking Cost (Passive Components including Patch Panel, LIU, OFC, Cat6 Cable, Power Cable, Patch Cords, Pipes, Installation & Labour Charges, etc.) for all Junctions	Lot.	1			

Schedule C : Variable Message Sign Boards, PA system, ECB & Environmental Sensors

#	Item Description	UOM	Qty	Make /Brand	Model Details	Full compliance with RFP
1	VaMS board including VaMS controller size 3000mm*1500mm*200 mm (minimum) with complete hardware and accessories	Nos.	25			
2	Mounting structure for VaMS including UPS	Nos.	25			
3	Variable Messaging Signage Software	Lot	1			
4	Public Announcement system with required mounts and accessories	Nos.	40			
5	Environmental sensor system with required mounts and accessories	Nos.	10			
6	Environment sensor software	Lot	1			
7	Emergency Call Box with complete hardware and accessories	Nos.	40			
8	PA System & ECB software	Lot	1			

9	Installation charges with passive Components including Patch Panel, LIU, OFC, Cat6 Cable, Power Cable, Patch Cords, Pipes & Labour Charges, etc. for all locations	Lump sum	1			
Schedule D : Traffic Enforcement System						
#	**Item Description**	**UOM**	**Qty**	**Make /Brand**	**Model Details**	**Full compliance with RFP**
1	Red Light Violation Detection (RLVD) cameras for covering all the arms & lanes at each junction with complete hardware	Nos.	74			
2	RLVD software with required no. of Licenses	Lot	1			
3	Automatic Number Plate Recognition (ANPR) cameras for covering all the arms & lanes at each junction with complete hardware	Nos.	108			
4	ANPR software with required no. of Licenses	Lot	1			
5	Speed Detection cameras with complete accessories	Nos.	16			
6	Certified Radar for Instant Speed Detection with complete accessories	Nos.	8			
7	SVD software with required no. of Licenses	Lot	1			
8	LPU for ANPR, RLVD & SVD	Nos.	As per solution requirements			
9	IR Illuminator	Nos.	As per solution requirements			
10	Handheld Device for Spot-Echallan with e-Challan App	Nos.	40			
11	E-Challan Software	Lot	2			
12	Integration Cost for integration with	Lot	1			

	existing E-Challan System					
13	Centralized Software - ANPR, RLVD & SVD, Event Aggregation, User Management, smart dashboard and client licenses	Lot	2			
14	Galvanized Cantilever/ standard Poles	Nos.	As per solution requirements			
15	Networking Cost (Passive Components including Patch Panel, LIU, OFC, Cat6 Cable, Power Cable, Patch Cords, Pipes, Installation & Labour Charges, etc.) for all junctions	Lot.	1			
Schedule E : Data Centre & Security Equipment						
#	**Item Description**	**UOM**	**Qty**	**Make /Brand**	**Model Details**	**Full compliance with RFP**
1	HCI Appliance with management tools and virtualization platform	Lot	As per solution requirements			
2	Servers for Non HCI environment	Nos.	As per solution requirements			
3	Operating System & Database Licenses (for DC & DR)	Lot	As per solution requirements			
4	Primary Storage (For DC & DR)	Lot	As per solution requirements			
5	Secondary Storage (For DC & DR)	Lot	As per solution requirements			
6	SAN Switch	Nos.	2			
7	Core Router	Nos.	2			
8	Core Switch	Nos.	2			
9	L3 Switches (copper / OFC)	Nos.	As per solution requirements			
10	L2 Switches (24 port)	Nos.	As per solution requirements			
11	Internet router	Nos.	2			

12	Next generation Firewall with IPS	Nos.	2			
13	Server Load Balancer	Nos.	2			
14	Link Load Balancer	Nos.	2			
15	DB encryption	Nos.	2			
16	SIEM & Behavioural analysis systems for anomaly detection	Nos.	1			
17	Web Application Firewalls	Nos.	2			
18	Denial of Service prevention device	Nos.	2			
19	DLP	Nos.	2			
20	Privileged Identity Management	Nos.	1			
21	Advanced Persistent Threat notification mechanism	Nos.	2			
22	Server Rack 42U	Nos.	As per solution requirements			
23	UPS with Battery (DC and CCC, rating as per solution requirement)	Nos.	2			
24	DG Set (DC and CCC, rating as per solution requirement)	Nos.	2			
25	IP PBX System	Lot	1			
26	BMS (AC, WLD, ACS, FAS, Rodent & Repellent, False flooring & ceiling etc.	Lot	1			
27	Non-IT Cost & Networking Cost (Passive Components)	lump sum	1			
Schedule F : CCC and Other Applications						
#	**Item Description**	**UOM**	**Qty**	**Make /Brand**	**Model Details**	**Full compliance with RFP**
1	Command & control software (client and server licenses for DC & DR	Lot	1			
2	Integration of different	Lot	1			

	modules with CCC application					
3	GIS Platform	Lot	1			
4	Application level integration with GIS	Lot	1			
5	Enterprise Management System (including SLA Mgmt., Helpdesk Mgmt., Network Mgmt., Asset Mgmt.)	Lot	1			
6	Anti-virus Software (client and server)	Lot	1			
7	Backup Software (for DC & DR)	Lot	1			

Schedule G : Integrated Command & Command Centre

#	Item Description	UOM	Qty	Make /Brand	Model Details	Full compliance with RFP
1	Monitoring Workstations with 3 Monitors for ICCC	Nos.	6			
2	Monitoring Workstations with 1 Monitors for ICCC	Nos.	6			
3	Monitoring Workstations with 1 Monitors for Call taker, helpdesk & citizen services	Nos.	4			
4	Video Wall (5x3) for ICCC Building	Nos.	1			
5	Video wall controller with management software(ICCC Building)	Nos.	2			
6	Video Wall (2x2) for Municipal Building	Nos.	1			
7	Video wall controller with management software(Municipal Building)	Nos.	1			
8	Monitoring Workstations with 1 Monitors for Call taker, helpdesk & citizen services	Nos.	8			
9	Laptop	Nos.	5			

10	LED TV 55'	Nos.	3			
11	IP Phone	Nos.	32			
12	Video Conferencing	Nos.	1			
13	Projector	Nos.	2			
14	Laser Network multifunction Duplex Printer	Nos.	2			
15	Laser network duplex Printer(heavy duty)	Nos.	1			
16	9U/12U Racks	Nos.	As per solution requirements			
17	Internal Dome Camera	Nos.	12			
18	PTZ for ICCC Building	Nos.	1			
19	Wi-Fi for ICCC Building	Set	1			
20	Control room interior and Furniture & fixtures and other non IT components	Lot.	1			
21	Non-IT & Networking Cost (Passive Components)	Lot.	1			
22	Multipurpose kiosks	Nos.	10			
23	Smartphones for Officials	Nos.	200			
24	Finger print reader	Nos.	200			

Schedule H: Manpower for Implementation Phase (for 12 months)

#	Item Description	UOM	Qty	
1	Project Manager	Nos.	1	Make and model Not Applicable
2	Solution Architect	Nos.	1	
3	Data Centre Expert	Nos.	1	
4	Database Administrator	Nos.	1	
5	Network Architect	Nos.	1	
6	Surveillance Expert	Nos.	1	
7	Security Expert	Nos.	1	
8	Application Analyst	Nos.	1	
9	Command Centre Expert	Nos.	1	
10	ICCC support staff	Nos.	2	
11	Electrical Expert	Nos.	1	

12	Field support Staff	Nos.	6			
13	Housekeeping Staff	Nos.	1			
14	ERP expert	Nos.	1			
15	ERP programming & customization Staff	Nos.	3			
16	GIS Expert	Nos.	1			
17	ITMS & ATCS Expert	Nos.	1			
Schedule I : eGov Applications						
#	**Item Description**	**UOM**	**Qty**	**Make /Brand**	**Model Details**	**Full compliance with RFP**
1	ERP module: Finance Mgmt.	Lot	1			
2	ERP module: HRMS	Lot	1			
3	ERP module: Project Mgmt.	Lot	1			
4	ERP module: Tax Mgmt.	Lot	1			
5	ERP module: Utility Billing	Lot	1			
6	ERP module: Audit Mgmt. & Vigilance	Lot	1			
7	ERP module: Knowledge mgmt.	Lot	1			
8	ERP module: Custom modules	Lot	1			
9	ERP module: Registration & Licencing module	Lot	1			
10	ASCL Portal & Mobile app platform	Lot	1			
11	Digital Signatures	Nos.	150			
12	Biometric Attendance Application with Licenses	Lot	1			
Schedule J : Data Digitization						
#	**Item Description**	**UOM**	**Qty**	**Make /Brand**	**Model Details**	**Full compliance with RFP**
1	Data digitization by scanning	Lump sum	10,00,000			
2	Data digitization by importing using OCR	Lump sum	30,00,000			

3	Data digitization by manual entry	Lump sum	10,00,000			
3	Primary Connectivity Bandwidth Between City to DR. *	Lot	1			
4	Secondary Connectivity Bandwidth between City to DR. *	Lot	1			
5	DC-DR Replication Bandwidth. *	Lot	1			
6	Primary Internet Bandwidth at ICCC (DC) @ 100Mbps	Lot	1			
7	Primary Internet Bandwidth at DR @50 Mbps	Lot	1			
8	Secondary Internet Bandwidth at ICCC (DC) @50Mbps	Lot	1			
9	Secondary Internet Bandwidth at DR. @25Mbps	Lot	1			
10	PRI Line.	Lot	1			
11	SMS Gateway	Nos.	1			
12	4G SIM for e-challan Hand Held Device & smartphone (e-Gov)	Nos.	240			

Annexure 2.14.2. Proposed Bill of material for OPEX

Schedule K : DRC, DC, and field equipment running cost			
#	**Item Description**	**UOM**	**Unit (A)**
1	DR on cloud (with servers, switching /routing, security, power & space on demand mode)	Quarterly	1
2	Running Cost of DG Set for DC and ICCC	Quarterly	1
3	Electricity and Running Charges for field locations	Quarterly	1
Schedule L : Network Connectivity			
#	**Item Description**	**UOM**	**Unit (A)**

1	ASCL fibre network (ring topology) including trenching, supplying, laying, commissioning, testing and active components	Lot	1
2	Operations & maintenance of ASCL fibre network for 5 years.	Lot	1
3	Primary Connectivity Bandwidth Between City to DR. *	Lot	1
4	Secondary Connectivity Bandwidth between City to DR. *	Lot	1
5	DC-DR Replication Bandwidth. *	Lot	1
6	Primary Internet Bandwidth at ICCC (DC) @ 100Mbps	Lot	1
7	Primary Internet Bandwidth at DR @50 Mbps	Lot	1
8	Secondary Internet Bandwidth at ICCC (DC) @50Mbps	Lot	1
9	Secondary Internet Bandwidth at DR. @25Mbps	Lot	1
10	PRI Line.	Lot	1
11	SMS Gateway	Nos.	1
12	4G SIM for e-challan Hand Held Device & smartphone (e-Gov)	Nos.	240
	* Note: - MSI has to propose bandwidth as per requirement.		

Schedule M: Capacity Building

#	Item Description	UOM	Unit (A)
1	Training Costs (per batch)- Functional Training	Batch Per Year	10
2	Training Costs (per batch)- Administrative Training	Batch Per Year	4
3	Training Costs (per batch)- Senior Management Training	Batch Per Year	8

Schedule H: Manpower for OPEX Phase (For 60 Months)

#	Item Description	UOM	Qty
1	Project Manager	Nos.	1
2	Server and Storage Administrator	Nos.	1
3	Network Administrator	Nos.	1
4	Database Administrator	Nos.	1
5	ITMS & Surveillance Expert	Nos.	1
6	Security Expert	Nos.	1
7	Command Centre Expert	Nos.	1

8	Helpdesk Executive	Nos.	3
9	Call Taker	Nos.	6
10	Application support staff	Nos.	As per solution requirements
11	Electrical Expert	Nos.	1
12	Field support Staff	Nos.	As per solution requirements
13	House Keeping Staff	Nos.	2
14	ERP expert	Nos.	1
15	e-Gov Service Delivery Staff	Nos.	3
16	ATCS Expert	Nos.	1
18	GIS Expert	Nos.	1

Annexure 2.15. Details of additional components

The Bidder may provide the additional line items in the proposed Bill of Material (BoM), in addition to the line items mentioned in the financial format in this RFP. Bidders are required to mention the details of the make/brand and model against each line item, wherever applicable. The bid can be considered non-responsive in the absence of such details. Once the bidder provides this information in the submitted bid, the bidder cannot change it with any other component / equipment etc. of lower specifications / performance; it can only be upgraded at the time of actual deployment/ installation. The Bidder shall quote only one specific make and model from only one specific OEM, for each of the goods. Providing more than one option shall not be allowed.

Annexure 2.15.1. Additional Bill of Quantity

Sl. No.	Description	UoM	Qty
1	**Item 1**		
2	**Item 2**		
3	**Item 3**		

Note:

The Bidder shall specify all additional line items proposed by him in the above specified format.

The successful bidder shall provide the price break-up for all such additional items proposed by him, before conclusion of contract agreement.

Annexure 3 – Formats of Price Bid

Annexure 3.1. Price Bid - Format 1

To,
Chief Executive Officer
Aligarh Smart City Limited
Room No. 108, Sewa Bhawan,
Church Compound, Civil Lines,
Aligarh – 202001, Uttar Pradesh

Subject: RFP FOR SELECTION OF MASTER SYSTEM INTEGRATOR FOR IMPLEMENTATION OF INTEGRATED COMMAND & CONTROL CENTER AND E-GOVERNANCE BASED SMART CITY SOLUTION AT ALIGARH.

Ref: Tender No : <No> Dated<DD/MM/YYYY>

We, the undersigned Bidder, having read and examined in detail all the RFP FOR SELECTION OF MASTER SYSTEM INTEGRATOR FOR IMPLEMENTATION OF INTEGRATED COMMAND & CONTROL CENTER AND E-GOVERNANCE BASED SMART CITY SOLUTION AT ALIGARH do hereby propose to provide services as specified in the RFP Documents number Tender No :<No> Dated<DD/MM/YYYY>

We offer our Price Bid as mentioned below:

#	Description	Value in INR (Inclusive of all applicable taxes / charges etc.)
A	Total Project Cost (Towards the Design, supply, Implementation, operation and maintenance of the Project, inclusive of 5 years O&M of the Project from the Phase wise Go-Live as detailed in the Project scope)	
	Project Cost Quoted in Words	

1. PRICE AND VALIDITY

- All the prices mentioned by us in this Price Bid are in accordance with the terms as specified in the RFP Documents. All the prices and other terms and conditions of this RFP are valid for a period of 180 calendar days from the date of submission of the Bid.
- We hereby confirm that our prices include all taxes, charges, levies etc. to be payable to various govt./non-govt./local authorities.
- We understand and agree that the finalization/selection of the System Integrator is solely on the basis of the **QCBS(70:30) based selection, subject to fulfilment of eligibility criteria.**

2. UNIT RATES

We also understand and agree that the unit rates of various components as per Format 2 of the Price Bid also should be quoted, without which the bid is liable to be rejected by the technical/ evaluation committee. The decision of the committee shall be final and binding on all in this regard.

We have indicated in the Format 2 of the Price Bid, the unit rates for the purpose of payment as well as for price adjustment in case of any increase to / decrease from the scope of work or quantities under the contract. We understand and agree that the unit rates will not be considered for evaluation, finalization/selection of the System Integrator under this RFP.

3. QUALIFYING DATA

We confirm having submitted the information as required by you in your Instruction to Bidder. In case you require any other further information/documentary proof in this regard before evaluation of our RFP, we agree to furnish the same in time to your satisfaction.

4. BID PRICE

We declare that our Bid Price is for the entire scope of the work as specified in the RFP Document. The relevant unit prices are indicated in the Format 2 of the Price Bid.

5. CONTRACT PERFORMANCE BANK GUARANTEE

We hereby declare that in case the contract is awarded to us, we shall submit the contract Performance Bank Guarantee in the form prescribed in the RFP.

We hereby declare that our RFP is made in good faith, without collusion or fraud and the information contained in the RFP is true and correct to the best of our knowledge and belief.

We understand that our response to the RFP is binding on us and that you are not bound to accept a RFP you receive.

Thanking you,

Yours faithfully,

(Signature of the Bidder)

Name

Designation

Seal.

Date:

Place:

Business Address:

Annexure 3.2. Price Bid - Format 2 – Unit Rates

Note: Please note that all unit rates quoted as per this Format 2 is for the sole purpose of price adjustment in case of any increase to/decrease from the scope of work or quantities under the contract. These rates will not be considered for evaluation or finalisation of the bid. However, based on the market trends, Authority retains the right to negotiate this rate for future requirement.

The components and quantities mentioned in the below table is indicative only and bidder shall propose the systems/components as per their proposed solution design to meet requirements of the RFP focusing on the outcome, future scalability, security, reliability and adherence to specified SLA under this RFP.

Annexure 3.2.1. Price Component for Capex – Unit Rates

(" Unit rate/base price should include all taxes, levies & duties like custom, excise, freight charges etc. other than GST")

The Bidder shall consider the components and quantity to fulfill the RFP and project requirements in totality as per the following formats:

Price Component for Capex – Unit Rates

Schedule (Name & Item Description as per BOM in Annexure 2.14.1)							
#	**Item Description**	**UOM**	**Unit** **(A)**	**Unit Rate** **(B)**	**CAPEX Amount** **(C)** **(A*B)**	**GST on CAPEX Amount** **(D)**	**Total CAPEX (including GST)** **(E)** **(C+D)**
1	As per Indicative BoM and additional line items	As per Indicative BoM and proposed quantity by bidder	As per Indicative BoM and proposed quantity by bidder				

Annexure 3.2.2. Price Component for Opex – Unit Rates

Price Component for Opex – Unit Rates

Schedule (Name & Item Description as per BOM in Annexure 2.14.2)										
#	Item Description	UOM	Unit (A)	Amount Year 1 (B)	Amount Year 2 (C)	Amount Year 3 (D)	Amount Year 4 (E)	Amount Year 5 (F)	GST on Total OPEX for Five years (G)	Total OPEX for Five years (Including GST) (H) (B+C+D+E+F+G)
1	As per Indicative BoM and additional line items	As per Indicative BoM and proposed quantity by bidder	As per Indicative BoM and proposed quantity by bidder							
Total - Schedule (Name As Per BOM) (INR)										

Annexure 3.3. General instructions

a. The Authority or any other government agency shall not have any liability of paying any taxes (including GST)/charges/levies as part of this project. The bidder has to quote their Price duly factoring in all these costs over the project duration.

b. Bidder should provide all prices as per the prescribed Format under this Annexure.

c. All the prices are to be entered in Indian Rupees (INR) only

d. Prices indicated in the schedules shall be inclusive of all taxes, GST, Levies, duties etc. The prices should also specify any recurring charges and four year O&M support cost as per specified Formats.

e. Authority reserves the right to ask the Bidder to submit proof of payment against any of the taxes, duties, levies indicated.

f. The Bidder needs to account for all Out of Pocket expenses on account of Boarding, Lodging and other related items.

g. The Unit Rate as mentioned in the prescribed Formats may be used for the purpose of 'Change Order' for respective items, if any. However, based on the market trends, Authority retains the right to negotiate this rate for future requirement

h. Bidder shall ensure that the future products to be supplied shall be of latest specifications as per the OEM roadmap.

i. Bidder should refer Volume II of the RFP for details on the functional requirements of the system and the benchmark minimum specifications for the items mentioned in the Price Formats.

j. Total cost should be inclusive of all applicable taxes / charges, annual support charges or any other recurring charges such as license fees etc.(for hardware as well as software components) as applicable.

k. No escalation of prices will be considered during the course of the project implementation and O&M.

l. The MSI/bidder has to ensure that their Price bid contains reasonable unit rates of CAPEX and OPEX items. ASCL may identify abnormally higher / lower unit rates of line items and seek justifications from bidders on the same. it is requested to bidder to maintain 65:35 ratio between CAPEX and OPEX

Annexure 4 -Format for EMD

(Either DD or BG from Nationalized / Scheduled Bank on INR 100/- Stamp Paper)

To,

<Name>

<Designation>

<Address>

<Phone Nos.>

<Fax Nos.>

<Email id>

Whereas <<Name of the bidder>> (hereinafter called 'the Master System Integrator') has submitted the bid for Submission of RFP <<RFP Number>> dated <<Date>> for <<Name of the assignment>> (hereinafter called "the Bid") to <<Authority>>.

Know all Men by these presents that we <<… >> having our office at <<Address>> (hereinafter called "the Bank") are bound unto the <<Authority>> (hereinafter called "the Authority") in the sum of Indian Rupees<<Amount in figures>> (Rupees <<Amount in words>> only) for which payment well and truly to be made to the said Authority, the Bank binds itself, its successors and assigns by these presents. Sealed with the Common Seal of the said Bank this <<Date>>.

The conditions of this obligation are:

1. If the Bidder having its bid withdrawn during the period of bid validity specified by the Bidder on the Bid Form; or

2. If the Bidder, having been notified of the acceptance of its bid by the Authority during the period of validity of bid

(a) Withdraws his participation from the bid during the period of validity of bid document; or

(b) Fails or refuses to participate in the subsequent Tender process after having been short listed;

We undertake to pay to the Authority up to the above amount upon receipt of its first written demand, without the Authority having to substantiate its demand, provided that in its demand the Authority will note that the amount claimed by it is due to it owing to the occurrence of one or both of the two conditions, specifying the occurred condition or conditions.

This guarantee will remain in force up to <<insert date>> and including <<extra time over and above mandated in the RFP>> from the last date of submission and any demand in respect thereof should reach the Bank not later than the above date.

NOTHWITHSTANDING ANYTHING CONTAINED HEREIN:

I. Our liability under this Bank Guarantee shall not exceed Indian Rupees<<Amount in figures>> (Rupees

<<Amount in words>> only)

II. This Bank Guarantee shall be valid up to <<*insert date*>>)

III. It is condition of our liability for payment of the guaranteed amount or any part thereof arising under this Bank Guarantee that we receive a valid written claim or demand for payment under this Bank Guarantee on or before <<insert date>>) failing which our liability under the guarantee will automatically cease.

(Authorized Signatory of the Bank)

Seal:

Date:

Annexure 5- Performance Bank Guarantee

[On Appropriate Stamp Paper]

Ref: _____ Date _____

Bank Guarantee No. _____

<Name>

<Designation>

<Address><Phone
Nos.><Fax
Nos.><Email id>

Whereas, <<name of the supplier and address>> (hereinafter called "the Master System Integrator") has undertaken, in pursuance of contract no. <Insert Contract No.> dated. <Date> to provide Implementation services for <<name of the assignment>> to Aligarh Smart City Limited (hereinafter called "the Authority")

And whereas it has been stipulated by in the said contract that the bidder shall furnish you with a bank guarantee by a recognized bank for the sum specified therein as security for compliance with its obligations in accordance with the contract;

And whereas we, <Name of Bank> a banking company incorporated and having its head/registered office at <Address of Registered Office> and having one of its office at <Address of Local Office> have agreed to give the supplier such a bank guarantee.

Now, therefore, we hereby affirm that we are guarantors and responsible to you, on behalf of the supplier, up to a total of Indian Rupees<Insert Value> (Rupees <Insert Value in Words> only) and we undertake to pay you, upon your first written demand declaring the supplier to be in default under the contract and without cavil or argument, any sum or sums within the limits of Indian Rupees<Insert Value> (Rupees <Insert Value in Words> only) as aforesaid, without your needing to prove or to show grounds or reasons for your demand or the sum specified therein.

We hereby waive the necessity of your demanding the said debt from the bidder before presenting us with the demand.

We further agree that no change or addition to or other modification of the terms of the contract to be performed there under or of any of the contract documents which may be made between you and the Master System Integrator shall in any way release us from any liability under this guarantee and we hereby waive notice of any such change, addition or modification.

This Guarantee shall be valid until <<Insert Date>>)

Notwithstanding anything contained herein:

I. Our liability under this bank guarantee shall not exceed Indian Rupees<Insert Value> (Rupees <Insert Value in Words> only).

II. This bank guarantee shall be valid up to <Insert Expiry Date>)

III. It is condition of our liability for payment of the guaranteed amount or any part thereof arising under this bank guarantee that we receive a valid written claim or demand for payment under this bank guarantee on or before <Insert Expiry Date>) failing which our liability under the guarantee will automatically cease.

Date _____

Place _____ Signature _____

Witness _____ Printed name _____

(Bank's common seal)

Annexure 6- Non-Disclosure Agreement

WHEREAS, we the undersigned Bidder, _____, having our principal place of business or registered office at _____, are desirous of bidding for RFP No. <<>> dated <<DD-MM-2018>> "**RFP FOR SELECTION OF MASTER SYSTEM INTEGRATOR FOR IMPLEMENTATION OF INTEGRATED COMMAND & CONTROL CENTER AND E-GOVERNANCE BASED SMART CITY SOLUTION AT ALIGARH"** (hereinafter called the said 'RFP') to the "Aligarh Smart City Limited", hereinafter referred to as 'Authority'

And,

WHEREAS, the Bidder is aware and confirms that the Authority's business or operations, information, application or software, hardware, business data, architecture schematics, designs, storage media and other information or documents made available by the Authority in the RFP documents during the bidding process and thereafter, or otherwise (confidential information for short) is privileged and strictly confidential and or proprietary to the Authority,

NOW THEREFORE, in consideration of disclosure of confidential information, and in order to ensure the Authority's grant to the Bidder of specific access to Authority's confidential information, property, information systems, network, databases and other data, the Bidder agrees to all of the following conditions.

It is hereby agreed as under:

1. The confidential information to be disclosed by the Authority under this Agreement ("Confidential Information") shall include without limitation, any and all information in written, representational, electronic, verbal or other form relating directly or indirectly to processes, methodologies, algorithms, risk matrices, thresholds, parameters, reports, deliverables, work products, specifications, architecture, project information, security or zoning strategies & policies, related computer programs, systems, trend analysis, risk plans, strategies and information communicated or obtained through meetings, documents, correspondence or inspection of tangible items, facilities or inspection at any site to which access is permitted by the Authority.
2. Confidential Information does not include information which:
    a. the Bidder knew or had in its possession, prior to disclosure, without limitation on its confidentiality;
    b. information in the public domain as a matter of law;
    c. is obtained by the Bidder from a third party without any obligation of confidentiality;
    d. the Bidder is required to disclose by order of a competent court or regulatory authority;
    e. Is released from confidentiality with the written consent of the Authority.

    The Bidder shall have the burden of proving hereinabove are applicable to the information in the possession of the Bidder.
3. The Bidder agrees to hold in trust any Confidential Information received by the Bidder, as part of the Tendering process or otherwise, and the Bidder shall maintain strict confidentiality in respect

of such Confidential Information, and in no event a degree of confidentiality less than the Bidder uses to protect its own confidential and proprietary information. The Bidder also agrees:

a. to maintain and use the Confidential Information only for the purposes of bidding for this RFP and thereafter only as expressly permitted herein;

b. to only make copies as specifically authorized by the prior written consent of the Authority and with the same confidential or proprietary notices as may be printed or displayed on the original;

c. to restrict access and disclosure of Confidential Information to their employees, agents, consortium members and representatives strictly on a "need to know" basis, to maintain confidentiality of the Confidential Information disclosed to them in accordance with this clause; and

d. To treat Confidential Information as confidential unless and until Authority expressly notifies the Bidder of release of its obligations in relation to the said Confidential Information.

4. Notwithstanding the foregoing, the Bidder acknowledges that the nature of activities to be performed as part of the Tendering process or thereafter may require the Bidder's personnel to be present on premises of the Authority or may require the Bidder's personnel to have access to software, hardware, computer networks, databases, documents and storage media of the Authority while on or off premises of the Authority. It is understood that it would be impractical for the Authority to monitor all information made available to the Bidder's personnel under such circumstances and to provide notice to the Bidder of the confidentiality of all such information.

5. Therefore, the Bidder shall disclose or allow access to the Confidential Information only to those personnel of the Bidder who need to know it for the proper performance of their duties in relation to this project, and then only to the extent reasonably necessary. The Bidder will take appropriate steps to ensure that all personnel to whom access to the Confidential Information is given are aware of the Bidder's confidentiality obligation. Further, the Bidder shall procure that all personnel of the Bidder are bound by confidentiality obligation in relation to all proprietary and Confidential Information received by them which is no less onerous than the confidentiality obligation under this agreement.

6. The Bidder shall establish and maintain appropriate security measures to provide for the safe custody of the Confidential Information and to prevent unauthorized access to it.

7. The Bidder agrees that upon termination or expiry of this Agreement or at any time during its currency, at the request of the Authority, the Bidder shall promptly deliver to the Authority the Confidential Information and copies thereof in its possession or under its direct or indirect control, and shall destroy all memoranda, notes and other writings prepared by the Bidder or its Affiliates or directors, officers, employees or advisors based on the Confidential Information and promptly certify such destruction.

8. Confidential Information shall at all times remain the sole and exclusive property of the Authority. Upon completion of the Tendering process and or termination of the contract or at any time during its currency, at the request of the Authority, the Bidder shall promptly deliver to the Authority the Confidential Information and copies thereof in its possession or under its direct or

indirect control, and shall destroy all memoranda, notes and other writings prepared by the Bidder or its Affiliates or directors, officers, employees or advisors based on the Confidential Information within a period of sixty days from the date of receipt of notice, or destroyed, if incapable of return. The destruction shall be witnessed and so recorded, in writing, by an authorized representative of the Authority. Without prejudice to the above the Bidder shall promptly certify to the Authority, due and complete destruction and return. Nothing contained herein shall in any manner impair rights of the Authority in respect of the Confidential Information.

9. In the event that the Bidder hereto becomes legally compelled to disclose any Confidential Information, the Bidder shall give sufficient notice and render best effort assistance to the Authority to enable the Authority to prevent or minimize to the extent possible, such disclosure. Bidder shall not disclose to a third party any Confidential Information or the contents of this RFP without the prior written consent of the Authority. The obligations of this Clause shall be satisfied by handling Confidential Information with the same degree of care, which the Bidder applies to its own similar Confidential Information but in no event less than reasonable care.

For and on behalf of:

(BIDDER)

Authorised Signatory	Office Seal:
Name:	Place:
Designation:	Date:

Annexure 7- Format of Agreement between Bidder and their Parent Company / 100% own subsidiary / Sister Concern Company (As the case may be)

(TO BE EXECUTED ON STAMP PAPER OF REQUISITE VALUE AND NOTORISED)

This agreement made this ___ day of ____ month ____ year by and between M/s. _____ (Fill in the Bidder's full name, constitution and registered office address) hereinafter referred to as bidder on the first part and M/s. _____ (Fill in full name, constitution and registered office address of Parent Company/100% own subsidiary / Sister Concern Company, as the case may be) hereinafter referred to as "Parent Company/ 100% own subsidiary Company/ Sister Concern Company (Delete whichever not applicable)" of the other part:

WHEREAS

Aligarh Smart City Limited (hereinafter referred to as ASCL) has invited offers vide their tender No. _____ for _____ and

M/s. _____(Bidder) intends to bid against the said tender and desires to have technical support of M/s. _____[Parent Company/ 100% own subsidiary Company/ Sister Concern Company-(Delete whichever not applicable)] and whereas Parent Company/ 100% own subsidiary Company/ Sister Concern Company (Delete whichever not applicable) represents that they have gone through and understood the requirements of subject tender and are capable and committed to provide the services as required by the bidder for successful execution of the contract, if awarded to the bidder.

Now, it is hereby agreed to by and between the parties as follows:

1. M/s._____ (Bidder) will submit an offer to ASCL for the full scope of work as envisaged in the tender document as a main bidder and liaise with ASCL directly for any clarifications etc. in this context.
2. M/s. _____ (Parent Company/ 100% own subsidiary Company/ Sister Concern Company (Delete whichever not applicable) undertakes to provide technical support and expertise, expert manpower and procurement assistance and project management to support the bidder to discharge its obligations as per the Scope of work of the tender / Contract for which offer has been made by the Parent Company/100% own subsidiary Company/Sister Concern Company (Delete whichever not applicable) and accepted by the bidder.
2. This agreement will remain valid till validity of bidder's offer to ASCL including extension if any and till satisfactory performance of the contract in the event the contract is awarded by ASCL to the bidder.
3. It is further agreed that for the performance of work during contract period bidder and Parent Company/100% own subsidiary Company/Sister Concern Company (Delete whichever not applicable) shall be jointly and severely responsible to ASCL for satisfactory execution of the contract.

4. However, the bidder shall have the overall responsibility of satisfactory execution of the contract awarded by ASCL.

In witness whereof the parties hereto have executed this agreement on the date mentioned above.

For and on behalf of _____ (Bidder) Signature: Name: Designation: **Witness 1:** Signature: Full name: Address: **Witness 2:** Signature: Full name: Address:	For and on behalf of _____ (Parent/100% own subsidiary /sister concern company) Signature: Name: Designation: **Witness 1:** Signature: Full name: Address: **Witness 2:** Signature: Full name: Address:

Annexure 8- Format of Parent Company / 100% own subsidiary / Sister Concern Company Guarantee (As the case may be)

(TO BE EXECUTED ON STAMP PAPER OF REQUISITE VALUE AND NOTORISED)

DEED OF GUARANTEE

THIS DEED OF GUARANTEE executed at …….. this …….. day of …… by M/s …….. (mention complete name) a company duly organized and existing under the laws of ……. (insert jurisdiction/country), having its Registered Office at …… hereinafter called "the Guarantor" which expression shall, unless excluded by or repugnant to the subject or context thereof, be deemed to include its successors and permitted assigns.

WHEREAS

A. Aligarh Smart City Limited, a statutory body under _____ , having its Registered Office at _____, hereinafter called "ASCL" which expression shall unless excluded by or repugnant to the context thereof, be deemed to include its successor and assigns, invited tender number …… for …….. on ……..

B. M/s …….. (mention complete name), a company duly organized and existing under the laws of ……. (insert jurisdiction/country), having its Registered Office at …….. (give complete address) hereinafter called "the Company" which expression shall, unless excluded by or repugnant to the subject or context thereof, be deemed to include its successor and permitted assigns, have, in response to the above mentioned tender invited by ASCL, submitted their bid number …… to ASCL with one of the condition that the Company shall arrange a guarantee from its parent company guaranteeing due and satisfactory performance of the work covered under the said tender including any change therein as may be deemed appropriate by ASCL at any stage.

C. The Guarantor represents that they have gone through and understood the requirement of the above said tender and are capable of and committed to provide technical and such other supports as may be required by the Company for successful execution of the same.

D. The Company and the Guarantor have entered into an agreement dated …….. as per which the Guarantor shall be providing technical and such other supports as may be necessary for performance of the work relating to the said tender.

E. Accordingly, at the request of the Company and in consideration of and as a requirement for ASCL to enter into agreement(s) with the Company, the Guarantor hereby agrees to give this guarantee and undertakes as follows:

    1. The Guarantor (Parent Company / 100% 100% own subsidiary Company/ Sister Concern (Delete whichever not applicable) unconditionally agrees that in case of non-performance by the Company of any of its obligations in any respect, the Guarantor shall, immediately on receipt of notice of demand by ASCL, take up the job without any demur or objection, in continuation and without loss of time and without any cost to ASCL and duly perform the obligations of the Company to the satisfaction of ASCL.

2. The Guarantor agrees that the Guarantee herein contained shall remain valid and enforceable till the satisfactory execution and completion of the work (including discharge of the warranty obligations) awarded to the Company.
3. The Guarantor shall be jointly with the Company and also severally responsible for satisfactory performance of the contract entered between the Company and ASCL.
4. The liability of the Guarantor, under the Guarantee, is limited to the 50% of the annualized contract price entered between the Company and ASCL. This will, however, be in addition to the forfeiture of the Performance Bank Guarantee furnished by the Company.
5. The Guarantor represents that this Guarantee has been issued after due observance of the appropriate laws in force in India. The Guarantor hereby undertakes that the Guarantor shall obtain and maintain in full force and effect all the governmental and other approvals and consents that are necessary and do all other acts and things necessary or desirable in connection therewith or for the due performance of the Guarantor's obligations hereunder.
6. The Guarantor also agrees that this Guarantee shall be governed and construed in accordance with the laws in force in India and subject to the exclusive jurisdiction of the courts of Aligarh, Uttar Pradesh.
7. The Guarantor hereby declares and represents that this Guarantee has been given without any undue influence or coercion, and that the Guarantor has fully understood the implications of the same.
8. The Guarantor hereby agrees that no change or addition to or other modification of the terms of the contract to be performed there under or of any of the contract documents which may be made between ASCL and the Bidder Company shall in any way release Guarantor from any liability under this guarantee and Guarantor hereby waive notice of any such change, addition or modification.
9. The Guarantor represents and confirms that the Guarantor has the legal capacity, power and authority to issue this Guarantee and that giving of this Guarantee and the performance and observations of the obligations hereunder do not contravene any existing laws.

For and on behalf of _____ (name of the Parent Company/100% own subsidiary /Sister Concern company)

Signature: _____

Name: _____

Designation: _____

Common seal of the guarantor company:

Witness 1:

Signature: _____

Full Name: _____

Address: _____

Witness 2:

Signature: _____

Full Name: _____

Address: _____

INSTRUCTIONS FOR FURNISHING PARENT/100% OWN SUBSIDIARY /SISTER CONCERN COMPANY GUARANTEE

1. Guarantee should be executed on stamp paper of requisite value and notarized.
2. The official(s) executing the guarantee should affix full signature (s) on each page.
3. Resolution passed by Board of Directors of the guarantor company authorizing the signatory (ies) to execute the guarantee, duly certified by the Company Secretary should be furnished along with the Guarantee.
4. Following certificate issued by Company Secretary of the guarantor company should also be enclosed along with the Guarantee.

"Obligation contained in the deed of guarantee No._____ furnished against tender No. _____ are enforceable against the guarantor company and the same do not, in any way, contravene any law of the country of which the guarantor company is the subject"

Annexure 9 - Consortium Agreement

(On INR 100.00 Non judicial Stamp Paper and duly notarized)

THIS JOINT BIDDING AGREEMENT is entered into on this the …… day of …… 20…

BETWEEN

1. ……, a company having its registered office at …… (hereinafter referred to as the **"First Part"** which expression shall, unless repugnant to the context include its successors and permitted assigns)

   AND

2. ……, a company having its registered office at …… (hereinafter referred to as the **"Second Part"** which expression shall, unless repugnant to the context include its successors and permitted assigns).
3. ……, a company having its registered office at …… (hereinafter referred to as the **"Third Part"** which expression shall, unless repugnant to the context include its successors and permitted assigns).
4.

   The above mentioned parties of the FIRST, SECOND and THIRD are collectively referred to as the "**Parties"** and each is individually referred to as a "**Party"**

   WHEREAS,

Aligarh Smart City Limited, represented by its Chief Executive Officer and having its offices at Room No. 108, Sewa Bhawan, Church Compound, Civil Lines, Aligarh – 202001, Uttar Pradesh, (hereinafter referred to as the "Employer" which expression shall, unless repugnant to the context or meaning thereof, include its administrators, successors and assigns) has invited applications (the Applications") by its Request for Bids No. …… dated …… (the "RFB") for selection of Bidders for construction of the …….. works (the "Works") through Design, Procurement, Build, Operate and Commission and Transfer Contract.

A. The Parties are interested in jointly Bidding for the Works as members of a JVA and in accordance with the terms and conditions of the RFB document and other Bid documents in respect of the Works, and
B. It is a necessary condition under the RFB document that the members of the JVA shall enter into a Joint Bidding Agreement and furnish a copy thereof with the Application.
   a. NOW IT IS HEREBY AGREED as follows:

1. Definitions and Interpretations

In this Agreement, the capitalized terms shall, unless the context otherwise requires, have the meaning ascribed thereto under the RFB.

2. JVA

2.1 The Parties do hereby irrevocably constitute a consortium/joint venture (the "JVA") for the purposes of jointly participating in the Bidding Process for the Works. The Parties confirm that all JVA members shall sign the Contract Agreement.

2.2 The Parties hereby undertake to participate in the Bidding Process only through this JVA and not individually and/ or through any other consortium constituted for this Works, either directly or indirectly or through any of their associates.

3. Covenants

The Parties hereby undertake that in the event the JVA is declared the selected Bidder and awarded the Contract, the JVA members shall enter into a Contract Agreement with the Employer and, through its lead partner, undertake to perform all its obligations in compliance with the Contract Agreement for the Works.

4. Role of the Parties

The Parties hereby undertake to perform the roles and responsibilities as described below:

a. Party of the First Part shall be the Lead member of the JVA and shall have the power of attorney from all Parties for conducting all business for and on behalf of the JVA during the Tendering Process and until the Contract Agreement is entered into with the Employer; Party of the First Part shall be the responsible for works …….. and (responsibility to be mentioned)

b. Party of the Second Part shall be the responsible for works…… (responsibility to be mentioned)

c. Party of the Third Part shall be the responsible for works…… (responsibility to be mentioned)

5. **Joint and Several Liabilities**

The Parties do hereby undertake to be jointly and severally responsible for all obligations and liabilities relating to the Works and in accordance with the terms of the RFB, Bidding Document and the Contract Agreement.

6. Percentage Participation in the JVA

6.1 The Parties agree that the proportion of percentage participation in works among the Parties in the JVA shall be as follows: First Party (Lead Member): [should have at-least 51% percentage participation] Second Party: [should have at least 20% percentage participation]; Third Party: [should have at least 20% percentage participation];

6.2 The Parties undertake that they shall collectively hold 100% (hundred per cent) of the percentage participation of the JVA at all times until the Completion of the Project.

7. Representation of the Parties

Each Party represents to the other Parties as of the date of this Agreement that:

a) Such Party is duly organized, validly existing and in good standing under the laws of its incorporation and has all requisite power and authority to enter into this Agreement;

b) The execution, delivery and performance by such Party of this Agreement has been authorized by all necessary and appropriate corporate or governmental action and a copy of the extract of the charter documents and board resolution/ power of attorney in favour of the person executing this Agreement for the delegation of power and authority to execute this Agreement on behalf of the JVA Member is annexed to this Agreement, and will not, to the best of its knowledge:

require any consent or approval not already obtained;

violate any Applicable Law presently in effect and having applicability to it;

violate the memorandum and articles of association, by-laws or other applicable organizational documents thereof;

violate any clearance, permit, concession, grant, license or other governmental authorization, approval, judgment, order or decree or any mortgage agreement, indenture or any other instrument to which such Party is a party or by which such Party or any of its properties or assets are bound or that is otherwise applicable to such Party; or

create or impose any liens, mortgages, pledges, claims, security interests, charges or encumbrances or obligations to create a lien, charge, pledge, security interest, encumbrances or mortgage in or on the property of such Party, except for encumbrances that would not, individually or in the aggregate, have a material adverse effect on the financial condition or prospects or business of such Party so as to prevent such Party from fulfilling its obligations under this Agreement;

c) this Agreement is the legal and binding obligation of such Party, enforceable in accordance with its terms against it; and

d) there is no litigation pending or, to the best of such Party's knowledge, threatened to which it or any of its associates is a party that presently affects or which would have a material adverse effect on the financial condition or prospects or business of such Party in the fulfillment of its obligations under this Agreement.

8. Termination

This Agreement shall be effective from the date hereof and shall continue in full force and effect until the Completion of the Project of the Works is achieved under and in accordance with the Contract Agreement, in case the Contract is awarded to the JVA. However, in case the JVA is either does not get selected for award of the Contract, the Agreement will stand terminated in case the Applicant is not pre-qualified or upon return of the Bid Security by the Employer to the Bidder, as the case may be.

9. Miscellaneous

9.1 This Joint Bidding Agreement shall be governed by laws of India.

9.2 The Parties acknowledge and accept that this Agreement shall not be amended by the Parties without the prior written consent of the Employer.

IN WITNESS WHEREOF THE PARTIES ABOVE NAMED HAVE EXECUTED AND DELIVERED THIS AGREEMENT AS OF THE DATE FIRST ABOVE WRITTEN.

For and on behalf of

SIGNED, SEALED AND DELIVERED	SIGNED, SEALED AND DELIVERED
LEAD MEMBER by:	SECOND MEMBER by:
Signature) (Name) (Designation) (Address)	(Signature) (Name) (Designation) (Address)

(Party of the first part) (Party of the second part) (Party of the third part)

Witness:

i. _____ ____

ii. _____ ____

Annexure 10 - Format for Power of Attorney for Lead bidder of Consortium

[To be executed on non-judicial stamp paper of the appropriate value in accordance with relevant Stamp Act. The stamp paper to be in the name of the company who is issuing the power of attorney]

Whereas _____ has invited RFP response for _____ (Name of the Project)

Whereas, the Members of the Consortium comprising of M/s._____, M/s._____, and M/s._____ (the respective names and addresses of the registered offices to be given) are interested in bidding for the Project and implementing the same in accordance with the terms and conditions contained in the RFP Documents.

Whereas, it is necessary for the members of the Consortium to designate one of them as the lead member with all necessary power and authority to do, for and on behalf of the Consortium, all acts, deeds and things as may be necessary in connection with the Consortium's RFP response for the Project.

NOW THIS POWER OF ATTORNEY WITNESSETH THAT

We, M/s._____ and M/s _____ hereby designate M/s. _____

being one of the members of the Consortium, as the lead member of the Consortium, to do on behalf of the Consortium, all or any of the acts, deeds or things necessary or incidental to the Consortium's RFP response for the Project, including submission of the RFP response, participating in meetings, responding to queries, submission of information or documents and generally to represent the Consortium in all its dealings with Client or any other Government Agency or any person, in connection with the Project until culmination of the process of bidding till the Project Agreement is entered into with Client and thereafter till the expiry of the Project Agreement.

We hereby agree to ratify all acts, deeds and things lawfully done by our said Attorney pursuant to this power of attorney and that all acts, deeds and things done by our aforesaid Attorney shall and shall always be deemed to have been done by us or Consortium.

Dated this the _____ day of _____ 2018

(Signature)

(Name in Block Letter of Executant) *[Seal of Company]*

Witness 1 Witness 2

Notes: To be executed by all the members individually, in case of a Consortium/Joint Venture.

The Mode of execution of the power of attorney should be in accordance with the procedure, if any laid down by the applicable law and the charter documents of the executant(s) and when it is so required the same should be under common seal affixed in accordance with the required procedure.

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ALIGARH SMART CITY

Smart City
MISSION TRANSFORM-NATION

REQUEST FOR PROPOSAL FOR SELECTION OF MASTER SYSTEM INTEGRATOR FOR IMPLEMENTATION OF INTEGRATED COMMAND & CONTROL CENTER AND e-GOVERNANCE BASED SMART CITY SOLUTION AT ALIGARH

VOLUME-II: SCOPE OF WORK

(Functional and Technical Requirements)

RFP Number: 14/ASCL/2018-19 : Date: 05/12/2018

Invited by:
Aligarh Smart City Limited (ASCL)
Aligarh
Uttar Pradesh.

Disclaimer

The information contained in this Request for Proposal document (RFP) or subsequently provided to Bidder(s), whether verbally or in documentary or any other form by or on behalf of Aligarh Smart City Limited (ASCL) or any of its employees or advisors, is provided to Bidder(s) on the terms and conditions set out in this RFP and such other terms and conditions subject to which such information is provided. This RFP is not an Agreement and is neither an offer nor invitation by ASCL to the prospective Bidders or any other person. The purpose of this RFP is to provide interested parties with information that may be useful to them in making their financial offers (Bids) pursuant to this RFP. This RFP includes statements, which reflect various assumptions and assessments arrived at by ASCL in relation to the Project. Such assumptions, assessments and statements do not purport to contain all the information that each Bidder may require.

This RFP may not be appropriate for all persons, and it is not possible for ASCL, its employees or advisors to consider the investment objectives, financial situation and particular needs of each party who reads or uses this RFP. The assumptions, assessments, statements and information contained in the Bidding Documents, may not be complete, accurate, adequate or correct. Each Bidder should therefore, conduct its own investigations and analysis and should check the accuracy, adequacy, correctness, reliability and completeness of the assumptions; assessments, statements and information contained in this RFP and obtain independent advice from appropriate sources.

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The Bidder shall bear all its costs associated with or relating to the preparation and submission of its Bid including but not limited to preparation, copying, postage, delivery fees, expenses associated with any demonstrations or presentations which may be required by the Authority or any other costs incurred in

connection with or relating to its Bid. All such costs and expenses will remain with the Bidder and the Authority shall not be liable in any manner whatsoever for the same or for any other costs or other expenses incurred by a Bidder in preparation or submission of the Bid, regardless of the conduct or outcome of the Bidding Process.

Table of Contents

1. Introduction 14
1.1. About Aligarh 14
1.2. About Aligarh Smart City Limited 18
1.3. Project Objectives 19
1.4. Purpose of the RFP 20
2. Project Overview & solution components 22
2.1. Solution Components & services overview 24
2.2. Component Architecture 29
2.3. Survey, Design Consideration for finalization of detailed technical architecture and project plan 31
3. Detailed Scope of Work 43
3.1. Solution Components 43
3.1.1. Adaptive Traffic Control System (ATCS) 44
3.1.2. Red Light Violation System (RLVD) 50
3.1.3. Speed Violation Detection System (SVD) 51
3.1.4. Automatic Number Plate Detection System (ANPR) 51
3.1.5. e-Challan System 53
3.1.6. Variable Message Board (VaMS) 56
3.1.7. Emergency Call Box System (ECB) 56
3.1.8. Public Announcement System (PA system) 56
3.1.9. Environmental sensors 57
3.1.10. City Surveillance 57
3.1.11. Drone based Surveillance 62
3.1.12. Facial Recognition System 63
3.1.13. e-Governance Solution 65
3.1.14. Fibre Network 67
3.1.15. GIS platform 74
3.1.16. IoT platform 92
3.1.17. Data Centre (DC) and Disaster Recovery (DR) Centre 97
3.1.18. ICCC Control Room 101
3.2. Roles & Responsibility Matrix 106
4. Commencement of Works 113
4.1. Site Clearance obligations & other relevant permissions 113

4.2. Existing Traffic Signal system 113
4.3. Road signs 113
4.4. Electrical works and power supply 113
4.5. Lightning-proof & other electrical measures 113
4.6. Earthing System 114
4.7. Junction Box, Poles and Cantilever 114
4.8. Cabling Infrastructure 115
4.9. Integrated Command & Control Centre (ICCC) 115
4.10. Data Center and Disaster Recovery Center 117
5. Other Expectation and Consideration from MSI 118
5.1. Inception Phase 118
5.2. Requirement Phase 119
5.3. Design Phase 120
5.4. Development Phase 120
5.5. Integration Phase 122
5.6. Pilot Deployment 122
5.7. Go-Live Preparedness and Go-Live 122
5.8. Handholding and Training 123
5.9. Operations and Maintenance 125
5.9.1. Applications Support and Maintenance 125
5.9.2. ICT Infrastructure Support and Maintenance 128
5.9.3. Warranty support 128
5.9.4. Maintenance of ICT Infrastructure at the DC and ICCC 129
5.9.5. Compliance to SLA 135
5.10. Compliance to Standards, Certifications & Guidelines/Advisories 135
5.11. Testing and Acceptance Criteria 137
5.12. Factory Testing 140
5.13. Final Acceptance Testing 141
5.14. Project Milestone & Payment Schedule 141
5.14.1. Project milestone 141
5.14.2. Payment Schedule 145
Annexure A: Details of locations for commissioning of smart assets 149
Annexure A.1. Locations for Surveillance Assets 149
Annexure A.2. Locations for ITMS (ATCS, RLVD & supporting ANPR) assets 152

Annexure A.3. Locations for SVD assets (with supporting ANPR assets) 153
Annexure A.4. Locations for VaMS assets 153
Annexure A.5. Locations for PA assets 154
Annexure A.6. Locations for ECB assets 156
Annexure A.7. Locations for Environment sensors 158
Annexure B: Minimum Techno-Functional Requirements 159
Annexure B.1. Fixed Surveillance Camera 159
Annexure B.2. IR Illuminator - Field Location 161
Annexure B.3. Surveillance Camera - PTZ 162
Annexure B.4. Indoor Dome Camera 164
Annexure B.5. B.4.Internet Router 166
Annexure B.6. Core Router 167
Annexure B.7. Core Switch 170
Annexure B.8. Access Switch 171
Annexure B.9. L3 Fibre Switch 172
Annexure B.10. SAN Switch 174
Annexure B.11. Server Load Balancer 176
Annexure B.12. Link Load Balancer 177
Annexure B.13. DDoS Solution 178
Annexure B.14. Next Generation Firewall 179
Annexure B.15. Anti-APT Solution 182
Annexure B.16. Web Application Firewall 183
Annexure B.17. DLP (Data Leakage Prevention) 184
Annexure B.18. Privileged Identity Management 185
Annexure B.19. IP phone 186
Annexure B.20. IP-PBX 187
Annexure B.21. Video Conferencing Solution 189
Annexure B.22. Multiparty conference Unit 190
Annexure B.23. Citizen contact centre 192
Annexure B.24. Video Management Solution & Video Analytics Solution 195
Annexure B.25. Facial Recognition Solution 210
Annexure B.26. Primary storage 213
Annexure B.27 Secondary storage 215
Annexure B.28. EMS 216

Annexure B.29. Variable message board 230
Annexure B.30. Automatic Number Plate Detection System 233
Annexure B.31. Red Light Violation Detection System 236
Annexure B.32. Speed Violation Detection System 239
Annexure B.33. Echallan System 241
Annexure B.34. Hand Held Devices for e-Challan 243
Annexure B.35. Public Announcement System 244
Annexure B.35. Emergency Call Box System 246
Annexure B.36. Environmental sensor 247
Annexure B.37. Drone 249
Annexure B.38. Adaptive Traffic Control System 252
Annexure B.39. Video wall 261
Annexure B.40. Video wall mgmt. 262
Annexure B.41. Display wall controller 264
Annexure B.42. Field Switch 265
Annexure B.43. UPS for DC & ICC 266
Annexure B.44. UPS for field 268
Annexure B.45. GIS 270
Annexure B.46. Database encryption (HSM Device) 277
Annexure B.47. Outdoor Junction Box 282
Annexure B.48. Laser Network Duplex Printer (Heavy Duty) 283
Annexure B.49. Laser Network Multifunction Duplex Printer 284
Annexure B.50. Multifunctional Kiosk 285
Annexure B.51. Integrated Command & Control Centre Solution 288
Annexure B.52. Laptop 306
Annexure B.53. DG Set 306
Annexure B.54. Antivirus with EDR & HIPS 309
Annexure B.54. Fingerprint Scanner 312
Annexure B.55. SIEM solution 314
Annexure C: e-Governance Solution Requirements 316
Annexure C.1. Finance Management 316
Annexure C.2. HRMS Solution 324
Annexure C.3. Project Management 333
Annexure C.4. Utility Billing Management 337

Annexure C.5. Tax Management 341
Annexure C.6. Audit & Vigilance Management 346
Annexure C.7. Document Management System 349
Annexure C.8. Workflow & Custom Modules 352
Annexure C.9. Registration & Licensing 358
Annexure C.10. Corporate web portal 358
Annexure C.11. Mobile Application 365

Definitions/Acronyms

Sr. No.	Term/Acronyms	Description
1.	AAA	Authentication, Authorization, and Accounting
2.	ABD	Area Based Development The Area Based Development (ABD) is considered to be an innovative approach enabling breakthrough in sustainable growth.
3.	ANPR	Automated Number Plate Recognition
4.	AP	Access Point
5.	B2C	Business to Citizen
6.	Bid	Offer by the Bidder to fulfil the requirement of the Authority for an agreed price. It shall be a comprehensive technical and commercial response to the RFP published which would be accompanied all supporting documents as mandated in the RFP
7.	BOM	Bill of Material
8.	CCTV	Closed Circuit Television
9.	ICCC	Integrated Command and Control Centre which acts as a nerve where from all the operation & management of the Smart city would be undertaken. The Smart City will have multiple smart solution components. These Smart solutions will be monitored & managed from the ICCC through the use of bi-directional communication channel
10.	Consortium	A consortium consists of multiple members (not more than three parties- Lead Bidder + 2 Consortium members) entering into a Consortium
		Agreement for a common objective of satisfying the ASCL requirements & represented by lead member of the consortium, designated as a "Lead Bidder". Also, the solely responsibility for successful execution of the entire project will be that of the defined Lead bidder. The consortium members shall support lead bidder for their work scope to execute the project successfully. The consortium members should have relevant experience of executing similar roles and responsibilities in reference to the requirements as mentioned in the RFP.
11.	DBA	Database Administrator
12.	DC	Data Centre is a specific infrastructure which consists of the IT components including but not limited to servers, storage, networking components, security components etc. and other non IT components including but not limited to access control, AC, main power, backup power etc. to support the operation of the datacentre.

13.	Deliverables	Products, infrastructure, services & support as agreed to be delivered by the Bidder as per the scope of work defined in the RFP, Implementation and the Maintenance phases and includes all documents related to the user manual, technical manual, design, process and operating manuals, service mechanisms, policies and guidelines (such as security related, data migration related), inter alia payment and/or process related etc., source code and all its modifications.
14.	DR	Disaster Recovery site which is a failback site which becomes live when datacentre becomes offline
15.	Effective Date	The date on which the Contract Agreement for this RFP comes into effect
16.	EMD	Earnest Money Deposit
17.	EMS	Enterprise Management System
18.	e- Procurement Portal	Refers to the electronic tendering system of the Authority
19.	FPS	Frames Per Second
20.	FRS	Facial Recognition Software
21.	G2C	Government to Citizens
22.	GI Pipes	Galvanized iron Pipes
23.	GIS	Geographical Information System is a system designed to capture, store, manipulate, analyse, manage, and present spatial or geographic data. The GIS platform that will be commissioned as a part of this project will be integrated with all the services & solution to provide the city administrators with visual tool to take faster & efficient decision
24.	Go UP	Government of Uttar Pradesh
25.	GPRS	General Packet Radio Service
26.	GPS	Global Positioning System
27.	GSM	Global Systems for Mobile Communications
28.	GUI	Graphical User Interface
29.	HO	Head Office
30.	ICT	Information and Communication Technology
31.	IDS	Intrusion Detection System
32.	IOE	Internet of Everything
33.	IP	Internet Protocol
34.	IPS	Intrusion Prevention System
35.	ITIL	Information Technology Infrastructure Library
36.	Iota	Internet of Things

37.	LAN	Local Area Network
38.	LED	Light Emitting Diode
39.	LOI/LOA	Letter of Intent/Letter of Award
40.	MoU	Memorandum of Understanding
41.	NNA	Nagar Nigam Aligarh
42.	NOC	A Network Operations Center (NOC) is defined as the place from which the networks are supervised, monitored and maintained. It typically has a network operations center, a room containing visualizations of the network or networks that are being monitored, workstations at which the detailed status of the network can be seen, and the necessary software to manage the networks.
43.	Node	Network aggregation points consisting of L3/L2 switches
44.	Non-Compliance	Means failure/refusal to comply the terms and conditions of the tender
45.	Non-Responsive	Means failure to furnish complete information in a given format and manner required as mandated in the tender documents or non-submission of tender offer in given forms / pro forma or not following procedure mentioned in this tender or any of required details or documents is missing or not clear or not submitted in the prescribed format or non- submission of tender fee on EMD
46.	O&M	Operations & Maintenance period in which the bidder would provide the services as per the terms & conditioned mentioned in the RFP document including the Service Level Agreements (SLA) defined in the RFP document
47.	OEM	Original Equipment Manufacturer is a company that produces parts and equipment that may be marketed by another party. OEM refers to the organizations who manufactures the products and not to the party who distributes or resells the same
48.	OFC	Optical Fiber Cable
49.	OS	Operating Systems
50.	PA System	Public Address System
51.	Pop	Points of Presence
52.	PTZ	Pan Tilt Zoom
53.	Required Consents	The consents, waivers, clearances and licenses to use Authority Intellectual Property Rights, rights and other authorizations as may be required to be obtained for the software and other items that DIT, GoI their nominated agencies are required to make available to Bidder pursuant to this Agreement;

54.	RFP	Request for Proposal
55.	RLVD	Red Light Violation Detection
56.	ROW	Right of Way
57.	RPO	Recovery Point Objective (RPO) describes the interval of time that might pass during a disruption before the quantity of data lost during that period exceeds the Business Continuity Plan's maximum allowable threshold or "tolerance." RPO limits how far to roll back in time, and defines the maximum allowable amount of lost data measured in time from a failure occurrence to the last valid backup.
58.	RTO	The Recovery Time Objective (RTO) is the duration of time and a service level within which a business process must be restored after a disaster in order to avoid unacceptable consequences associated with a break in business continuity. RTO is related to downtime and represents how long it takes to restore from the incident until normal operations are available to users
59.	SLA	Service Level Agreement (SLA) is a commitment between a service provider and a client relating to a project which is well defined in advance and based on which the quality of services are defined. SLA also define the penalty which would be levied on the service provider in case of a service goes below the threshold/ accepted level. Particular aspects of the service – quality, availability, responsibilities – are agreed between the service provider and the service user. The most common component of SLA is that the services should be provided to the customer as agreed upon in the contract. The level of service and other performance criteria which will apply to the Services delivered by the Bidder;
60.	MSI	Master System Integrator (Bidder) A Master Systems Integrator is a company that specializes in bringing together supporting organizations, component subsystems in whole and ensuring that those subsystems function together as per the scope of work and within the defined SLAs of the RFP. The term MSI in this RFP context also refers to the prospective bidder for this RFP and can be used interchangeably in the RFP document
61.	Successful Bidder	The bidder who is qualified (as per the pre-qualification criteria of the RFP) to participate in the bidding process and is finally declared are the winner of the bidding process as per the bid evaluation process defined in the RFP and is awarded the contract to execute the project as per the project scope
62.	URL	Uniform Resource Locator

63.	VA	Video Analytics
64.	VaMS	Variable Message System
65.	VCA	Video Content Analytics
66.	VMS	Video Management Software/System
67.	WAN	Wide Area Network
68.	Server Room	Sever room shall refer to the area of the datacentre which consists of the IT components including but not limited to servers, storage, networking components, security components etc.

1. Introduction

1.1. About Aligarh

Aligarh is one of the seventy-five districts of Uttar Pradesh (North India), at a distance of about 126 km from India's capital New Delhi. Aligarh is one of the largest cities in Uttar Pradesh, and is the 55th largest city in India. Aligarh is famous for lock industries. Aligarh Muslim University is another thing Aligarh is famous for. The city is administered by Nagar Nigam Aligarh (Municipal Corporation). Infrastructure development of the city is looked after by the Aligarh Development Authority (ADA).

Aligarh is an important business centre of Uttar Pradesh. The city is an agricultural trade centre. Agricultural product processing and manufacturing are important. Aligarh is most famous for its lock industry and are exported across the world. In 1870, Johnson & Co. was the first English lock firm in Aligarh. In 1890, the company initiated production of locks on a small scale here. Aligarh is also famous for brass hardware and sculpture.

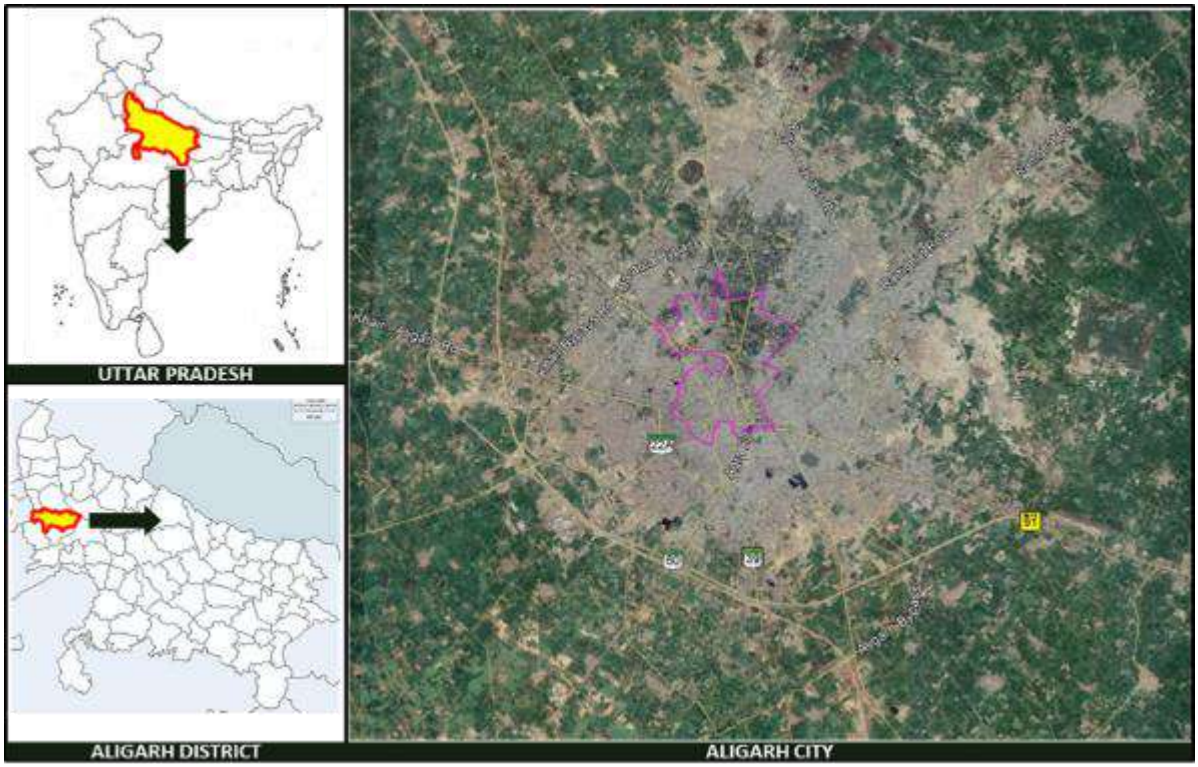


Figure 1: Location of Aligarh

Location & Connectivity

The district of Aligarh spreads from 27º88'N latitude to 78º08'E longitude at an elevation of 178m above mean sea level. It lies in central heart of Ganga Yamuna Doab. The district is bounded Bulandshahr district in the North and Mathura district in the South. The total geographical area of the district is about 5028 sq. kms.

By Railway

Aligarh Junction railway station is the primary station for Aligarh city and is a major stop on the Delhi-Kolkata route. It is an A-Class railway station. It is one of the oldest railway stations of this route. Aligarh railway station handles over 136 trains daily (in both directions). Aligarh has one Branch Railway Line to Bareilly.

By Road

Aligarh is one of the Divisions (Depot) of UPSRTC, named BudhVihar. Uttar Pradesh State Road Transport Corporation (UPSRTC) buses serve cities all over the state and cities in Uttarakhand, Rajasthan, Madhya Pradesh and Haryana. There are buses plying from Aligarh to Delhi at frequent intervals. Aligarh is well connected through the following Highways.

- National Highway 91 (Grand Trunk Road) connects Kolkata to National Capital New Delhi. Ghaziabad-Aligarh section is 4 Lane Highway.
- National Highway 93 connects Moradabad to Agra, the city of Taj Mahal via Aligarh. Aligarh-Agra section is constructed as Brij bhoomi Expressway.
- Yamuna Expressway is a 6 Lane Expressway Noida-Agra crossing at Tappal in Khair Tehsil from where Khair City is 30 km, and Aligarh, 46 km.

By Air

The nearest international airport from Aligarh is Indira Gandhi International Airport, New Delhi

Climate

Aligarh has a monsoon-influenced humid subtropical climate; this is a typical of north-central India. Summers start in April and are hot with temperatures peaking in May. The average temperature range is 28–38 °C (82–100 °F). The monsoon season starts in late June, continuing till early October. Aligarh gets most of its rainfall during Monsoon. The annual rainfall is on an average of 800 millimetres (31 in). Winter sets in December, and continues till February. Temperatures range between 5–11 °C (41–52 °F). Winters in Aligarh are generally mild. The fog and cold snaps are extreme.

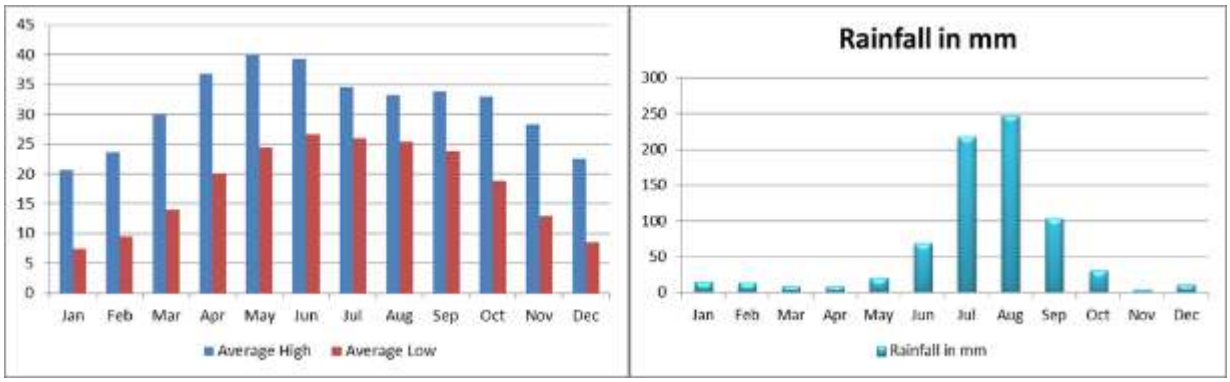


Figure 2: Climate Information on Aligarh

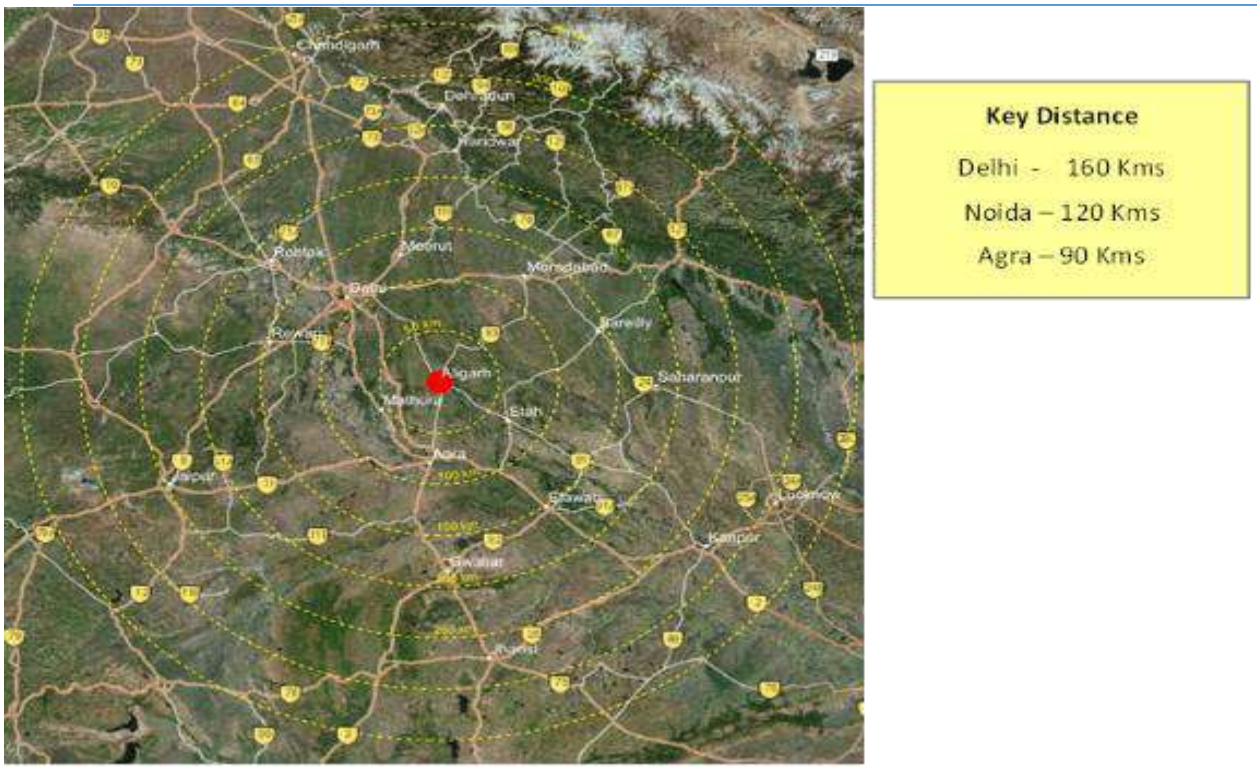


Figure 3: Proximity of Aligarh from Various City

Topography

Aligarh district is a part of Central Ganga Plain. The district is bounded by river Ganga in the west and the river Yamuna in the east. The entire district falling in Upper- Ganga doab represents flat topography. The irrigation in the district takes place. Through Upper-Ganga and Lower Ganga Canal network system. The district is mainly drained by river Ganga & Yamuna and their tributaries. Karwan, Sirsa & Sengar are important.

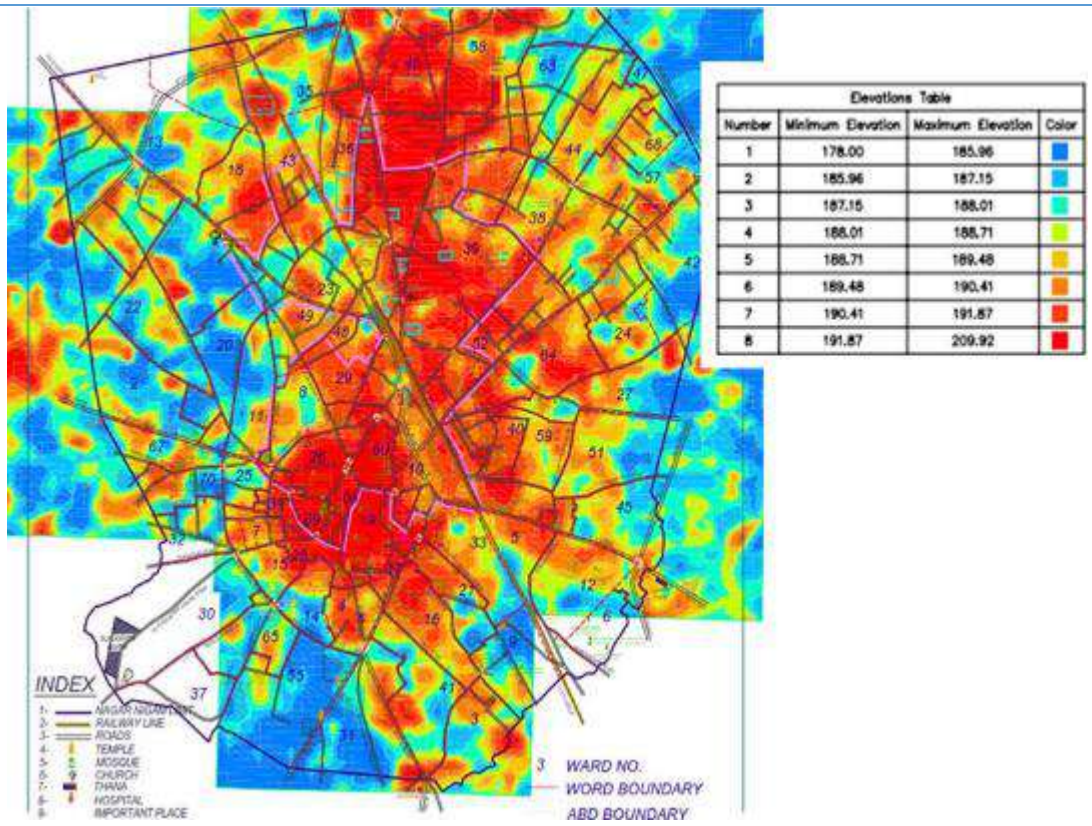


Figure 3: Topography of Aligarh

Overall Planning for Implementation of Smart City

In the line of Smart cities guidelines, Aligarh Smart City Limited, SPV was formed and incorporated in August 2017 under the Companies Act, 2013. Aligarh Smart City Limited is responsible for planning, appraisal, approval, release of funds, implementation, monitoring and evaluation of the Smart City projects. The City commissioner was appointed as CEO of the SPV and has nominees of Central Government, State Government and ULB on its Board. The Aligarh Smart City Limited, SPV appointed URS Scott Wilson India Private limited in joint venture with Mahindra Defence Systems and Knight Frank Private Limited as Project Management Consultants (PMC) for designing, developing, managing and implementing Pan City and Area-Based Development projects.

Vision of the Aligarh Smart City

City level consultation has been undertaken during the smart city proposal preparation stage. Based on the city's aspiration Vision of Aligarh Smart City has been framed which is:

"MUKAMMAL ASHIYAN ALISHAN ALI-e-GARH"

The vision is derived from three major goals of the project which is as follows.
Mukammal Ashiyan – "Mukammal" means Complete and "Ashiyan"' means Home. The initial two words of the vision means elating the lives of people of Aligarh by providing basic amenities and infrastructure. This represents a high quality of city life which has smooth access to basic infrastructures, is clean & green, energy efficient and environmental friendly and has peaceful atmosphere. The city aims to provide

improved infrastructure services, better management of liquid and solid waste, better managed traffic, road spaces with improved public realm for more social interactions.

Alishan – Alishan means State of the art. The goal aims to have sound economy, which can be achieved through promotion of Industry.

ALI-e-GARH: Represents ICT initiatives for improvement in Govt. service delivery to citizens through e-governance, improved traffic management and better public utility services.

The goal is divided into sub goals. Sub goal have tangible and intangible benefits.

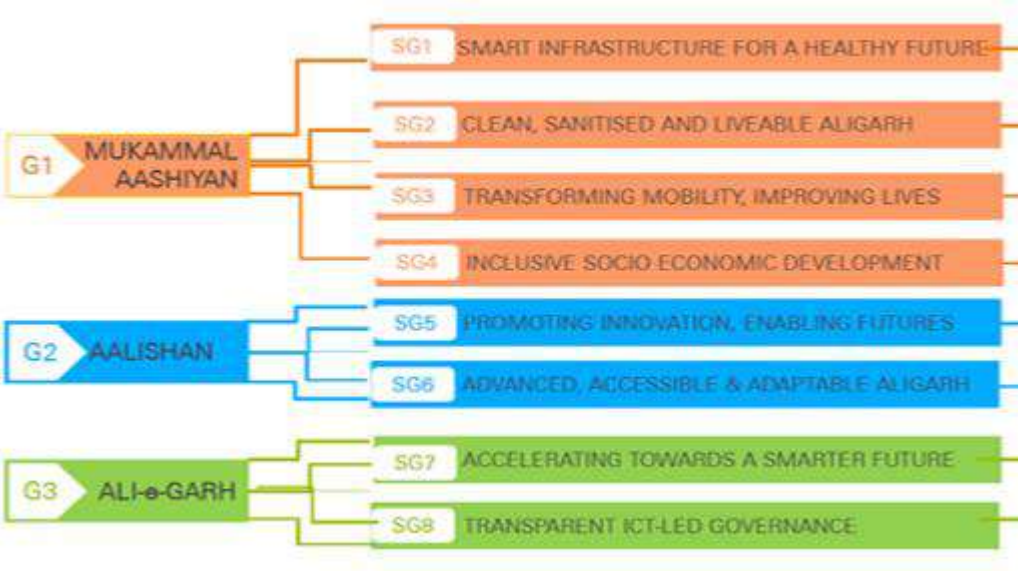


Figure 4: Goals and Sub Goals of Aligarh Smart City

In order to achieve this objective, Aligarh Smart City Limited has appointed consortium of URS Scott Wilson India Private limited in joint venture with Mahindra Defence Systems and Knight Frank Private Limited for implementation of the smart city proposal.

ABD Area

The area selected under Area Based Development (ABD) for delivery of services under Septage management Component of the city covers an area of 5.0 Sq. Km. The ABD area is divided by the railway track into two part called as city side and civil lines side. The civil lines side is mainly the newly developed area while the city side is the old settlement.

1.2. About Aligarh Smart City Limited

Aligarh Smart City Limited (ASCL) is a Special Purpose Vehicle (SPV) created with representation from all major stakeholders from the city of Agra, as per the Government of India's Smart City guidelines. This SPV is responsible for the implementation of projects under the smart city mission. This SPV shall carry end to end responsibility for vendor selection, implementation, and operationalization of various smart city projects.

1.3. Project Objectives

The key objective of this project is to establish a collaborative framework where input from different smart city solutions implemented by ASCL, and other stakeholders can be assimilated, analysed and managed on a single platform; subsequently resulting in aggregated city level information and management centre or the Integrated Command & Control System (ICCC). Further, this aggregated city level information can be converted to actionable intelligence, which would be propagated to relevant stakeholders and citizens in coordinated and collaborative manner. Following are the key outcomes expected to be achieved by the proposed interventions:

a. Improved visualization of ambient or emergency situation in the city and facilitation of data driven decision making

b. Efficient traffic management

c. Enhanced safety and security

d. Better management of utilities and quantification of services

e. Better Asset Management

f. Better Emergency Response

g. Efficiency in improvement in public service delivery

h. Interdepartmental coordination and collaboration for faster execution of services

i. Implementation and Integration with all existing and future services as identified by Aligarh Smart City Limited (ASCL) in the city including but not limited to (with provision for future integration & scalability):

- CCTV based Surveillance System
- On site Data Centre
- Disaster Recovery Centre as a service over the cloud
- Integrated Command and Control Centre
- Adaptive Traffic Control System
- Red Light Violation Detection System
- Speed Violation Detection System
- Automatic Number Plate Detection System
- E-Challan System

- Public Address System
- Variable Message Board System
- Environmental sensors
- Emergency / Panic button system
- ASCL fibre network
- E-Governance Solution
- GIS Map Solution
- Integration with Smart Solutions

1.4. Purpose of the RFP

The purpose of this tender is for the Aligarh Smart City Limited (ASCL) to enter into a contract with a qualified firm or consortium of firms for the Supply, Installation, Configuration, Integration, Commissioning, Operations and Maintenance of Integrated Smart Solutions to support the of ASCL to make the City of Aligarh into a "Smart City".

It is with this backdrop that ASCL is envisioning to select & engage a Master Service Integrator –

a. Who brings strong technological experience in smart city implementation, integration and operations through integrated and multiple smart application platform

b. Who can develop Standard Operating Procedures for the various components of the project and link with uses cases prepared by them

c. Who has a quality control plan in place to demonstrate that all equipment is tested and passed prior to shipping

d. Who is capable of providing high quality installations of the project equipment

e. Who is capable of maintaining and operating the complex smart city systems to provide maximum decision making support and performance of the systems as per the Service Level Agreements (SLA) as provided in the RFP document

f. Who brings forth expertise for various smart city application rollout, monitoring & management

g. Who will strongly build capacity of various stakeholders for efficient operations and management of the proposed solutions

This tender is designed to provide interested bidders with sufficient basic information to submit proposals meeting minimum requirements, but is not intended to limit a proposal's content or exclude

any relevant or essential data. Bidders are at liberty and are encouraged to expand upon the minimum techno-functional specifications provided in this RFP to provide better & robust solution with superior service delivery & management.

2. Project Overview & solution components

The solution components envisioned under this RFP are as follows:

Sl. No.	Solution Component	Solution Scope
1.	CCTV based Surveillance System	Under this solution scope CCTV based surveillance cameras would be installed at strategic junctions across the city for providing safety & security. This solution would also include the use of Drone based surveillance & facial recognition system
2.	On site Data Centre	The datacentre which would act as the centralized data processing & repository would be located centrally in Aligarh. The location for the same would in the Lal Diggi area of Aligarh near IG Khan Circle
3.	Disaster Recovery Centre as a service over the cloud	The Disaster Recovery (DR) site would be provisioned over the cloud as a service. The sizing the DR site will be 50% in terms of compute, storage & camera feed
4.	Integrated Command and Control Centre	The integrated Command & Control Centre (ICCC) would be act as the nerve centre for the entire Aligarh Smart City Solution and would be collocated with the Datacentre in the Lal Diggi area
5.	Adaptive Traffic Control System	Under this solution scope intelligent traffic light system would be installed across strategic junctions of Aligarh which would manipulate the traffic light timings as per the traffic density at all the arms of the junction to facilitate smooth traffic and lower waiting time at the junctions
6.	Red Light Violation Detection System	This solution would install smart solution components based on which any vehicle jumping a red light would be identified & subsequently the challan can be generated
7.	Speed Violation Detection System	This solution would install smart solution components based on which any vehicle violating the maximum speed limit of a road would be identified & subsequently the challan can be generated
8.	Automatic Number Plate Detection System	The ANPR system will use Optical Character Recognition System (OCR) to identify the vehicle registration number. The same capability will also cater to identification of the vehicle violating the traffic rules. The ANPR system will provide the vehicle

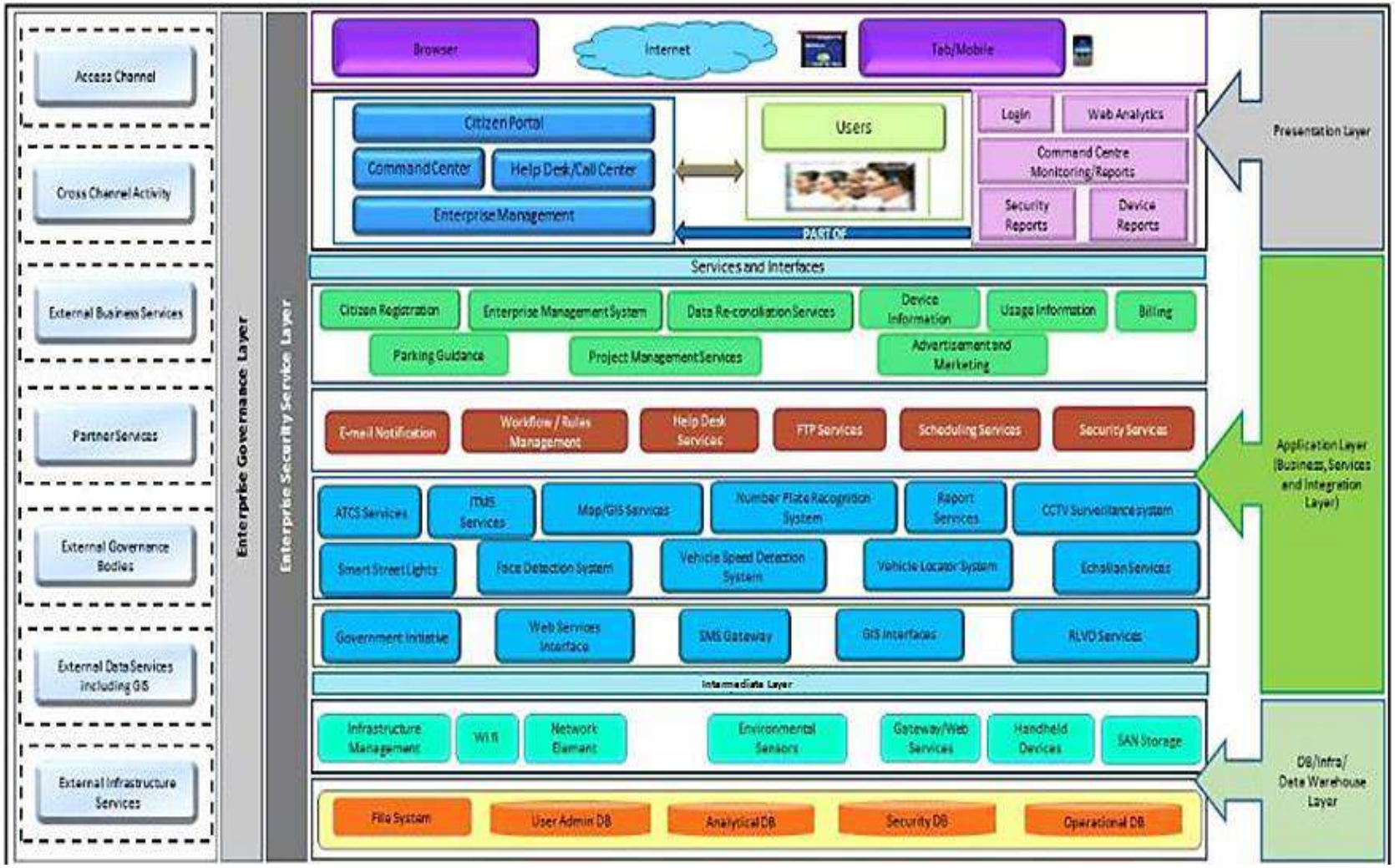
		identification mechanism for both RLVD & SVD system
9.	E-Challan System	The e-challan system will integrate with VAHAN & SARATHI database of RTO to correctly identify the owner of the vehicle violating the traffic rules to generate the corresponding challan. The same system can be used by RLVD & SVD systems for generating the challans. Additionally, using handheld device, the traffic department can also generate challans from the roadside
10.	Public Address System	The PA system which will be installed at strategic junctions across the city of Aligarh can be utilized by the city management agencies to broadcast instructions/ advice to the commuters on road.
11.	Variable Message Board System	This can display equipment that can be installed at strategic locations across the city to broadcast critical information for general awareness. The same can also be used for monetization by displaying advertisements.
12.	Environmental sensors	Environmental sensors can also be installed at strategic locations to identify the level of pollution at the identified locations. The same information can then be broadcasted using the Variable Massage Sign Boards across the city.
13.	Emergency/ Panic button system	The Emergency / Panic button system can be installed at various strategic locations across the city which can enable two-way communication with the control room. In case of any disaster/ emergency this mechanism will enable direct communication with the control room.
14.	ASCL fibre network	A dedicated Fibre Network would be created for connecting various ground level assets with the ICCC for smooth functioning & management of the Smart City Solution
15.	e-Governance Solution	Process automation would be undertaken in Nagar Nigam Aligarh to enhance the transparency, service quality & auditing of the services being delivered to the common man. This solution is intended to undertake automation in the processes of Aligarh Nagar Nigam to transform into e-Municipal Corporation. Various multipurpose kiosks can be

		installed across the city to facilitate the service delivery in a more efficient fashion
16.	GIS Map Solution	A GIS platform can be created to map various assets by creating multiple layers of information. This would enable the city administrators to visually manage & monitor the city conditions and take appropriate decisions
17.	Integration with Smart Solutions	The solution should have sufficient flexibility and scalability to integrate any Smart solution which may be implemented in future in the city of Aligarh. The Smart City platform should have all the required application & protocol supports that would enable the integration of various smart solution like but not limited to solid waste management, Smart street lighting, water & sewerage management & leak detection, smart parking, Smart education, smart poles, Septage management, Rain water harvesting, Smart electrical & water metering, Intelligent Building Management, smart energy management etc. These integrations should enable 2-way/ bidirectional data communication & control.

2.1. Solution Components & services overview

The selected MSI shall ensure the successful implementation of the proposed Smart City project implementation as per the scope of work detailed in this RFP as well as provide capacity building support to city authorities. Any functionality not expressly stated in this document but required to meet the needs of the ASCL to ensure successful operations of the system shall essentially be under the scope of MSI and for that no extra charges shall be admissible.

Smart Aligarh Logical Architecture



MSI shall deliver the systems and components as per the minimum techno-functional specifications which are described in this RFP and implement the same. MSI's scope of work shall include but will not be limited to the following broad areas.

1. Assessment, Scoping and Survey Study: Conduct a detailed assessment, survey, gap analysis, and scoping study and develop a comprehensive project plan, including:

    a. Assess existing ICT systems, Network connectivity within the city and the other sites for the scope items mentioned in this Volume of the RFP

    b. Conduct site survey for finalization of detailed technical architecture, gap analysis, final Bill of Quantities and project implementation plan

    c. Conduct site surveys to identify the need for site preparation activities

    d. Obtain site clearance obligations, ROW permission & other relevant permissions and approvals with the support of ASCL

2. Design, Supply, Configuration, Installation, Implementation, Testing and Commissioning of the following primary components:

    a. Integrated Command and Control Centre

    b. Data Centre within ICCC Building

    c. Disaster Recovery Centre as a service (Hosted on cloud data centre of any MEITY empanelled Cloud Service Provider)

    d. City Surveillance

        - CCTV based Surveillance
        - Drone based surveillance
        - Facial Recognition System

    e. Intelligent Traffic Management System

        - Adaptive Traffic Control System (ATCS)
        - Automatic Number Plate Recognition (ANPR) System
        - Red Light Violation Detection (RLVD) System
        - Speed Violation Detection (SVD) System

- e-Challan System
- Variable Message Sign boards
- Public Address (PA)
- Emergency Call Box (ECB) System

f. Environmental Monitoring Sensors

g. City Web Portal & Mobile App

h. Enterprise GIS Portal

i. e-Governance Solution

3. Integration various smart city solutions to enable bi-directional control & management of Smart Solutions that would be implemented as part of scope of work of the project and also various smart city solutions that will be implemented in a later phase within ASCL Smart City ICT landscape, not limited to:

a. Smart solid waste management

b. Smart street lighting

c. Water & sewerage management & leak detection

d. Smart parking

e. Smart education

f. Smart poles

g. Smart Septage management

h. Rain water harvesting

i. Smart electrical & water metering

j. Intelligent Building Management

k. Smart energy management

4. Data Centre: Provisioning of Hardware, Network and Software Infrastructure, which includes design, supply, installation and commissioning of ICT Infrastructure at the Command Control and Communication Centre; Data Centre.as per the scope of the project this scope consist of:

a. Site preparation services

b. IT Infrastructure including server, storage, other required hardware, application portfolio, licenses

c. Integrated Command Centre infrastructure including operator Video Walls, workstations, IP phones, joystick controller etc.

d. Establishment of LAN and WAN connectivity at ICCC and DC

e. Application integration services with the above identified applications

5. Provisioning of City wide Network backbone within the city

a. Assessment, network designing & project planning for laying the fibre network

b. Trenching, supplying, installation (of active & passive components) for the fibre network

c. Connectivity between field device and DC and ICCC

d. Connectivity between DC & proposed DR

e. Internet Connectivity at DC

f. Network shall be sized with sufficient capacity to support the redundancy and future traffic growth in order to complete traffic rerouting on the network in event of failure without affecting overall network performance. The MSI can create the network with 24/48 core fibre cables as per the project & site requirements but also ensure that there is room for sufficient scalability for future requirements

6. Capacity Building for ASCL and any other department which includes preparation of operational manuals, training documents and capacity building support, including:

a. Training of city authorities, operators and other stakeholders on operationalization of the system

b. Support during execution of acceptance testing

c. Preparation and implementation of the information security policy, including policies on backup and redundancy plan

d. Preparation of KPIs which would be verified by ASCL for performance monitoring of various urban utilities monitored through the system envisaged to be implemented

e. Developing standard operating procedures for operations management and other services to be rendered by ICCC

f. Preparation of system documents, user manuals, performance manuals, Operation manual etc.

7. Operations and Maintenance MSI shall also be responsible for the maintenance and management of entire systems, solutions, and application deployed as part of this RFP for a period of 5 years from the Go- Live date in an efficient and effective manner and as per the Service Level Agreements specified in the document.

2.2. Component Architecture

Indicative architecture of the components envisaged under the ""Integrated Command Control and Communication Centre" is as given below. Please note that this component architecture is indicative in nature and is given in the RFP to bring clarity to prospective bidders on the overall scope of project and its intended use. MSI shall carry out the detail requirement analysis and finalize technical architecture in consultation with authority and its consultants. The architecture layers of the complete network of smart elements is as follows.

1. Sensor or ground level component layer

The sensor layer will help the city administration gather information about the ambient city conditions or capture information from the edge level devices like intelligent traffic signals, cameras, surveillance cameras, emergency call boxes, environmental sensors etc. installed at multiple locations across the city, to measure & report various environmental conditions for decision makers to take preventive, pro-active and execute responses in case of emergency/natural calamity.

2. Data Collection and Transmitting Layer

Sensor & Controller processes data, that is input from the sensor applies the logic of control and causes an output action to be generated. This signal may be sent directly to the controlled device or to other logical control functions and ultimately to the controlled device.
The controllers function is to compare its input (from the sensor) with a set of instructions and then produce appropriate output information. It usually consists of a control response along with other logical decisions that are unique to the specific sensor application. After taking the logical decision of the information it will hand over the information to the next layer (Network Layer) which will subsequently available at the ICCC.

3. Network/Communication Layer

The secured network layer will serve as the backbone for the project and provide connectivity to gather data from sensors and communicate messages to display devices and actuators through the ASCL fibre network that is provisioned to be created as part of the project scope. This envisioned fibre network will support the various smart city services and other smart elements (sensors and displays) at given locations wherever applicable. The network layer will be scalable such that additional sensors, actuators, display devices can be seamlessly added in future.

4. Data Centre Layer

The data Centre layer will house centralized computing power required to store, process and analyse the data to decipher actionable information. This layer includes servers, storage, ancillary network equipment elements, security devices and corresponding management tools. Similar to the network layer, it will be scalable to cater to the increasing computing and storage needs in future.

5. Security Layer

The Security layer of the entire system will be of paramount significance and MSI will have to provide:

a. Infrastructure security- including policies for identity and information security policies

b. Network security- including policies and practices adopted to prevent and monitor unauthorized access, misuse, modification, or denial of a computer network and network-accessible resources, etc.

c. Identity and Access Management – including user authentication, authorization, SSL & Digital Signatures.

d. Application security- including Hosting of Government Websites and other Cloud based services, Adoption of Technical Standards for Interoperability Framework and other standards published by GoI for various e-Governance applications.

e. End device security, including physical security of all end devices such as display boards, emergency boxes, kiosks etc.

f. Following security parameters should be included for all smart elements, but not limited to:

   i. Identity and access management

   ii. User/administrator audit log activity (logon, user creation, date-time of PA announcements, voice recording etc.)

   iii. Secured data storage (storage of video/image/voice/location/data captured by various smart elements)

   iv. SSL/TLS based encryption for web and mobile application based interfaces for sensitive data transfer

   v. Protection against Denial of Service (DoS)

6. Smart Application and Integration Layer

The smart applications layer will contain data aggregation and management systems (rules engines, alerting systems, diagnostics systems, control systems, messaging system, events handling system), and reporting / dashboard system to provide actionable information to city administrators and citizens. It will be an evolving layer with applications added and integrated as and when new applications are developed at ASCL. While aspects of ambient conditions within the city will be gathered through various sensors deployed, some city specific data will come from other

government and non-government agencies. It is through the integration layer – that data will be exchanged to and from the underlying architecture components and other data from system developed by government (such as police department, meteorological department, street lights department, water department, irrigation department, transport organizations with ASCL ICCC) and non-government agencies (if required).

7. Service delivery and Publishing Layer

The output field devices layer will contain display devices or bi-directional (input & output) devices connected to the network which will be used by citizens to consume and for administrators to provide - actionable information. Such field devices include digital messaging boards, environmental data displays, etc. The Integrated command & Centre publishes the information which will enable citizens and administrators alike to get a holistic view of city conditions. The implementation vendor will have to develop the Integrated Command & Centre at a site location determined by ASCL (which is in Lal Diggi Area near IG Khan Circle) and commission the various smart city solutions for understanding the ambient city conditions.

2.3. Survey, Design Consideration for finalization of detailed technical architecture and project plan

After signing of contract, the Systems Integrator needs to deploy local team (based out of ASCL) proposed for the project and ensure that a Project Inception Report is submitted to ASCL as per the project timelines defined in the RFP and should cover following aspects:

1. Detailed Survey Report including infrastructure assessment, phase wise location distribution, hardware deployment plans etc.

2. Detailed Project Plan including Operations management, Contract management, Risk management, Information Security and Business Continuity

3. Detailed plan for installation of ground level assets required for the ITMS & Surveillance solution components and other assets to be installed in the ground level.

4. Detailed plan to map the various processes for automation and development of the SRS document
5. Detailed plan for laying of fibre network connecting all the junctions as per locations mentioned in the RFP

6. Data Design requirements reports for business plan, which will include data segregation strategy, data regulation planning, data lifecycle management strategy etc.

7. Risk identification & mitigation plan

MSI shall conduct a comprehensive as-Is study of the existing system and infrastructure. The report shall also include the expected measurable improvements against each KPI in 'As-Is' study after

implementation of smart solutions under this project. The benchmarking data should also be developed to track current situation and desired state. MSI shall study the existing business processes, functionalities, existing systems and applications including MIS reporting requirements. MSI has to ensure to get required approval for all the documents & KPIs defined from ASCL.

MSI will be responsible to propose transition strategy for dismantling of existing signals, and setting up of new smart signals and field components. The proposed strategy should clearly provide approach and plan for implementing the new signals and field components while ensuring minimum disturbance to the road traffic and shall use appropriate static signage designating the work in progress status.

Additionally, MSI should provide detailed To-Be designs specifying the followings:

1. High Level Design (including but not limited to) Application architecture, Logical and physical database design, Data dictionary and data definitions, ER diagrams and other data modelling documents and Physical infrastructure design for devices on the field

2. Application component design including component deployment views, control flows, etc.

3. Low Level Design (including but not limited to) Application flows and logic including pseudo code, GUI design (screen design, navigation, etc.), Database architecture, including defining data structure dictionary as per standards laid-down by Government of India.

4. Location of all field systems and components proposed at the junctions, (KML /KMZ file plotted on map) with GEO coordinates.

5. Height and foundation of Cameras, Traffic Signals and Poles for Pedestrian signals, Height and foundation of Poles, cantilevers, gantry and other mounting structures for other field devices

6. Location of Junction Boxes, Wi-Fi Access Points

9. Electrical power provisioning

MSI shall also identify the customizations/ workaround that would be required for successful implementation and operation of the project. The report should take into consideration following guiding principles:

1. Transformational Nature of Smart City applications: Applications should look to fully embrace mobile adoption, online authentication, etc. to transform the processes completely and offer wider choice and direct interaction point for residents to interact directly. It is critical that project designs are aligned to larger trends and designed for next decade rather than past.

2. Use of Open Standard for evolving Technologies: The entire system would be built to be open (standards, open API, plug-n-play capabilities like virtual environments, creating sandbox), components coupled loosely to allow changes in sub- system level without affecting other parts, architected to work completely within a heterogeneous compute, storage, and multi-vendor environment. Use of the latest & best available standards to avoid use of obsolete technologies are to be taken up by the MSI. Large

integrated systems of Smart City operations should be designed to get best cost and performance advantages and the solution architecture should be open and vendor neutral, and designed for both horizontal & vertical scalabilities

3. Distributed, PKI based Authentication and Authorization - The solution shall support PKI based Authentication and Authorization, in accordance with IT Act 2000, using the Digital Certificates issued by the Certifying Authorities (CA). In particular, 3 factor authentications (login id & password, biometric and digital signature) shall be implemented by the MSI for officials/employees involved in processing citizen services.

4. Security and privacy of data – The security services will cover the user profile management, authentication and authorization aspects of security control. This service run across all the layers since service components from different layers will interact with the security components. The service will authenticate users and allows access to other features of the envisaged application for which the user is entitled to but however all public contents should be made available to all users without authentication. The system should be designed to provide the appropriate security levels commiserate with the domain of operation. Also the system will ensure data confidentiality and data integrity. The architecture must adopt an end-to-end security model that protects data and the infrastructure from malicious attacks, theft, natural disasters etc. MSI must make provisions for security of field equipment as well as protection of the software system from hackers and other threats. Using Firewalls and Intrusion Prevention Systems and other security devices such attacks and theft should be controlled and prevented with corresponding security policy. The virus and worm attacks should be well defended with gateway level Anti-virus system, along with workstation level Anti-virus mechanism. There should also be an endeavour to make use of the SSL/VPN technologies to have secured communication between Applications and its end users.

   Furthermore, all the system logs should be properly stored & archived for future analysis and forensics whenever desired. The authority would carry out the security audit of the entire system upon handover and also at regular interval during O&M period. Bidder's solution shall adhere to the model framework of cyber security requirements set for Smart City (K-15016/61/2016-SC-1, Government of India, and Ministry of Urban Development).

   Field equipment installed through this Project would become an important public asset. During the contract period of the Project the MSI shall be required to repair / replace any equipment if stolen / damaged/faulty. Appropriate insurance cover must be provided to all the equipment's supplied under this project.

   Additionally, following are the key consideration that the MSI should consider during the installation & commissioning of the Smart City Solutions:

   a. The systems implemented for project should be highly secure, considering that it is intended to handle sensitive data relating to the city and residents of the city. The overarching security considerations are described below.

b. The security services used to protect the solution shall include: Identification, Authentication, Access Control, Administration and Audit and support for industry standard protocols.

c. The solution shall support advanced user authentication mechanisms including digital certificates and biometric authentication.

d. Security design should provide for a well-designed identity management system, security of physical and digital assets, data and network security, backup and recovery and disaster recovery system.

e. The solution should provide for maintaining an audit trail of all the transactions and should also ensure the non-repudiation of audit trail without impacting the overall performance of the system.

f. The solution needs to comply with ISO 27001 standards of security.

g. The application design and development should comply with OWASP top 10 Principles

h. A secure solution should be provided at the hardware infrastructure level, software level, and access level.

i. Authentication, Authorization & Access Control: 3 factors (User ID & Password, Biometric, and Digital Signature) security mechanisms should be implemented (where ever required) to enable secure login and authorized access to portal information and services.

j. Encryption of sensitive information and data of users and portal information should be ensured.

k. Appropriate mechanisms, protocols, and algorithms necessary to protect sensitive and confirmation data and information both during communication and storage should be implemented.

l. Data security policies and standards to be used as per Government of India guideline.

m. In order to adequately provide access to secured information, security needs must be identified and developed at the data level. Database design must consider and incorporate data integrity requirements.

n. Role based access for all the stake holders to be implemented to access and use the system

o. Ability to adopt other authentication mechanism if required in future

p. Authorization validity to be ensured for the users providing the data to the system. Data should be accepted only from the entity authorized

q. Audit trails and Audit logging mechanism to be built in the system to ensure that user action can be established and can investigated if required

r. Prevention of data alterations through unauthorized channel should be prevented.

s. Industry good practice for coding of application so as to ensure sustenance to the Application Vulnerability Assessment

t. Build a complete audit trail of all activities and operations using log reports, so that errors in system – intentional or otherwise – can be traced and corrected.

u. Access controls must be provided to ensure that the system is not tampered or modified by the system operators.

v. The security of the field devices must be ensured with system architecture designed in a way to secure the field devices in terms of physical damage & unauthorized access.

w. The message exchange between various applications in the smart city should be fully encrypted and authenticated. Any application outside the Data Centre (DC) should talk to the applications hosted in the data centre through predefined APIs only.

x. APIs should be published and the IT systems be running on standard protocols like JSON / XML or equivalent etc.

y. From a network security perspective all information that flows on the network should be encrypted to ensure safety and privacy of confidential data. The devices at each endpoint of the network should be authenticated (using mechanisms based on attributes one of which could use passwords). The authentication system so used on these endpoint devices should ensure that only authorized users are sending data over the network, and there is no rogue data that is sent to the control systems to generate false alarms or sabotage the systems.

z. All IoT sensors deployed as part of Smart cities system should talk only to the authorized network, and do not hook on to the rogue networks. The relevant guidelines to secure networks as published by Department of Telecom must be followed.

aa. All traffic from the sensors in the Smart city to the application servers should be encrypted Secure Socket Layer (SSL) and authenticated prior to sending any information. The data at rest and in transit must be encrypted

bb. Authentication of sensors in the Smart city should happen at the time of provisioning the sensors, and adding them into the system, and should be based on physical characteristics of the sensors like MAC Id., Device Id. etc.

cc. Sensors deployed in solutions to set up Smart city should be hardened devices with the ability to be upgraded remotely for firmware through encrypted image files.

dd. The Sensors or edge device deployed in Smart city should not have any physical interface for administration. Monitoring of systems and networks should be undertaken remotely.

ee. All the sensors in the Smart city should connect to ASCL fibre network which would be commissioned as part of the RFP.

ff. As various sensors use multiple protocols to communicate with the underlying network with varied security capability, the system should allow provisioning of necessary authentication and encryption at the gateway or the nearest data aggregation level if the sensor is not able to do the same.

gg. Secured Information and Event Management system monitoring all Smart City networks, devices and sensors to identify malicious traffic Activities such as anti-spoofing (no one should be able to masquerade for inappropriate access), anti-sniffing (no one should be able get data and interpret it), anti-tampering (no one should be able to put/change data which was not meant to be put/changed) should be taken care for data in transit, as well as data at rest, from internal and external threats.

5. Sustainable & Scalable Solution- Important technical components of the architecture must support scalability to provide continuous growth to meet the growing demand of the city. The system should also support vertical and horizontal scalability so that depending on changing requirements from time to time, the system may be scaled upwards. There must not be any system imposed restrictions on the upward scalability in number of cameras, data centre equipment's or other smart city components. Main technology components requiring scalability are but not limited to storage, bandwidth, computing performance (IT Infrastructure), and device connectivity for future applications.

   The architecture should be scalable (cater to increasing load of internal and external users and their transactions) and capable of delivering high performance till the system is operational. In this context, it is required that the application and deployment architecture should provide for Scale-Up and Scale out on the Application and Web Servers, Database Servers and all other solution components. The data centre infrastructure shall be capable of serving at least 1000 concurrent users. The expectation is that the system should sustain at least 10 years from GO-Live. There must not be any system imposed restrictions on the upward scalability in number of field devices.

6. Availability - Components of the architecture must provide redundancy and ensure that are no single point of failures in the key project components. Considering the high sensitivity of the system, design should be in such a way as to be resilient to technological sabotage. To take care of remote failure, the systems need to be configured to mask and recover with minimum outage. MSI shall make the provision for high availability for all the services of the system. Redundancy has to be considered at the core / data centre components level and offering system High Availability and failover. The solution should meet the minimum of following availability requirements

   a. Load Balanced across two or more Web Server avoiding single point of failure

   b. Deployment of multiple application instances should be possible

   c. Distributed or load balanced implementation of application to ensure that availability of services is not compromised at any failure instance.

   d. Network, DC, DR should be available as per the SLA Defined in VIL-III of RFP.

e. Comply with the published e-Governance standards, frameworks, policies and guidelines available on http://egovstandards.gov.in (updated from time-to-time) and smart city guidelines/ advisories published by MoHUA

f. Provide analytic tools build into the system that shall support automatic detection of anomalies and their quick mitigation.

7. Manageability - 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 scalability of the system

8. Interoperability - Keeping in view the evolving needs of interoperability, especially the possibility that the solution shall become the focal point of delivery of services, and will also involve cross-functionality with the e-Government projects of other departments / businesses, the solution should be built on Open Standards. The MSI shall ensure that the application developed is easily integrated with the existing applications. The software codes used should not build a dependency on any proprietary software, particularly, through the use of proprietary 'stored procedures' belonging to a specific database product. The standards should:

   a. at least comply with the published e-Governance standards, frameworks, policies and guidelines available on http://egovstandards.gov.in (updated from time-to-time); and

   b. be of leading industry standards and

   c. as per standards/ guidelines/advisory issued by MoHUA for smart cities released and update time to time

   The SI would not be allowed to subcontract work, except for following:

   a. Passive networking & civil work during implementation and O&M period,

   b. FMS staff for non- IT support during post-implementation

   c. Sub-contracting shall be allowed only with prior written approval of ASCL.

   However, even if the work is sub-contracted, the sole responsibility of the work shall lie with the MSI. The MSI shall be held responsible for any delay/error/non-compliance/penalties etc. of its sub-contracted vendor. The details of the sub-contracting agreements (if any) between MSI & the corresponding party would be required to be submitted approved by ASCL before resource mobilisation.

9. Convergence - Under the smart city program, ASCL has envisaged to create a state of the art infrastructure and services for the citizens of ASCL, hence it is imperative that all infrastructure created under the project shall be leveraged for maximum utilization. Hence MSI is required to ensure that such infrastructure will allow for accommodation of equipment's being procured under other smart city projects. Equipment like Junction Boxes and poles deployed under the project scope at the field

locations will be utilized to accommodate field equipment's created under the other future projects of ASCL however the procedure for utilization of the infrastructure will be mutually agreed between the ASCL and MSI.

10. GIS Solution & its Integration- MSI shall undertake deployment of a GIS solution platform and creation of various data layers. Additionally, MSI should undertake detail assessment for integration of the Smart Governance, Surveillance System and all other components commissioned as a part of scope of the project with the Geographical Information System (GIS). MSI is required to carry out the seamless integration to ensure ease of use of GIS in the Dashboards in Integrated Command & Control Centres. If this requires field survey, it needs to be done by MSI. If such a data is already available with city, it shall facilitate to provide the same. MSI should check the availability of such data and its suitability for the project. MSI is required to update GIS maps from time to time.

11. SMS Gateway Integration- MSI shall carry out SMS Integration with the Smart City System and develop necessary applications to send mass SMS to groups/individuals. Any external/third party SMS gateway can be used, but this needs to be specified in the Technical Bid, and approved during Bid evaluation.

12. Integration with existing Payment Gateway: MSI shall carry out the activity of integrating existing payment gateway used by Nagar Nigam Aligarh (NNA)/ ASCL for undertaking transactions.

13. Integration with e-Office solution: As a part of the e-Governance solution, the MSI should integrate the solution with the e-Office solution which would be used centrally by NNA/ASCL for all their file creation, movement & tracking.

14. Integration with e-nagarsewa & other Govt. portal: MSI should undertake the integration with e-nagarsewa portal and other Government/Departmental portal for data seamless transactions.

15. Application Architecture

    a. The applications designed and developed as per the project scope of work must follow best practice and industry standards. In order to achieve the high level of stability and robustness of the application, the system development life cycle must be carried out using the industry standard best practices and adopting the security constraints for access and control rights. The various modules / application should have a common Exception Manager to handle any kind of exception arising due to internal/ external factors. The standards should (i) at least comply with the published e-Governance standards, frameworks, policies and guidelines available on http://egovstandards.gov.in (updated from time-to-time); and (ii) Smart City Guidelines/ Advisories issues by MoHUA and (iii) leading industry standards and (iii) as per standards/ guidelines/advisory issued by MoHUA for smart cities released and updatd time to time

    b. The modules of the application are to be supported by the Session and Transaction Manager for the completeness of the request and response of the client request. The system should have a module exclusively to record the activities/ create the log of activities happening within the system/

application to avoid any kind of irregularities within the system by any User / Application. MSI shall design and develop the Smart City System keeping the following in consideration:

i. The Modules specified will be developed afresh based on approved requirement.

ii. Apart from this, if some services are already developed/under development phase by the specific department, such services will be integrated with the Smart City System.

iii. The user of citizen services should be given a choice to interact with the system in Hindi & English. The application should provision for uniform user experience across the multi lingual functionality covering following aspects:

- Front end web portal in Hindi & English
- E-forms (Labels & Data entry in local languages). Data entry should be provided preferably using the Enhanced In-script standard (based on Unicode version 6.0 or later) keyboard layout with option for floating keyboard.
- Storage of entered data in local language using UNICODE (version 6.0 or later) encoding standard.
- Retrieval & display in local language across all user interfaces, forms and reports with all browsers compliant with Unicode version 6.0 and above.
- Facility for bilingual printing (English and the local language)

iv. Application should have a generic workflow engine for citizen centric services. This generic workflow engine will allow easy creation of workflow for new services. At the minimum, the workflow engine should have capabilities to create process automation having capabilities to print reports, citizen documents, tracking of file/citizen request, etc.

v. The application should have a module for management of digital signature including issuance, renewal and suspension of digital signatures based on the administrative decisions taken by the State. SI shall ensure using Digital signatures/e-Authentication (Aadhar Based) to authenticate approvals of service requests etc.

vi. Transaction & SLA Monitoring Tools

- The SI should be able to measure and monitor the performance of the deployed infrastructure and all SLAs set out in this RFP. More importantly, it should be possible to monitor in REALTIME, the number of citizens touched through e-Services each day, month and year, through appropriate tools and MIS reports.
- The Infrastructure management and Monitoring System shall be used by SI to monitor the infrastructure (Both IT and Non-IT) hosted at the Data centre and DR site.

- For monitoring of uptime and performance of IT and non IT infrastructure deployed, the SI shall have to provision for monitoring and measurement tools, licenses, etc. required for this purpose.

vii. The Smart City Application should have roadmap to integrate with key initiatives of State namely Portal Services, Citizen Contact Centre, and Certifying Authority etc.

viii. Complete mobile enablement of the Smart City System

16. Integration with Smart Applications that would be implemented in future in Aligarh
The solution should have sufficient flexibility and scalability to integrate any Smart solution which may be implemented in future in the city of Aligarh. The Smart City platform should have all the required application & protocol supports that would enable the integration of various smart solution like but not limited to solid waste management, Smart street lighting, water & sewerage management & leak detection, smart parking, Smart education, smart poles, Septage management, Rain water harvesting, Smart electrical & water metering, Intelligent Building Management, smart energy management etc. These integrations should enable 2-way/ bidirectional data communication & control.

Other expectations from SI

1. MSI shall engage early in active consultations with the ASCL, City Police and other key stakeholders to establish a clear and comprehensive project plan in line with the priorities of all project stakeholders and the project objectives.

2. MSI shall assess existing infrastructure's current ability to support the entire solution and integrate the same with the proposed solution wherever applicable and possible

3. MSI shall judiciously evaluate the resources and time planned for undertaking the current state assessment, given the overall timelines and milestones of the project.

4. MSI shall be responsible for supply of all the Products/equipment such as optical fibre cable, Network, Hardware, Software, Devices, etc. as indicated (but not limited to) in the tentative Bill of Materials included in the RFP and their appropriate quantity & capacity.

5. MSI shall be responsible for supply of passive components indicated in the Bill of Materials section of the RFP viz. Housings, Fibre Patch Cords, Racks etc. Civil work required for the site shall be undertaken by the MSI.

6. Validate / Assess the re-use of the existing infrastructure if any with approval from ASCL

7. Supply, Installation, and Commissioning of entire solution at all the locations.

8. MSI shall Install and commission connectivity across all designated locations.

9. MSI shall establish high availability, reliability and redundancy of the network elements to meet the Service Level requirements.

10. MSI shall be responsible for planning and design of the access network architecture (access controllers, backhaul connectivity, routers, switches, etc.) to meet the technical, capacity and service requirements for all smart city initiatives.

11. MSI shall be responsible for upgradation, enhancement and provisioning additional supplies of network (including active / passive components), hardware, software etc. as requisitioned by Authority.

12. MSI shall ensure that the infrastructure provided under the project shall not have an end of life within minimum 6 months from the date of bidding.

13. MSI shall ensure that the end of support is not reached during the concurrency of the contract and 5 years thereafter.

14. MSI shall ensure compliance to all mandatory government regulations as amended from time to time.

15. The MSI shall ensure that all the peripherals, accessories, sub-components required for the functionality and completeness of the solution, including but not limited to devices, equipment, accessories, patch cords (fibre), cables, software, licenses, tools, etc. are provided according to the requirements of the solution.

16. Authority shall not be responsible if the MSI has not provisioned some components, subcomponents, assemblies, sub-assemblies as part of Bill of Materials in the RFP. The MSI shall have to provision these & other similar things to meet the solution requirements at no additional cost and time implications to Authority.

17. All the software licenses that the MSI proposes shall be perpetual software licenses along with maintenance, upgrades and updates for the currency of the contract. The software licenses shall be on the name of ASCL and shall not be restricted based on location and ASCL shall have the flexibility to use the software licenses for other requirements if required.

18. The MSI shall ensure there is a 24x7 comprehensive onsite support for duration of the contract for respective components to meet SLA requirement. The MSI shall ensure that all the OEMs have an understanding of the service levels required by Authority. MSI is required to provide the necessary MAF (Manufacturer Authorization Form) as per the format provided in the RFP in support of OEMs active support in the project.

19. Considering the criticality of the infrastructure, MSI is expected to design the solution considering the RFP requirement of no single point of failure with high level of redundancy and resilience to meet the network uptime requirements.

20. MSI shall be responsible for periodic updates & upgrades of all equipment, cabling and connectivity provided at all locations during the contract period.

21. MSI shall be responsible for setting up / building / renovating the necessary physical infrastructure including provisioning for network, power, rack, etc. at all the locations.

22. MSI is expected to provide following services, including but not limited to:

a. Provisioning hardware and network components of the solution, in line with the proposed authority's requirements

b. Size and propose for network devices (like Router, switches, security equipment including firewalls, IPS / IDS, routers, etc. as per the location requirements with the required components/modules, considering redundancy and load balancing in line with RFP.

c. Size and provision the WAN bandwidth requirements across all locations considering the application performance, data transfer, DR and other requirements for smart city initiatives.

d. Size and provision the internet connectivity for Service Provider network and Network Backbone.

e. Liaise with service providers for commissioning and maintenance of the links.

f. Furnish a schedule of delivery of all IT/Non-IT Infrastructure items

g. All equipment proposed as part of this RFP shall be rack mountable.

h. Authority may at its sole discretion evaluate the hardware sizing document proposed by the MSI. The MSI needs to provide necessary explanation for sizing to the Authority

i. Complete hardware sizing for the complete scope with provision for upgrade

j. Specifying the number and configuration of the racks (size, power, etc.) that shall be required at all the locations.

k. The MSI shall provide for all required features like support for multiple routing protocols, congestion management mechanisms and Quality of Service support.

l. The MSI shall ensure that all active equipment (components) are Simple Network Management Protocol (SNMP) V3 compliant and are available for maintenance/management through SNMP from the date of installation by a Network Monitoring System.

Note:

1) The specifications provided in this RFP are minimum & indicative in nature and carry guiding rule. The MSI is free to offer products and solutions which meet requirements of the RFP focusing on the outcome, future scalability, security, reliability and adherence to specified SLA under this RFP, in line with applicable standards & best practices adopted in the industry. The MSI is encouraged to design an optimized solution which is technically superior, innovative, proven, better in terms of functionality and is cost effective; and

2) MSI has to deploy the all the solutions with disable friendly features with in it to enable the more usage and help all type of users.

3. Detailed Scope of Work

Main objective of this project is to create a Smart City framework using which synergies within and across various departments operating within the city of Aligarh is achieved for efficient city administration. To achieve this MSI shall also ensure appropriate check points are built in the various smart city solutions. This will ensure optimum and efficient delivery of public services to the citizens and visitors of Aligarh city.

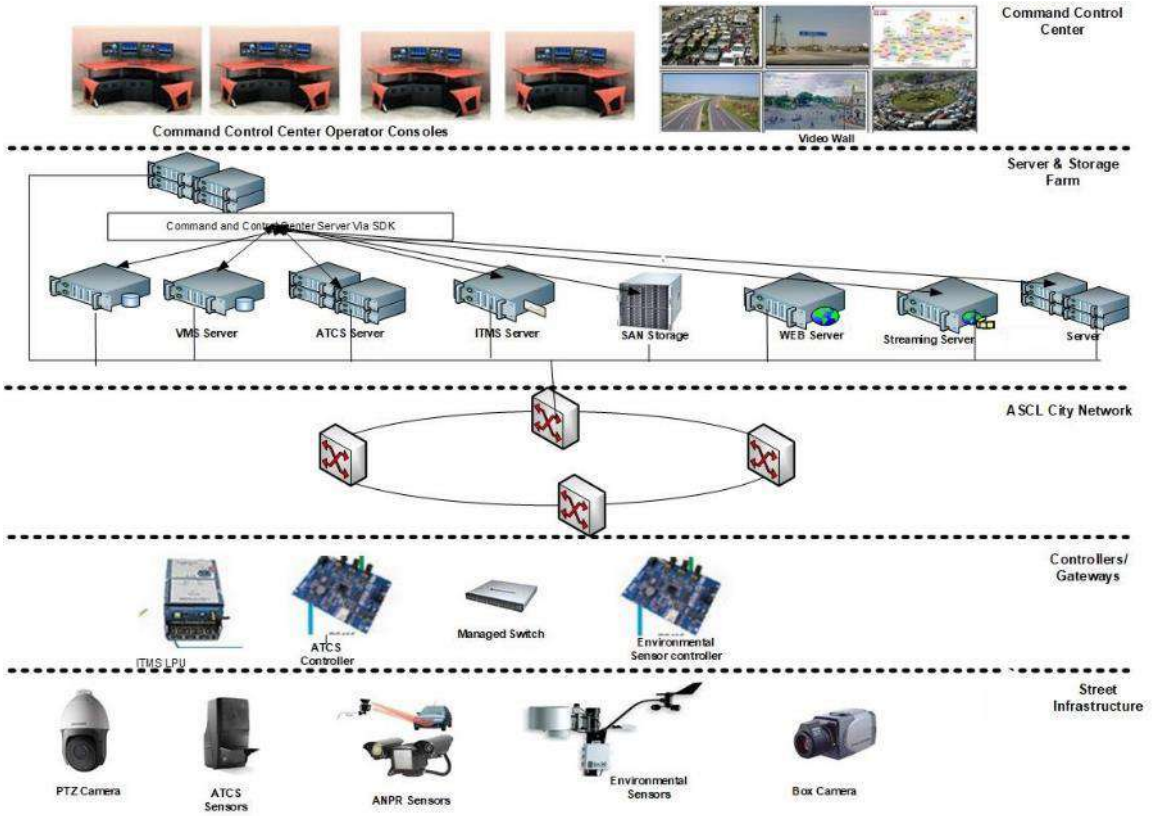
MSI shall be responsible to carry out detailed survey prior to submission of bid for the various components of smart city solution to finalize infrastructure requirement, network bandwidth requirement, operational & administrative challenges, etc.

Following are the broad activities that the MSI is supposed to undertake as a part of the project scope:

1. Project Planning, Execution and Management
2. Assessment and Gap analysis of requirement for all smart city components under scope.
3. Solution Design, System Customization and development for all components mentioned in the scope of work fulfilling all the project requirements & objectives
4. Procurement, installation, deployment and commissioning of ICT and other equipment
5. Site Preparation including required civil work, LAN/WAN Networking
6. Application and general awareness Training
7. Business Process Reengineering for the selected applications/ services, if required
8. STQC Certification
9. UAT & Go live
10. Training & Capacity Building Support
11. Technical Support
12. Operation & Maintenance (O & M) for 5 Years starting from Go-Live date.

3.1. Solution Components

The envisaged Smart City solution stack for the city of Aligarh will have a collection of various smart solution components that is aimed at improving the quality of service delivery and living standards for the people of Aligarh. The various solution components envisioned under the present project scope are detailed in the subsequent sections.



3.1.1. Adaptive Traffic Control System (ATCS)

The city of Aligarh faces a lot of traffic congestion problem. Some of the typical traffic related issues is Aligarh can be summarized as:

1. Traffic congestion and huge waiting time
2. No Priority for emergency vehicles like ambulance, police, etc.
3. VIP movement clearance
4. Lack of information on prominent & frequent traffic congestions both location wise and time wise for city authorities
5. Absence of real-time traffic and congestion information to the public
6. Absence of central control mechanism to monitor & regulate the city traffic flow

   Multiple initiatives are being undertaken as a part of the Smart city initiative which includes but not limited to junction improvement, carriageway improvement, implementation of ATCS solution to name a few.

ASCL intends to implement an Intelligent Traffic Management System within the existing landscape using various smart traffic based solutions like ATCS, RLVD, SVD, and ANPR to:

1. Automate the process of traffic management by optimally configuring traffic junction signals on real time basis
2. Minimize traffic congestions and waiting time

3. Centrally controlled traffic management system to ensure smooth movement of emergency services like ambulance, police etc.
4. Increase Traffic Signal Efficiency
5. Improve Journey Time Reliability
6. Managed & coordinated VIP movements
7. Availability of traffic data to further analyses and optimize the traffic flow
8. Real Time Incident Message and Advisory Messages to citizens
9. Improved Traffic Regulation

The primary objective of the Centralized Adaptive Traffic Control System software is to remotely monitor & control Traffic signals, using a traffic responsive strategy based on real time traffic conditions and traffic queue at each arm of a junction to reduce the overall waiting time. Junction level Traffic controller shall be interfaced with vehicle detectors to count number of vehicle present at junctions. ATCS shall in real time respond to vehicle density and remotely respond by updating traffic timings. The ATCS shall be used for effective traffic management. It can receive real time vehicle data from the outfield equipment, allow its monitoring and to generate and issue control commands by the Operator.

Critical Consideration to be kept in mind while deploying the ATCS solution are as follows:

1. Performance: The performance criteria would be as per the IRC guidelines with an aim to reduce average waiting time at each junction.
2. Scalable: The ATCS solutions should be scalable to accommodate future addition of more junctions. The network infrastructure (routers, switches, servers, etc.) should be provisioned and configured to support these scalability requirements. Similarly, the last mile connectivity should also be upgradable to meet the future requirements.
3. Secure: The ATCS should have built-in security features for data communication so that data communication happens in a controlled fashion. Mechanisms for controlled access should be implemented at all levels. CRC check, data integrity protocol should be employed to prevent attacks from hackers and secure the systems effectively.
4. Manageable: The entire network should be seamlessly managed with centralized network management software. All the network components should be manageable using open standard management protocols such as SNMP
5. Fault tolerant and resilient: The ATCS controllers should have built-in redundancy features to provide high availability. In event of loss of connectivity, the proposed controller should have timing plans stored local as to function without any downtime.
6. Intelligent: The network should be configured with the required QoS features to prioritize traffic based on the application and handle the traffic accordingly.
7. Interoperability: All controllers should be flexible & easy to configure with significant interoperability.

Designing, Integration & Maintenance of ATCS by the MSI shall consist of following activities:

1. Preparation of Solution Architecture and Gap Analysis

2. Installation of vehicle detectors, controllers and other required accessories for successful operation of the ATCS for ASCL.

3. Installation of ATCS software application as per requirements specified in the RFP.

4. Procurement and supply of necessary software required for successful functioning of the ATCS sub module.

5. Integration of ATCS infrastructure with existing traffic applications

6. Configuration of traffic signal at each junction along with development of signal control plan for individual operations, coordinated signal plan for junction in sync with area wide signal plan for different operating conditions. Operating conditions may include peak, off-peak conditions, special events, contingency plans etc.

7. MSI shall supply, install, commission and maintain the following

i. Adaptive Traffic Management System (ATCS) – Vehicle detectors, Signal controller, Traffic light aspects & poles, power supply and related accessories and associated civil work including cabling for successful operation of the system

ii. Provide software platforms in Data Centre (DC) /Disaster Recovery Centre which would aggregate incoming data streams onto a single platform provide traffic flow estimates for near term future on a real-time basis and assist in analysing impact of alternate traffic management strategies.

iii. Develop individual signal control strategies including definition of signal grouping, setting of potential strategies for traffic control under various scenarios, specification of traffic management strategies for planned and unplanned events

iv. Develop a consolidated database of incoming real time data for future analysis and evaluation purposes. It is envisaged that the proposed adaptive traffic management system will incorporate historic trends for development of traffic management strategies and adaptive control strategies.

v. Field Equipment: Design, Supply, Installation, Commissioning and Maintenance of all the components required for the commissioning of the ATCS solution

vi. Develop the Standard Operating Procedure (SOP) for managing the systems in consultation with Police Dept. of Aligarh and get the approved by Police Dept. & ASCL

Minimum Solution Requirements for ATCS solution component

General:

1. The system would be used to monitor and control traffic signals, including signalized pedestrian crossings, using a traffic responsive strategy based on real-time detector data.

2. All signal controllers under ATCS shall be provided with inputs from non-intrusive vehicle detection sensors for detecting traffic state and communicating demand data to central ATCS server and to receive control instructions on the control strategy in near real-time.

3. The system should be extensible to add more signals whenever required.

4. Existing infrastructure at the junctions that might help in traffic control (e.g. ANPR cameras, CCTV cameras etc.), where possible, should be integrated with the proposed ATCS.

Traffic detectors:

1. Non-intrusive video based traffic detectors for detecting traffic demand on major road approaches to junctions

2. It shall provide presence detection for all the lanes in a junction

3. The detector shall be able to detect the presence of vehicles near stop-line in non-lane based mixed traffic flow conditions.

4. It shall provide both non-directional and directional detection for all the arms of a junction with capability for user configured for each traffic zone.

5. The sensor firmware shall be capable of being upgraded after installation.

Traffic signal controller:

1. The controller should support the required number of phases and stage for 3-way, 4-way and 5-way junctions for operation during different times of the day and day of the week and for special day types

2. The ATCS controller should define common inter-green period formed by the clearance Amber and Red extension period. It shall also be possible to program individual inter-green period.

3. The controller shall have a facility to list all conflicting phases at an intersection. After configuration, a traffic engineer shall verify that the signal aspects are functioning as expected for all signal plans before go live.

4. During power up the controller shall initially execute the Flashing Amber / Flashing Red plan.

5. Fault monitoring should be available for the traffic controller and the signal aspects under all modes of operations. The fault data should be communicated to the central ATCS server in near-real-time.

6. A hardware failure leading to a conflict condition (due to faulty devices or short circuit in the output) shall force the signal into Flashing Amber/ Flashing Red. The conflict data should be communicated to the central ATCS server in near-real-time.

7. The controller shall be able to interface with a wide variety of detectors having industry standard open collector interface.

8. The controller shall support the following modes of operation:

i. Fixed time mode - the controller shall execute a pre-set signal plan based on the time of the day and day of the week. Signal timings will not be modified dynamically using real-time traffic detector data under this mode.

ii. Vehicle Actuated (VA) mode - the controller shall execute a pre-set VA logic and not have fixed stage durations. The green time for each stage shall be bound by the constraints of specified minimum green and maximum green times. The actual green time would be determined based on the vehicular demand obtained from the traffic detectors at the given approach and conflicting approaches using VA logic.

iii. ATCS mode - the controller shall execute optimized signal timings determined by the ATCS application in the control centre using inputs from traffic detectors, including cycle time, splits and offsets. The traffic signal controller can optionally have the ability to locally override the signal timings determined by the central ATCS.

9. The controller shall provide either a fixed operator console or support a portable one to allow traffic engineers to program the controller on-site.

10. No proprietary protocols shall be used for communication between the traffic signal controller and ATCS server.

ATCS Application:

1. The ATCS application should determine optimal signal timings dynamically using near real time detector data for a group of junctions using any suitable algorithm. The system should be able to determine a common cycle time for a group of junctions, splits and offsets between adjacent signals.

2. The application should support selective vehicle priority for movement of buses and other important vehicles such as ambulances, fire engines etc. To avoid queue build-ups, the system shall also provide compensated green to the other stages after the passage of a priority vehicle

3. The application shall allow specification of green corridors for movement of Emergency Response vehicles, such as ambulances, VIP vehicles, fire engines and police vehicles.

4. The application support interfacing with a commonly used microscopic traffic simulation software for pre and post implementation analysis and study of the proposed ATCS control strategy.

5. The application shall optionally be able to estimate a common operational view of the network state by fusing data from multiple sources such as detectors or any other such data collected from other third party sensors/detectors/cameras.

6. The application should be capable of operating in the following minimum four modes:

i. Fixed-time mode: This mode should enable traffic police personnel to select and run fixed-time traffic signal timing plans using the ATCS interface available in the ICCC. The signal timing plans should be able to support fixed offsets between pairs of adjacent traffic signals.

ii. VA mode: Individual signals should be able to run on stand-alone VA mode.

iii. Fully adaptive mode - tactical: Signal timings for a group of junctions should be dynamically optimized using near-real-time detector data.

iv. Remote operation: Traffic police personnel should be able to remotely control (change stages) using the ATCS interface from the control room.

7. The application shall have a Graphical User Interface (GUI) which can be integrated with the centralized GIS system that would be installed as a part of the project and shall display the road network and the traffic signals, traffic cameras/detectors, Variable Message Sign boards and Public Address systems deployed.

8. The GUI shall provide:

i. Flexibility to the operators to zoom and navigate with ability to interact with objects on the map.

ii. Interoperability across multiple platforms.

iii. Web browser based access, requiring no local setup on the

iv. Graphically present signal plan execution and traffic flow at the intersection on a desktop

9. The GUI shall have the following features:

i. User login – Operator authentication shall be verified at this screen with login name and password.

ii. Network Status Display – This online display shall indicate with appropriate colour coding on site map whether an intersection under the ATCS is online or off. On double clicking the intersection a link shall be activated for the traffic flow display for the intersection.

iii. Traffic Flow Display – This online display shall indicate the current traffic flow with animated arrows, mode of operation, stage number being executed and elapsed stage time.

iv. Saturation Snapshot – This display shall show the current saturation levels of all intersections in a corridor.

v. Reports Printing / Viewing – This link shall allow selection, viewing and printing of different reports available under ATCS.

vi. Time-Space Diagram – The time-space diagram shall display the current stages being executed at every intersection in a corridor with immediate previous history. Junctions shall be plotted proportional to their distance on Y-axis and time elapsed for the stage in seconds on X-axis.

10. ATCS application shall graphically show the execution of the signal plans, in near-real-time.

11. The ATCS system shall support generation of various reports which includes but not limited to Stage Timing report, Plan Change Report, Cycle Timing report, Mode Change Report, Mode switching report, Lamp Status Report, Power on & down, Loop Failure Report, Corridor Performance Report, Corridor Cycle Time Report etc.

3.1.2. Red Light Violation System (RLVD)

Red Light Violation Detection (RLVD) system is a system for capturing details of vehicles that have crossed the stop line at the junction while the traffic light is red. System shall be able to automatically detect red light through evidence camera units and other equipment. The information so captured shall be used to issue challans to the violators. MSI shall describe in detail, the design, operational and physical requirements of the proposed Red Light Violation Detection system, to demonstrate compliance with all the specified requirements mentioned in this RFP.

RLVD solution shall have an overview camera to capture the zoomed out picture of the entire area when there is a red light violation. Light sensors shall be placed to detect the change in traffic light. Once the traffic light has turned red, the sensors shall activate the camera to capture images of the vehicles that jumped the traffic light.

RLVD system, in case of an offence detected, shall capture details such as site name, location details, lane number, date & time, registration number of vehicle (using ANPR system) and type of offence on the image itself. The system shall also be able to generate number of reports for analysis such as the traffic light with maximum offenders, peak time of traffic offence and other reports in discussion and as per the customization requirement of the ASCL. The RLVD system should provide sufficient evidence which can be produced for generating a challan for the offender.

The RLVD system should be capable of the following:

a) The RLVD system should use the Video/Image processing techniques to identify the red-light violations and generate supporting video evidence as proof.

b) The RLVD system Including ANPR capabilities should be integrated with the various application and Databases like VAHAN, and e-Challan application (to be developed under this project) etc. such that e-Challans can be generated by the system through an automated process.

c) The RLVD system and related videos as well as the surveillance video feed should go to the central control rooms, wherein the Red-Light violation and its Number plate detection shall take place in real time.

d) The system should be capable of identifying & capturing of vehicles traveling through a signalized intersection during the ‘red’ signal phase during 24x7 (both day and Night) and recording a series of violation images that track the whole violation event.

e) The system should be able to capture the image of the violating Vehicle along with the active Red Light, as a proof of the violation.

f) The system should be able to perform OCR (optical character recognition) of number plates (Read and Detect) written in English with character in standard or non-standard fonts, unusual characteristics like Different size characters, font, colours, special characters etc.

g) The system should be able to do simultaneous monitoring of multiple lanes and should be able to identify multiple Red Light Violations simultaneously within the same lane/ Road.

h) The RLVD system has to be integrated with the Red Light Signalling System controlled and should be able to sense the Red-light signal and identify violators based on it.

i) The System should be able to identify and log Red Light Violations with minimum accuracy as per the SLA mentioned

j) The System should be able to read and identify the Registration plate of the vehicle violating the Red Light through the ANPR system.

k) The system should be able to generate various MIS reports like vehicle(s) made rule violations, Vehicle details, violation type along with date and time stamp, week / Month / Year wise reports.

l) The bidder should develop the SOP for the system in consultation with Police Dept. and get the same approved by Police Dept. & ASCL

3.1.3. Speed Violation Detection System (SVD)

MSI shall provide Speed Violation Detection (SVD) System using which any vehicle violating the maximum speed defined for a stretch of road can be identified. The SVD system should use radar & camera based speed violation detection system that can be produced in the court of law in case of any litigation.

The SVD system would be installed at strategic stretches of road over speeding is encountered. The SVD system should work in conjunction with the ANPR system which would also capture the details of the vehicle violating the traffic rule.

3.1.4. Automatic Number Plate Detection System (ANPR)

MSI shall provide Automatic Number Plate Recognition (ANPR) solution at the identified locations. MSI shall describe in detail, the design, operational and physical requirements of the proposed ANPR system, to demonstrate compliance with all the specified requirements in this RFP.

ANPR cameras shall provide the feed to the command control Centre, where the ANPR server shall be located. The ANPR server shall process the image using OCR software for getting the registration number of the vehicle with highest possible accuracy. The system shall be able to detect, normalize and localize the image of the number plate for detection of alpha numerical characters. System shall be able to identify stolen/ suspected vehicles by cross checking the numbers with vehicle database like VAHAAN. ANPR software shall be integrated with video management system.

ANPR system shall provide a user interface with live view of vehicle entry point 24x7, event notification, image captured, number detection and recognition, event reports customized report generation etc. The analysis of image captured shall be done in real time. Database so created from the images captured & analysis shall store the following:

1) Details of vehicle
2) Number and time of entries and exits
3) License plate numbers
4) Validation/Analysis results etc.

The ANPR System should be capable of the following:

a) The proposed ANPR System shall enable monitoring of vehicle flow. The system shall support real-time detection of vehicles, reading of its number plate and conversion of the same into alphanumeric text.

b) The proposed system should be able to generate an auto alarms /alerts based on the vehicles status and category as specified by the database.

c) The proposed ANPR system has to be integrated with various Applications/ Databases of the application of the Police/RTO department, e- challan etc. for verification/checking and fetching the required vehicle information.

d) The proposed system should be able to store the image of vehicle, number plate and also able to create a record of vehicle no., Date & time stamp, locations etc.

e) The proposed ANPR system and related videos as well as the surveillance video feed should go to the ICCC and Police control room (if desired by ASCL) whereas the processing and recording of the video footage of ANPR shall take place at intersection itself.

f) The proposed System should be able to detect and recognize the English alphanumeric License plate in standard fonts and formats of all the vehicles.

g) The proposed system should be capable to perform OCR (optical character recognition) of number plates (Detect and Read) written in English and Hindi language with character in standard or non-standard fonts, unusual characteristics like different size characters, font, colours, special characters etc.

h) The system database should allow to advance search the database with different set of criteria while conducting post incident analysis/investigations.

i) The proposed system should be able to generate various MIS reports like vehicle flow, detected vehicle category wise reports, change in vehicle status etc.

j) The system should be able to plot the camera locations on to the city map in case of any stolen/suspected/wanted/Hot listed vehicle has been identified at any or multi camera

locations, such that the pictorial view of the data on the map gives a meaningful insight to the alert generated and the monitoring of the same can be done in a better way.

3.1.5. e-Challan System

The objective of E Challan application is as follows:

1) Issuing challan for traffic violations to a traffic violator

2) Maintaining details pertaining to all activities of Traffic circles/violations/violators.

3) Providing requisite information to traffic management officials as and when required.

4) Generating various statutory reports for administrative use and functioning of Traffic unit in matters of prosecution of violators and monitoring functioning of field officers.

5) Integrating and networking the system with state-of-the-art hardware and application software for Traffic Police to access and use information in their day-to-day work.

6) E-Challan System should allow for spot payment of fines using Hand-Held Terminal

7) e-Challan System should integrate with RTO databases like VAHAN and SARATHI for getting vehicle related information

Functional Requirements of E Challan System

a. E-challan software shall work in client-server mode, where the handheld (HH) devices units, workstation units will act as clients connected to the server through cellular network for data transfer.

b. E-challan system shall be able to retrieve vehicle owner details and vehicle data from RTO data base to minimise data entry

c. E-challan system shall be able to retrieve vehicle registration details and driving license details

d. It should be integrated with the all the required databases/systems for auto generation of e-Challan like RTO system, VMS system and other required resources.

e. Server should maintain log of all current devices. Any access to the system must be recorded along with date, time, user ID and IP address

f. Traffic officer should log in to the handheld device through the unique user ID and password or smart card issued for the purpose

g. A unique challan number should be generated through client software for each challan

h. As soon as a vehicle registration number is entered, the Handheld device should automatically check from the server if the vehicle is stolen, wanted in any criminal case or is in the list of suspicious vehicles.

i. The most frequent traffic offences should be kept at the top in the drop down menu and offence ingredients should be available if required by an officer.

j. Date, time and GPS coordinates of place of challan should be automatically populated in the relevant fields of client software

k. Compounding amount must populate in the field automatically from master table

l. MSI should develop GUI and functionality as per requirements of Traffic Police

m. GUI should be Multi lingual i.e. English and Hindi

n. It should be possible to integrate, as an enhancement when required, for integration with payment gate way for facilitation of payment

o. Application Software should work in a web based environment.

p. Application software should be user friendly, easy to operate

q. Software must provide comprehensive data back-up and restoration capability.

r. System will function in web-based system where the hand-held device shall work as a node.

s. Application software should maintain logs of user activities to facilitate audit trail.

t. Software should be able to generate various periodical reports, summaries, MIS reports, query reply, etc. as per the requirements of Traffic Police.

u. Administrator should be able to modify the master tables as and when required and should have the capability to push the changes to hand-held devices.

v. All database tables, records etc. required for various dropdown menus etc. shall also be created by the vendor.

w. Application software is to be provided by the vendor to handle various processes of the prosecution required by the office of senior police officers, courts, etc.

x. MSI to ensure that e-Challan System is able to integrate through available APIs with third party applications which are available by Government of UP and follow guidelines of MORTH (Ministry of Road Transport and Highway)

y. The successful bidder is required to handover/submit source code, Sops, documents, FAQ along with all the patches and upgrades of the system. Client will use the source code for keeping

system up and running on completion of contract duration and it will not be used for any commercial purpose.

Hand Held Devices

1) Once the application is loaded on the hand-held device there should be no possibility to modify the application by the user. Reloading and modifying of application should be possible only by an administrator.

2) On switching on the hand-held device, the system must give access only after validation through user ID and password.

3) The communication between the server and hand-held device would be through GSM/GPRS/ 3G or better connectivity etc.

4) Every challan created must have a unique self-populated number.

5) HH application must be able to access information from the main Server and display upon request, pop- up tables/codes, vehicle and license details, all types of offences, compounding amount, challan types, vehicle details, court calendar etc. to minimize the typing by the prosecuting officer.

6) HH device should be able to access data/ information on the basis of driving license number, vehicle registration number etc. from the main server data relating to previous offences.

7) HH application software should also suggest date of challan, place of challan, name of the court and court date, etc. to further reduce typing by the officer. These fields should be designed in consultation with Traffic Police Dept. of Aligarh.

8) When a challan is issued, the name and ID of the officer should be printed on the challan.

9) HH device must be able to input and print multiple offences on the same challan.

10) HH software must validate challan fields automatically before the challan is printed. The system must ensure that certain fields are properly completed before allowing the challan to be printed.

11) When downloading application software or pop-up tables or lists to the HH, or uploading challan records to the Server, synchronization of HH system must be automatic, to minimize human intervention.

12) Uploading data to the Database Server should be automatic in consistent manner.

13) Application should provide features wherein when a driving license/ vehicle registration number is entered; it should be able to pull from the server all the details relating to the driving license holder/ vehicle owner including history of previous offences.

14) Software should capture the list of documents seized during prosecution and such list must be reflected on the printed court challan.

15) HH application software shall allow the user to generate a summary report to facilitate evaluation of his daily work.

16) Once the challan is complete and saved any further editing should not be possible unless so authorized by administrator.

17) Each hand-held device should be provided with original printed user manual and appropriate carry case for HH device with charger.

18) Application software should allow secured online payment and direct payment at HH device

19) There should be automatic rejection of payment for the settlement of expired notices or challans. Partial payment of an offence must not be accepted by the system.

3.1.6. Variable Message Board (VaMS)

Variable Message Signboard (VaMS) shall be installed at identified strategic locations as mentioned in Annexure A. The VaMS shall communicate information & guidance about traffic, diversions, etc. to the citizens / public on the road. They shall also be used for showing emergency/ disaster related messages as and when required. The MSI shall describe in detail the design, operational and physical requirements of the proposed Variable Message Signboards to demonstrate compliance with all the requirements in this RFP.

VaMS shall be managed and operated from the ICCC, handled by a server where information in the form of data messages shall be fed in a manner to be displayed on a specific VaMS installed at a particular location or across all locations. The VaMS boards shall be viewable from a distance of 100 m and various angles on the road. For installing VaMS Signboards, the MSI shall provide required mounting structure as per NHAI (National Highway Authority of India) guidelines.

3.1.7. Emergency Call Box System (ECB)

1) A high quality digital transceiver, to be placed at certain key locations as mentioned in Annexure A. Emergency call box (ECB) forms part of safety and communication infrastructure. ECB system is a necessary link in the attendance chain to emergency services and other road side assistance. These high quality digital transceivers shall be placed at the identified traffic junctions.
2) These units shall preferably have a single button which when pressed, shall connect to the Integrated Command and Control Centre for direct interaction with the ICCC

3.1.8. Public Announcement System (PA system)

Public Address system shall be used at intersections, public places, market places or those critical locations (As per Annexure A.4) as identified by ASCL to make important announcements for the public. It shall be able to broadcast messages across all PA systems or specific announcement could be made to a particular location supporting single zone / multi zone operations. The system shall also deliver pre-recorded messages to the loud speakers attached to them from CD/DVD Players & Pen drives for public announcements.

The system shall contain an IP based amplifier and speaker system. The system shall also contain the control software that could be used to control/monitor all the components of the system that includes Controller, Calling Station & keypad, Amplifier (Mixing & Booster). The MSI shall describe in detail the design, operational and physical requirements of the proposed public announcement system to demonstrate compliance with all the requirements of RFP.

3.1.9. Environmental sensors

Smart environment sensors will gather data about pollution, ambient conditions (light, noise, temperature, humidity and barometric pressure), weather conditions (rain), levels of gases in the city (pollution) and any other events on an hourly and subsequently daily basis. It is for information of citizens and administration to further take appropriate actions during the daily course/cause of any event.

Functional Specifications

1) The environment sensors should have the following capabilities:

I. They should be ruggedized enough to be deployed in open air areas, on streets, roads, parks etc.
II. They should be able to read and report at least the following parameters: Air- Quality, Sun Light, Noise, Weather conditions etc.

2) Smart environment sensors will notify and allow citizens and administrators to keep a check on their activities which impact the environment and enable the city to take remedial action if required.

3) The data should be collected on a data analytics application server housed in the ICCC. Various environment sensors shall sense the environment conditions and send the data to the integrated control system where real time data resides and the same shall be made available to various other departments and applications for decision making. The platform must include intelligent analytical engines that make information meaningful to all stakeholders and helps ease decision making.

4) In a situation where environmental deterioration crosses a threshold limit set by the concerned authorities in the software system, the system should be able to notify the concerned authorities of various departments by means of SMS and E-mails.

5) The sensor management platform should allow the configuration of the sensor to the network and also location details etc.

6) The sensors should be able to be managed remotely. This includes sensors being updated with calibration parameters and software upgrades.

7) Apart from information provision, the sensors must ensure data is transmitted securely and have security measures from sensors to the software platform. It must also ensure tamper alerts are provided in cases of vandalism, security breaches, etc.

3.1.10. City Surveillance

Aligarh Smart City Limited (ASCL) has envisaged state-of-the art city surveillance as a part of the Smart City initiative. In concurrence with the vision of delivering services to the citizens in a fast, efficient and timely manner, Surveillance system which would also support for emergency Services like, police assistance, reporting of crime & accidents, medical assistance in case of road accidents, reporting of fire etc.

Below are the critical design aspects which are mandatory for the design of the security & Surveillance solution for the city of Aligarh:

a. All fixed and PTZ cameras at each junction will be interconnected switch, which will further be connected to fibre network connecting to the ICCC.

b. Video stream from all the cameras will be transmitted through the ASCL network to the datacentre.

c. Video cameras at the Junction will be managed by the Video management system hosted in the datacentre and the video stream will be stored in the storage area network.

Storage of Video Feeds on SAN (Primary Storage & Secondary Storage)

All the camera feeds would be recorded in the Primary Storage for minimum 30 days on 25 FPS and full HD with H.264/265. MSI also needs to keep incident/flagged video data and non-video data (ANPR, RLVD, SVD, FRS, Incidents, e-Governance etc.) for 90 days in primary storage. In addition to that, MSI should also provision for additional 5% of space in primary storage.

All incident/flagged video data and non-video data (ANPR, RLVD, SVD, FRS, and Incidents etc.) should be available on secondary storage for additional 90 days. MSI is expected to provision secondary storage for e-Governance related data for complete duration of contract including O&M phase.

The DR site would have 50 % capacity for compute, storage & video feeds.

Video Management System – Functional Specifications

Video Management System (VMS) shall bring together physical security infrastructure and operations and shall use the IP network as the platform for managing the entire surveillance system. End users shall have rapid access to relevant information for analysis. This shall allow operations managers and system integrator to build customized video surveillance networks that meet their exact requirements. Software suite shall be a scalable and flexible video management system that could be easily managed and monitored. Scalable system shall permit retrieval of live or recorded video anywhere, anytime on a variety of clients via a web browser or any other suitable mode.

Video management server, on which the VMS is hosted upon, shall run seamlessly in the background to manage connections, access and storage. Video management server shall either accept directly or indirectly the feed from IP Camera installed at field locations. Server shall stream incoming video to a connected storage. VMS shall support directly or indirectly video IP fixed colour / B&W cameras, PTZ / Dome cameras, Multi-sensor Cameras, infrared cameras, low light/IR cameras and any other camera that provides a composite PAL video signal.

Video management software shall have but not limited to following components: -

a) CCTV Camera Management: enables management of cameras associated with VMS.

b) Video recording, retrieval and archiving: manages live camera viewing, recording of live feeds for future review, search and retrieval of recorded feeds and archiving of recorded video feeds for optimum utilization of resources.
c) Video Analytics (VA) alert management: enables defining of rules for handling of alerts using the VA handling of events as per the defined rules.
d) MIS and Reporting: provides users with business analytics reporting and tools to organize evaluate and efficiently perform day to day operations.
e) Security and Roles: manages role definitions for internal & external access.

General Requirement: -

1) VMS shall be Codec and IP camera agnostic such that it can support devices that are not supplied by manufacturer/developer of VMS software and Codec hardware.

2) VMS shall support tamper detection for all cameras to warn of accidental or deliberate acts that disable the surveillance capability.

3) For alarm interfacing requirements, VMS shall allow selection of minimum five (5) cameras per single alarm source. The designated primary camera shall be automatically displayed as a full-screen image on the main GUI CCTV screen. VMS shall also, on alarm, present associated pre/post event video allowing the Operator to assess the alarm cause. Other associated cameras, when called up, shall be displayed as split-screen images on the other monitor of the operator workstation.

4) When viewed on GIS map, text description of each camera shall be capable of being positioned anywhere on the monitor screen, on a camera by camera basis, shall afford options for size variations, and display with a flexible solid, semi-transparent or transparent background.

5) Playback of any alarm related video, (including pre and post alarm video) shall start at the beginning or indexed part alarm sequence.

6) Video management software shall incorporate/integrate online and offline video analytics.

7) System shall provide the capability to select duration and resolution of storage by camera, time and activity event and user request. Frequency/trigger of transfer shall be configurable by user.

8) System shall provide the capability to digitally sign recorded video.

9) Live video viewing: System shall allow the viewing of live video from any camera on the system at the highest rate of resolution and frame rate that the camera shall support on any workstation on the network.

10) Video clips of specific events via Video Analytics or by operator action shall be capable of being separately stored and offloaded by operator with appropriate permissions on to recordable media such as CD or Write Once Read Many (WORM) together with any associated meta-data for subsequent independent playback.

11) Recorded video viewing: System shall allow the viewing of recorded video from any camera on the system at whatever rate the camera was recorded.

12) System shall provide the capability to manage the video storage to allow selective deletions, backups, and auto aging.

13) VMS shall have an extensive reporting capability with ability for administrator to define reports in a user-friendly manner. The pre-existing reports shall include, but not limited to, the following:

I. Reports on alerts received by type, date and time, location

II. Reports on system errors and messages

III. Reports on master data setup including cameras, decoders, locations

IV. Reports on cameras health check

V. Reports on audit trails such as user actions

VI. Reports on system health including storage availability, server performance, recordings

14) VMS shall provide support in MPEG4 or H.264/H.265 for monitoring of dual streaming devices. Therefore, it shall automatically select the most appropriate stream from the edge device in accordance with the workstations/decoder performance and network bandwidth.

Integrated Map/GIS Functionality

System shall support a mode of operation whereby a map of all or part of the map (at operator request) is displayed on a separate or same screen and that status information can be provided via an icon, and access to any cameras shall be accessible by means of an icon on that screen.

1. These Maps shall be defined so that an operator may select from the same source of mapping that is available to the other systems within the command control Centre, displaying whichever Map or section the operator needs, and it shall be displayed within one (1) second.
2. VMS shall allow the user to “drag & drop” a camera or any other sensor from the map area to a video window or to click on a camera to start viewing it in a pop-up window.
3. The map supported formats shall be: BMP, GIF, JPG, PNG and TIFF.
4. VMS shall allow the user to perform operations on cameras or any other sensors that are placed on a map.

User Management Functionality

1. MSI shall request a detailed User Prioritization List (UPL) during the project.
2. Over and above user priority, users shall be enabled for following in varying combinations:
    a. Image viewing
    b. Image recording
    c. PTZ control
3. In addition, control location shall be prioritized such that command control Centre has full control of all functions and priority one override over all other locations.
4. UPL shall enable programming of CCTV management system with agreed user prioritization.
5. Within the hierarchy, each user’s log-on password shall not only allow access to varying levels of system functionality, but shall provide for relative priority between users of equal access rights.

Operators in above groups shall be individually allocated a priority level that allows or denies access to functions when in conflict with another operator of lower or higher priority level.

Recording Functionality

1. All images shall be recorded centrally as a background process at configurable parameters.
2. It shall not be possible to interrupt, stop, delay or interfere with the recording streams in any way, without the appropriate user rights.
3. Pre and Post Event (PPE) recording clips shall be provided by the VMS and retrieved from the central video archive on the buffer storage system. This PPE stream shall be totally independent of the background recording stream provided to the central video archive such that central video archive recording, as programmed, continues under all circumstances.
4. In the event of a trigger, VMS shall capable that the programmed sections of pre and post event video are immediately presented to the Operator to complement alarm display and simultaneously saved as an identified indexed video clip, complete with time/date stamp, in a reserved and protected area of storage system. Such PPE recording shall then be capable of retrieval via search criteria.
5. CCTV recording system shall enable Pre and Post Event (PPE) recording, presentation and storage, initiated automatically in response to system alarm sources received by the VMS.
6. Once tagged and saved, the PPE video clip shall NOT be overwritten except by an operator with the required permissions i.e. it is excluded from the normal FIFO regime of the bulk storage system. Recording shall also be initiated on-demand by manual triggers from system operators e.g. keyboard key-stoke. Manual or on demand recording: -
    a. Recording shall also be initiated on-demand by manual triggers from system operators e.g. keyboard key-stoke (subject to user rights).
    b. System shall allow for an operator to initiate recording on any live stream being viewed.

Integration requirements

1. VMS shall be integrated with the Command and Control System via SDK/API. All events and alarms that occur with the VMS and its sub systems will be available in the Command and Control System as required based on the SDK/API integration.
2. Alarm linking between VMS sub-systems shall be done at VMS sub-system level to, for example, call up relevant pictures to screens and move PTZ units to pre-set positions in response to alarm and activate video recordings, modifying recording parameters as necessary.
3. All OPC software shall be fully compliant with the OPC specification as set down by the OPC foundation. Any software or products which are not compliant shall be highlighted in the Technical Proposal return. MSI shall indicate in the technical proposal return how the OPC interface shall be implemented.
4. If an OPC interface cannot be provided, an alternative solution shall be provided for this data

5. Using a standard open protocol and confirmation as to how this shall be implemented shall be provided in the technical proposal return.
6. If an SDK solution is provided the system shall allow reconfiguration by (City) and end users without recourse to special languages. A system SDKs shall be supplied with all required supporting software to allow the integration of the system with new devices and systems.
7. Either OPC or SDK shall manage interface between VMS, GUI and other City Management systems as required.
8. OPC or SDK shall allow the operator workstations to control the VMS irrespective of the vender chosen by duplicating all control functionality of the VMS used for normal day-to-day activities.

Video Analytics – Functional Specifications

Surveillance system shall have capability to deploy intelligent video analytics software on any of the selected cameras. This software shall have capability to provide various alarms & triggers. The software shall essentially evolve to automate the suspect activity capture and escalation; eliminate need of human observation of video on a 24x7 basis.

Analytics software shall bring significant benefit to review the incidences and look for suspicious activity in both live video feeds and recorded footages.

Type of video analytics that shall be supported on identified cameras are:

I. Attribute Based Search
II. Loitering detection
III. Improper Parking
IV. Camera Tampering
V. Abandoned objects detection
VI. Tripwire/Intrusion
VII. Motion in the zone, user-defined with any polyline
VIII. Motion from one area to another

3.1.11. Drone based Surveillance

Aligarh Smart City Limited intends to adopt new technological innovations for enhancing the efficiency in the maintenance and management of city level security & surveillance Hence, the envisaged security & surveillance paradigm of Aligarh will explore the possibilities of airborne survey and surveillance. The purpose of the project is to demonstrate the technical viability and cost-efficiency and functional efficiency of drone based surveillance.

Aligarh being an old city has got areas with high density of population and poor road infrastructure. These congested areas often present challenges for active surveillance & monitoring. In addition to this there are certain pockets of Aligarh city which are sensitive in nature. Hence with this backdrop it is

proposed that drone based surveillance should also be a part of the Smart city security & surveillance initiative.

Drones are airborne systems providing advanced surveillance solutions that can be used by law enforcement agencies to monitor situations like large scale crowd gathering, processions, Strike, Rasta-roko and similar surveillance purposes wherein the incidents like stampede (A group of people or Animals run in uncontrolled ways), chaos (unpredictable or random behaviour). etc., may happen causing irrevocable aftermath.

Remote-controlled drone could be flown to incident locations and scenes of accident. A high resolution camera would be mounted on the drone that can rotate to have a complete 360° view of the ground and the data is transmitted to the command control room providing a real time awareness of the situation thus facilitating the authorities to assess and control the situation and prevent any untoward incidents. Preventive measures could be properly assessed and planned in advance in case of any further events.

High resolution photos received from the feeds can be stored as records and can provide valuable evidence for subsequent analysis. The Solution should also support drone based GIS surveying & mapping.

3.1.12. Facial Recognition System

Face Recognition System (FRS) shall be designed for identifying or verifying a person from various kinds of photo inputs from digital image file to video source. The system shall offer logical algorithms and user-friendly, simple graphical user interface making it easy to perform the facial matching. The system shall be able to broadly match a suspect/criminal photograph with database created using photograph images available with Passport, CCTNS, and Prisons, State or National Automated Fingerprint Identification System or any other image database available with police/other entity. The FRS algorithm/engine should have appeared in top 10 listing of latest NIST benchmark test.

The system shall be able to:

1) Capture face images from CCTV feed and generate alerts if a blacklist match is found.

2) Search photographs from the database matching suspect/people features.

3) Match suspected criminal face from pre-recorded video feeds obtained from CCTVs deployed in various critical identified locations, or with the video feeds received from private or other public organization’s video feeds.

4) Investigate to check the identity of individuals upon receiving such requests from Police Stations.

5) Capability to enable mobile with app to capture a face on the field and get the matching result from the backend server.

6) Capability to undertake detailed facial recognition in offline mode.

The facial recognition system shall be enabled at cameras identified by ASCL.

Functional requirement –

1) The facial recognition system should be able to integrate with IP Video Cameras as required in the solution and shall be able to identify multiple persons of interest in real-time, through leading-edge face recognition technology. The system shall be able to recognize subjects appearing simultaneously in multiple live video streams retrieved from IP surveillance cameras. The Facial recognition system should seamlessly be integrated to the network video recorders or the video management system.

2) The user interface of the facial recognition system should have a report management tool without installation of any additional client software. It should be able to generate real time report such as Audit log report, Hit List Report, Daily Statistics Report, and Distribution Report.

3) The system should have ability to handle initial real-time watch list of minimum 10,000 Faces (should be scalable to at least 1 Million faces) and all Camera Feeds (commissioned for FRS) simultaneously and generate face matching alerts.

4) The algorithm for facial recognition or the forensic tool should be able to recognize partial faces with varying angles.

5) The system should be able to detect multiple faces from live single video feed

6) The system should have combination of eye-zone extraction and facial recognition

7) The system should have short processing time and high recognition rate

8) The system should be able to recognize faces regardless of vantage point and any facial accessories/ hair (glasses, beard, and expressions)

9) Face detection algorithms, modes and search depths should be suitable for different environments such as fast detection, high accuracy etc. The FRS system shall use of GPU technology instead of Traditional CPUs, to greatly improve the computational performance in crowded environments.

10) The system should be able to identify and authenticate based on individual facial features

11) The system should be compatible with the video management system being proposed by the system integrator

12) The system should have capability for 1:1 verification and 1: N identification matching

13) The system should be able to integrate with other systems in the future such as 'Automatic fingerprint identification system (AFIS)' etc. in future if required

14) The system should be able to support diverse industry standard graphic and video formats as well as live cameras

15) The system should be able to match faces from recorded media.

16) The system should be able to detect a face from a group photo

17) The system should be able to detect a face from stored videos of any format

28) The system should have bulk process of adding faces in the system

19) The system should be an independent system, with capability to integrate with industry standard Video Management Systems (VMS) for alert viewing.

20) The system should allow users to search or browse captured faces (based on date or time range), export any captured image for external use with a capability to support a Handheld mobile with app for windows OS or android OS to capture a face on the field and get the matching result from the backend server

21) The proposed solution should provide the ability to assign different security levels to people and places. It should alert security staff when someone is spotted in an area where they're not permitted, whilst allowing them free access to non-restricted/public areas

22) The system should have the facility to categorize the images like but not limited to "blacklist", "Remember this person" or "hit-list" or "wanted".

25) The OEM should have support facility in India

3.1.13. e-Governance Solution

The proposed e-Governance solution implementation and post-implementation support at ASCL is a comprehensive solution for modernization of the Corporation and envisages end-to-end computerization. It is envisaged to undertake Enterprise Wide Resource Planning approach, enabling ASCL to use various data in most optimal way and provide services to citizens in efficient and effective manner.

The Scope of Work can be primarily divided into seven main elements:

a) Transformation into e-Municipal Corporation

b) Implementation/customization of e-Governance applications/products/solutions

c) Integration of applications/software implemented by ASCL for various services on the new e-Governance platform

d) Migration of all data from some of the existing applications to the e-Governance platform

e) Operations and maintenance of the proposed solution for 5 years after Go-Live along with deployment of manpower as necessary

f) Deployment and supervision of personnel required for the successful completion of the project

g) Capacity building and training

Objectives are generally to improve efficiency and effectiveness and to save costs. The driving force can also be public demand for online services and information that increase democratic participation, accountability, transparency, and the quality and speed of services. The implementation and use of ICT solutions can support governance reforms.

The three main target groups that can be distinguished in e-governance concepts are government, citizens and businesses/interest groups. The external strategic objectives focus on citizens and businesses and interest groups, the internal objectives focus on government itself.

e-Governance is defined as the application of electronic means in

a) Interaction between government and citizens (G2C) and government and businesses (G2B)

b) Internal government operations to simplify and improve democratic, government and business aspects of Governance (G2G)

The strategic objective of e-governance is to support and simplify governance for all parties - government, citizens and businesses. The use of Information & Communication Technology (ICT) can connect all three parties and support processes and activities. In other words, in e-governance uses electronic means to support and stimulate good governance. Therefore, the objectives of e-governance are similar to the objectives of good governance. Good governance can be seen as an exercise of economic, political, and administrative authority to better manage affairs of the city at all levels.

MSI needs to commission the e-Governance solution for the following modules:

1. HRMS Module
2. Finance Management Module
3. Project Management Module
4. Utility billing Management
5. Taxation Management Module
6. Audit & Vigilance Management
7. Document Management System
8. Workflow & custom modules
9. Registration & Licensing Module
10. City Web portal & Mobile app

Brief Scope of work for e-Governance Solution

1. Planning & Scheduling of project: Prepare a project-plan with detailed activity schedule and a time-bound action plan for the implementation of the integrated system and associated software
2. Business Process Analysis & re-engineering:

a. The SI shall study the existing functionalities of all the business processes in detail and submit the document detailing the functionalities, problem areas and expectations of the ASCL
b. Identify the customization/parameterization/workarounds to be done in the e-Governance solution
c. Identify the process/procedure that needs to be modified/introduced to meet the needs of the proposed system

3. Supply, Configuration and Installation of the Software
    a. Implement the system
    b. Configuration of the proposed solution to meet the process requirements
    c. As required by ASCL, the MSI shall integrated the stand-alone applications during this stage itself
    d. Design and prepare test data, quality control, and trial run and arrange acceptance testing of all modules, including a full load and stress test
    e. Testing of the configured solution
4. Data Digitization & Migration
    a. Undertake digitization of legacy data which are kept as paper form
    b. Identification of data migration requirements
    c. Collection and migration of user and master data from legacy and manual systems
5. Integration of the e-Governance solution with the ICCC and other smart solution (as required)
6. Change management & training
    a. Training for all stakeholders of VMC including core team, end users, etc.
    b. Documentation, training, simulation. Conduct onsite workshops for process stakeholders and highlight the benefits of this new environment
7. Pilot & Go-Live
    a. Undertake pilot of the solution commissioned
    b. Go-Live of all modules of the solution as envisaged with real-time data at all locations
8. Support & maintenance of the solution for the entire duration of the project

3.1.14. Fibre Network

With technology being a key driver for implementation of smart city initiatives across the city of Aligarh, ASCL through this project desires to provide 24*7 uninterrupted network to critical Smart City Initiatives with robust citywide network is one of the key foundational requirements on which future ICT based 'Smart' elements shall be designed and built.

Accordingly, it has been decided to establish a citywide network backbone infrastructure, which shall act as the backbone for effective implementation of smart city initiatives across city of Aligarh as in Annexure-A of Vol II of RFP.

The provisioned network backbone infrastructure shall be designed in a manner, which shall be capable to carry all the key services that shall be implemented in due course under smart city initiatives. ASCL envisages to implement a dedicated and secure fibre network backbone to be established across Aligarh city.

The expected benefits to be derived from city network backbone are:

a. Connectivity – Network that interconnects citizens, government, business and communities

b. Secure, private and resilient – Network built considering security standards and best practices with stability in bandwidth provisioning and resilient

c. Efficient – Network that is capable to deliver the envisaged bandwidth and related services

d. Smartness – Network that allow better management and control to offer richer application experiences

e. Scalable – A network that can scale up to cater all the required bandwidth for deployment of future smart city initiatives

To achieve the set objectives – ASCL desires to create a citywide fibre network, which will establish core ring connecting various zones and access rings in the city, which connects various smart city elements for ASCL

The network backbone is expected to help Aligarh build a converged network, bringing together different city management vertical solutions on a single foundational network infrastructure. The converged network shall facilitate information exchange between resources and applications across different domains. It is proposed to be an end-to-end platform enabling delivery of varied services for citizens. Key objectives envisaged are to provide:

a. IP connectivity that shall enable the citizens to avail varied services under smart city initiatives

b. Wired and wireless, scalable, and highly secure network platform

c. Data management framework to help enable data collection, organization, and sharing

d. Adoption and usage of distributed compute and storage services, location services, and security services

NOTE: The MSI should undertake the process for getting the ROW permission from the concerned authorities for laying down the fibre network in consultation with ASCL. ASCL will facilitate the process of getting the ROW.

Functional design

The overall functional design of network backbone is indicative in nature and is envisaged to be implemented in a three-tiered architecture as depicted below. The 3-tier architecture as below is indicative and the MSI is required to prepare its own architecture in the technical bid.

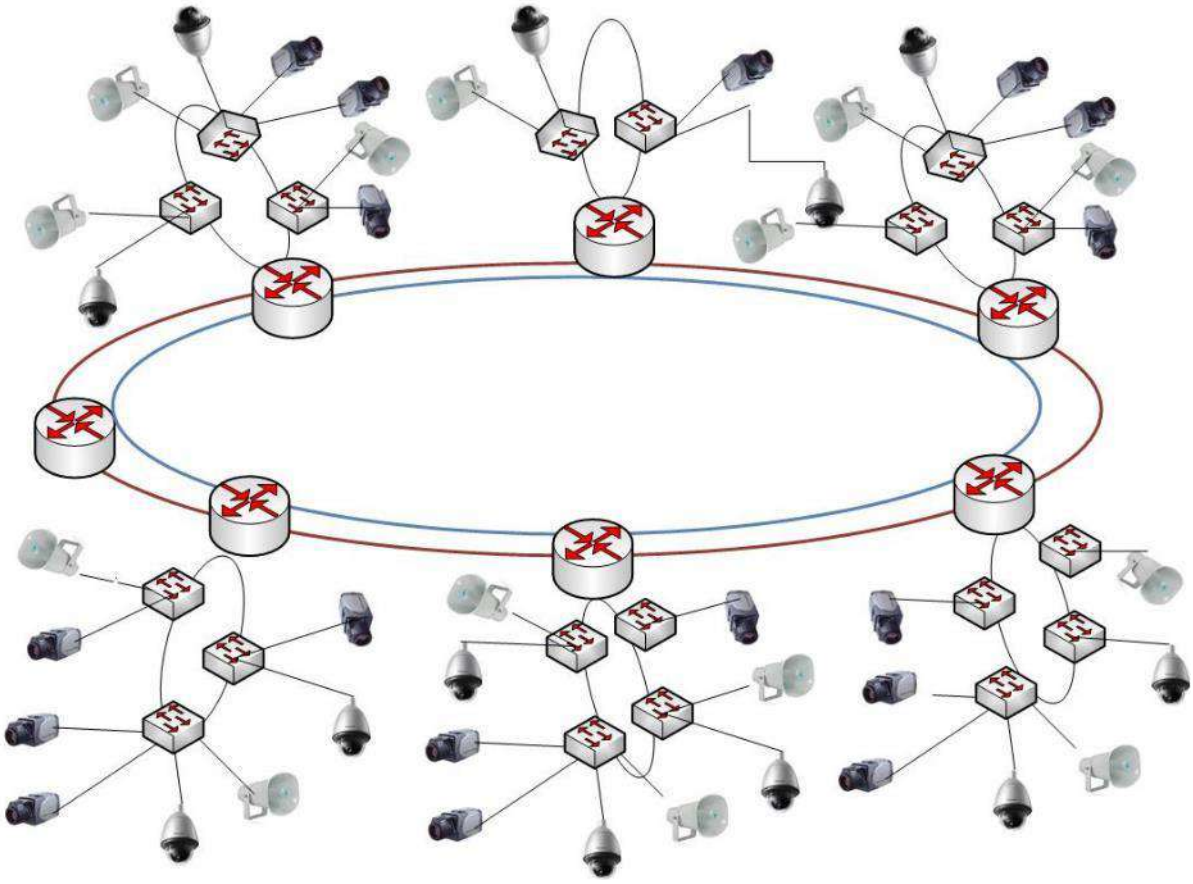


Figure 5: Indicative Fibre Network Topology

The envisaged layers of the City Network Backbone are:

a. Core Layer: The Core layer forms the backbone of the entire network which consists of Compute, storage, application, links and connectivity to be established at the ICCC. This layer shall enable all applications hosted at ICCC to be accessed over the backbone for departments and users. Core layer shall form the point of aggregation for all the traffic coming from the Zone layer and beyond.

b. Aggregation Layer – Zone Level: The aggregation layer is envisaged at Zone level. The traffic coming from respective wards shall get aggregated at the Zone level. Ring architecture is proposed to be formed to establish the required redundancy. The aggregation layer shall further connect to the Core layer for forwarding the traffic to the Core layer.

c. Access Layer –Ward Level: The Access layer shall be formed at the wards of Nagar Nigam Aligarh (NNA). All the wards in the respective zone shall form individual rings to establish redundancy. There can be multiple rings within the respective zone. e.g. if there are 10 wards in a given zone, then two rings comprising of 5 wards each can be created. These two rings shall ultimately connect to the respective zone (PoP). The access layer shall enable the smart city solutions to connect to the network backbone. The aggregation switch of the respective smart city solution shall tap on the respective access layer devices.

d. Services Layer – Smart City Solution Level: The Service layer shall be formed at various locations within the wards of NNA. The service layer shall enable various smart city solution components such as City Surveillance, Multi-Purpose Kiosk, ITMS and others to connect to the network backbone. This layer

would also enable the convergence any sensor that would be integrated in the IoT environment of the ICCC that would come up in future. The aggregation switch shall connect on the Access layer devices to connect to the network backbone.

Key services which shall be provisioned under various layers:

1. Monitoring and Management – The management and monitoring layer shall be provisioned centrally from core layer. Centralized management of infrastructure resources shall be implemented in core, aggregation layer, zonal layer and ward layer. All key services that shall be provisioned for the users such as –

a) ITMS solution components
b) CCTV surveillance
c) Multipurpose Kiosk
d) All other Smart City initiatives

2. Network Operation Centre (NOC): The NOC shall consist of two layered:

a) Core layer: This shall monitor all the infrastructure devices (Router, switches, firewall, bandwidth etc.) that are kept in core layer, aggregation layer along with key services that shall be provisioned in due course
b) Aggregation layer: The aggregation layer shall help in monitoring the issues related to fibre, network, infrastructure implemented at zone layer and ward layer

3. Configuration and change management: Configuration shall be managed from core layer for all the devices on the network

4. The proposed solution shall be scalable in nature to host all key services under smart city

5. The proposed solution shall have redundancy built at each layer

6. The proposed solution shall be capable to allow enough redundancy built at fibre as well as at infrastructure level

7. The proposed solution shall be ready to scale up both horizontally and vertically

8. The proposed solution shall be ready in all respect where it is envisaged by ASCL to make use of this infrastructure under different revenue models under its long term vision.

9. The solution shall meet demands of bandwidth needs for all the procured and planned smart city solutions

10. The solution shall easily integrate with Wi-Fi subsystem that shall be connected on the same backbone infrastructure.

11. The solution shall be ready in all aspects to host voice, video and data services over fibre

Fibre layout

Fibre backbone infrastructure is an important component of the entire smart city initiative that shall enable the delivery of all the key and important services to be made available to its citizens with seamless access. Network backbone infrastructure shall comprise of dark fibre, setting of various point

of presence (PoP) that shall be established across city and cover all zones and wards. The fibre shall be further utilized at access / ward layer for services to be enabled as and when required.

Key requirements that need to be fulfilled by the MSI while carrying the activities are provided as below:

1. Route Survey & Network Design Preparation:

a) The MSI shall prepare the route map & network design and submit the final route maps and network design to the purchaser.
b) All important information like no. of ducts, type of fibre, location of chambers, location of rack, and model of equipment installed etc. along with location information will be maintained.
c) The MSI are advised to make a detailed survey and familiarize them with the soil and terrain so that the rates quoted takes all factors into consideration.

2. Fibre Implementation:

a) Supply, delivery to site, unloading, storing and handling of 24/48 Core Fibre drums along with fittings and associated items as required.
b) All fittings, accessories and associated works for proper and safe installation of fibre assets to be taken into consideration by the MSI
c) Laying, jointing, live line installation, testing and commissioning of all optical fibre and its accessories
d) Training of Engineers / linesmen, both in supplier's premises and at site, in the installation, operation and maintenance of the optical fibre cables.
e) The estimated fibre optic cable length requirements are indicated in the Bill of Material (BoM) and reflected in the Price Schedule.

Note: The MSI shall be paid for the actual quantity supplied and installed at site. The measurement for quantity to be paid shall be based on horizontal route length of the optical fibre cable (OFC) laid and the price quoted by the MSI.

3. Core Backbone

a) The Core backbone ring topology shall be constructed using 48 Core armoured Single mode Optical Fibre Cables (OFC).
b) The Core layer shall have POP locations connecting to each other as backbone of the network for providing bandwidth to the entire network components.
c) The Core shall utilize a 10 Gigabit Ethernet / optical technology and shall support 40 Gigabit Ethernet / optical technologies.
d) The core architecture shall be established maintaining high level of redundancy with no single point of failure
e) The Core layer shall have 2 numbers of 40mm High Density Polyethylene (HDPE) pipes.
f) Two cores in each laid OFC shall be redundant for future scalability and maintenance activity.
g) The maximum fibre distance between Core and Zone layer shall not exceed 8 Kms.
h) The proposed Core layer shall consider 25 % more fibre length than surface length, 15% for looping in chambers, 5% for modulation, 1% for splice joint preparation & remaining 4% for wastage.
i) There shall not be more than one Splice, Joint closures installed between two (2) locations, during hand over of Network to Purchaser.

j) The Core layer shall have chamber at approx. 200 meters and shall have OFC joint splice closure at approx. 300 – 500 meters. Additional chambers to be constructed wherever there is a road crossing or at sharp turns.
k) All the 48 cores shall be spliced & joined in the Core Backbone.
l) The colour code shall be uniformly followed across the Core ring, zonal aggregation ring & ward ring.
m) 2 numbers of 48F FDP will be installed at all PoP locations for full cable termination of 48F Core OFC.

4. Zonal Aggregation Backbone – Ring Topology

a) The Aggregation rings shall be established using 24 Core Optical Fibre Cables.
b) The Zonal Aggregation architecture shall be formed using ring topology.
c) Two of the cores in each OFC shall be redundant for future scalability and maintenance activity. These two spare cores at Zonal Aggregation Backbone shall not be used for any other purpose apart from the stated.
d) Adequate loop of 10 meters of OFC shall be left on junction wherever applicable.
e) There shall not be more than one Splice Joint closures installed between two aggregations points during hand over of Network to Purchaser.
f) All the 24 cores shall be spliced & joined in the Zonal Aggregation Backbone ring.
g) The maximum fibre distance between Zone layers shall not exceed 12 Kms
h) The Core layer shall have 2 numbers of 40mm High Density Polyethylene (HDPE) pipes.
i) 2 numbers of 24F FDP will be installed at all PoP locations for full cable termination of 24F Core OFC.
j) It shall utilize a 1 Gigabit / 10 Gigabit Ethernet / optical technology.

5. Ward (Access) Backbone – Ring Topology

a) The Ward rings shall be constructed using 24 Core Optical Fibre Cables.
b) Multiple Ward rings shall be created for the zones that ward is falling under for e.g. If there are 10 wards in a zone, two rings of 5 wards shall be created.
c) The Ward Aggregation architecture shall be formed using ring topology.
d) Two cores in each OFC shall be redundant for future scalability and maintenance activity and these cores at the Ward Backbone ring shall not be used for any other purpose apart from the stated.
e) Adequate loop of 10 to 15 meters of OFC shall be left on junction wherever applicable.
f) There shall not be more than one Splice Joint closures installed between two aggregations points during hand over of Network to Purchaser.
g) All the 24 cores shall be spliced & joined in the Ward Backbone ring.
h) The Core layer shall have 2 numbers of 40mm High Density Polyethylene (HDPE) pipes.
i) 2 numbers of 24F FDP will be installed at all PoP locations for full cable termination of 24F Core OFC.
j) The access layer shall be extended using the lit fibre, which shall be used to allow all the key services to pass through the network backbone. The access point, CCTV surveillance system etc. shall be plugged into lit fibre to enable the services for the Smart City solutions.
k) It shall utilize a 1 Gigabit / 10 Gigabit Ethernet / optical technology.

6. General Requirements

a) Based on the survey results and ASCL's requirements (e.g. suggestion from NNA / ASCL of using HDD methodology to prevent damage to e2e carpeted asphalt / CC road), the mode of digging (Automatic or Manual or clamping) needs to be decided for each section of the route.
b) After finalizing the same the route diagrams / sketch will be prepared on the AUTOCAD map and submit to the Authority for approval
c) Based on the Route diagram submission, ROW permissions needs to be taken from the NNA authorities
d) Preferably all digging manual or HDD along with Chamber preparations needs to be done on the Footpaths (wherever applicable for last mile connectivity). This will ensure minimal damages to Tar Roads.
e) After the same is over proper Labelling and Feruling as per the design and consent of the authorities needs to be done so that identification post installation during the maintenance becomes easy
f) OFC drums will be tested with OTDR on sampling basis to verify optical loss characteristics and cable length parameters as prescribed by OEM before installing the cable in duct.
g) After the Splicing work is over, Fibre testing needs to be done.
h) SI will use PC – APC patch cord for connectivity between FDP and active equipment, APC (angular Point Contact) connector at FDP end and PC (Polished Connector) at equipment end.
i) Apart from post sign off, the SI needs to submit following in soft and hard formats:
j) Details of Survey jotted on CAD Drawings as per the specifications defined.
k) Drawings of Route Details on the CAD Drawings along with the Survey details.
l) Post Go Live the SI should maintain the Network for the Period of 5 Years
m) During the course of installation, if any utility services or roads or other NNA assets or third party assets etc. are damaged, then the SI has to repair and reinstate the same at his own cost.
n) SI will be responsible to undertake and complete the works related to supply installation and commissioning of services as indicated in the RFP
o) The works are to be completed on turnkey basis and the supplied equipment's and Network are required to be maintained for 5 years on comprehensive AMC basis from the date of Final Approval and Testing and need to sign SLA. The SI shall be responsible for implementation of the work as defined.
p) During the installation activities, records must be kept of all items installed. Including reference to cable pathways used, final location, identity of cables and equipment. The presentation of all of these records will provide the "As-Installed" basis for all future reference to the installation.
q) The Optical Fibre cabling shall be installed in accordance with manufacturer's installation instructions. The Contractor will ensure that the manufacturer's specifications for the Optical Fibre cable meet the transmission characteristics required by Cabling Standards.
r) All installed racks, cables, termination boxes, distribution panels and wall outlets shall be marked and numbered in accordance with Administration Standard for the Telecommunications Infrastructure. Area based unique entity IDs may be created for all assets deployed for easy identification in field. Specific format of entity ID (for ex. 4 digits for area code, 1 digit for network layer, 2 digits for assets like racks, 3 digits for unique numbering etc.) may be suggested by SI and jointly agreed.

s) The documentation required at the completion of the installation phases shall contain all of the following information, together with any other information the installer has acquired during the installation
   a. "As-Installed" documentation, showing total cabling and connections installed using floor space plans and cable record sheets. This documentation must show all cables and outlets incorporating the full numbering and marking convention supplied.
   b. All test results (including OTDR & Splice report) and certification information, identified by cable, connection and numbering convention, necessary for all Optical Fibre cables.
   c. As – built drawings of all fibre optic routes and OFC laying report.
   d. Drawings of Each Rack installed.

3.1.15. GIS platform

Geographic Information System (GIS) technology has found its way into many smart cities across the India. Many Urban Local Bodies (ULB) now rely on GIS technology as a support tool to design development plans to make important decisions. Geographic Information System (GIS) activities are undertaken for implementation of data base generation, planning, preservation and proper monitoring of the Municipal Administration.

The MSI should undertake integration of the GIS solution with various Smart Solution which are part of the project scope also would be implemented in the future for visual reporting and intuitive decision making.

Various services that are imperative to achieve the proposed GIS solution and which need to be delivered by bidder includes but not limited to:

Base Map Creation

a) Incorporation of Existing GIS Data
b) Procurement of Satellite Imagery (0.3m or better) (if not available with ASCL)
c) DGPS survey for Geo-referencing Satellite Imagery
d) Creation of Data model
e) Digitization of Satellite Imagery.
f) Creation of Utility Data from Paper / CAD Drawings
g) Incorporating TP and DP plans in GIS
h) Preparation of Final Base Map
i) Data Migration on Centralize GIS Database

Supply of COTS GIS and Image Processing Software

a) Supply of COTS GIS and Image Processing Desktop Software
b) Supply of COTS Enterprise GIS and Image Processing Server Platform Software

Design and Develop Enterprise Web GIS Portal and Department Modules

a) Design and Develop Enterprise Web Portal and Department Applications on COTS base Enterprise GIS Server Platform Approx. 17 Modules

Design and Development of GIS Enabled Mobile Applications

a) Development of GIS Enabled Mobile Application for municipal Survey and Services with comprehensive features.

Integrations with Existing Systems

a) Municipality Portal
b) Smart City Component
c) Central Command and Control Centre

Training

a) Training to Departmental Users

Collection of Existing GIS Data

a) Selected Bidder will collect the available maps and secondary data from Municipal Corporation / Smart City (soft copy and or hard copy) namely; municipal boundary, Zone boundary, Town survey maps, Field measurement book (if available), ward boundary maps, slum related data, sanitation, and basic infra-structural facilities and land marks, details of Town Planning Schemes to be incorporated superimposed / synchronized and corrected suitably to match current field data;

b) Town Planning Schemes showing proposed land use zoning, transport network and sites designated for various public purposes.

c) Maps showing administrative boundaries ward boundaries, census boundaries, slum boundaries.

d) Revenue Maps showing Cadastral Boundaries.

e) Soft copy Maps / drawings of utilities like water supply, sewerage, storm, water drainage, solid waste disposal, roads and street lights along with the data available with other Concerned Department.

f) Location of State and Central Government offices, railways and highways, police stations, primary &high schools, colleges, universities, primary health centres, hospitals, banks, theatres etc. also need to be located on the maps through field verification.

g) All the details that Municipal Corporation / Smart City desires to include.

Data validation and gap analysis

Selected Bidder will conduct QA QC and check the qty., Quality, Accuracy, source and reliability of the collected data from Municipal Corporation / Smart City, whether the data (spatial or non-spatial) is recent or accurate enough to be used and not obsolete. Ad come with detail Gap analysis Report.

Positional Accuracy Selected Bidder will check whether the positional accuracy of the existing data available with Municipal Corporation / Smart City is in sync with the Satellite Imagery provided by Municipal Corporation / Smart City. Selected Bidder will prepare base map using the available and

fetched data and validation of the same will be carried out by the authorized officials of Municipal Corporation / Smart City. In case of Field Measurement Books, they are to be built and super imposed on the Base Maps.

Accuracy Requirement: The 10% of GCPs will be randomly selected as sample for the accuracy of .3 Mt On the data and see whether data fits on the projection of baseman in case data doesn't fit Municipal Corporation / Smart City will provide data which can be used.

Reliability: Selected Bidder will check from the available legacy data with Municipal Corporation, whether the data (spatial or non-spatial) is recent or accurate enough to be used and not obsolete. In case data is rejected Municipal Corporation / Smart City will be responsible to provide rectified data.

Attribute Validity:

a) Selected Bidder will validate attribute data accuracy, whether the data accurate enough to be used and not obsolete.

b) Procurement of High Resolution Satellite Imagery if not available with ASCL

c) The selected bidder has to procure and supply ortho rectified having .3 Mt or better resolution latest satellite imagery

d) Only procured imagery shall be used for the preparation of Base Maps, data from alternative online sources such as Google Earth / Google Maps is strictly prohibited as this is strictly against the usage policies of the respective services.

e) Municipal Corporation / Smart City will provide necessary NOC/Approvals for procurement of Satellite Imagery to the successful bidder. Cost of the Satellite Imagery would be quoted in the Price Bid. Bidder will provide the details of Satellite Imagery proposed in the Technical Solution.

f) DGPS Survey and Geo referencing and Post Processing of Satellite Imagery

g) Geo-referencing is the process of assigning real world coordinates to each pixel of the raster. It is the process of scaling, rotating and translating the image to match a particular size and position.

h) For Geo-referencing the Bidder needs to take the Ground Control Points (GCPs). GCPs are basically taken as a road intersection points, Building Corners, Permanent Locations etc. Bidder shall generate the Grid of 1 x 1 Sq. Km. on the Satellite Image and collect appropriate No of GCPS per sheet. GCPs need to be collected using DGPS. The locations identified on the image and real ground should be verified with the Authorized Representative appointed by the Corporation. The data should have following

i) Projection: Universal Transverse Mercator (UTM), Spheroid: WGS 84, Zone: 43N. Observation time for DGPS instruments has to be minimum 12 (Twelve) Hours at Base Station and minimum 30 Min Thirty Minutes at each GCP using DGPS.

j) The horizontal accuracy of GCPs should be 0.1-0.3 meters. 5% of GCPs would be randomly selected as sample for the accuracy. If the incorrectness in accuracy found in any sample, the entire work shall be rejected and shall be required to rework.

Creation of Data Model

Data Model for storing the spatial & Non-Spatial data shall be decided by the Municipal Corporation / Smart City in consultation with the successful Bidder/SI in accordance with the National Large Scale Mapping Policy.". Bidder will modify the data model and update the same with the help of detailed round of discussion with each concerned Municipal Corporation / Smart City department officials. Bidder will understand existing data model of Municipal Corporation / Smart City and will use proper tools to create the data model like CASE tools and UML etc. The final data model will be approved by the Municipal Corporation / Smart City and before proceeding further the data model will be finalized.

Use of Drone based GIS mapping

The solution should be capable for using drone base GIS mapping which can be then incorporated in the GIS maps. Since this project involves aerial photography data acquisition using Drones, it is mandatory to obtain necessary clearances from Local authority and other applicable agencies. Necessary clearances/permissions shall be obtained from authorized agencies as needed for flying over the project area to acquire Drone based aerial imagery. Necessary support will be provided by ASCL.

Digitization of Satellite Imagery.

a) Bidder will create / update all geographical features class required as per RFP/SRS by digitizing from satellite imagery.

b) The Satellite Image / scanned map will be digitized using the suitable COTS GIS software. This process includes Creation of standard Template Initially; a standard template will be created & inserted into each Digitized Map. In this template the layer name, line type and colour for each feature present on the map will be standardized. This system helps when a number of sheets and village maps are to be mosaicked. This process maintains uniformity in all the maps, which will be digitized.

c) Post the processing of the satellite imagery by removing the geometric anomalies (if any), the bidder will prepare a Grid of 1Km x 1Km for positioning bidder with respect to its Geographic Location. These grids then further will be divided into 250m x 250m scenes for future usage like Map Book creations, Smart Asset ID creation etc. and future analysis. All the grids and scenes will have unique IDs.

d) Bidder will then take sufficient number of Ground Control Points (GCPs) collected through Differential Global Positioning System (DGPS) survey. Bidder will prepare an up-to-date large-scale base map (Scale 1:2000) of all the wards/zones of City using satellite imageries and then will prepare a new Database using the existing Database available with Municipal Corporation / Smart City, as unified Geo-Spatial Data with infrastructure details.

e) Bidder will carry out mapping on the rectified satellite data using heads up digitization process. The features that would be taken for mapping includes Buildings, Vacant Plots, Roads, Bridges, Railway Tracks, Parks, Gardens, Stadiums, Slums, Traffic Squares, Water Bodies (River, Lake, Pond, Drainage, Canal etc.), Over Head Tanks, etc. While doing the digitization, a special care of data correctness to be taken like no overshoots / undershoots, proper layering, proper symbol etc.

f) Creation of Utility Data from Paper / CAD Drawings

g) Bidder will digitize Geo reference existing Paper/Cad Drawing in GIS

h) Incorporating TP and DP in GIS

i) Bidder wills Incorporate Geo reference existing TP and DP in GIS

Final Base Map Preparation

Bidder will integrate information of Utilities features such as Street lighting, Water supply line, Sewerage network, Wastewater, Storm water drain, sanitation facilities (Household/public/private), Solid Waste management and unauthorized properties as provided by Municipal Corporation / Smart City as layers with base map.

The layer list would be exhaustive taking into consideration of the features to be captured, the attributes will have added etc., The layer list and the database layers would be created using programs, appropriately. All the data captured would be checked and validated using custom built routines for its accuracy and logical correctness. The rigorous QC process of bidder would help in achieving accurate feature capturing, required accuracy in coding and classification.

Final base maps will be prepared at 1:2000 Scale incorporating the data collected, processed and digitized after survey process. The base maps will be prepared in various layers as defined by Municipal Corporation.

Sr. No	Layer Name	Vector Representation
1	Municipal Boundary	Polygon
2	Area of Interest Boundary	Polygon
3	Ward Boundary	Polygon
4	Zone Boundary	Polygon
5	Election Ward	Polygon
6	Town Planning Schemes	Polygon
7	Development Plan	Polygon
8	Slum Boundary	Polygon
9	Plots Boundary	Polygon

10	Buildings foot prints	Polygon
11	Streams/Drainage/Canal	Line
12	Over Head Tanks	Polygon
13	DGPS Points	Point
14	Sewerage Network/Drainage Network	Line
15	Storm Water Network	Line
16	River / Canal	Line
17	Manholes	Point
18	Water Supply Network	Line
19	Water treatment plants	Point
20	Fire Stations	Point
21	Street Lights	Point
22	Bridges/Flyover	Line
23	Parks/Gardens	Polygon
24	Health Institutions	Polygons
25	Tube Well	Point
26	Hand Pump	Point
27	Water Pumping Stations	Point
28	Traffic Square	Point
29	Railway Network	Line
30	Road Network	Line
31	Footpath	Line
32	Sewerage Treatment Plant and Sewerage Pumping Station	Point
33	Mobile Tower / Telephone Tower	Point
34	Bus Stands /Shelters	Point
35	Landmarks	Point
36	Key features for Solid Waste Management	Point
37	Mapping of key Institutions with sanitation	Point

Data Migration

Bidder will Migrate Updated Base Map and Utility Data at Municipal Corporation / Smart City into centrally located Enterprise GIS database

Property Survey, Property Tagging

The bidder has to undertake property survey & tagging using GIS enabled Survey Mobile application for all the properties of Municipal corporation/Smart City and validate the existing data field available. This activity is very critical and would be completed by Bidder's team with support from Municipal corporation field officials. The property survey & tagging of properties has to be carried out in Ward wise manner. Bidder can create a separate module for Municipal corporation field officials to get web based property maps on which the officials can tag the property assessment numbers with their field knowledge. They can also take the print of the available data sets and base map image, validate the same in the field, bidder may be required to confirm on the area of the property and other related parameters and identify any available delta in the area of the property under survey.

This exercise aims to validate and update the existing property tax database available with Municipal corporation. This activity shall be carried out have property number tagged to each mapped property in GIS with the help of field officials.

Also this activity will give information on property mapped in GIS but not available in the property tax department assessment data and can be considered as unassessed properties.

Similarly, properties on field but not mapped in GIS can also be mapped with the help of field officials and bidder's GIS mapping team.

Supply of COTS GIS and Image Processing Software

Supply of Cots Desktop GIS and Image Processing Software

Bidder will provide three licenses of COTS Based Standard Desktop GIS and Image Processing Software for Data Creation/Updating and Change Deduction and Image Classification with the following features:

S.no	General Features
1.	Multiple Document Interface (MDI)
2.	Project, View and Layer Management
3.	Geo-Linked Multiple Views
4.	Well known Raster, Vector and Tabular file formats support
5.	On the Fly Map Projection Transformation
6.	Large set of Library for Projection & Geographic Coordinate System
7.	Advance Map Navigation and Visualization
8.	Seamless data handling using ORDBMS

9.	Identification and Measurement Tools
10.	Customizable GUI
11.	Extensive Map Composition Tool
12.	Raster and Vector Catalogue
13.	GIS Features
14.	Advance Drawing and Editing
15.	Topology Creation
16.	Edge Matching and Rubber Sheeting
17.	Geometric Correction
18.	Database Management
19.	Query Builder for Simple and Complex Query
20.	Legend Creator for thematic mapping
21.	A large library of symbols
22.	Rule Based Labelling and Annotation
23.	Geo-processing and Overlay Analysis
24.	Vector to Raster
25.	Advanced Report Generation with wizard
26.	Image Processing Features
27.	Image Enhancement and Filtering
28.	Image Analysis Tools
29.	Image Geo-referencing
30.	Image Extraction and Mosaicking
31.	Atmospheric and Radiometric Correction
32.	Image Transformation
33.	Image Classification
34.	Advance Segmentation
35.	Advanced Change Detection
36.	Raster To Vector
37.	Band Arithmetic and Linear Algebraic

38.	Advanced Module
39.	Network Analysis
40.	Defining Network Rules
41.	Add Network Location
42.	Remove Network Location
43.	Find Shortest and Optimum Path
44.	Location Analysis
45.	Multi Location Analysis
46.	Service Area
47.	Dynamic Segmentation
48.	Hyper-spectral Tools
49.	Internal Average Relative Reflectance (IARR)
50.	Auto IARR
51.	Log and Auto Log Residuals
52.	Normalize
53.	Rescale
54.	Spectrum Average
55.	Signal to Noise
56.	Mean per Pixel
57.	3D Modelling
58.	Terrain Extraction
59.	Flythrough & Walkthrough Creation
60.	Drape Raster, Vector and 3D Object
61.	Line of Sight and Radio Line of Sight
62.	View Shed Analysis
63.	Stereo Viewing
64.	Environmental Effect Like Fog, Fire, Cloud, Sun, etc.
65.	Particle emitter
66.	Save Image & Animation [*.avi]

67.	Raster GIS Analysis
68.	Spatial Analysis
69.	Distance Tools:
70.	Math Tools
71.	Conditional Tools
72.	Extraction Tools
73.	Local
74.	Generalization
75.	Multivariate
76.	Neighbourhood
77.	Weighted Overlay
78.	Terrain Analysis
79.	DEM to Contour and DEM from Point and Contour Line
80.	Slope and Aspect
81.	Hill Shade and Topographic Normalize
82.	Cut & Fill Analysis
83.	View Shed, Route Indivisibility and Line of Sight
84.	Best Path
85.	Area/Volume Calculation
86.	Hypsometry
87.	Semi Variance
88.	Surface Specification Points
89.	Anaglyph
90.	Global Positioning System
91.	Interface with GPS device
92.	GPS Tracking and Navigation
93.	Extract feature using GPS
94.	Simulate GPS file
95.	GPS data validation

96.	GPS error correction
97.	Satellite sky-view
98.	Speed and Bearing Indication
99.	Way-Path generation and storing
100.	Geo-fencing
101.	Different File formats support
102.	Export to KML/KMZ
103.	Hydrology Tools
104.	Fill
105.	Flow Direction
106.	Flow Accumulation
107.	Flow Length
108.	Sink
109.	Stream
110.	Stream Feature
111.	Stream Link
112.	Stream Order
113.	Basin
114.	Watershed
115.	Tracking Analysis
116.	Simulate and analyse time-based data
117.	Report on patterns related to time and defined rules.
118.	Monitoring of mobile resources
119.	Analyse patterns of movement
120.	Neural Network Classification
121.	Supervised
122.	Unsupervised

Design and Development of Enterprise Web GIS Portal and Department Modules

Bidder will Design and Develop web GIS application for Municipal Corporation using COTS Base Enterprise GIS platform. This application will cater to the viewing, analysing, & utilizing the Geographic Information needs of the different departments of Municipal Corporation. And will also play a role of decision support system and Backbone for Smart City Command Control System

The required features to be developed for web GIS application is as follows: -

a) Will be based on COTS Base Enterprise GIS Platform
b) OGC Open Geospatial data standards compliant
c) Existing Server, Client, Web, Mobile / Tablets to be supported
d) Application will be open to integrate additional functionalities in future
e) Visualization of data e.g. Land Parcel Data DEM on Satellite Image will support multiple relational database connections
f) Shall have query based results
g) Application will have facility of Historical data analysis for Land parcel information, property tax information, building information using time series
h) Will support distributed transaction. This allows multiple users to edit the map data at a same time
i) Application will support DBMS spatial index and R- tree index for better system performance
j) Creation of server clusters with load balancing and fail-over functionality will be supported
k) Application will support data compression and asynchronous map view, static& dynamic cache.
l) Application will have facility to configure additional menus for future functionality
m) User authorization and authentication should be GUI based
n) Application will have the facility to monitor application operations and status: Logged in user status, server load, data access status
o) Application will have the facility to create custom GUI without business customization through designated application the selected bidder is expected to follow the complete SDLC for the development of the GIS application.
p) Proposed/Developed GIS Application software will follow National Spatial Data Infrastructure (NSDI) Meta standards and should be compatible with National Urban Information System (NUIS) Scheme. Tightly integrate the spatial data with the existing system at Municipal Corporation.

MSI should provision for the following modules in GIS application for use in the Smart City Solution stack

S. No	Department Modules
1	Module for Property Department
2	Module for Estate Management
3	Module for Disaster fire & Emergency Services Management
4	Module for Parks and Gardens

5	Module for Water Supply
6	Module for Sewerage Operation
7	Module for Road and Traffic
8	Module for Strom Water Drainage
9	Module for Street Light Management
10	Module for Education
11	Module for Health Services
12	Module for Advertisement and Hoardings
13	Module for Town planning
14	Module for Building permission
15	Module for Building Use certification
16	Module for Slum
17	Module for Project Monitoring and Control

MODULE FOR PROPERTY DEPARTMENT

a) **Property Tax Map handling module:** User will be able to visualize various type of properties with an option to create theme base view of the property base on its category, age of building and other relevant attributes. Map viewer will also show a tool tips when mouse is over on particular features.

b) Processing:

a. Map should be displayed with basic layers listed in the description
b. Zoom In – Map should be zoom In based on the extents provided by the user
c. Zoom Out – Map should be zoom out based on the extents provided by the user Pan – Map should be panned based on the user's action
d. Full Extent – Full Extent of map should be displayed
e. Identify – When user identifies any feature, corresponding details should be displayed
f. Map viewer will also support editing of parcels and building lots.

c) **Output:** Based on the tool selected by the user, corresponding action must take place (as described in processing).

d) **Municipal Services Query Module:** User will be able to derived information of properties like type, paying tax, properties as and when they are assessed for tax, whether properties involved in court cases or nor, Properties having carpet area more than 125 Sq. meters and above, from attribute attached.

e) **Spatial Query Module:** Spatial queries will be provided to calculated plot area, carpet area, zone area and other spatial analysis required, related to property details.

f) **Reports:** Reports will be generated on queries results based on details regarding type of property, Properties with age and above, Properties involved in court cases, Properties involved in court cases, properties as and when they are assessed for tax etc.

MODULE FOR LAND & ESTATE MANAGEMENT

This solution will help Municipal Corporation / Smart city officials to manage the estate related information along with analysis of slum area and ULB owned vacate land.

Modules and Sub Modules of Land and Estate Management System:

a) **Map Handling Module:** User can view municipal plot details along with plot dimensions, details of heritage structure with buffer analysis and ward, village and election boundaries. He/she can also view and asses the area under slum and location of ULB owned vacant lands.

b) **Municipal Service Query Module:** Query module will support users to access details about encroachment and legal information of plots. Query system will also support user to see information based on plinth area, floor wise details.

c) **Spatial Query Module:** This will support user to analyse area under slum and the zone, ward and other information regarding location of vacant land of ULB.

d) **Reports:** Reports will be generated queries results based on city survey number, built-up area, plinth area, floor details, date of possession, details of encroachment, slum details, ward boundaries etc.

MODULE FOR DISASTER FIRE & EMERGENCY SERVICES MANAGEMENT

This system will enable user to do the advance planning of all possible disasters to control the situation effectively and rapidly locating the incident location which requires immediate rescue and administrative support.

a) **Map Handling Module:** In map viewer user can view all required spatial features such as road plan including lanes and by lanes, position of water hydrants, high rise buildings, and location of fire stations along with other relevant layers.

b) **Incident Locating & Tracking:** To track incident location in a faster manner this module will provide intelligent location search by implementing fuzzy logic to search the location input by user without matching the exact words system will show the possible matches as per input given by user. User can relate the information and zoom to the location as required.

c) **Query Module:** This module will help user to access information about necessary emergency services such as nearby fire stations, police stations, hospitals and other related information. User

can also get information about facilities available in hospitals such as no of beds etc. Query module will also provide information current project status.

d) **Spatial Query Module:** Spatial query module will enable user to perform nearest neighbour analysis to find out closest facility available from incident site, also spatial routing will enable users to find out shortest path to display transportation routes for responding equipment with commutable roads.

e) **Reports:** Reports will be generated on queries based on location of numbers of nearest health care centres, hospitals; those are nearest to the incident occurred.

MODULE FOR PARK AND GARDENS MANAGEMENT SYSTEM

This solution will enable Municipal Corporation / Smart city officials for effective management of development sheet with the garden department. It will provide detail information about the garden and parks available in the city such as location detail, garden area number of trees etc.

a) **Map Handling Module:** In this module Map viewer will show garden and parks, stadium location and plot boundaries which can be measured with the help of measuring tool on the map interface. User can also view other associated information such as number of trees, services availability, water bodies inside the garden, and shopping area details.

b) **Query Module:** Query module is designed to provide maximum information associated with garden and parks, user can locate all parks and garden and open spaces through query search and then zoom the exact location of selected garden and park on the map viewer. He / She can extract information about number of taps provided in park/ garden.

c) **Spatial Query Module:** This module will enable user to perform buffer analysis to get information around park /garden as well as services availability such as water connection, sewerage facility, telephone etc.

d) **Reports:** This module will allow the users to generate report on query results based Number of public taps provided, Lease period/ adoption period with expiry date of Lease or adoption of individual Park/Garden.

MODULE FOR WATER/ELECTRICITY MANAGEMENT SYSTEM

It will enable user to identify, isolate, and map areas of concern during a leak or outage. He / She can also trace the network to identify customers who are downstream of a main break, complete valve isolation traces, create leak reports, and reroute resources in an outage with detection of spots where leakage in the pipe have occurred. Through GIS system user can communicate leak or outage information with customers and related agencies such as public works and water companies. System will create all city water pipe line networks along with diameter and valves information to calculate flow and pressure at junction.

a) **Map Handling Module:** Map viewer will show entire water pipeline network along with valves in legends user can view information related to diameter, length, and depth of a particular water line

segment. User can also view different water bodies such as Lake, open wells, bore wells etc. User can click on the water pipeline segment to know the material and condition of pipe.

b) **Routing and Utility Network:** Routing will enable user to find out shortest route from source to the particular pump station.

c) **Query Module:** User can extract data through queries base on diameter of pipelines and resultant can further be select to see position of valves on the select water pipe line. Depth of pipeline from road level and inverted level can also be fetch through queries. He / She can locate all water bodies and valves throughout the municipal area along with details like maintenance history, repair and replacement of water pipeline and type of material of construction.

d) **Spatial Query Module:** This sub module will allow user to get population statistics of the selected area and generate buffer along with water pipeline to analyse nearby other utilities in the area.

e) **Reports:** This will allow the users to generate report on query results based on numbers of Leakage spots, pipe having more numbers of leakage spots etc. and also will allow Selection of the diameter of pipeline based on the, population statistics of the area, Lines of diameter and above/ below, Lines of diameter and above/ below, depth of pipeline from road level and invert level, repairs/replacement history, types of material, location of valves with select material of construction etc.

MODULE FOR SEWERAGE OPERATION

This system will support Municipal Corporation / Smart city officials to manage collection treatment and disposal of sewerage effectively by using GIS application. User can plan and track maintenance schedule of sewage lines, calculate flow capacity based on diameter of sewage pipeline along with overall capacity of sewer line.

a) **Map Handling Module:** On map viewer user can view entire network of sewerage pipeline, he/she can also run network trace and could view the output on the viewer part of the application. Position of manholes will also be shown as point location on the map.

b) **Query Module:** User can execute queries base on diameter of pipeline, material of construction, slippage in maintenance schedule flow capacity and status of pumping mains, shutdown status, present capacity of sewer line, locations of landfill, transfer stations and waste handling facilities etc.

c) **Spatial Query Module:** With spatial query user can get the details of bypass line direction of flow, position details of ventilation column, User can also run sewerage line network trace between two points and view result on map viewer.

d) **Reports:** Reports will be generated on queries on type manholes including depth and size, slippages in Maintenance schedule, flow, capacity and Current status of pumping mains, status of shutdown in attribute attached etc.

MODULE FOR ROAD AND TRAFFIC MANAGEMENT

It will enable Municipal Corporation / Smart city users to planning and tracking of maintenance of all roads with in the municipal limits including all types of bus stands, taxi stands, and petrol pumps. The application system will enable users to identify position of road divider, position of U-turn boards and speed breakers, number of speed breakers in a stretch, and road partition along with road street light information.

a) **Map Handling Module:** Map viewer will show all the roads within the municipal limits of Municipal Corporation / Smart city with footpath surface as well as it will show traffic lights as point location. User can identify bus stand, bus route, and petrol pumps location on map.

b) **Query Module:** With queries user can identify position of road divider, U-turn boards, and speed breaker, road partition for light and heavy vehicles, number of street lights, and number of speed breakers on stretch of a road. User can also query bus stand, bus routes, location of petrol pumps.

c) **Routing & Network:** Routing will enable user to find out alternative route in case of Jam, emergency or certain festivals, user can also user routing for identifying routes of all petrol filling vehicle.

d) **Spatial Query Module:** Spatial analysis will enable user to get information of speed breaker, number of street lights and other relevant features based on selected area.

e) **Reports:** It will be generated on query results based on getting numbers of street lights per km in a road, number of speed breakers on a stretch of road, Identifying roads with number of street lights less than per km.

MODULE FOR STROM WATER DRAINAGE MANAGEMENT SYSTEM

This solution will enable users to perform effective management of storm water drains.

a) **Map Handling Module:** Map viewer will show main town level drains with thematic view based on their type such as “Nalla” or “Outfall” along with cross sections.

b) **Query Module:** User can perform queries based on size, slope, and materials of drains. Maintenance schedule data can also be extracted for effective tracking of De-silting achievements.

c) **Spatial Query Module:** Through spatial queries user can locate cross section of all drains with details like width and depth levels.

d) **Reports:** Reports will be generated based on the queries on details of cross-section of all drains with clear width and depth levels, and information about type of drain.

MODULE FOR STREET LIGHT MANAGEMENT SYSTEM

It will enable Municipal Corporation / Smart city users to planning and tracking of maintenance of all street lights with in the municipal limits including all types of street lights, traffic signals, high mast lights, installation policy and Failure Statistics. The application system will enable users to identify position and numbers of street lights, high mast light, traffic signals on road and partition along with road street light information.

a) **Map Handling Module:** Map viewer will show all the roads within the municipal limits of Municipal Corporation / Smart city with high mast lights, street lights it will also show traffic lights as point location.

b) **Query Module:** With queries user can identify position and numbers of street lights per km in a road, Identifying roads with number of street lights less than per km, traffic signals, and high mast lights on stretch of a road. User can also query Failure Statistics, installation policy etc.

c) **Spatial Query Module:** Spatial analysis will enable user to get information of traffic signals, number of street lights, within the buffer area or within the ward boundaries of the municipal limits and other relevant features based on selected area.

d) **Reports:** It will be generated on query results based on getting numbers of street lights per km in a road, number of traffic signals on a stretch of road, identifying roads with number of street lights less than per km and failure statistics analysis based on user input to the GIS application.

Development of GIS Enabled Mobile Application

Bidder will Design and Develop GIS based Mobile Application for various municipal services under this work. This Mobile Application needs to be developed as a comprehensive feature covering the tracking of all municipal services

Sr.No.	Minimum Features
1.	Offline Working
2.	Native android application so seamless support to phone hardware like GPS, Camera etc.
3.	Offline Spatial and non-spatial data viewing and update.
4.	GIS server attribute data display on geometry (offline support)
5.	GIS layer on off
6.	Zoom in-zoom out functionality
7.	Current location of surveyor
8.	GPS navigation
9.	Add spatial feature
10.	Spatial Feature (Point, line, polygon) creation
11.	Local language support for data viewing, data entry
12.	Local language searching and indexing for all attribute data.
13.	Image compression and conversion to base64 for saving in database
14.	Distinct form for Open Land, Building and Floor.

15.	Video capture
16.	Laser distance meter integration
17.	Mobile application integration with DGPS
18.	IMEI integration for data security and offline authentication
19.	Resurvey module up to unit level.
20.	Unlimited User
21.	User management module for addition and updation of surveyor, supervisor and administrator and workflow integration (Geographically boundary wise area allocation)
22.	Project monitoring module with Gantt chart
23.	Survey allocation and management module
24.	Map module for spatial data viewing, querying, exploration and allotment to surveyor
25.	Report Module includes charts, maps, attribute query, image viewer and downloading functionality with local language support
26.	Data QA-QC module
27.	Resurvey allotment module to surveyor up to unit level
28.	Attribute data upload functionality with local language support
29.	OGC standard GIS server integration for consuming wms, wfs, wmts services
30.	Form builder for addition and updation in mobile forms for data capturing utility like text box, drop down box, multi-line text box, radio button, check box, file upload, camera utility, Laser Distance meter integration
31.	Spatial query support

Integrations with Existing Systems

Bidder should undertake the activity of integrating the GIS solution with Municipality Portal, e-Governance services, various smart city components (which are part of scope of the project and future integration with more smart city services that are envisioned to come up) and Integrated Command & control System.

3.1.16. IoT platform

As part of scope of the project various ground level sensors would be installed which would collect ground level data and communicate the same to the ICCC for further processing. This IoT platform would act as the ground level information gathering layer for Aligarh Smart city platform. The various capabilities of the IoT platform is as under:

Data Aggregation, Normalization and Access

1) The city will be using various device vendors for various smart services. For example, in the Smart city journey of the city, various vendors of smart elements will be used for deployment and each will be generating data in their own format. This Platform should be able to define its own data model for each smart service like waste, lighting, transport, etc. and map data from different device vendors to the common data model.

2) Data from the IoT platform must be exposed to application eco system using secure APIs or any other secure methodology

3) Platform should be able to integrate with any type of sensor platform being used for the smart services irrespective of the technology used. Agnostics to sensor technologies such as LoRA, ZigBee, GPRS, Wi-Fi, IP Camera

4) Platform should also allow the manufacturers of the sensors to develop integrations themselves using the platform SDKs without affecting the northbound applications and existing integration.

5) Platform should be able to normalize the data coming from different devices of same type (i.e. Different lighting sensor from different OEMs, different energy meters from different OEMs etc.) and provide secure access to that data

6) Platform should support distributed deployment of functions (workflows & policies) across city's network and compute infrastructure with centralized management and control
7) Platform should be able to handle high data volume, handle a high events rate (up to 10,000 events per sec) with low latency processing

8) Platform should be able to correlate and handle multiple data streams, while providing real-time logic, analysis and routing applied to incoming data streams and aggregating data over time

9) Platform should store data in-memory (or to an external database) for use by other components or flows inside platform

10) Platform should an interface to graphically build and edit complex workflows that include data transforming, analysis, filtering and routing to destination system or using your output stream as input to other workflows. Adding an input or output device shall be as easy as dragging an adapter from a template and connecting it to flow

GIS Map Support

System should support leading GIS solutions and should provide the following functionalities:

1) Provides geographical coordinates of specific facilities, roads, and city infrastructure assets, as well as unmapped facilities
2) Calculates distance between two, or more, locations on the map
3) Locates and traces devices on the map

4) Software shall include an inherent Geographic Information Systems (GIS) view, supporting real world coordinates with predefined coordinate systems.
5) Software shall provide integrated capability with maps from survey of India and others
6) Software shall provide integrated capability to display high resolution satellite imagery and vector maps. To show the camera location on the map the map scale required is 1:1000 and to be created from high resolution satellite imagery of 0.5m
7) The GIS view shall provide a common operational picture enabling information sharing in real time between different users filtered according to predefined organization hierarchy. All GIS entities shall be automatically synchronized in the background between all client workstations.
8) The software shall display the building outline for all important buildings.
9) The GIS map shall support easy navigation operations such as pan, zoom in/ out, zoom to extent, previous zoom and next zoom
10) Software shall enable system administrators to define different data layers for displaying on GIS maps. Different layer types supported including geo referenced raster images, lines, zones, location of sensors and other objects (tracked vehicles for example)
11) Defined data layers can be turned on/off on demand or automatically according to predefined rules.
12) Software shall enable authorized users to edit the vector data presented within the defined layers.
13) When displaying layers, the Software shall enable administrators to turn their layers on/off when they are displayed
14) Software shall support saving of multiple GIS map views for later on demand or automatic popup. These views shall determine the selected layers and the exact map zoom level. The system shall support the ability to automatically bring up these predefined map views or locations most relevant to an incident.
15) Software shall support the customization and real time activation of multiple-level drill downs by linking objects placed on map layers to other GIS views.
16) Software shall support the placement of Action map objects on layers. Whenever these objects are clicked, the predefined action shall take place.
17) Software shall support the placement of predefined objects on map locations
18) Software shall allow for region of interest areas to be drawn on the map and pull out all the camera view simultaneously along with alerts like boundaries of police stations etc.
19) Software shall enable operators to add points, polylines and polygons to maps in order to identify multiple locations related to an incident.
20) Software shall enable users to open up a new incident and directly associate it with a map location or to associate an already opened incident with a new map location. The system shall also be capable to receive an API call which will open up a new incident and automatically place it on the map using a map location passed via the API. The relevant map location shall be displayed on the map for as long as the incident is open.
21) Software shall support display of heat maps, pin map, trend map, repeat incident count map etc. over GIS maps based on incident data
22) Software shall support for configuration and display of cameras Field of View (FOV) overlay. It shall be possible to display the FOV for a single camera or for all cameras at once.

23) Users' (responders) map context menus shall include the capability to send other users messages, assign tasks and initiate phone calls. It shall also be possible to view the tasks presently assigned to selected users.
24) Software shall allow administrators to define and draw zones of arbitrary shapes and sizes. These zones shall be used for triggering various activation rules. The GIS shall be able to show/hide these zones as layers.
25) Software shall provide the ability to track movements and status of all location-based technologies (e.g. GPS, RFID, etc.). Software shall also support the on demand visual display of historical movement path.
26) Software shall support the searching of objects on the GIS map by name. The search shall support wild cards and shall highlight the found objects for easy identification.
27) Software shall support the ability to easily capture and send snapshots of the GIS maps.
28) Software shall provide users with a map 'Toolbox' with the most frequently used map operations for selected map entity types. The Toolbox operation buttons shall be customizable.
29) Software shall support the searching of a geographical location on the map, via entry of ZIP code, street address, milestone etc. ("Geo-coding").
30) Software shall support the calculation and map representation of the nearest geographical route between two locations. The calculation shall be capable of including factors such as street directionality.

IOT platform shall enable online Developer Program tools.It should help produce new applications, and/or use solution APIs to enhance or manage existing solution free of cost. The IoT platform vendor shall provide the platform SDK to such new application/system developers for such requirements.

Authentication

Authorization System should support standard Authentication and Authorization Methodology

Resiliency

1) Architecture should provide smart city use cases much needed resiliency.
2) Platform must support fault tolerance, load balancing and high availability
3) Provides ways to define policies that make applications or things respond to external environments
4) Schedule actions to happen at future time points
5) Platform should have integrations with the network layer to proactively monitor any incidents on the network for active troubleshooting and triaging
6) Platform should be able to alert any incidents in the network proactively on City Operation Command Centre.

API Repository / API Guide

1) SDK/APIs should be available for the smart system domains (Outdoor Lighting, Traffic,

Environment, Urban mobility etc.) to monitor, control sensor and/or actuators functionality to enable app developers to develop apps on the platform

2) For example - Vendor agnostic SDK/API to control Lighting functionality.
3) Platform OEM should provide the SDK/ APIs for the smart system domains (Parking, Outdoor Lighting, Traffic, Environment, Urban mobility etc.) to allow sensor vendors and app developers to develop their connectors / adaptors to the platform

Platform upgrade and maintenance

1) OEM should be able to securely access the platform remotely for platform updates / upgrades and maintenance for the given duration
2) Platform should be able to be deployed on DC/DR for disaster recovery

Platform functionality API management and gateway

1) Provides secure API lifecycle, monitoring mechanism for available APIs
2) User and subscription management: should provide different tier of user categorization, authentication, authorization, and services based on roles and responsibilities
3) Application management: should provide role-based access view to applications
4) Enabling analytics: Time shifted and real-time data available for big data and analytics
5) Platform should also be able to bring in other e-governance data in City Operations Command Centre dashboard
6) All data should be rendered / visualized on command and control centre dashboard.

SDK/API Based Open Platform

1) Provides SDK/API to develop applications for each of the Smart City Services domains.
2) Platform should have API Management capabilities like API Security
3) Platform should be able to provide SDK/API access based on roles and access control policies
4) MSI should have already documented the platform SDK/APIs using which applications can be developed
5) MSI should be able to demonstrate existing applications that are developed using these platform SDK/ APIs
6) Trending Service System should provide trends in graphical representation from data sources over a period. Trends should allow monitoring and analysing device performance over time.

Policies and Events

1) System should allow policy creation to set of rules that control the behaviour of infrastructure items. Each policy should a set of conditions that activate the behaviour it provides. System should allow Default, Time-based, Event-based and Manual override polices creation. For example, an operator might enforce a "no parking zone" policy manually to facilitate road repairs.
2) System should provision to defines a set of conditions that can be used to trigger an event-based policy

3.1.17. Data Centre (DC) and Disaster Recovery (DR) Centre

The 'Data Centre' (DC) infrastructure catering to all the Components & features of the Aligarh Smart City – ICT Solutions, will be co-housed in the building identified by ASCL which will be provided to MSI with requisite space and electric main power depending on the requirement as per the proposed solution of MSI from electrical department. MSI is required to provide UPS and DG-set of corresponding ratings along with required infrastructure for data centre and control room of ICCC. The MSI shall be required to undertake a detailed assessment of the requirements at the identified location and commission all the necessary ICT and non-ICT infrastructure which also add civil/ electrical work as required.

The Data Centre wherein the entire ICT infrastructure along with the network infrastructure are installed. The data centre will host all the software applications for various smart city components. The Data Centre shall provide the private cloud like functionalities which allows agility; seamless expansion which is non-disruptive and help infuse the new technologies into the existing landscape as and when available. The data centre to have adequate provision for data security through implementation of firewall, IPDS, antivirus system, etc. The Physical access to the data centre shall be managed through a biometric access system.

The Disaster recovery centre should be on cloud as a service (from cloud service providers empanelled by Meaty). The Disaster Recovery Centre is a mirror image of all the application hosted at the data centre & will be 50% of the Compute and storage however the data of video feeds is to be available from 50% of cameras in case of Disaster. In case of non-availability of data centre, the DR centre should be able to operate all the applications for the smart city components. The DR centre will have all the functionality and infrastructure similar to the data centre.

Disaster Recovery Centre will be 50% of Data Centre Site, it is mandatory to have two separate physical locations and distance itself through Seismic Zones.

Implementation- Design, Installation, and Configuration, Commissioning and Testing: -

Datacentre

1) MSI shall be responsible for detail designing and Solutions architecture of required Infrastructure, setup, applications of ASCL and premise shall be software defined data centre which has zero dependency on the proprietary hardware.
2) MSI must ensure that virtual machines are having private IP network assigned to VM.
3) MSI must ensure that all the managed hosted VMs are in same network segment (VLAN) even if they are spread across DC-DR
4) In case of scalability like horizontal scalability, the MSI should ensure that additional require network is provisioned automatically of same network segment.
5) MSI must ensure that ASCL gets ability to map private IP address of VM to public IP address as require from portal
6) MSI must ensure that public IP address of VMs remains same even if VM gets migrated to another datacentre due to any incident.

7) MSI must ensure that public IP address of VMs remains same even if VM network is being served from DC-DR

8) MSI must ensure that the public network provisioned for VMs is redundant at every point.

9) MSI must ensure that VMs are accessible from ASCL private network.

10) MSI should ensure that VM network is IPv4 and IPV6 compatible with segregated ports.

11) MSI should have provision of dedicated virtual links for data replication between their multiple datacentre in order to provide secure data replication for DR services.

12) MSI should ensure use of appropriate load balancers for network request distribution across multiple VMs.

13) MSI shall propose the system which has the capacity planning built into the system which provides ASCL the transparent view of the system resources used and required for future expansion.

14) MSI shall provide the capabilities to assign role based access and ability to prepare template of the VM, Application based on the workload.

15) Understanding the other Infrastructure, setup, software, applications of ASCL and planning for DC-DR solution

16) MSI must ensure that virtual machine is into separate network tenant and virtual LAN. Also, Micro segmentation shall be part of solution architecture which enables the fine grained security policies to be assigned to data centre applications down to workload level.

17) MSI shall require while architecting the solution which works on the software defined data centre conceptualization inside the firewall & further workloads which cannot be virtualized on bare metal or physical server that shall be used for the software defined storage pool.

18) MSI is required to locate all hardware/software and related items as per design offered for smart city infrastructure including SLA monitoring and Help desk management, in above data Centre complying with standard guidelines as per Telecommunications Infrastructure UPTIME/TIA-942.

19) Data Centre shall be available for 24 x 365 operations.

20) MSI shall propose the system which has ability to define redundancy level for each workload across the cluster.

21) Reduction in data centre footprint over traditional siloes architecture for power, cooling and space savings.

22) Smart city infrastructure shall have built in redundancy and high availability in computing and storage to ensure that there is no single point of failure.

23) MSI shall submit to ASCL adequate documentation/ evidences in support of the choice of the data Centre to meet the project requirements.

24) Minimum Guiding factors for selection of Data Centre: Following are benchmark requirements which should act as guiding factors for MSI to select and propose locations for Data Centre

25) There should be dedicated rack space available in the Data Centre for entire smart city solutions / infrastructure.

26) Access to Data Centre Space where the Smart City Project Infrastructure is proposed to be hosted should be demarcated and physical access to the place would be given only to the authorized personnel

27) Smart City Data Centre should be as per Telecommunications Infrastructure Standard for Data Centre and should get ISO 27001 Certified.

28) It should have access control system implemented for secured access.

29) Indoor CCTV Cameras would be required to be installed to monitor the physical access of the system from remote location

30) If required, it should be possible to depute police personnel for physical security of the premises.

31) Access logs to be stored for entire duration of contract and handed over to ASCL upon termination/expiry of the contract.

32) MSI must ensure that there is access to VMs if there is a requirement to access it using IPSEC/SSL or any other type of VPN.

33) MSI must provision for storage and availability of archived/flagged video data of incidents and events on an archival server at the Police Control Room. Admin/Operator in the Police Control room should have access to this data though client workstations or web enabled clients.

34) The operator should be able to export archived video directly from the archival server and produce the same when needed in court of law or for other requirements.

Disaster Recovery as service over the cloud

1) MSI shall avail hosting services from MEITY Empanelled Cloud Service Provider to host DR site in addition to implement and manage the architecture accordingly.
2) MSI is responsible for Disaster Recovery Services so as to ensure continuity of operations in the event of failure of primary data centre meet the RPO (Recovery Point Objective) and RTO (Recovery Time Objective) requirements.
3) RPO should be less than or equal to 4 minutes.
4) RTO shall be less than or equal to 20 Min.
5) During the change from Primary DC to DR or vice-versa (regular planned changes), there should not be any data loss.
6) Support for synchronous and asynchronous data replication.
7) Automated site to site failover and failback.
8) Support for non-identical server and storage configurations at the remote site.
9) The Primary Managed hosted DC-DR should be in different seismic zones.
10) MSI should provision VM's for both DC and DR.
11) During normal operations, the Primary Data Centre will serve the requests. The Disaster Recovery Site shall/will not be performing any work but will remain on standby.

12) The MSI shall conduct DR drill one in every six months, of operation wherein the Primary DC has to be deactivated and complete operations shall be carried out from the DR Site. However, during the change from DC to DR or vice-versa (or regular planned changes), there should not be any data loss
13) DC Data shall be replicated on an ongoing basis at DR, as per designed RTO/RPO and replication strategy, data consistency and integrity should be maintained
14) Website and live application (both external and internal) should be routed seamlessly from DC site to DR site.
15) During this period, the compute environment for the application in DR shall be available on demand basis for a functional DR and minimum compute if required, as per the solution offered. The application environment shall be installed and ready for use.
16) The MSI shall clearly define the procedure for announcing DR based on the proposed DR solution. The MSI shall also clearly specify the situations in which disaster shall be announced along with the implications of disaster and the time frame required for migrating to DR. The MSI shall plan all the activities to be carried out during the Disaster Drill and issue a notice to the Department at least 15 working days before such drill.
17) RPO monitoring, Reporting and Events Analytics for the Disaster recovery solutions should be offered as part of the offering. Any lag in data replication should be clearly visible in dashboard and alerts of same should be sent to respective authorities.
18) Training should be provided to the staff members and System Administrator on DR.
19) Services provider should provide the solution document of DR.
20) Selected bidder should have proper escalation procedure and emergency response in case of failure/disaster at DC.
21) Selected bidder shall provide support for all server maintenance activities. This would include periodic health check, on-demand troubleshooting, etc. from certified vendors. ITIL processes named problem, change, incident & configuration will be followed by selected bidder at DR site.
22) Database should be in Active mode at DC and Passive mode at DR, data consistency and integrity should be maintained.
23) In the event of a site failover or switchover, DR site will take over the active role, and all the requests will be routed through that site. Application data and application states will be replicated between data centres so that when an outage occurs, failover to the surviving data centre can be accomplished within the specified RTO. The installed application instance and the database shall be usable and the same SLAs as DC shall be provided. Self-remediating security implementation which allows systems to revert back to approved security state at designated interval.
24) Selected bidder shall provide Disaster Recovery services during the event of Disaster.
25) The Selected bidder shall configure all the components and sub-components for end-to end user access to all applications/services.
26) ASCL reserves the right, on its own or via a third-party auditor, to conduct overall testing at any point of time for the services delivered by the selected bidder.
27) The selected bidder shall make provisioning of requisite software licenses, Database licenses and other required monitoring software, tools for IT setup at DR site
28) The selected bidder shall undertake installation and configuration of operating systems, databases, and storage solution and replication mechanism for all in-scope business application systems.
29) The selected bidder would be solely responsible for implementation of all applications at DR site. All costs including licenses for application, OS, replication tools or databases if any shall be borne by the selected bidder Automated switchover/ failover facilities (during DC failure & DR Drills) to be

provided and ensured by selected bidder. The switchback mechanism shall also be automated. The Selected bidder shall also provide a tool/ mechanism for ASCL DC to trigger DR switchover. Selected bidder shall provide support for the development of detailed activity plans for recovery for all systems.

30) The selected bidder shall undertake installation and configuration of any other specialized applications/ software solution/Hardware solution required for the Disaster Recovery Setup.
31) Selected bidder shall provide support for the development of a detailed disaster recovery plan. This plan document will contain steps/procedures to switch over services to DR site in the event of invocation of disaster at DC site. Selected bidder shall also document steps for restoring services from DR site to DC site.
32) Selected bidder shall provide support with the development of detailed operating manuals for the implemented replication solution from system administrator's perspective.

DC Minimum characteristic: (as per tier III datacentre standards)

1. Data Centre Availability: The availability of data from the hardware at a location must be guaranteed as per the SLAs defined in Vol III of the RFP
2. No more than 1.6 Hours of downtime per year
3. N+1 fault tolerant providing power outage protection
4. All IT equipment should be dual-powered and fully compatible within the topology of site architecture.
5. Redundancy and concurrent maintainability. It requires at least n+1 redundancy as well as concurrent maintainability for all power and cooling components and distribution systems. Any such component's lack of availability due to failure (or maintenance) should not affect the infrastructure's normal functioning.

3.1.18. ICCC Control Room

1. Looking at the huge volume of information generation that would be generated with the help of pan city ICT infrastructure, it is envisaged to have a Centralized Integrated Command and Control Centre for Aligarh Smart City project. All the smart solution, network, components will converge at the ICCC which is proposed to be constructed at Lal Diggi area near IG Khan Circle Aligarh.
2. ICCC would involve leveraging on the information provided by various departments and providing a comprehensive response mechanism for the day-to-day challenges across the city. ICCC shall be a fully integrated, web-enabled solution that provides seamless incident – response management, collaboration and geo-spatial display.
3. The ICCC shall facilitate the viewing and controlling mechanism for the selected field locations in a fully automated environment for optimized monitoring, regulation and enforcement of services. The ICCC shall be accessible by operators and concerned authorized entities with necessary role based authentication credentials.
4. Bidder is responsible for setting up and O&M of entire ICCC including all the, hardware and software, interior work for setting-up of ICCC at physical space provided by ASCL, Network Cabling, Electrical Works, Video Wall, Furniture's and Fixtures, Building Management System, CCTV

Surveillance system of the ICCC, Access Control System etc. as per the scope of work and technical specification of RFP.

5. The Command & Control solution should be implemented and complied with the industry open standards.
6. Activities at the ICCC will comprise of monitoring services, incident management, Response as per the defined Sop's with defined escalation procedures etc. as per the requirement laid out in the RFP. These SOPs will be prepared by the bidder and have to be approved by ASCL.
7. Bidder is responsible for integration of ICCC with various smart city solutions which would be commissioned as part of the project and also with any future Smart applications that are envisaged to be rolled out. The ICCC should enable bi-direction communication with all Smart solution which are part of the project and the ones which would be later commissioned. The bidder has to prepare the SOPs and have to be approved by ASCL.
8. The successful bidder will have to provide all necessary Software, Databases, Hardware, Network Infrastructure, Active and Passive Connectivity, Power Backup including all IT infrastructures that may be required for the ICCC for the entire contract duration.
9. The ICCC will manage and monitor entire project and services. All the Information and data collected through various components of the smart city project will be viewable through a centralized VMS Application.
10. Activities at the ICCC will comprise of monitoring services, incident management with defined escalation procedures, etc.
11. All hardware & software procured should be from reputed OEMs with license, support and warranty in the name of ASCL for the complete project/contract period.
12. Bidder should seek confirmation from ASCL before installation and commissioning of the solutions, Technical Architecture and Equipment's at CCC.
13. Video Wall: A state of art LED video wall facility should be installed at CCC. Followings are the functional requirement of video wall: -
    - The video wall shall use multi-monitor (e.g., different monitor can display different input source) and split screen (e.g., several intersections can be displayed on one monitor) display technology to provide the flexibility to accept audio and video inputs Camera system, TV signal, recorded video, and Laptop computer.
    - Should have provision for live monitoring and control of various application & Smart solution modules
    - The system should have Integration with existing control centres in the city & other services (with provision for future scalability in terms of systems to be integrated and extent of integration with existing systems)

14. Integration with e-Governance Services which would be commissioned as part of the project

15. Integration with Smart Solutions which would be installed as part of the project and others which are envisaged to be rolled out in future

16. All applications that are part of project scope should be accessible from the ICCC. The Work Stations should be web-enabled, provide for appropriate User Access (Role based, read only/ Read write) and other security controls.

17. Additionally, there will be video wall deployed for the Municipal Commissioner viewing at the NNA HQ at Sewa Bhawan, Church Compound, Civil Lines, Aligarh

18. Integrated Dashboard for the Entire Project Component: The successful bidder is required to develop a centralized dashboard for entire smart city project for the reporting and viewing of all the

project components and Key performance indicators of systems commissioned as part of the project such as city surveillance system, ITMS, etc. through a single interface with the following capabilities:

19. Should be able to integrate all the existing services/utilities currently being used or to be commissioned by the City administration and with the capability to add and integrate upcoming smart city application/ components to be brought by the ASCL.

20. Should be able to provide a distinct view of all the integrated utilities/services through a single console/interface in a clear and hassle free manner.

21. Should be able to provide all possible status and details of the end utilities/components deployed throughout the city through a single interface

22. The system should provide a mechanism to configure and monitor Service Levels for monitored key performance indicators which are used to configure the business process lifecycle.

23. The system should be able to provide a mechanism to trigger actions towards the incident management system when the Service Levels for monitored key performance indicators are breached using different colour combinations. It should also provide an easy to navigate user interface for managing incidents, events, profiles, groups, alarms, KPI's etc.

24. The system should provide the tools to assemble personalized dashboard views of information pertinent to critical incidents, emergencies and operations of command centre.

25. The system should be able to monitor live deployed event applications for performance usage and planning statistics in a graphical interface, including CPU, memory, connection and Queues etc.

26. The dashboard should provide filtering capabilities that enable end users to dynamically filter the data in their dashboard based upon criteria such as Alarm, event, status, KPIs etc. The dashboard shall have capabilities to drill down in to the datasets and visual representations.

27. The system should be implemented using industry open standards based commercial off the shelf products

28. The Command centre should facilitate converged communication across all communication media as determined by ASCL

29. Each operator shall be provided with one workstation with three monitors for system monitoring along with one intercom line.

30. Collaborative Monitoring: - The Bidder has to provide a solution which will have a collaborative framework for receiving video feeds from various and sensors which would be commissioned as part of the project.

31. It is envisaged that the centralized helpdesk, functioning as proposed below, would be commissioned & managed by the bidder and shall serve following objectives:

- Act as the Point of Contact for the users of Surveillance System
- Own an Incident throughout its Lifecycle
- Communicate effectively with Police / Home Dept. Officers and IT support teams.
- Maintain high user satisfaction levels
- Maintain the SLA statistics & submit quarterly report to Police / Home Department

32. Bidders scope of work and supply of the control room only in the ICCC and its components including Ergonomic Study, Desk, Ceiling, Flooring, Panelling, Partition, Illumination defined in this document shall be on turnkey basis. The expected size of the control would be 1500 Sq. ft.

33. Design, Engineering, Manufacturing, supply of all related goods and providing all related services including installation, testing, integration, commissioning etc. all complete, preparation of related drawings, documentations etc. of the control room.

34. Quality assurance and commissioning of the complete system at site to the complete satisfaction of the owner/consultant.
35. To ensure uniformity, consistency & quality in final product, bidder should have In-house metal manufacturing & automatic conveyorized Powder Coating Plant. Bidder to furnish the images of the set-up which shall be verified before approval.
36. The bidder or its consortium must be ISO 9001, ISO 14001, OHSAS 18001 and ISO 27001 certified.
37. Manufacturer of the control room furniture should be FSC certified from last 2 years.
38. UL Certified design of High-density Poly Urethane Foam moulded on industrial grade aluminium core to form 50mm deep tapered edge to be installed on worktop. The Edge shall be mechanically replaceable within 30 minutes in case of damage or wear without opening or removing the worktop. Certificate to be enclosed.
39. Wall panelling, ceiling & desk system shall be seismic zone 5 tested and certified from government approved test laboratory on the name of bidder.

Minimum required Specifications for ICCC components: -

a) Control Desk: -

1. **Structure**: - Every desk shall be standing on aluminium pole-based system; the pole shall have 200 mm diameter and minimum 10 mm wall thickness at circumference. Both the load carrying poles shall be visible as design elements on the extreme sides of the desk; work top & floating CPU Cabinets shall be installed on these poles. The CPU cabinet shall be raised by 150mm from floor and shall be firmly mounted between extreme end poles. The CPU cabinet shall have curved extruded aluminium shutters. Straight shapes/profiles of desk like under structure, slat wall, front edge, table tops etc. shall be deemed unacceptable.
2. Conventional bulky, boxy type desk of metal and aluminium structure shall be deemed unacceptable.
3. Console should be Greengard Gold Certified.
4. Wire shall be routed into the cabinet through the pole. Proper maintenance access points to be provided via suitable snap fit plastic /metal covers.
5. **Table Top: -** The table top core shall be made up of aluminium and shall have 2 mm thick acoustic laminate finish on the top. Desk top shall have a feature of tilting by 2 to 5 degrees with help of noise free mechanisms.
6. **Front Edge: -** UL Certified design of High-density Poly Urethane Foam moulded on industrial grade aluminium core to form 50mm deep tapered edge to be installed on worktop. The Edge shall be mechanically replaceable within 30 minutes in case of damage or wear without opening or removing the worktop.
7. **Cable Managers and Rear Edge**: - All the cable manager openings and rear edge of worktop shall be protected from no spill moulded PU edge, 5 mm high above worktop surface to prevent liquid from spilling inside the CPU/Equipment Cabinet.
8. **Slat Wall: -** 60 mm thick Curvilinear Slat wall shall have radius matching to the CPU cabinet shutter. Slat wall shall have inbuilt mechanism for tool less & effortless sliding of the monitor arm across the length of the console without removing the monitor pole.
9. **Monitor Arm Assembly** shall have auto-lock, push & add/remove die-cast aluminium extendible arms of 150mm each with tool less addition/deletion feature to cater future

requirements. Tool less addition / deletion in less than a minute. UL certificate to be enclosed along with the bid.

10. **Height Adjustable Mechanism: -** The desk shall feature Height Adjustable Work-surface as per the user's requirement.
11. **Touch Screen for Supervisor/In-charge: -** On supervisors / shift in-charge's desk a touch screen shall be provided. The touch screen shall have following features: -
    a. Provide live data of Humidity & temperature of the control room.
    b. Provide cabinet temperature of all CPU Cabinets to ensure safe & continuous operations.
    c. Power distribution units shall update the master controller on touch screen for fault indication.
12. **Electricals: -** The exhaust fans shall be provided with thermostats. Fans will automatically shut down in case the shutters are opened.
13. **Cable Trays: -** The desks must be designed with vertical and horizontal cable trays to allow for continuous cable management between the cabinets.
14. **Task light: -** Following features should be certified by UL.
    a. Slat wall mounted task light with built-in touch strip for multilevel dimming.
    b. Sleek array of small LEDs to rotate in any direction to illuminate.
    c. Light head shall spin in its socket, sweep side to side, and rotate around the end of the arm to point in any direction.
15. **Special requirement:** Minimum one touch table of 55" diagonal shall be provided in viewing gallery for visitor's interface with the control room environment for process understanding of control room. The horizontal touch screen shall become vertical at a touch of a button for multi-purpose use.
16. All the furniture including touch screen mounts, printer tables, meeting tables must belong to same family i.e. pole based structure of 200mm diameter and minimum 10mm thickness at circumference matching to that of control desk.
17. **Dynamic Indication: -** Every desk top shall have inbuilt indication on the work-surface with following feature:
    a. The indication shall be connected with phone calls, messaging.
    b. In case of emergency, the indication will change to alert the operator and shall match with the emergency theme of the control room.
    c. The entire desk shall not have MDF, Ply, Chip-board, Glass and Acrylic Solid surface material.

b) **Partition and Ceiling System: -**

1. Look and feel of the control room shall be ultra-modern & unique. To solve monotony in control room in future, the panelling shall have inbuilt design in 20% tiles of panelling to change the colour without ordering new. The MSI shall propose 3 colour options in advance during approval stage and shall change the approved colour scheme in future at no cost.
2. Conventional Gypsum, wood, Fabric and painting work shall be deemed unacceptable in the control room area.

3. Ceiling and panelling system shall be a combination of hexagonal and rectangular designs defined below: -
   a. Hexagonal design: - Hexagonal ceiling and panelling shall be made up of extruded aluminium periphery rigid enough to pass seismic test mentioned above.
   b. Rectangular design: - 25mm deep tray type panelling tiles with rounded corners shall be snap fitted to the main structure and firmly hold in place by die-cast aluminium corner locks. The die-cast locks shall be attached to the main MS structure or min 1.6 mm.
   c. Tiles: - Tiles shall have minimum 10,000 micro-perforations per square meter to achieve NRC of 0.6 Sound Absorption Coefficient by diffuse field method; IS: 8225-1987 "Measurement of Sound Absorption Coefficient in Reverberation Room" (Equivalent to ISO: 354- 1985 and ASTM 423-90). Test report from reputed agency to be attached to the tender proposal.
   d. Hexagonal system shall extend possibility to integrate various raw materials like Solid surface, Fabric, Glass, Metal (perforated and non-perforated), illumination in the tiles to form multiple design combinations.
   e. Structure: - The structure shall be made up of 1.6mm thick powder coated steel structure.
   f. **Cut-outs for LVS: -** Panelling shall have provisions to accommodate Video wall in an aesthetically appealing manner.

C) Flooring: -

1. **Acoustic flooring**: - The decorative flooring shall reduce impact sound by 14dB (ISO 717-2)). It shall be twin-layer linoleum built up from 2 mm acoustic laminate and 2 mm Corkment backing.

d) Doors

1. **Metallic Door: -** With door spring and locking arrangements and both way handle. Prepare with rigid thermo fused film metal panels. Specification: 0.6mm thick Metal panel sheets, cavity filled with glass wool insulation of density 24kg/cum in roll form of make inside adequate quantity. Material of the partition and that of metal door will remain the same.

1. **Metal door with Toughened Glass Vision Panel: -** The door shall have 100mm frame (made of same material as that of wall Panelling /partition) and shall have 12mm thick glass pane in between. Glass Properties: Safety (tempered): when broken, must split into tiny harmless pieces.

   Illumination: - Control Room illumination shall be designed as per ISO 11064 norms and shall be controlled through touch screen installed on the supervisor's console. The same touch screen shall indicate at least three vital parameters of control room solution including desk.

3.2. Roles & Responsibility Matrix

This following section defined the Roles & Responsibility matrix of the various stakeholders involved in the project. The RACI matrix is the simplest, most effective means for defining and documenting project

roles and responsibilities. Knowing exactly who is responsible, who is accountable, who needs to be consulted, and who must be kept informed at every step significantly improves the chances of project success. In the RACI matrix, the nomenclature used is as follows:

- R = Responsible
- A = Accountable
- C = Consult
- I = Inform
- R/A = Responsible & Accountable
- NA = Not Applicable for those who has no role in the concerned phase

Key Activities	Successful Bidder/ MSI	ASCL	NNA	Police Dept.	PMC
Project Initiation Phase					
Detailed Survey Report including infrastructure assessment, phase wise location distribution, hardware deployment plans etc.	**R/A**	**I**	**N/A**	**N/A**	**I**
Detailed Project Plan including Operations management, Contract management, Risk management, Information Security and Business Continuity	**R/A**	**I**	**N/A**	**N/A**	**I**
Detailed plan for installation of ground level assets required for the ITMS & Surveillance solution components	**R/A**	**I**	**N/A**	**N/A**	**I**
Detailed plan to map the various processes for automation and development of the SRS document	**R/A**	**I**	**N/A**	**N/A**	**I**
Detailed plan for laying of fiber network connecting all the junctions as per locations mentioned in the RFP	**R/A**	**I**	**N/A**	**N/A**	**I**
Data Design requirements reports for business plan, which will include data segregation strategy, data regulation planning, data lifecycle management strategy etc.	**R/A**	**I**	**N/A**	**N/A**	**I**
Submission of inception report and mobilization of team proposed for the project	**R/A**	**I**	**N/A**	**N/A**	**I**
Ground Level Data Collection Phase					

Detailed interaction with the Departmental officials to understand the processes that needs to be automated and the junctions where the ICT assets are to be installed	**R/A**	**R**	**R**	**N/A**	**I**
Detailed survey & mapping of the exact locations in the junctions where the ICT assets (including ITMS, Surveillance, PA system, environmental sensors, VaMs, etc.) as part of the project would be installed	**R/A**	**I**	**I**	**R**	**I**
Detailed designing of the DC components installation and connectivity with DR site	**R/A**	**I**	**N/A**	**N/A**	**I**
Designing of the automated process flow document of the processes along with the SRS document	**R/A**	**I**	**I**	**N/A**	**I**
Detailed designing of the GIS solution components	**R/A**	**I**	**N/A**	**N/A**	**I**
Detailed designing of the fiber network including active passive components & trenching plan	**R/A**	**I**	**N/A**	**N/A**	**I**
Getting approval from ASCL and concerned dept. officials for the ground level survey conducted	**R/A**	**A**	**A**	**A**	**A**
Supply Phase					

Supply of IT & Non IT assets which are proposed by the MSI as part of the project (as per the BOM & BOQ filled by the MSI during the time of bidding)	**R/A**	**N/A**	**N/A**	**N/A**	**I**
ASCL can undertake an inspection of the IT & Non-IT assets to ensure compliance of the equipment supplied	**R**	**A**	**N/A**	**N/A**	**A**
Installation Phase					
Physically installation of the IT & non-IT including ITMS, Surveillance, PA system, environmental sensors, VaMs, multi-purpose kiosks etc. assets as per the project planned locations	**R/A**	**I**	**N/A**	**N/A**	**I**
Undertaking all the ICCC related activity to make the site ready as per the terms & conditions mentioned in the RFP	**R/A**	**I**	**N/A**	**N/A**	**I**
Installation of the DC components along with security & datacenter components and the connectivity with the DR site	**R/A**	**I**	**N/A**	**N/A**	**I**
Installation of the fiber network which includes trenching, laying of fiber, installation of active & passive components, creation junctions & POPs	**R/A**	**I**	**N/A**	**N/A**	**I**
Installation of all the software components including database, eGov platform, GIS platform etc. proposed as a part of the RFP scope of work	**R/A**	**I**	**N/A**	**N/A**	**I**

Commissioning Phase					
Commissioning of the ground level IT & Non IT assets which are installed previously	**R/A**	**I**	**N/A**	**N/A**	**I**
Commissioning of the DC & DR Site with all the security & data redundancy features as mentioned in the RFP	**R/A**	**I**	**N/A**	**N/A**	**I**
Commissioning of the fiber network	**R/A**	**I**	**N/A**	**N/A**	**I**
Commissioning of the require software codes/ changes to incorporate the approved process flows for process automation	**R/A**	**I**	**N/A**	**N/A**	**I**
Commissioning of the software solutions like eGov platform, GIS solution,	**R/A**	**I**	**N/A**	**N/A**	**I**
Data digitization and migration	**R/A**	**I**	**N/A**	**N/A**	**I**
Integration of the ICCC solution with the various solution components	**R/A**	**I**	**N/A**	**N/A**	**I**
Finalization of the test environment to test the process flows.	**R/A**	**I**	**N/A**	**N/A**	**A**
SOP preparation	**R/A**	**A**	**A**	**A**	**A**
Over Testing & Training Phase					
Undertake various testing including but not limited to UAT & FAT testing of solution components	**R/A**	**A**	**A**	**A**	**A**
Training of minimum 2 batches of trainees in each category of training modules (remaining training should be completed before end of year)	**R/A**	**A**	**A**	**A**	**A**
Go Live Phase					

Undertake a pilot run of the services for a month before official inauguration of the Smart City services in Aligarh	**R/A**	**I**	**N/A**	**N/A**	**I**
Go Live of the project	**R/A**	**I**	**N/A**	**N/A**	**I**
Submission of the warranty certificates & licenses	**R/A**	**I**	**N/A**	**N/A**	**I**
Operation and Maintenance phase					
Provision of the O&M services as per the terms & condition of the RFP	**R/A**	**I**	**N/A**	**N/A**	**I**
Helpdesk & Assets management services as per RFP	**R/A**	**I**	**N/A**	**N/A**	**I**
Patch & version updation	**R/A**	**I**	**N/A**	**N/A**	**I**
Application enhancement & debugging	**R/A**	**I**	**N/A**	**N/A**	**I**
Measurement & Compliance to the SLA agreements as per the RFP. For violations, penalty as defined in the RFP would be levied on the MSI on a quarterly basis.	**R/A**	**I**	**N/A**	**N/A**	**I**
Provide refresher training courses for all training categories as finalized by ASCL	**R/A**	**I**	**N/A**	**N/A**	**I**

4. Commencement of Works

4.1. Site Clearance obligations & other relevant permissions

Prior to starting the site clearance, MSI shall carry out survey of field locations as specified in RFP, for buildings, structures, fences, trees, existing installations, etc. The ASCL shall be fully informed of the results of the survey and the amount and extent of the site clearance required shall then be agreed with the ASCL before executing the plan

4.2. Existing Traffic Signal system

The infrastructure of existing traffic signal systems including the aspects, controllers etc. will be dismantled and replaced with the new systems, which are proposed and required under the scope of the ITMS. The dismantled infrastructure shall be delivered at the ASCL designated location without damage at no extra cost.

4.3. Road signs

All existing road signs which are likely to be effected by the works are to be carefully taken down and stored. Signs to be re-commissioned shall be cleaned, provided with new fixings where necessary and the posts re-painted in accordance with ASCL guidelines. Road signs, street name plate, etc. damaged during their operation by MSI shall be repaired or replaced by MSI at no additional cost.

4.4. Electrical works and power supply

MSI shall directly interact with electricity board for provision of mains power supply at all desired locations for all the field level devices and data center and command center. MSI shall be responsible to submit the electricity bill including connection charge, meter charge, recurring charges etc. to the electricity board directly. No Re--imbursement will be done against electrical and water charges.

4.5. Lightning-proof & other electrical measures

MSI shall comply with lightning-protection and anti –interference measures for system structure, equipment type selection, equipment earthing, power, signal cables laying. MSI 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.

4.6. Earthing System

All electrical components are to be earthen by connecting two earth tapes from the frame of the component ring and will be connected via earthing electrodes. The cable arm will be earthen through the cable glands. The entire applicable IT infrastructure i.e. signal junction or command centre shall have adequate earthing. Further, earthling should be done as per local/ state/ national standard in relevance with ISI 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. so as to avoid a ground differential. ASCL 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, in order 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 need 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.

7. The metallic housing of electronic equipment/junction box/ panel/pole/cantiliver shall be connected to the earthing system

8. The active electronic parts of an electronic equipment system shall be connected to the earthing system

4.7. Junction Box, Poles and Cantilever

1) MSI shall provide the Junction Boxes, posts and cantilever to mount the field sensors like the cameras, traffic sensors, traffic light aspects, active network components, controller and power backup (UPS/Alternate energy sources) at all field locations, as per the minimum specifications given in the RFP.

2) Junction Box needs to be appropriately sized in-order to accommodate the systems envisaged at the Junctions, and MSI should design the Junction box for 1.5 times the actual size MSI requires for utilization under the ITMS project.
3) Additional 50% space in the Junction Box may be utilized by ASCL to accommodate any future requirements under other projects

4) It should be noted that MSI would have designed the Junction box keeping in mind the scalability requirements of ITMS project, and the additional 50% volume needs to considered over and above such requirement

5) The junction box should be designed in a way that, separate compartment will be available for separate system (i.e. ITMS Controller, Mini server, Active component, etc.). Each compartment shall have lock & key facility. There should be provision made to integrate the systems if required.

4.8. Cabling Infrastructure

1) MSI shall provide standardized cabling for all devices and subsystems.

2) MSI 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.

3) 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.

Cabling must be carried out per relevant BIS standards. All cabling shall be documented in a cable plan by MSI.

Standards for Structured Cabling:

a) Standards: ANSI TIA 568 C for all structured cabling components
b) OEM Warranty: OEM Certification and Warranty of 15-20 years as per OEM standards
c) Certification: UL Listed and Verified

Standards for Electric Cabling:

a) All electrical components shall be design manufactured and tested in accordance with relevant Indian standards IEC's

4.9. Integrated Command & Control Centre (ICCC)

The vision of the Command and Control (ICCC) is to have an integrated view of all the smart initiatives undertaken by ASCL with the focus to serve as a decision support engine for city administrators in day-to-day operations or during exigency situations. ICCC involves leveraging on the information provided by various departments and providing a comprehensive response mechanism for the day-to-day challenges across the city. ICCC shall be a fully integrated solution that provides seamless traffic management, incident – response management, collaboration and geo-spatial display. This platform is expected to integrate various urban services devices at the street layer so that urban services applications can be developed on top of this platform independent of the technology that is used in the devices.

Following are the integration capabilities from this platform. The platform should be able to integrate with any type of sensor platform being used for the urban services irrespective of the technology used. The platform should be able to normalize the data coming from different devices of same type (i.e. Different lighting sensor from different OEMs, different energy meters from different OEMs etc.) and provide secure access to that data using data API(s) to application developers. ICCC shall facilitate the viewing and controlling mechanism for the selected field locations in a fully automated environment for optimized monitoring, regulation and enforcement of services. The smart city operations centre shall be accessible by operators and concerned authorized entities with necessary authentication credentials. Various smart elements should be able to use the data and intelligence gathered from operations of other elements so that civic services are delivered a lot more efficiently and in an informed fashion. ICCC should be able to integrate with various utility systems such as Water/SCADA, Power, Gas, ITMS, Parking, BRT, Sewerage/ Drainage system, Disaster Mgmt. System etc. which may be implemented in future.

MSI has to integrate all smart components of the project at Integrated Command & Control and Communication Centre with an integrated operations and dashboard application that will integrate various Smart City components implemented in this project and in future. As part of this RFP, MSI shall ensure that redundancy and fault tolerance is considered at the ICCC components level in the actual deployment.

Integrated city operation platform should be able to carter to following requirements;

1. Urban Services and Data APIs:

    a. Live data and visual feed from diverse sensors should be connected to the platform

    b. Application integration at APIs level: for listed domain (Parking, Outdoor Lighting, Traffic, Environment, Urban mobility etc.) to monitor, control sensor and/or actuators functionality which are part of the project scope and others which would be integrated in future.

    c. Cross APIs Integration: Enabling contextual information (API-API Bi-directional) and correlation across domains and verticals (Multiple vendor and Multi-sensor in future)

2. Platform functionality:

    a. API management and gateway level integration: Provides secure API lifecycle, monitoring mechanism for available APIs. The MSI is also expected integrate the existing payment gateway & e-Office solution with the ICCC application stack.

    b. User and subscription management: Provides different tier of user categorization, authentication, authorization, and services based on the subscriptions

    c. Application management: Provides role-based access view to applications

d. Enabling analytics: Time shifted and real-time data available for big data and analytics

e. Generation of reports.

4.10. Data Center and Disaster Recovery Center

1) The location for the ICCC is decided to be in Lal Diggi area to house the compute and storage infrastructure and the Data Centre facility being built at the Integrated Command and Control Centre.

2) The DR for the data centre shall be on cloud on empanelled service providers by MeiTY availed as a service.

3) Various ICT equipment to be provisioned and maintained by MSI as a part of the scope of work at the Data Centre

4) MSI is free to design the bets fitting solution as per the project scope without compromising the envisaged project outcomes and complying to the minimum techno-functional specifications as mentioned in the RFP.

5) MSI shall ensure that the minimum BOM / BOQ as specified to meet the performance requirements as per the proposed project needs. MSI may also suggest additional components as per the solution requirements.

6) The information between the DC and the DR cloud shall be synchronised over the network such that that the smart city solutions are high available on the network

5. Other Expectation and Consideration from MSI

5.1. Inception Phase

MSI will be responsible for preparation of detailed project plan. The plan shall address at the minimum the following:

1) Define an organized set of activities for the project and identify the interdependence between them.

2) Resource planning and loading for each phase/activity. This must also indicate where each resource would be based during that phase, i.e. onsite at the ASCL office or off site at MSI premises.

3) Establish and measure resource assignments and responsibilities

4) Highlight the milestones and associated risks

5) Communicate the project plan to stakeholders with meaningful reports.

6) Measure project deadlines and performance objectives.

7) Project Progress Reporting. During the implementation of the project, MSI should present weekly reports. This report will be presented in the steering committee meeting to ASCL. The report should contain at the minimum the under mentioned:

    a) Results accomplished during the period (weekly)

    b) Cumulative deviations from the schedule date as specified in the finalized Project Plan

    c) Corrective actions to be taken to return to planned schedule of progress

    d) Plan for the next week

    e) Support needed

    f) Highlights/lowlights

    g) Issues/Concerns

    h) Risks/Show stoppers along with mitigation

    i) Identify the activities that require the participation of client personnel (including ASCL, the Program Management Unit etc.) and communicate their time requirements and schedule early enough to ensure their full participation at the required time.

5.2. Requirement Phase

MSI must perform the detailed assessment of the business requirements and ICT Solution requirements as mentioned in this RFP. Based on the understanding and its own individual assessment, MSI shall develop & finalize the System Requirement Specifications (SRS) in consultation with ASCL and its representatives. While doing so, MSI at least is expected to do following:

1) MSI shall conduct a detailed survey and prepare a gap analysis report, detailed survey report of the physical and field infrastructure requirements. MSI shall duly assist the department in preparing an action plan to address the gaps.

2) MSI shall study and revalidate the requirements given in the RFP with ASCL and submit as an exhaustive FRS document. MSI shall develop the FRS and SRS documents of all concerned project components.

3) MSI shall develop and follow standardized template for requirements capturing and system documentation.

4) MSI must maintain traceability matrix from SRS stage for the entire implementation.

5) MSI must get the sign off from user groups formed by ASCL for the concerned application.

6) For all the discussion with ASCL team, MSI representatives including the key resources shall be required to be present at ASCL office with the requisite team members.

7) Prior to starting the site clearance, MSI shall carry out survey of field locations as specified in Annexure A, for undertaking the ground level activities as part of the project scope.

8) The infrastructure of existing traffic signal and other street ICT infrastructure may need to be dismantled and replaced with the new systems which are proposed and required under the scope of the project. The infrastructure such as poles, cantilevers, cabling, aspects etc. should be reused (if they can be) to derive economies for the project with prior approval of ASCL. The dismantled infrastructure shall be delivered at the ASCL designated location without damage at no extra cost.

9) All existing road signs which are likely to be effected by the works are to be carefully taken down and stored. Signs to be re-commissioned shall be cleaned, provided with new fixings where necessary and the posts re-painted in accordance with ASCL guidelines. Road signs, street name plate, etc. damaged by MSI during their operation shall be repaired or replaced by MSI at no additional cost.

10) MSI shall directly interact with electricity boards for provision of mains power supply at all desired locations for field solution. ASCL shall facilitate the same. The recurring electricity charges will be borne by ASCL as per actual consumption.

5.3. Design Phase

The solution proposed by MSI should comply with the design considerations requirements as mentioned therein.

5.4. Development Phase

MSI shall carefully consider the scope of work and provide a solution that best meets the project's requirements. Considering the scope set in this RFP, MSI shall carefully consider the solutions it proposes and explicitly mention the same in the technical proposal. The implementation of the application software will follow the procedure mentioned below:

1) Software Products (Configuration and Customization): In case MSI proposes software products the following need to be adhered:

a) MSI will be responsible for supplying the application and licenses of related software products and installing the same so as to meet project requirements.

b) MSI shall have provision for procurement of licenses in a staggered manner as per the actual requirement of the project.

c) MSI shall perform periodic audits to measure license compliance against the number of valid End User software licenses consistent with the terms and conditions of license agreements, volume purchase agreements, and other mutually agreed upon licensed software terms and conditions. MSI shall report any exceptions to license terms and conditions at the right time to ASCL. However, the responsibility of license compliance solely lies with MSI. Any financial penalty imposed on ASCL during the contract period due to license non-compliance shall be borne by MSI.

d) As per requirement of complex solution implementation MSI has to put requirement that OEM own resource & MSI best technical resources are deployed in this project.

e) The OEM should provide the specific solution designing & implementation (OEM Low Level Design, Core Implementation) support to make sure that their supplied technology & products work as per the design objectives.

f) OEM to design and implement the complete security policy and workflow as per industry best practice in consultation with Customer to meet their Business requirements

g) MSI should provide the overall program management and OEM to ensure that the solution which may include multiple technologies from various OEM, to work together seamlessly as per the design goals. The seamless integration with all devices would be SI responsibility for the respective products offered.

h) MSI shall also supply any other tools & accessories required to make the integrated solution complete as per requirements. For the integrated solution, MSI shall supply:

   i. Software & licenses.

ii. Supply tools, accessories, documentation and provide a list of the same. Tools and accessories shall be part of the solution.

iii. System Documentation: System Documentation both in hard copy and soft copy to be supplied along with licenses and shall include but not limited to following.

2) Documentation to be maintained updated and submitted to ASCL regularly:

a) Functional Requirement Specification (FRS)

b) High level design of whole system

c) Low Level design for whole system / Module design level

d) System Requirements Specifications (SRS)

e) Any other explanatory notes about system

f) Traceability matrix

g) RACI Matrix

h) Technical and product related manuals

i) Installation guides

j) User manuals

k) System administrator manuals

l) Toolkit guides and troubleshooting guides

m) Other documents as prescribed by ASCL

n) Quality assurance procedures

o) Change management histories

p) Version control data

q) SOPs, procedures, policies, processes, etc. developed for ASCL

r) Documents related to software & applications:

a. Entire source codes as applicable

b. All programs must have explanatory notes for understanding

c. Version control mechanism

d. All old versions to be maintained

e. Test Environment:

i. Detailed Test methodology document

ii. Module level testing

iii. Overall System Testing

iv. Acceptance test cases

(These documents need to be updated after each phase of project and to be maintained updated during entire project duration. The entire documentation will be the property of ASCL.)

5.5. Integration Phase

The Integrated Command and control Centre should be integrated with feeds of all tracks/component. MSI shall provide the testing strategy including traceability matrix, test cases and shall conduct the testing of various components of the software developed/customized and the solution as a whole. The testing should be comprehensive and should be done at each stage of development and implementation.to enable city for batter decision management and planning

5.6. Pilot Deployment

a) MSI shall conduct Pilot deployment and testing for meeting ASCL's business & process requirements before rolling out the complete system. The pilot will be run for four weeks to study any issues arising out of the implementation. MSI shall also review health, usage and performance of the system till it is stabilized during pilot deployment. Based on ASCL's feedback for incorporating changes as required and appropriate, MSI shall train staff involved in the Pilot implementation.

b) Pilot shall be demonstrated to the ASCL's representatives. If for any reason the pilot is found to be incomplete, these will be communicated to the MSI in writing on the lapses that need to be made good. A one-time extension will be provided to the MSI for making good on the lapses pointed out before offering the system to Client for review. Failure to successfully demonstrate the Pilot may lead to termination of the contract with no liability to Client.

5.7. Go-Live Preparedness and Go-Live

a) MSI shall prepare and agree with ASCL, the detailed plan for Go-Live (in-line with ASCL's implementation plan as mentioned in RFP).

b) MSI shall define and agree with ASCL, the criteria for Go-Live.

c) MSI shall ensure that all the data migration is done from existing systems.

d) MSI shall submit signed-off UAT report (issue closure report) ensuring all issues raised during UAT are being resolved prior to Go-Live.

e) MSI shall ensure that Go –Live criteria as mentioned in User acceptance testing (clause 5.11 of Vol 2 of this RFP) of Project is met and MSI needs to take approval from ASCL team on the same.

f) Go-live of the application shall be done as per the finalized and agreed upon Go-Live plan.

5.8. Handholding and Training

In order to strengthen the staff, structured capacity building programmes shall be undertaken for identified resources of ASCL, NNA and stakeholder departments. It is important to understand the training needs to be provided to each and every staff personnel of ICCC. These officers shall be handling emergency situations with very minimal turnaround time. The actual number of trainees will be provided at design stage.

a) MSI shall prepare and submit detailed Training Plan and Training Manuals to ASCL for review and approval.

b) Appropriate training shall be carried out as per the User Training Plan prepared in detail stating the number of training sessions to be held per batch of trainees, course work for the training program, coursework delivery methodologies and evaluation methodologies in detail.

c) MSI shall also be responsible for full capacity building. Training and capacity building shall be provided for all individual modules along with their respective integrations.

d) MSI shall be responsible for necessary demonstration environment setup including setup of cameras, ground level assets and application solutions to conduct end user training. End user training shall include all the equipment including but not limited to all the applications and infrastructure at ICCC, DC, field locations etc. User training shall be conducted at a centralized location or any other location as identified by ASCL with inputs from the MSI.

e) MSI shall conduct end user training and ensure that the training module holistically covers all the details around hardware and system applications expected to be used on a daily basis to run the system.

f) MSI shall impart operational and technical training to internal users on solutions being implemented to allow them to effectively and efficiently use the ICCC system.

g) MSI shall prepare the solution specific training manuals and submit the same to ASCL for review and approval. Training Manuals, operation procedures, visual help-kit etc. shall be provided in Hindi & English language.

h) MSI shall provide training to selected officers of the Authority covering functional, technical aspects, usage and implementation of the products and solutions.

i) MSI shall ensure that all concerned personnel receive regular training sessions, from time to time, as and when required. Refresher training sessions shall be conducted on a regular basis.

j) An annual training calendar shall be clearly chalked out and shared with the ASCL along with complete details of content of training, target audience for each year etc.

k) MSI shall update training manuals, procedures manual, deployment/Installation guides etc. on a regular basis (Quarterly/ Biannual) to reflect the latest changes to the solutions implemented and new developments.

l) MSI shall ensure that training is a continuous process for the users. Basic intermediate and advanced application usage modules shall be identified by the MSI.

m) Systematic training shall be imparted to the designated trainees that shall help them to understand the concept of solution, the day-to-day operations of overall solution and maintenance and updating of the system to some extent. This shall be done under complete guidance of the trainers provided by the MSI.

n) Time Schedule and detailed program shall be prepared in consultation with ASCL and respective authorized entity. In addition to the above, while designing the training courses and manuals, MSI shall take care to impart training on the key system components that are best suited for enabling the personnel to start working on the system in the shortest possible time.

o) MSI is required to deploy a Master Trainer who shall be responsible for planning, designing and conducting continuous training sessions.

p) The master trainers shall demonstrate a thorough knowledge of the material covered in the courses, familiarity with the training materials used in the courses, and the ability to effectively lead the staff in a classroom setting. If at any stage of training, ASCL feels that on-field sessions are required, the same shall be conducted by the MSI.

q) If any trainer is considered unsuitable by ASCL, either before or during the training, MSI shall provide a suitable replacement without disrupting the training plan.

r) Training sessions and workshops shall comprise of presentations, demonstrations and hands-on mandatorily for the application modules.

s) ASCL shall be responsible for identifying and nominating users for the training. However, MSI shall be responsible for facilitating and coordinating this entire process.

t) MSI has to ensure that training sessions are effective and the attendees shall be able to carry on with their work efficiently. For this purpose, it is necessary that effectiveness of the training session is measured through a comprehensive feedback mechanism. MSI shall be responsible for making the feedback available for the ASCL to review and track the progress, in case, after feedback, more than 40% of the respondents suggest that the training provided to them was unsatisfactory or less than satisfactory then the SI shall re-conduct the same training at no extra cost.

Following the trainings types that the MSI needs to provide as part of the project scope:

1. Functional Training: Under this training module hands on training on the functional scope & working of the solution components are to be provided to the operators of the Smart solution which would be deployed by the MSI as a part of the project scope. The objective of this training is to enable & enhance the capability of users as identified by ASCL. MSI should provide at-least 7 such trainings to batches per year till the end of the project duration.

2. Administrative Training: MSI needs to provide hands on training to the administrators who would be administering the smart solution components deployed as part of the project scope. This would enable the various solution administrators & domain experts to effectively & efficiently utilize the manage the solution components. MSI should provide at-least 2 such trainings to batches per year till the end of the project duration.

3. Senior Management Training: MSI needs to provide hands on training to the senior management who would be utilizing these smart solutions to take city management decisions in an efficient manner. This would enable the various City Administrators & decision makers to avail the smart solutions for better city level management. MSI should provide at-least 5 such trainings to batches per year till the end of the project duration.

5.9. Operations and Maintenance

MSI will operate and maintain all the components of the ICCC System for a period of five (5) years after Go-Live date. During O&M phase, MSI shall ensure that service levels are monitored on continuous basis; service levels are met and are reported to ASCL. After Go-Live, if any system/sub-system/appliance that is deployed during the O&M phase must be added in the System only after proper induction procedures are followed including hardening and security testing. MSI needs to implement suitable Performance Improvement Process (PIP) in the project. PIP program applies to all the processes of ICCC project. MSI needs to submit its detailed approach for PIP in its technical proposal. Every process and procedure implemented in this project must be reviewed and updated by MSI at least on annual basis from the Go- Live Date. All the manpower engaged for O&M support of the project should be citizens of India. MSI will ensure that at no time shall any data of ICCC System be ported outside the geographical limits of the country.

5.9.1. Applications Support and Maintenance

Application support includes, but not limited to, production monitoring, troubleshooting and addressing the functionality, availability and performance issues, implementing the system change requests etc. MSI shall keep the application software in good working order; perform changes and upgrades to applications as requested by the ASCL team. All tickets related to any issue/complaint/observation about the system shall be maintained in an ITIL compliant comprehensive ticketing solution. Key activities to be performed by MSI in the application support phase are as follows:

1) Compliance to SLA

MSI shall ensure compliance to SLAs as indicated in this RFP and any upgrades/major changes to the software shall be accordingly planned by MSI ensuring the SLA requirements are met at no additional cost to the ASCL.

2) Annual Technology Support

MSI shall be responsible for arranging for annual technology support for the OEM products to ASCL provided by respective OEMs during the entire O&M phase.

3) Application Software Maintenance

a) MSI shall provide unlimited support through onsite team/telephone/Fax/Email/ Video Conferencing/installation visit as required
b) MSI shall address all the errors/bugs/gaps in the functionality in the solution implemented by the MSI (vis-à-vis the FRS, BRS and SRS signed off) at no additional cost during the O&M phase.
c) All patches and upgrades from OEMs shall be implemented by the MSI ensuring customization done in the solution are applied. Technical upgrade of the installation to the new version, as and when required, shall be done by the MSI. Any version upgrade of the software / tool / appliance by MSI to be done after taking prior approval of ASCL and after submitting impact assessment of such upgrade.
d) Any changes/upgrades to the software performed during the support phase shall subject to the comprehensive and integrated testing by the MSI to ensure that the changes implemented in the system meets the specified requirements and doesn't impact any other function of the system. Release management for application software will also require ASCL's approval. A detailed process in this regard will be finalized by MSI in consultation with ASCL.
e) Issue log for the errors and bugs identified in the solution and any change done in the solution shall be maintained by the MSI and periodically submitted to the ASCL.
f) MSI, at least on a monthly basis, will inform ASCL about any new updates/upgrades available for all software components of the solution along with a detailed action report.
g) In case of critical security patches/alerts, the MSI shall inform about the same immediately along with his recommendations. The report shall contain MSI's recommendations on update/upgrade, benefits, impact analysis etc. The MSI shall need to execute updates/upgrades though formal change management process and update all documentations and Knowledge databases etc. For updates and upgrades, MSI will carry it out free of cost by following defined process.

4) Problem identification and Resolution

a) Errors and bugs that persist for a long time, impact a wider range of users and is difficult to resolve becomes a problem. MSI shall identify and resolve all the application problems in the identified solution (e.g. system malfunctions, performance problems and data corruption etc.).
b) Monthly report on problem identified and resolved would be submitted to ASCL along with the recommended resolution.

5) Change and Version Control

All planned or emergency changes to any component of the system shall be through the approved Change Management process. The MSI needs to follow all such processes (based on industry accepted change request & management framework). For any change, MSI shall ensure:

a) Detailed impact analysis
b) Change plan with Roll back plans
c) Appropriate communication on change required has taken place
d) Proper approvals have been received
e) Schedules have been adjusted to minimize impact on the production environment
f) All associated documentations are updated post stabilization of the change
g) Version control maintained for software changes

The MSI shall define the Software Change Management and Version control process. For any changes to the solution, MSI has to prepare detailed documentation including proposed changes, impact to the system in terms of functional outcomes/additional features added to the system etc. MSI shall ensure that software and hardware version control is done for entire duration of MSI's contract

6) Maintain configuration information

MSI shall maintain version control and configuration information for application software and any system documentation.

7) Training:

MSI shall provide training to ASCL personnel whenever there is any change in the functionality. Training plan has to be mutually decided with ASCL.

8) Maintain System documentation

MSI shall maintain at least the following minimum documents with respect to the ICCC System:

a) High level design of whole system
b) Low Level design for whole system / Module design level
c) System requirements Specifications (SRS)
d) Any other explanatory notes about system
e) Traceability matrix
f) Compilation environment

9) MSI shall also ensure updation of documentation of software system ensuring that:

a) Source code is documented
b) Functional specifications are documented
c) Application documentation is updated to reflect on-going maintenance and
d) Enhancements including FRS and SRS, in accordance with the defined standards
e) User manuals and training manuals are updated to reflect on-going
f) changes/enhancements
g) Standard practices are adopted and followed in respect of version control and management.

10) All the project documents need to follow version control mechanism. MSI will be required to keep all project documentation updated and should ensure in case of any change, the project documents are updated and submitted to ASCL by the end of next quarter.

11) For application support MSI shall keep dedicated software support team to be based at MSI location that will single point of contact for resolution of all application related issues. This team will receive all the application related tickets/incidents and will resolve them. In its technical proposal MSI need to provide the proposed team structure of application support including number of team members proposed to be deployed along with roles and skills of each such member. Application support team shall be employees of MSI

12) Any software changes required due to problems/bugs in the developed software/application will not be considered under change control. The MSI will have to modify the software/ application free of cost. This may lead to enhancements/customizations and the same needs to be implemented by the MSI at no extra cost.

13) Any additional changes required would follow the Change Control Procedure. ASCL may engage an independent agency to validate the estimates submitted by the MSI. The inputs of such an agency would be taken as the final estimate for efforts required. MSI to propose the cost of such changes in terms of man month rate basis and in terms of Function point/Work Breakdown Structure (WBS) basis in the proposal.

5.9.2. ICT Infrastructure Support and Maintenance

ICT infrastructure includes servers, storages, back up, networking, load balancers, security equipment, operating systems, database, enterprise management system, help desk system and other related ICT infra required for running and operating the envisaged system. MSI shall define, develop, implement and adhere to IT Service Management (ITSM) processes aligned to ITIL framework for all the ICT Services defined and managed as part of this project.

5.9.3. Warranty support

a) MSI shall provide comprehensive and on-site warranty for 5 years from the date of Go-Live for the infrastructure deployed on the project. MSI need to have OEM support for these components and documentation in this regard need to be submitted to ASCL on annual basis.

b) MSI shall provide the comprehensive & onsite manufacturer's warranty in respect of proper design, quality and workmanship of all hardware, equipment, accessories etc. covered by the RFP. MSI must warrant all hardware, equipment, accessories, spare parts, software etc. procured and implemented as per this RFP against any manufacturing defects during the warranty period.

c) MSI shall provide the performance warranty in respect of performance of the installed hardware and software to meet the performance requirements and service levels in the RFP.

d) MSI is responsible for sizing and procuring the necessary hardware and software licenses as per the performance requirements provided in the RFP. During the warranty period MSI shall replace or augment or procure higher-level new equipment or additional licenses/hardware at

no additional cost to the ASCL in case the procured hardware or software is not enough or is undersized to meet the service levels and the project requirements.

e) During the warranty period MSI shall maintain the systems and repair/replace at the installed site, at no charge to ASCL, all defective components that are brought to the MSI's notice.

f) The MSI shall carry out Preventive Maintenance (PM) of all hardware and testing for virus/ Worm attacks or any cyber security related attacks if any, and should maintain proper records at each site for such PM. The PM should be carried out at least once in six months for all the components & solutions commissioned as a part of the project scope.

g) The MSI shall carry out Corrective Maintenance for maintenance/troubleshooting of supplied hardware/ software and support infrastructure problem including network (active/passive) equipment, security and rectification of the same. The MSI shall also maintain complete documentation of problems, isolation, cause and rectification procedures for building knowledge base for the known problems in centralized repository, accessible to ASCL team as well.

h) MSI shall monitor warranties to check adherence to preventive and repair maintenance terms and conditions.

i. The MSI shall ensure that the warranty complies with the agreed technical standards, security requirements, operating procedures, and recovery procedures.

i. MSI shall have to stock and provide adequate onsite and offsite spare parts and spare component to ensure that the uptime commitment as per SLA is met.

ii. Any component that is reported to be down on a given date should be either fully repaired or replaced by temporary substitute (of equivalent configuration) within the time frame indicated in the Service Level Agreement (SLA).

iii. The MSI shall introduce a comprehensive Assets Management process & appropriate tool to manage the entire lifecycle of every component of ICCC system.

5.9.4. Maintenance of ICT Infrastructure at the DC and ICCC

a) Management of DC and ICCC

MSI need to deploy requisite mix of L1, L2 and L3 resources (on 24X7 basis) for management of entire ICCC System including ICT infrastructure deployed at DC and ICCC. All resources deployed in the project should be employees of MSI and be Indian citizens. All the L1 and L2 resources proposed for the project need to be dedicated for the project. Any change in the team once deployed will require approval from ASCL. It is expected that resources have proven track record and reliability.

Considering the criticality of the project, ASCL may ask for security verification (Police verification) of every resource deployed on the project and MSI need to comply the same before deployment of the resource at the project. At all times, the MSI need to maintain the details of resources deployed for the

project to ASCL and keep the same updated. A detailed process in this regard will be finalised between ASCL and MSI. The MSI shall maintain an attendance register for the resources deployed Attendance details of the resources deployed also need to be shared with ASCL on monthly basis. ASCL reserves the right to interview resources deployed for Operations and maintenance and assess the suitability of the resource for the role. In case a resource is not found suitable, MSI will change the resource on request of ASCL. MSI shall comply with this.

The scope of work for infrastructure and maintenance includes the following:

1. DC operations to be in compliance with industry leading ITSM frameworks like ITIL, ISO 20000 & ISO 27001 or equivalent
2. Ensure compliance to relevant SLA's
3. 24x7 monitoring & management of availability & security of the infrastructure and assets
4. Perform regular hardening, patch management, testing and installation of software updates issued by OEM/vendors from time to time after following agreed process
5. Ensure overall security – ensure installation and management of every security component at every layer including physical security
6. Prepare documentation/policies required for certifications included in the scope of work
7. Preventive maintenance plan for every quarter
8. Performance tuning of system as required
9. Design and maintain Policies and Standard Operating Procedures
10. User access management
11. Other activities as defined/to meet the project objectives
12. Updation of all Documentation.

During operations phase the MSI needs to submit proof of renewal of support for all IT infrastructure products and other system software's for whom it is mandated to have OEM support. This needs to be submitted on an annual basis and needs to be verified before release of 2nd quarter payment of each year.

b) System Maintenance and Management

1) MSI shall be responsible for tasks including but not limited to setting up servers, configuring and apportioning storage space, account management, performing periodic backup of data and automating reporting tasks, and executing hardware and software updates when necessary. It shall be noted that the activities performed by the MSI may also be reviewed by ASCL.

2) MSI shall provision skilled and experienced manpower resources to administer and manage the entire system at the Data Centre and ICCC.
3) On an ongoing basis, MSI shall be responsible for troubleshooting issues in the IT infrastructure solution to determine the areas where fixes are required and ensuring resolution of the same.
4) MSI shall be responsible for identification, diagnosis and resolution of problem areas pertaining to the IT Infrastructure and maintaining the defined SLA levels.
5) MSI shall implement and maintain standard operating procedures for the maintenance of the IT infrastructure based on the policies formulated in discussion with ASCL and based on the industry best practices/frameworks. MSI shall also create and maintain adequate documentation/checklists for the same.
6) MSI shall be responsible for managing the user names, roles and passwords of all the relevant subsystems, including, but not limited to servers, other devices, etc. MSI shall be required to set up the directory server. Logs relating to access of system by administrators shall also be kept and shall be made available to ASCL on need basis.
7) MSI shall implement a password change mechanism in accordance with the security policy formulated in discussion with ASCL and based on the industry best practices/frameworks like ISO 27001, ISO 20000 etc.
8) The administrators shall also be required to have experience in latest technologies so as to provision the existing and applicable infrastructure on a requirement based scenario.

c) System Administration

1) 24*7*365 monitoring and management of the servers in the DC and the DR infrastructure.
2) MSI shall also ensure proper configuration of server parameters and performance tuning on regular basis. MSI shall be the single point of accountability for all hardware maintenance and support the ICT infrastructure. It should be noted that the activities performed by the MSI may be reviewed by ASCL.
3) MSI shall be responsible for operating system administration, including but not limited to management of users, processes, preventive maintenance and management of upgrades including updates, upgrades and patches to ensure that the system is properly updated.
4) MSI shall also be responsible for installation and re-installation of the hardware(s) as well as the software(s) in the event of system crash/failures.
5) MSI shall also be responsible for proactive monitoring of the applications hosted as a part of the project scope
6) MSI shall appoint system administrators to regularly monitor and maintain a log of the monitoring of servers to ensure their availability to ASCL at all times.
7) ASCL shall undertake regular analysis of events and logs generated in all the sub systems including but not limited to servers, operating systems, database, security components, networking components etc. The system administrators shall undertake actions in accordance with the results of the log analysis. The system administrators shall also ensure that the logs are backed up and truncated at regular intervals. MSI shall refer to CERT-In Guidelines so as to ensure their alignment with the practices followed.

8) The system administrators shall adopt a defined process for change and configuration management in the areas including, but not limited to, changes in servers, operating system, applying patches, etc.
9) The system administrators shall provide hardening of servers in line with the defined security policies. Validation of hardening configuration will be carried out quarterly and deviations must be tracked through SLA reporting
10) The system administrators shall provide integration and user support on all supported servers, data storage systems etc.
11) The system administrators shall be required to trouble shoot problems with web services, application software, server relationship issues and overall aspects of a server environment like managing and monitoring server configuration, performance and activity of all servers.
12) The system administrators should be responsible for documentation regarding configuration of all servers, IT Infrastructure etc.
13) The system administrators shall be responsible for managing the trouble tickets, diagnosis of the problems, reporting, managing escalation, and ensuring rectification of server problems as prescribed in Service Level Agreement.
14) The administrators will also be required to have experience in latest technologies so as to provision the existing and applicable infrastructure on a requirement based scenario.

d) Storage Administration

1) MSI shall be responsible for the management of the storage solution including, but not limited to, storage management policy, configuration and management of disk array, SAN fabric/switches, backup solution etc. It should be noted that the activities performed by the MSI may be reviewed by ASCL.
2) MSI shall be responsible for storage management, including but not limited to management of space, SAN/NAS volumes, RAID configuration, LUN, zone, security, business continuity volumes, performance, etc.
3) The storage administrator will be required to identify parameters including but not limited to key components in the storage solution, interconnects between key resources in the storage solution, health of key resources, connectivity and access rights to storage volumes and the zones being enforced in the storage solution.
4) The storage administrator will be required to create/delete, enable/disable zones in the storage solution.
5) The storage administrator will be required to create/delete/modify storage volumes in the storage solution.
6) The storage administrator will be required to create/delete, enable/disable connectivity and access rights to storage volumes in the storage solution.
7) To facilitate scalability of solution wherever required.
8) The administrators will also be required to have experience in technologies such as virtualisation and cloud computing so as to provision the existing and applicable infrastructure on a requirement based scenario.

e) Database Administration

1) MSI shall be responsible for monitoring database activity and performance, changing the database logical structure to embody the requirements of new and changed programs.
2) MSI shall be responsible to perform physical administrative functions such as reorganizing the database to improve performance.
3) MSI shall be responsible for tuning of the database, ensuring the integrity of the data and configuring the data dictionary.
4) MSI will follow guidelines/advisories issued by MoHUA / ASCL in this regard from time to time including access of data base by system administrators and guidelines relating to security of data base.
5) Database administration should follow the principle of segregation of duties to ensure no single DBA can update production tables/data singularly.
6) In addition to restrictions on any direct change in data by any administrator, the Databases shall have Auditing features enabled to capture all activities of administrators.

f) Backup/Restore/Archival

1) MSI shall be responsible for implementation of backup & archival policies as finalized with ASCL. The MSI is responsible for getting acquainted with the storage policies of ASCL before installation and configuration. It should be noted that the activities performed by the MSI may be reviewed by ASCL.
2) MSI shall be responsible for monitoring and enhancing the performance of scheduled backups, scheduled regular testing of backups and ensuring adherence to related retention policies.
3) MSI shall be responsible for prompt execution of on-demand backups of volumes and files whenever required by ASCL or in case of upgrades and configuration changes to the system.
4) MSI shall be responsible for real-time monitoring, log maintenance and reporting of backup status on a regular basis. MSI shall appoint administrators to ensure prompt problem resolution in case of failures in the backup processes.
5) MSI shall undertake media management tasks, including, but not limited to, tagging, cross-referencing, storing, logging, testing, and vaulting (if required)
6) MSI shall also provide a 24 x 7 support for file and volume restoration requests at the Data Centre(s).

g) Network monitoring

1) MSI shall provide services for management of network environment to maintain performance at optimum levels on a 24 x 7 basis. It should be noted that the activities performed by the MSI may be reviewed by ASCL.
2) MSI shall be responsible for creating and modifying VLAN, assignment of ports to appropriate applications and segmentation of traffic.
3) MSI shall also be responsible for break fix maintenance of the LAN cabling within DC/ICCC etc.
4) MSI shall also provide network related support and will coordinate with connectivity service providers of ASCL who are terminating their network at the DC/ICCC for access of system.

h) Security Management

1) Regular hardening and patch management of components of the ICCC System as per the project requirement in agreement with ASCL
2) Performing security services on the components that are part of the ASCL environment as per security policy finalized with ASCL
3) IT Security Administration – Manage and monitor safety of information/data
4) Reporting security incidents and resolution of the same
5) Proactively monitor, manage, maintain & administer all security devices and update engine, signatures, and patterns as applicable.
6) Managing and monitoring of anti-virus, anti-malware, phishing and malware for managed resources.
7) Ensuring 100 percent antivirus coverage with patterns not old more than period of 3 days
8) Reporting security incidents and co-ordinate resolution
9) Monitoring centralized pattern distribution (live update) and scan for deficiencies
10) Maintaining secure domain policies
11) Secured IPsec/SSL/TLS based virtual private network (VPN) management
12) Performing firewall management and review of policies on at-least quarterly basis during first year of O&M and then after at-least on half-yearly basis
13) Resolution of calls for security notifications, system alerts, vulnerabilities in hardware/ software and alerting ASCL as appropriate
14) Performing patch management using software distribution tool for all security applications including content management system, antivirus and VPN
15) Providing root cause analysis for all defined problems including hacking attempts
16) Monthly reporting on security breaches and attempts plus the action taken to thwart the same and providing the same to ASCL
17) Maintaining documentation of security component details including architecture diagram, policies and configurations
18) Performing periodic review of security configurations for inconsistencies and redundancies against security policy
19) Performing periodic review of security policy and suggest improvements
20) Reviewing logs daily of significance such as abnormal traffic, unauthorized penetration attempts, any sign of potential vulnerability. Security alerts and responses. Proactive measures in the event a problem is detected
21) Policy management (firewall users, rules, hosts, access controls, daily adaptations)
22) Modifying security policy, routing table and protocols
23) Performing zone management (DMZ) in the DC architecture
24) Sensitizing users to security issues through regular updates or alerts – periodic updates/ Help ASCL issuance of mailers in this regard
25) Performing capacity management of security resources to meet business & functional needs
26) Rapidly resolving every incident/problem within mutually agreed timelines
27) Testing and implementation of patches and upgrades
28) Network/device hardening procedure as per security guidelines issued by MoHUA for Smart Cities / ASCL/ industry leaders
29) Implementing and maintaining security rules
30) Performing any other day-to-day administration and support activities

i) Other Activities

1) MSI shall ensure that it prepares configuration manual for OS, appliances, middleware, all tool, servers/devices and all equipment's and the same need to be submitted to ASCL, any changes in the configuration manual need to be approved by ASCL. Configuration manual to be updated periodically.
2) MSI shall maintain data regarding entitlement for software upgrades, enhancements, refreshes, replacements and maintenance.
3) If the Operating System or additional copies of Operating System are required to be installed/reinstalled/un-installed, the same should be done as part of O&M.
4) MSI should carry out any requisite adjustments/changes in the configuration for implementing different versions of Application Software.
5) Updates/Upgrades/New releases/new versions: The MSI shall provide from time to time the Updates/Upgrades/new releases/new versions of the software and operating systems as required. The MSI should provide free upgrades, updates & patches of the software and tools to ASCL as and when released by OEM.
6) MSI shall provide patches to the software as part of IT infrastructure, operating system, databases and other applications.
7) Software License Management: The MSI shall provide for software license management and control. MSI shall maintain data regarding entitlement for software updates, enhancements, refreshes, replacements, and maintenance.
8) Data backup/recovery management services
9) All other activities required to meet the project requirements and service levels.
10) It is responsibility of the MSI to scale up the Operations & Maintenance (O&M) team as and when required to ensure smooth project execution throughout the project duration.

5.9.5. Compliance to SLA

a) MSI shall ensure compliance to uptime and performance requirements of project solution as indicated in the SLA (as per Section C clause 40 Volume III of RFP) section of the RFP and any upgrades/major changes to the ICCC System shall be accordingly planned by MSI for ensuring the SLA requirements and complied.
b) MSI shall be responsible for measurement of the SLAs at the ICCC System level as well as at the user level with the help of the enterprise monitoring tool on a periodic basis.
c) Reports for SLA measurement must be produced ASCL officials as per the project requirements.

5.10. Compliance to Standards, Certifications & Guidelines/Advisories

a) For a large and complex set up such as the Project, it is imperative that the highest standards applicable are adhered to. In this context, MSI will ensure that the entire Project is developed in compliance with the applicable standards.

b) During project duration, MSI will ensure minimum adherence to prescribed standards as provided below:

Sl. No.	Component/Application/System	Minimum Prescribed Standard
1.	Information Security	ISO 27001
2.	IT Infrastructure Management	ITIL specifications
3.	Service Management	ISO 20000 specifications
4.	Project Documentation	IEEE/ISO/CMMI (where applicable) specifications for documentation
5.	Smart City Guidelines	All guidelines/advisories issued by MoHUA for Smart cities from time to time
6.	e-Governance Standards	All guidelines/advisories issued by Govt. of India from time to time

The MSI is free to advise and incorporate any other standards, certifications & guidelines/advisories if deemed required for delivering and managing the project as per the scope of work & the SLAs defined in the project.

c) Apart from the above MSI need to ensure compliance of the project with Government of India IT security guidelines including provisions of:

   i. The Information Technology Act, 2000" and amendments thereof and

   ii. Guidelines and advisories for information security published by Cert-In/MeitY (Government of India) issued till the date of publishing of tender notice. Periodic changes in these guidelines during project duration needs to be complied with.

d) While writing the source code for application modules MSI should ensure high quality documentation standards to improve the readability of the software module. An illustrative list of comments that each module contained within the source file should be preceded by is outlined below:

   i. The name of the module

   ii. The date when module was created

   iii. A description of what the module does

   iv. A list of the calling arguments, their types, and brief explanations of what they do

   v. A list of required files and/or database tables needed by the module

   vi. Error codes/Exceptions

   vii. Operating System (OS) specific assumptions

viii. A list of locally defined variables, their types, and how they are used

ix. Modification history indicating who made modifications, when the modifications were made, and what was done.

e) Apart from the above MSI needs to follow appropriate coding standards and guidelines inclusive of but not limited to the following while writing the source code for various applications

i. Proper and consistent indentation

ii. Inline comments

iii. Structured programming

iv. Meaningful variable names

v. Appropriate spacing

vi. Declaration of variable names

vii. Meaningful error messages

f) Quality Audits

i. ASCL, at its discretion, may also engage independent auditors to audit any/some/all standards/processes. MSI shall support all such audits as per calendar agreed in advance. The result of the audit shall be shared with MSI who has to provide an effective action plan for mitigations of observations/non-compliances, if any.

ii. MSI should comply with all the technical and functional specification provided in various sections in this RFP document.

5.11. Testing and Acceptance Criteria

a) MSI shall demonstrate the following mentioned acceptance criteria prior to acceptance of the solution as well as during project operations phase, in respect of scalability and performance etc. MSI may propose further detailed Acceptance criteria with consultation of ASCL. Once ASCL provides its approval, the Acceptance criteria can be finalized. In case required, parameters might be revised by ASCL in mutual agreement with bidder and the revised parameters shall be considered for acceptance criteria. A comprehensive system should be set up that would have the capability to log & track the testing results, upload & maintain the test cases and log & track issues/bugs identified.

b) The following table depicts the details for the various kinds of testing envisaged for the project:

Sl. No.	Type of Testing	Responsibility	Scope of Work
1.	System Testing	MSI	• MSI to perform System acceptance testing • MSI to prepare test plan and test cases and maintain it. ASCL may request MSI to share the test cases and results • Required testing should be performed through manual as well as automated methods • Automation testing tools to be provided by MSI. ASCL doesn't intend to own these tools
2.	Integration testing	MSI	• MSI to perform Integration testing • MSI to prepare and share with ASCL the integration test plans and test cases • MSI to perform Integration testing as per the approved plan • Integration testing to be performed through manual as well as automated methods • Automation testing tools to be provided by MSI. ASCL doesn't intend to own these tools
3.	Performance & load testing	a. MSI b. ASCL / Third Party Auditor if appointed by ASCL	• MSI to do performance and load testing. • Various performance parameters such as transaction response time, throughput, and page loading time should be taken in the test parameters. • Load and stress testing of the ICT solution components to be performed on business transaction volume • Test cases and test results to be shared with ASCL • Performance testing to be carried out in the exact same architecture that would be set up for production • MSI need to use performance and load testing tool

			for testing. ASCL doesn't intend to own these tools • ASCL if required could involve third party auditors to monitor/validate the performance testing. Cost for such audits to be paid by ASCL
4.	Security Testing (including Penetration And Vulnerability testing)	a. MSI b. ASCL / Third Party Auditor if appointed by ASCL	• Solution should demonstrate the compliance with security requirements as mentioned in the RFP including but not limited to security controls in the application, at the network layer, network, data centre (s), security monitoring system deployed by MSI • Solution shall pass vulnerability and penetration testing for rollout of each phase. The solution should pass web application security testing for the portal, mobile app and other systems and security configuration review of the infrastructure. • MSI should carry out security and vulnerability testing on the developed solution. • Security testing to be carried out in the exact Same environment/ architecture that would be setup for production. • Security test report and test cases should be shared with ASCL • Testing tools if required, to be provided by MSI. • During O&M phase, penetration testing to be conducted on yearly basis and vulnerability assessment to be conducted on half-yearly basis. • ASCL will also involve third party auditors to perform the audit/ review/ monitor the security testing carried out by MSI. Cost for such Third Party auditors to be paid by ASCL
5.	User Acceptance Testing (UAT) of Project	ASCL/ ASCL appointed third party auditor	• ASCL / ASCL appointed third party auditor to perform User Acceptance Testing • MSI to prepare User Acceptance Testing test cases • UAT to be carried out in the exact same environment/architecture that would be set up for production • MSI should fix bugs and issues raised during UAT and get approval on the fixes from ASCL /third party

			auditor appointed by ASCL before production deployment • Changes in the application as an outcome of UAT shall not be considered as Change Request. • MSI has to rectify the observations.

Note:

a. Bidder needs to provide the details of the testing strategy and approach including details of intended tools/environment to be used by MSI for testing in its technical proposal. ASCL does not intend to own the tools.

b. MSI shall work in a manner to satisfy all the testing requirements and adhere to the testing strategy outlined. MSI must ensure deployment of necessary resources and tools during the testing phases. MSI shall perform the testing of the solution based on the approved test plan, document the results and shall fix the bugs found during the testing. It is the responsibility of MSI to ensure that the end product delivered by MSI meets all the requirements specified in the RFP. MSI shall take remedial action based on outcome of the tests.

c. MSI shall arrange for environments and tools for testing and for training as envisaged. Post Go-Live; the production environment should not be used for testing and training purpose. If any production data is used for testing, it should be masked and it should be protected. Detailed process in this regard including security requirement should be provided by MSI in its technical proposal. The process will be finalized with the selected bidder.

d. All the Third Party Auditors (TPA) as mentioned above will be appointed and paid by ASCL directly. All tools/environment required for testing shall be provided by MSI.

e. STQC/Other agencies appointed by ASCL shall perform the role of TPA. MSI needs to engage with the TPA at the testing strategy requirement formulation stage itself. This is important so that unnecessary re-work is avoided and the audit is completed in time. The audit needs to be completed before Go-Live of different phases. MSI needs to prepare and provide all requisite information/documents to third party auditor and ensure that there is no delay in overall schedule.

f. The cost of rectification of non-compliances shall be borne by MSI.

5.12. Factory Testing

Success MSI shall have to submit Factory Test Certificate for the below mentioned materials before the actual supply of the items. MSI has to provide MAF (OEM certificate) where-ever applicable.

5.13. Final Acceptance Testing

The final acceptance shall cover 100% of all the components as commissioned as a part of the project scope. After successful testing by the ASCL; a Final Acceptance Test Certificate (FAT) shall be issued by the ASCL to MSI. Prerequisite for Carrying out FAT activity:

1) Detailed test plan shall be developed by MSI and approved by ASCL. This shall be submitted by MSI before FAT activity to be carried out.
2) All documentation related to ASCL Project and relevant acceptance test document (including IT Components, Non IT Components etc.) should be completed & submitted before the final acceptance test to the ASCL.
3) The training requirements as mentioned should be completed before the final acceptance test.
4) Successful hosting of all Applications (which comprises as part of the project scope), NMS, MIS Software etc.
5) Successful commissioning of all hardware & software components as a part of the project scope
6) For both IT & Non-IT equipment's / software manuals / brochures / Data Sheets / CD / DVD / media for all the ASCL Project supplied components.

The FAT shall include the following:

1) All hardware and software items must be installed at respective sites as per the minimum specification mentioned in the RFP.

2.) Availability of all the defined services shall be verified.

3) MSI shall be required to demonstrate all the features / facilities / functionalities as mentioned in the RFP.

4) MSI shall arrange the test equipment required for performance verification, and will also provide documented test results.

5) MSI shall be responsible for the security audit of the established system to be carried out by a certified third party as agreed by ASCL. Any delay by MSI in the Final Acceptance Testing shall render him liable to the imposition of appropriate Penalties. However, delays identified beyond the control of MSI shall be considered appropriately and as per mutual agreement between ASCL and MSI.

5.14. Project Milestone & Payment Schedule

5.14.1. Project milestone

S. No.	Milestone	Deliverables	Timelines (in Months)
1.	Project Initiation phase	• Detailed Survey Report including infrastructure assessment, phase wise location distribution, hardware deployment plans etc. • Detailed Project Plan including Operations management, Contract management, Risk management, Information Security and Business Continuity • Detailed plan for installation of ground level assets required for the ITMS & Surveillance solution components • Detailed plan to map the various processes for automation and development of the SRS document • Detailed plan for laying of fiber network connecting all the junctions as per locations mentioned in the RFP • Data Design requirements reports for business plan, which will include data segregation strategy, data regulation planning, data lifecycle management strategy etc. • Submission of inception report and mobilization of team proposed for the project	T+15 days
2.	Ground level data collection phase	• Detailed interaction with the Departmental officials to understand the processes that needs to be automated and the junctions where the ICT assets are to be installed • Detailed survey & mapping of the exact locations in the junctions where the ICT assets (including ITMS, Surveillance, PA system, environmental sensors, VaMs, etc.) as part of the project would be installed • Detailed designing of the DC components installation and connectivity with DR site • Designing of the automated process flow document of the processes along with the SRS document • Detailed designing of the GIS solution	T+60 days

		components • Detailed designing of the fiber network including active passive components & trenching plan • Getting approval from ASCL and concerned dept. officials for the ground level survey conducted	
3.	Supply phase	• Supply of IT & Non IT assets which are proposed by the MSI as part of the project (as per the BOM & BOQ filled by the MSI during the time of bidding) • ASCL can undertake an inspection of the IT & Non-IT assets to ensure compliance of the equipment supplied Note: MSI will provide order for procurement of IT & non IT assets after getting approval from ASCL. This approval process is intended to ensure that any assets being procured will not lie unused and their warranty being wasted.	T+4 months
4.	Installation phase	• Physically installation of the IT & non-IT including ITMS, Surveillance, PA system, environmental sensors, VaMs, multi-purpose kiosks etc. assets as per the project planned locations • Undertaking all the ICCC related activity to make the site ready as per the terms & conditions mentioned in the RFP • Installation of the DC components along with security & datacentre components and the connectivity with the DR site • Installation of the fiber network which includes trenching, laying of fiber, installation of active & passive components, creation junctions & POPs • Installation of all the software components including database, eGov platform, GIS platform etc. proposed as a part of the RFP scope of work	T+7 months

5.	Commissioning phase	• Commissioning of the ground level IT & Non IT assets which are installed previously • Commissioning of the DC & DR Site with all the security & data redundancy features as mentioned in the RFP • Commissioning of the fiber network • Commissioning of the require software codes/ changes to incorporate the approved process flows for process automation • Commissioning of the software solutions like eGov platform, GIS solution, • Data digitisation and migration • Integration of the ICCC solution with the various solution components • Finalization of the test environment to test the process flows. • SOP preparation	T+8 months
6.	Overall Testing & training phase	• Undertake various testing including but not limited to UAT & FAT testing of solution components • Training of minimum 2 batches of trainees in each category of training modules (remaining training should be completed before end of year)	T+0 months
7.	Go-Live phase	• Undertake a pilot run of the services for a month before official inauguration of the Smart City services in Aligarh • Go Live of the project • Submission of the warranty certificates & licenses	T+12months
8.	**Operations and Maintenance phase**		**T1 + 60 months**
8.1	Operation & Maintenance phase	• Provision of the O&M services as per the terms & condition of the RFP • Helpdesk & Assets management services as per RFP • Patch & version updation • Application enhancement & debugging • Measurement & Compliance to the SLA agreements as per the RFP. For violations, penalty as defined in the RFP would be levied on the MSI on a quarterly basis.	Every Quarter payments made at equal proportion

		• Provide refresher training courses for all training categories as finalized by ASCL	

5.14.2. Payment Schedule

Payments to MSI, after successful completion of the target milestones (including specified project deliverables), shall be made as under: -

S. No.	Scope of Work	Timelines	Payment
1.	Submission & approval of the following documents by ASCL • Detailed Survey Report including infrastructure assessment, phase wise location distribution, hardware deployment plans etc. • Detailed Project Plan including Operations management, Contract management, Risk management, Information Security and Business Continuity • Detailed plan for installation of ground level assets required for the ITMS & Surveillance solution components • Detailed plan to map the various processes for automation and development of the SRS document • Detailed plan for laying of fiber network connecting all the junctions as per locations mentioned in the RFP • Data Design requirements reports for business plan, which will include data segregation strategy, data regulation planning, data lifecycle management strategy etc. • Mobilization of team proposed for the	T+15 days	10% of the contract value as mobilization advance against PBG.

	project		
2.	• Supply of IT & Non IT assets which are proposed by the MSI as part of the project (as per the BOM & BOQ filled by the MSI during the time of bidding)	T+4 months	10% of the contract value
3.	• Installation of the IT & non-IT including ITMS, Surveillance, PA system, environmental sensors, VaMS, multi-purpose kiosks etc. assets as per the project planned locations • Undertaking all the ICCC related activity to make the site ready as per the terms & conditions mentioned in the RFP • Installation of the DC components along with security & datacentre components and the connectivity with the DR site • Installation of the fiber network which includes trenching, laying of fiber, installation of active & passive components, creation junctions & POPs • Installation of all the software components including database, e-Gov platform, GIS platform etc. proposed as a part of the RFP scope of work	T+7 months	10% of the contract value
4.	• Commissioning of the ground level IT & Non IT assets which are installed previously • Commissioning of the DC & DR Site with all the security & data redundancy features as mentioned in the RFP • Commissioning of the fiber network • Commissioning of the require software codes/ changes to incorporate the approved process flows for process automation • Commissioning of the software	T+8 months	10% of the contract value

	solutions like e-Gov platform, GIS solution, • Integration of the ICCC solution with the various solution components • Commissioning of the software components like e-Gov solution, GIS solution, integrated services with ICCC, and Integration of different services with the ICCC application stack as defined in the project scope in the RFP • Finalization of the test environment to test the process flows • Undertaking the UAT & FAT testing of all the components installed/commissioned by the MSI as a part of the project		
5.	• Training of minimum 2 batches of trainees in each category of training modules • UAT & FAT testing of solution components	T+10 months	10% of the contract value
6.	Pilot run of the project components & Go-Live and handing over the warranty certificates & licenses	T+12 months	10% of the contract value
7.	Operations & Maintenance phase for a period of 60 months from the date of Go Live of the last solution	T1 + 60 Months	The balance 40% payment shall be in equal quarterly instalments. (Equally distributed on a quarterly basis). For violations, penalty as defined in the RFP would be levied on the MSI on a quarterly basis. Any quarterly payment would be made to the MSI after deducting the required penalty for the concerned

			quarter

Annexure A: Details of locations for commissioning of smart assets

Annexure A.1. Locations for Surveillance Assets

Sl. No.	Junction Name	Police Station	Co-ordinates		No. of arms
			Latitude	Longitude	
1	Kunji Lal Tiraha	Kotwali	27°52'48.70"N	78° 4'15.20"E	3
2	Chowraha Bhujpura	Kotwali	27°52'32.36"N	78° 3'37.09"E	4
3	Chowraha Haddi Godam	Kotwali	27°52'29.90"N	78° 3'30.00"E	5
4	Tiraha Turkman Gate	Kotwali	27°52'32.38"N	78° 3'38.52"E	3
5	Handewali Gali	Kotwali	27°52'48.80"N	78° 4'15.50"E	3
6	Sasni Gate	Sasni Gate	27°52'4.49"N	78° 4'14.85"E	4
7	Hatras Adda	Sasni Gate	27°52'36.85"N	78° 4'31.83"E	3
8	Delhi Gate Chouraha	Delhi Gate	27°52'54.70"N	78° 3'43.14"E	4
9	Gonda More	Delhi Gate	27°52'8.50"N	78° 2'40.80"E	4
10	Gonda Pool	Delhi Gate	27°52'22.90"N	78° 1'57.90"E	4
11	Nada Pool	Delhi Gate	27°53'21.45"N	78° 1'55.27"E	4
12	Rasalganj Chouraha (Agrasen Chauraha)	Banna Devi	27°53'17.50"N	78° 4'23.80"E	4
13	Kabarkutta (ABD)	Banna Devi	27°53'17.60"N	78° 4'23.80"E	3
14	Barahdwari-1	Delhi Gate	27°53'6.14"N	78° 4'6.02"E	4
15	Gandhi Bagh / Company Bagh Chouraha (Awantika Bai Chowk)	Gandhi Park	27°53'8.77"N	78° 4'26.01"E	4
16	D S Degree College	Gandhi Park	27°52'52.45"N	78° 4'34.85"E	2
17	Ramlila Maidan Achal Tal (ABD)	Gandhi Park	27°52'47.68"N	78° 4'37.70"E	4
18	Gilhraj Mandir par	Gandhi Park	27°52'42.36"N	78° 4'31.60"E	3
19	Madhupura Tiraha (ABD)	Civil Lines	27°53'17.90"N	78° 4'32.90"E	3
20	Lal Diggi Tiraha (ABD)	Civil Lines	27°54'7.31"N	78° 4'32.92"E	3
21	Centre Point (ABD)	Civil Lines	27°53'28.30"N	78° 4'43.80"E	4
22	Control Room ke Samne (ABD)	Civil Lines	27°53'53.40"N	78° 4'29.40"E	3
23	AMU Circle (ABD)	Civil Lines	27°54'17.96"N	78° 4'34.77"E	4
24	Abdulla Tiraha	Civil Lines	27°54'2.64"N	78° 4'57.57"E	3
25	Jakriya Market	Civil Lines	27°54'56.11"N	78° 5'7.81"E	3
26	Subhash Chowk (Akroor Chowk)	Civil Lines	27°53'39.20"N	78° 4'26.70"E	4
27	Samsad Market Chouraha (ABD)	Civil Lines	27°54'35.24"N	78° 4'10.60"E	4
28	Railway Station Entry	Civil Lines	27°53'18.94"N	78° 4'31.93"E	2

29	Quarsi Chouraha	Quarsi	27°54'19.90"N	78° 6'9.59"E	4
30	Kisanpur Tiraha	Quarsi	27°53'43.36"N	78° 5'23.51"E	3
31	Gandhi Eye Tiraha	Quarsi	27°53'24.61"N	78° 4'56.50"E	3
32	Kela Nagar Chouraha	Quarsi	27°54'15.17"N	78° 5'23.41"E	4
33	Marris Road Chouraha (ABD)	Quarsi	27°53'54.18"N	78° 5'11.33"E	4
34	Masudabad Chouraha (ABD)	Banna Devi	27°53'39.70"N	78° 3'55.00"E	4
35	Dubey Ka Parao Chouraha (ABD)	Gandhi Park	27°52'59.19"N	78° 4'31.20"E	4
36	Madar Gate Chouraha (ABD)	Kotwali	27°52'47.86"N	78° 4'25.21"E	4
37	Khirnigate Chouraha	Sasni Gate	27°52'29.76"N	78° 4'29.98"E	4
38	Eta Chungi Chouraha	Gandhi Park	27°52'29.92"N	78° 5'47.28"E	4
39	Mirumal Chouraha	Gandhi Park	27°53'8.00"N	78° 4'16.80"E	4
40	Barahdwari Chouraha - 2	Banna Devi	27°53'5.88"N	78° 4'4.15"E	4
41	Diwani ke Samne	Civil Lines	27°54'16.10"N	78° 4'16.90"E	2
42	Achal Taal Tiraha	Gandhi Park	27°52'48.84"N	78° 4'33.42"E	4
43	Abdul Kareem Chouraha	Kotwali	27°52'56.23"N	78° 4'9.30"E	4
44	Sabji Mandi Chouraha (ABD)	Kotwali	27°52'54.90"N	78° 4'8.80"E	4
45	Collectorate Tiraha	Civil Lines	27°54'15.70"N	78° 4'17.90"E	3
46	Tasvir Mahal Chouraha (ABD)	Civil Lines	27°53'57.63"N	78° 4'21.27"E	5
47	Barchi Bahadur Tiraha	Civil Lines	27°53'36.20"N	78° 4'20.60"E	3
48	Manik Chowk Tiraha	Kotwali	27°52'55.30"N	78° 4'24.94"E	3
49	Tehseel Tiraha	Banna Devi	27°53'43.30"N	78° 3'45.20"E	3
50	Kayampur Mod	Quarsi	27°53'36.01"N	78° 6'36.14"E	3
51	FM Tower Tiraha	Quarsi	27°56'23.1"N	78°04'58.6"E	3
52	Jamalpur Crossing	Civil Lines	27°56'2.30"N	78° 4'50.08"E	3
53	Near OLF School	Quarsi	27°53'51.15"N	78° 5'34.48"E	3
54	Khaireshwar Chouraha	PS Loadha	27°53'31.10"N	78° 1'25.42"E	4
55	Mamu Bhanja Tiraha Agra Road	Gandhi Park	27°53'6.88"N	78° 4'18.80"E	3
56	Mathura Road Changer	Sasni Gate	27°51'11.80"N	78° 3'36.80"E	4
57	Agra Road Changer	Sasni Gate	27°50'45.40"N	78° 4'41.00"E	5
58	D S College ke Samne	Gandhi Park	27°53'2.10"N	78° 4'34.30"E	2
59	Dodhpur Chouraha	Civil Lines	27°54'22.02"N	78° 5'7.40"E	3
60	KAMAALPUR CHAURAHA	Gandhi Park	27°51'00.4"N	78°06'40.9"E	4
61	MATHURA ROAD OLD BYPASS HIGHWAY KE NEECHE	Sasni Gate	27°51'25.5"N	78°03'05.0"E	4
62	TALAASHPUR KHURD	KotwaliThana	27°51'48.8"N	78°02'47.8"E	3
63	Soot Mill Chauraha / Sarsoul Chauraha	Banna Devi	27°90'43.81"N	78°04'76.46"E	4

64	Jama Masjid Chowk (ABD)	Kotwali			4

Annexure A.2. Locations for ITMS (ATCS, RLVD & supporting ANPR) assets

Sl. No.	Junction Name	Police Station	Co-ordinates		
			Latitude	Longitude	No of Arms
1	Rasalganj Chouraha (Agrasen Chauraha)	Banna Devi	27°53'17.50"N	78° 4'23.80"E	4 arm
2	Kabarkutta (ABD)	Banna Devi	27°53'17.60"N	78° 4'23.80"E	3 arm
3	Gandhi Bagh / Company Bagh Chouraha (Awantika Bai Chowk)	Gandhi Park	27°53'8.77"N	78° 4'26.01"E	4 arm
4	Abdulla Tiraha	Civil Lines	27°54'2.64"N	78° 4'57.57"E	3 arm
5	Quarsi Chouraha	Quarsi	27°54'19.90"N	78° 6'9.59"E	4 arm
6	Kela Nagar Chouraha	Quarsi	27°54'15.17"N	78° 5'23.41"E	4 arm
7	Marris Road Chouraha (ABD)	Quarsi	27°53'54.18"N	78° 5'11.33"E	4 arm
8	Dubey Ka Parao Chouraha (ABD)	Gandhi Park	27°52'59.19"N	78° 4'31.20"E	4 arm
9	Eta Chungi Chouraha	Gandhi Park	27°52'29.92"N	78° 5'47.28"E	4 arm
10	Tasvir Mahal Chouraha (ABD)	Civil Lines	27°53'57.63"N	78° 4'21.27"E	5 arm
11	Tehseel Tiraha	Banna Devi	27°53'43.30"N	78° 3'45.20"E	3 arm
12	Near OLF School	Quarsi	27°53'51.15"N	78° 5'34.48"E	3 arm
13	Dodhpur Chouraha	Civil Lines	27°54'22.02"N	78° 5'7.40"E	4 arm
14	Soot Mill Chauraha / Sarsoul Chauraha	Banna Devi	27°90'43.81"N	78°04'76.46"E	4 arm
15	Masudabad Chouraha (ABD)	Banna Devi	27°53'39.70"N	78° 3'55.00"E	4 arm
16	AMU Circle (ABD)	Civil Lines	27°54'17.96"N	78° 4'34.77"E	4 arm

17	Kisanpur Tiraha	Quarsi	27°53'43.36"N	78° 5'23.51"E	3 arm
18	Collectorate Tiraha	Civil Lines	27°54'15.70"N	78° 4'17.90"E	3 arm
19	Hatras Adda	Sasni Gate	27°52'36.85"N	78° 4'31.83"E	3 arm
20	Centre Point (ABD)	Civil Lines	27°53'28.30"N	78° 4'43.80"E	4 arm

Annexure A.3. Locations for SVD assets (with supporting ANPR assets)

Sl. No.	Junction Name	Police Station	Co-ordinates	
			Latitude	Longitude
1	Quarsi Chouraha	Quarsi	27°54'19.90"N	78° 6'9.59"E
2	Eta Chungi Chouraha	Gandhi Park	27°52'29.92"N	78° 5'47.28"E
3	Kayampur Mod	Quarsi	27°53'36.01"N	78° 6'36.14"E
4	Jamalpur Crossing	Civil Lines	27°56'2.30"N	78° 4'50.08"E
5	Khaireshwar Chouraha	PS Loadha	27°53'31.10"N	78° 1'25.42"E
6	Mathura Road Changer	Sasni Gate	27°51'11.80"N	78° 3'36.80"E
7	Agra Road Changer	Sasni Gate	27°50'45.40"N	78° 4'41.00"E
8	Soot Mill Chauraha / Sarsoul Chauraha	Banna Devi	27°90'43.81"N	78°04'76.46"E

Annexure A.4. Locations for VaMS assets

Sl. No.	Junction Name	Police Station	Co-ordinates	
			Latitude	Longitude
1	Hatras Adda	Sasni Gate	27°52'36.85"N	78° 4'31.83"E
2	Delhi Gate Chouraha	Delhi Gate	27°52'54.70"N	78° 3'43.14"E
3	Rasalganj Chouraha (Agrasen Chauraha)	Banna Devi	27°53'17.50"N	78° 4'23.80"E
4	Kabarkutta (ABD)	Banna Devi	27°53'17.60"N	78° 4'23.80"E
5	Gandhi Bagh / Company Bagh Chouraha (Awantika Bai Chowk)	Gandhi Park	27°53'8.77"N	78° 4'26.01"E

6	Centre Point (ABD)	Civil Lines	27°53'28.30"N	78° 4'43.80"E
7	AMU Circle (ABD)	Civil Lines	27°54'17.96"N	78° 4'34.77"E
8	Abdulla Tiraha	Civil Lines	27°54'2.64"N	78° 4'57.57"E
9	Jakriya Market	Civil Lines	27°54'56.11"N	78° 5'7.81"E
10	Quarsi Chouraha	Quarsi	27°54'19.90"N	78° 6'9.59"E
11	Kela Nagar Chouraha	Quarsi	27°54'15.17"N	78° 5'23.41"E
12	Marris Road Chouraha (ABD)	Quarsi	27°53'54.18"N	78° 5'11.33"E
13	Masudabad Chouraha (ABD)	Banna Devi	27°53'39.70"N	78° 3'55.00"E
14	Dubey Ka Parao Chouraha (ABD)	Gandhi Park	27°52'59.19"N	78° 4'31.20"E
15	Eta Chungi Chouraha	Gandhi Park	27°52'29.92"N	78° 5'47.28"E
16	Achal Taal Tiraha	Gandhi Park	27°52'48.84"N	78° 4'33.42"E
17	Collectorate Tiraha	Civil Lines	27°54'15.70"N	78° 4'17.90"E
18	Tasvir Mahal Chouraha (ABD)	Civil Lines	27°53'57.63"N	78° 4'21.27"E
19	Tehseel Tiraha	Banna Devi	27°53'43.30"N	78° 3'45.20"E
20	Near OLF School	Quarsi	27°53'51.15"N	78° 5'34.48"E
21	Khaireshwar Chouraha	PS Loadha	27°53'31.10"N	78° 1'25.42"E
22	Mathura Road Changer	Sasni Gate	27°51'11.80"N	78° 3'36.80"E
23	Agra Road Changer	Sasni Gate	27°50'45.40"N	78° 4'41.00"E
24	Dodhpur Chouraha	Civil Lines	27°54'22.02"N	78° 5'7.40"E
25	Soot Mill Chauraha / Sarsoul Chauraha	Banna Devi	27°90'43.81"N	78°04'76.46"E

Annexure A.5. Locations for PA assets

Sl. No.	Junction Name	Police Station	Co-ordinates	
			Latitude	Longitude
1	Kunji Lal Tiraha	Kotwali	27°52'48.70"N	78° 4'15.20"E
2	Chowraha Haddi Godam	Kotwali	27°52'29.90"N	78° 3'30.00"E
3	Tiraha Turkman Gate	Kotwali	27°52'32.38"N	78° 3'38.52"E
4	Sasni Gate	Sasni	27°52'4.49"N	78° 4'14.85"E

		Gate		
5	Hatras Adda	Sasni Gate	27°52'36.85"N	78° 4'31.83"E
6	Delhi Gate Chouraha	Delhi Gate	27°52'54.70"N	78° 3'43.14"E
7	Rasalganj Chouraha (Agrasen Chauraha)	Banna Devi	27°53'17.50"N	78° 4'23.80"E
8	Kabarkutta (ABD)	Banna Devi	27°53'17.60"N	78° 4'23.80"E
9	Barahdwari-1	Delhi Gate	27°53'6.14"N	78° 4'6.02"E
10	Gandhi Bagh / Company Bagh Chouraha (Awantika Bai Chowk)	Gandhi Park	27°53'8.77"N	78° 4'26.01"E
11	Ramlila Maidan Achal Tal (ABD)	Gandhi Park	27°52'47.68"N	78° 4'37.70"E
12	Gilhraj Mandir par	Gandhi Park	27°52'42.36"N	78° 4'31.60"E
13	Madhupura Tiraha (ABD)	Civil Lines	27°53'17.90"N	78° 4'32.90"E
14	Lal Diggi Tiraha (ABD)	Civil Lines	27°54'7.31"N	78° 4'32.92"E
15	Centre Point (ABD)	Civil Lines	27°53'28.30"N	78° 4'43.80"E
16	Control Room ke Samne (ABD)	Civil Lines	27°53'53.40"N	78° 4'29.40"E
17	AMU Circle (ABD)	Civil Lines	27°54'17.96"N	78° 4'34.77"E
18	Abdulla Tiraha	Civil Lines	27°54'2.64"N	78° 4'57.57"E
19	Jakriya Market	Civil Lines	27°54'56.11"N	78° 5'7.81"E
20	Subhash Chowk (Akroor Chowk)	Civil Lines	27°53'39.20"N	78° 4'26.70"E
21	Samsad Market Chouraha (ABD)	Civil Lines	27°54'35.24"N	78° 4'10.60"E
22	Railway Station Entry	Civil Lines	27°53'18.94"N	78° 4'31.93"E
23	Quarsi Chouraha	Quarsi	27°54'19.90"N	78° 6'9.59"E
24	Kisanpur Tiraha	Quarsi	27°53'43.36"N	78° 5'23.51"E
25	Gandhi Eye Tiraha	Quarsi	27°53'24.61"N	78° 4'56.50"E
26	Kela Nagar Chouraha	Quarsi	27°54'15.17"N	78° 5'23.41"E
27	Marris Road Chouraha (ABD)	Quarsi	27°53'54.18"N	78° 5'11.33"E
28	Masudabad Chouraha (ABD)	Banna Devi	27°53'39.70"N	78° 3'55.00"E
29	Dubey Ka Parao Chouraha (ABD)	Gandhi Park	27°52'59.19"N	78° 4'31.20"E
30	Madar Gate Chouraha (ABD)	Kotwali	27°52'47.86"N	78° 4'25.21"E

31	Eta Chungi Chouraha	Gandhi Park	27°52'29.92"N	78° 5'47.28"E
32	Mirumal Chouraha	Gandhi Park	27°53'8.00"N	78° 4'16.80"E
33	Barahdwari Chouraha - 2	Banna Devi	27°53'5.88"N	78° 4'4.15"E
34	Diwani ke Samne	Civil Lines	27°54'16.10"N	78° 4'16.90"E
35	Achal Taal Tiraha	Gandhi Park	27°52'48.84"N	78° 4'33.42"E
36	Abdul Kareem Chouraha	Kotwali	27°52'56.23"N	78° 4'9.30"E
37	Sabji Mandi Chouraha (ABD)	Kotwali	27°52'54.90"N	78° 4'8.80"E
38	Collectorate Tiraha	Civil Lines	27°54'15.70"N	78° 4'17.90"E
39	Tasvir Mahal Chouraha (ABD)	Civil Lines	27°53'57.63"N	78° 4'21.27"E
40	Soot Mill Chauraha / Sarsoul Chauraha	Banna Devi	27°90'43.81"N	78°04'76.46"E

Annexure A.6. Locations for ECB assets

Sl. No.	Junction Name	Police Station	Co-ordinates	
			Latitude	Longitude
1	Kunji Lal Tiraha	Kotwali	27°52'48.70"N	78° 4'15.20"E
2	Chowraha Haddi Godam	Kotwali	27°52'29.90"N	78° 3'30.00"E
3	Tiraha Turkman Gate	Kotwali	27°52'32.38"N	78° 3'38.52"E
4	Sasni Gate	Sasni Gate	27°52'4.49"N	78° 4'14.85"E
5	Hatras Adda	Sasni Gate	27°52'36.85"N	78° 4'31.83"E
6	Delhi Gate Chouraha	Delhi Gate	27°52'54.70"N	78° 3'43.14"E
7	Rasalganj Chouraha (Agrasen Chauraha)	Banna Devi	27°53'17.50"N	78° 4'23.80"E
8	Kabarkutta (ABD)	Banna Devi	27°53'17.60"N	78° 4'23.80"E
9	Barahdwari-1	Delhi Gate	27°53'6.14"N	78° 4'6.02"E
10	Gandhi Bagh / Company Bagh Chouraha (Awantika Bai Chowk)	Gandhi Park	27°53'8.77"N	78° 4'26.01"E
11	Ramlila Maidan Achal Tal (ABD)	Gandhi Park	27°52'47.68"N	78° 4'37.70"E
12	Gilhraj Mandir par	Gandhi	27°52'42.36"N	78° 4'31.60"E

		Park		
13	Madhupura Tiraha (ABD)	Civil Lines	27°53'17.90"N	78° 4'32.90"E
14	Lal Diggi Tiraha (ABD)	Civil Lines	27°54'7.31"N	78° 4'32.92"E
15	Centre Point (ABD)	Civil Lines	27°53'28.30"N	78° 4'43.80"E
16	Control Room ke Samne (ABD)	Civil Lines	27°53'53.40"N	78° 4'29.40"E
17	AMU Circle (ABD)	Civil Lines	27°54'17.96"N	78° 4'34.77"E
18	Abdulla Tiraha	Civil Lines	27°54'2.64"N	78° 4'57.57"E
19	Jakriya Market	Civil Lines	27°54'56.11"N	78° 5'7.81"E
20	Subhash Chowk (Akroor Chowk)	Civil Lines	27°53'39.20"N	78° 4'26.70"E
21	Samsad Market Chouraha (ABD)	Civil Lines	27°54'35.24"N	78° 4'10.60"E
22	Railway Station Entry	Civil Lines	27°53'18.94"N	78° 4'31.93"E
23	Quarsi Chouraha	Quarsi	27°54'19.90"N	78° 6'9.59"E
24	Kisanpur Tiraha	Quarsi	27°53'43.36"N	78° 5'23.51"E
25	Gandhi Eye Tiraha	Quarsi	27°53'24.61"N	78° 4'56.50"E
26	Kela Nagar Chouraha	Quarsi	27°54'15.17"N	78° 5'23.41"E
27	Marris Road Chouraha (ABD)	Quarsi	27°53'54.18"N	78° 5'11.33"E
28	Masudabad Chouraha (ABD)	Banna Devi	27°53'39.70"N	78° 3'55.00"E
29	Dubey Ka Parao Chouraha (ABD)	Gandhi Park	27°52'59.19"N	78° 4'31.20"E
30	Madar Gate Chouraha (ABD)	Kotwali	27°52'47.86"N	78° 4'25.21"E
31	Eta Chungi Chouraha	Gandhi Park	27°52'29.92"N	78° 5'47.28"E
32	Mirumal Chouraha	Gandhi Park	27°53'8.00"N	78° 4'16.80"E
33	Barahdwari Chouraha - 2	Banna Devi	27°53'5.88"N	78° 4'4.15"E
34	Diwani ke Samne	Civil Lines	27°54'16.10"N	78° 4'16.90"E
35	Achal Taal Tiraha	Gandhi Park	27°52'48.84"N	78° 4'33.42"E
36	Abdul Kareem Chouraha	Kotwali	27°52'56.23"N	78° 4'9.30"E
37	Sabji Mandi Chouraha (ABD)	Kotwali	27°52'54.90"N	78° 4'8.80"E
38	Collectorate Tiraha	Civil Lines	27°54'15.70"N	78° 4'17.90"E
39	Tasvir Mahal Chouraha (ABD)	Civil Lines	27°53'57.63"N	78° 4'21.27"E
40	Soot Mill Chauraha / Sarsoul Chauraha	Banna Devi	27°90'43.81"N	78°04'76.46"E

Annexure A.7. Locations for Environment sensors

Sl. No.	Junction Name	Police Station	Co-ordinates	
			Latitude	Longitude
1	Sasni Gate	Sasni Gate	27°52'4.49"N	78° 4'14.85"E
2	Rasalganj Chouraha (Agrasen Chauraha)	Banna Devi	27°53'17.50"N	78° 4'23.80"E
3	Barahdwari-1	Delhi Gate	27°53'6.14"N	78° 4'6.02"E
4	Centre Point (ABD)	Civil Lines	27°53'28.30"N	78° 4'43.80"E
5	AMU Circle (ABD)	Civil Lines	27°54'17.96"N	78° 4'34.77"E
6	Masudabad Chouraha (ABD)	Banna Devi	27°53'39.70"N	78° 3'55.00"E
7	Dubey Ka Parao Chouraha (ABD)	Gandhi Park	27°52'59.19"N	78° 4'31.20"E
8	Eta Chungi Chouraha	Gandhi Park	27°52'29.92"N	78° 5'47.28"E
9	Collectorate Tiraha	Civil Lines	27°54'15.70"N	78° 4'17.90"E
10	Agra Road Changer	Sasni Gate	27°50'45.40"N	78° 4'41.00"E

Annexure B: Minimum Techno-Functional Requirements

The following section describes the minimum techno-functional specifications of the project solution components. The bidder is encouraged to propose better solution, if available as part of the proposed solution, however under no circumstances the following mentioned minimum Techno-functional specifications can be dis-regarded.

NOTE: For any compliance deviation or partial compliance, add another column after compliance column explaining the deviation or partial compliance

Annexure B.1. Fixed Surveillance Camera

Sr.No.	Parameter	Minimum Requirement	Compliance (Y/N)
1	Image Sensor and Resolution, FPS	1/2.8" CMOS or better,Min.1920 × 1080 or better; 25fps or better	
2	Image control	Time stamp, text overlay, flip or mirror, Configurable brightness, contrast, saturation, sharpness, white balance, exposure control, gain, backlight compensation, privacy masks, 3DNR, defog, AGC	
3	Wide Dynamic Range	120dB or better	
4	Minimum illumination	Color: 0.05 lux; B/W: 0.005 lux or better	
5	Video Compression	H.265, H.264, and MJPEG Min. three individually configurable streams	
6	Protocols	IPv4, IPv6, TCP/IP, HTTP, HTTPS, RTSP/RTP/RTCP, IGMP, SMTP, FTP, DHCP, NTP, Quality of Service (QoS)	
7	Privacy Regions	Support up to three (3) user-defined privacy regions	
8	Lens type	Vari-Focal Motorized Lens 8-50 mm, Auto Iris, Corrected IR cut filter	
9	On-board Storage	The camera should compliant with SD/SDHC/SDXC min. 64GB or better, In the event of failure of connectivity to the network storage the camera shall record video locally on the SD card automatically	
10	ONVIF	ONVIF Support	
11	Edge based/ Software Based	Video Motion detection, video tampering, line crossing, intrusion detection	
12	Housing	Vandal and impact resistant housing, IK 10, IP67/ NEMA 4X	
13	Security	Support for IEEE 802.1X authentication , User Access Log, IP address filtering, Password	

		protection	
14	Alarm	1 alarm input, 1 alarm output	
15	Audio	1 audio input, 1 audio output	
16	Safety Certifications	UL , CE, FCC, ONVIF	
17	Operating Temperature	0° C to 50° C or better Humidity 20–80% RH (non-condensing)	
18	Power Source	Suitable adaptor shall be supplied to make the equipment work on 230V +10%, 50Hz or Power over Ethernet	

Annexure B.2. IR Illuminator - Field Location

Sr. No.	Parameter	Minimum Requirement	Compliance (Y/N)
1	IR Type	Internal / External	
2	IR Range Distance	Minimum 80 m or better	
3	Power	Input 100-240V AC, or 12/24 V AC/DC	
4	Casing	IP67 rated / NEMA 4X , IK10 vandal resistance	
5	Operating Condition	0° to 50°C or better	
6	Safety Certifications	CE, FCC, UL, RoHS	
7	Lighting	High Definition LED's	
8	Required Accessories	Power Supply, Mounting Clamps, U-bracket, Polycarbonate bird control spike	
9	Support	System should not be an end of life / end of service product.	

Annexure B.3. Surveillance Camera - PTZ

Sr.No.	Parameter	Minimum Requirement	Compliance (Y/N)
1	Image Sensor and Resolution, FPS	1/2.8" CMOS or better with Min.1920 × 1080 or better, 25 fps or better	
2	Image control	Time stamp, text overlay, flip or mirror, Configurable brightness, contrast, saturation, sharpness, white balance, exposure control, gain, backlight compensation, privacy masks, defog, AGC	
3	Wide Dynamic Range	120 dB or better	
4	Minimum Illumination	0.05 Lux (Colour) , 0.005 Lux (B/W), 0 Lux with IR illumination on	
5	Video Compression	H.265, H.264, and MJPEG Min. three individually configurable streams	
6	Protocols	IPv4, IPv6, TCP/IP, HTTP, HTTPS, RTSP/RTP/RTCP, IGMP, SMTP, FTP, DHCP, NTP, Quality of Service (QoS)	
7	Privacy Regions	Support up to 24 programmable privacy masks	
8	S/N Ratio	55 dB	
9	ONVIF	ONVIF Support	
10	Lens Type	4.3-129 or 4.7–142 mm or better, Auto Iris, Full HD (1080P), F/1.6, IR Corrected – Day / Night mode- Colour	
11	IR Illuminators	Built in 150 meters or better	
12	Pan Speed	0.1° ~ 160° / sec	
13	Pan Range	360° endless	
14	Tilt Speed	0.1° ~ 200° / sec	
15	Tilt Range	-15° to 90° with Auto-Flip	
16	On-board Storage	The camera should compliant with SD/SDHC/SDXC min. 64GB or better, In the event of failure of connectivity to the network storage the camera shall record video locally on the SD card automatically	
17	Audio Capability	Two-way Audio, G.711, G.726 with Interface External microphone input	
18	Security	Support for IEEE 802.1X authentication , User Access Log, IP address filtering, Password protection	

19	Alarm	2 alarm input, 1 alarm output	
20	Audio	1 audio input, 1 audio output	
21	Edge based/ Software Based	Video motion detection, Line Crossing, Intrusion Detection , Video tampering	
22	Auto-Tracking	Auto-tracking on moving object	
23	Power Input	PoE /AC/DC 24V	
24	Casing	IP66, IK10	
25	Safety Certifications	UL , CE, FCC, ONVIF	
26	Operating Temperature	0°C to 50°C or better Humidity 20–80% RH (non-condensing)	
27	Power Source	Suitable adaptor shall be supplied to make the equipment work on 230V +10%, 50Hz or Power over Ethernet	

Annexure B.4. Indoor Dome Camera

Sr.No.	Parameter	Minimum Requirement	Compliance (Y/N)
1	Image Sensor and Resolution, FPS	1/2.8" CMOS or better,Min.1920 × 1080 or better; 25 fps or better	
2	Image control	Time stamp, text overlay, flip or mirror, Configurable brightness, contrast, saturation, sharpness, white balance, exposure control, gain, backlight compensation, privacy masks,	
3	Wide Dynamic Range	120dB or better	
4	Minimum illumination	Colour: 0.05 lux; B/W: 0.005 lux or better	
5	Video Compression	H.265, H.264, and MJPEG Min. three individually configurable streams	
6	Protocols	IPv4, IPv6, TCP/IP, HTTP, HTTPS, RTSP/RTP/RTCP, IGMP, SMTP, FTP, DHCP, NTP, Quality of Service (QoS)	
7	Privacy Regions	Support up to three (3) user-defined privacy regions	
8	Lens type	Vari-Focal Motorized Lens 2.8-12 mm, Corrected IR cut filter	
9	On-board Storage	The camera should compliant with SD/SDHC/SDXC min. 64GB or better, In the event of failure of connectivity to the network storage the camera shall record video locally on the SD card automatically	
10	ONVIF	ONVIF Support	
11	Edge based/ Software Based	Video Motion detection, video tampering, line crossing, intrusion detection	
12	Housing	Vandal and impact resistant housing, IK 10, IP67/ NEMA 4X	
13	Security	Support for IEEE 802.1X authentication , User Access Log, IP address filtering, Password protection	
14	Alarm	1 alarm input, 1 alarm output	
15	Audio	1 audio input, 1 audio output	
16	Safety Certifications	UL , CE, FCC, ONVIF	
17	Operating Temperature	0° C to 50° C or better, Humidity 20–80% RH (non-condensing)	

18	Power Source	Suitable adaptor shall be supplied to make the equipment work on 230V +10%, 50Hz or Power over Ethernet	

Annexure B.5. B.4.Internet Router

S. No.	Minimum Requirement	Compliance (Y/N)
1.	The router should be modular in architecture with minimum 3 slots and should be a single chassis solution, should support redundant Router processors / Routing engines and Redundant Power supply. All modules, fan trays & Power supplies should be hot swappable	
2.	Router Should have minimum 35 Gbps throughput from day 1 with minimum 50 Mbps with services on IPv4 and IPv6. Route Processors should have minimum 4GB of flash memory, 4GB of RAM/DRAM	
3.	Minimum 6 x Gigabit Ethernet routing ports with copper transceiver and 4x Gigabit Ethernet Ports (Supporting long haul and short haul SFP). Should support wide variety of interfaces including 10G, OC3, OC48, DS3, ChE1/T1 WAN interfaces, should support 4 x 10G ports.	
4.	Features: QoS classification, policing and shaping, NAPT64, CGNAT, ACL, Router should support hardware encryption capabilities.	
5.	Should support 250K IPv4 and 250k IPv6 Routes, 100k MAC addresses, 1000 VRFs and should have 32K Multicast route	
6.	Protocols: Should support RIPv2, OSPF, IS-1S and BGP4, LDP, BFP routing protocols & IP multicast routing protocols: PIM, IGMP, MPLS, PWE3, FRR, VPLS, NAT, PAT, RADIUS, TACACS+	
7.	Security Features: should support IPv6 for IPSec encryption for data confidentiality, 3DES and AES encryption standards	
8.	Management: SNMP V1 and V2, Telnet, TFTP	
9.	Certifications: EAL3/ NDPP or above Certified	

Annexure B.6. Core Router

S. No	Minimum Requirement	Compliance (Y/N)
1.	**Features:**	
2.	**Architecture & Performance**	
3.	The router should be chassis based and mid-plane architecture	
4.	Should support Redundant route processor and state full failover support.	
5.	Router should support redundant power supplies.	
6.	All the interfaces per line card should have wire speed, no interface should be provided on the CPU card.	
7.	Router shall support 500 Mbps forwarding performance. The performance is considered with IPv4 & IPv6	
8.	The router should have following interfaces	
9.	8 X 1 Gig Base SFP interface and 2 X 10Gig interface (The optics should be populated from day one)	
10.	Router should have at-least 2 free main slots (daughter slots would not be considered) for future scalability.	
11.	**High Availability Features**	
12.	Non Stop Routing , Graceful Restart	
13.	Router should support ISSU (In Service Software Upgrade)	
14.	Should support 802.1ag, Y.1731,Multi Chassis Link Aggregation(MC-LAG),BFD for IPV4 and IPV6,VRRP	
15.	**Features to be supported**	
16.	Dynamic Host Configuration Protocol (DHCP)	
17.	IP Multicast, PIM SM, PIM SSM, IGMP, MLD, RP, Next generation Multicast using MPLS LSP.	
18.	Should support HQOS with minimum	
19.	Intermediate System-to-Intermediate System (IS-IS)	
20.	Label Distribution Protocol (LDP)	
21.	Multi-protocol Label Switching (MPLS) ,MPLS FRR	
22.	L2 VPN, L3 VPN, VPLS	
23.	Diff Serv TE	
24.	Should support virtual switch or bridge domain for local switching	
25.	Software based Logical Routers to segment a router into multiple administrative and routing domains, so that two completely different organizations can share infrastructure should be offered	
26.	**IPv4 Features**	
27.	Support for RIP Version 2, OSPF, ISIS, BGP	
28.	Support for BGP confederations & Route Reflectors	

29.	Integrated routing and bridging support	
30.	Should support Bridge domain and virtual switch.	
31.	Security features	
32.	Shall support NAT64 and IPv6 Tunnelling	
33.	Policing/Rate-limiting of traffic to CPU	
34.	**IPv6 Features**	
35.	Should support IPv6 ping	
36.	Should support IPv6 trace route	
37.	Should support Stateless Auto configuration	
38.	Should support RIPng, OSPFv3, VRRPv6, MLD	
39.	Should support IPv6 L3 forwarding in HW	
40.	Should support PIM for Ipv6 multicast	
41.	Should support IPv6 ACL	
42.	Should support IPv6 traffic over MPLS LSPs	
43.	Should support 6PE, 6VPE, dual stack and CGNAT in hardware	
44.	Should provide state full session redundancy for IPv6 modules	
45.	**IP/MPLS features**	
46.	Route redistribution and Route filtering	
47.	MPLS features- LDP, L2VPN,	
48.	Traffic engineering with RSVP-TE,	
49.	Fast reroute Link Node and path protection	
50.	Policy Based Routing (PBR)	
51.	Support MPLS (LDP,L2VPN)and traffic engineering with RSVP-TE	
52.	**QoS Classifications**	
53.	802.1Q	
54.	Single rate policer (ingress)	
55.	Two-rate three-color policer (ingress)	
56.	Egress policer	
57.	Strict priority queuing (LLQ) – egress	
58.	WRED (egress)	
59.	Trust 802.1p/DSCP (ingress)	
60.	Per port and per queue shaping	
61.	HQoS with minimum 8 hardware queues per port	
62.	**Performance Numbers**	
63.	3M Ipv4 routing entries per system	
64.	2 M Ipv6 routing entries per system	
65.	15 logical routers	
66.	OAM & Monitoring Features	
67.	802.3ah (Ethernet transport OAM -UDLD equivalent)	

68.	802.1ag	
69.	RMON	
70.	**Network Management**	
71.	SNMP: Support for SNMP version 2 & upgradable to version 3 shall be provided.	
72.	Console or out of –band Management: The Router shall have console management access	
73.	The Router shall support Network Time Protocol (NTP) as per RFC 1305 or SNTP (simple NTP) as per as per RFC 2030	
74.	**Certification**	
75.	Router should be NEBS certified	
76.	The router should be EAL 3/NDPP certified under Common Criteria.	

Annexure B.7. Core Switch

S. No	Minimum Requirement	Compliance (Y/N)
1.	The Core Switch should be Modular (Distributed Architecture with 100% passive backplane/mid-plane) with aggregate capacity of at-least 4 Tbps. Should have at-least 6 payload slots with 32 x 10/100/1000 BaseT RJ 45 and 32 SFP+ Ports. The per slot bandwidth should be at-least 240 Gbps. All Interface Module should have local processing.	
2.	Redundancy: should have redundant switch Fabrics to support bandwidth for future Highly Scalable Ethernet Standards from Day 1. Should have redundant CPU and redundant power supply from day 1.	
3.	Interface support: 40G and 100G from Day 1, Support up to 160 Nos of 10 Gigabit Ethernet or 240 Gigabit Ethernet ports.	
4.	HA Features: All the main components like CPU module, switching fabric, power supplies and fans etc. should be in redundant configuration. Components, like modules/power supplies/fan tray should be Hot Swappable. The switch should have redundant Switch Fabric's working in an active-active load sharing mode, Support for Hot Swap of all redundant components: Line Cards, Fabric, power supply, and fan trays.	
5.	Should have 4 GB DRAM and 250,000 Nos. of MAC addresses and 4K VLAN, minimum 500,000 Route entries for IPv4 and IPv6. Should support 100,000 IPv4/IPv6 multicast routes	
6.	Protocols: IEEE 802.1w RSTP and IEEE 802.1s MSTP, RIP V1/v2, OSPF v1/v2, BGPv4, IS-IS, IPv6 packet switching. VRRP, Should support MPLS, GRE tunnelling, IP Multicast PIM - SSM, MSDP, IGMP v1, v2 , v3, IGMP Snooping, H/W based IPv4 and IPv6 Multicasting.	
7.	Security Features: ACL, DHCP replay, Dynamic Arp, MAC address based filtering, RADIUS, TACACS+	
8.	Monitoring: Should Support SNMP, RMON/RMON-II, SSH, telnet, web management through network management software,	
9.	IEEE Standards: IEEE 802.1AB, IEEE 802.1D, IEEE 802.1p, IEEE 802.1Q, IEEE 802.1s, IEEE 802.1w, IEEE 802.3ae, IEEE 802.3ba, IEEE 802.3ah, IEEE 802.3ad	
10.	Certification: EAL3/ NDPP or above Certified	

Annexure B.8. Access Switch

S. No.	Minimum Requirement	Compliance (Y/N)
1	19" Rack Mountable stackable switch with min 24 Nos. 10/100/1000 base-T POE (15.4W) ports and additional support of 4x1G SFP, support for external/internal redundant power supply.	
2	Switch should support for minimum 96 Gbps of forwarding throughput & minimum 70 mbps forwarding rate	
3	The switch should support dedicated stacking port separate from uplink ports with 80 Gbps of stacking bandwidth to put minimum 8 switches into a single stack group.	
4	Switch should have static, default IP routing enabled.	
5	It shall have IEEE 802.1x, IEEE 802.1D, IEEE 802.1Q, IEEE 802.3 10BASE-T, IEEE 802.3u 100BASE-TX	
6	Switch should have feature to protect access ports using port security, TACACS/TACACS+, Radius, storm control, Access Control List both port, VLAN based.	
7	Should have Power supply 230 Volt 50Hz input	
8	Switch should support automated image installation, configuration & automatic configuration of per port QoS to reduce switch provisioning time & effort.	
9	Must have SNMP v1, v2, v3 from day one	
10	Should have CLI and GUI based management console port.	
11	The switch should be IPv6 ready	

Annexure B.9. L3 Fibre Switch

S. No.	Minimum Requirement	Compliance (Y/N)
1.	**Architecture**	
2.	Switch capacity - 1.4 Tbps or higher	
3.	Switch forwarding rates – 1Bpps or higher	
4.	10G SFP+- 24 ports populated with SFP module, scalable to 32 x 1/10G fibre ports	
	40 Gig interface for uplink Populated with module – 4 Nos.	
5.	Non-blocking switch architecture and modular operating system	
6.	**Switching features**	
7.	802.3ad based standard port/link aggregation, Jumbo frames, storm control	
8.	Support at least 4000 VLAN and 150,000 MAC Address	
9.	FIP snooping ,Data centre bridging exchange (DCBX) and IEEE 802.1Qbb (PFC) from day1	
10.	**Security**	
11.	802.1X Network Security and Radius/TACACS AAA authentication	
12.	MAC Address filtering based on source and destination address	
13.	support for various ACLs like port based, vLan based and L2- L4 ACL's	
14.	Should have Control plane (DoS) protection	
15.	The switch should support MACsec, SSH v1 & v2 and Dynamic ARP inspection	
16.	**Network Protocols**	
17.	Layer3 routing protocols like Static, RIP, OSPF, RIPnG, OSPFv3 from day 1 for the solution.	
18.	The switch should support MPLS, L2 and L3 VPN and IPv6 Tunnelling	
19.	**Quality of Service**	
20.	8 number of hardware queues per port	
21.	DSCP, 802.1p	
22.	**Multicast**	
23.	IGMP v1,v2,v3, IGMP snooping, PIM SM and MSDP	
24.	**High Availability**	
25.	The switch should support ISSU and BFD	
26.	**Management**	
27.	SNMP v1, v2, v3, RMON/RMON-II enabled, SSH, telnet, GUI, Web management and should have dedicated Management port	
28.	The switch should support CLI via console, telnet, or SSH and should have image rollback option.	
29.	Switch should support port mirroring feature for monitoring network traffic of a particular port/VLAN.	
30.	Switch should support Link Aggregation on two different switches	

31.	Built-in real-time performance monitoring capabilities	
32.	Power Supply: Switch should have internal Hot Swappable Redundant Power supply	
33.	Cooling Fans: Should have redundant cooling FANS	
34.	The switch should support NEBS	
35.	Switch should be stackable/VPC/Equivalent (All accessories to be provided from day 1)	
36.	The Switch should be EAL3/ NDPP certified	

Annexure B.10. SAN Switch

S. No.	Minimum Requirement	Compliance (Y/N)
1	The fibre channel switch must be rack-mountable. Thereafter, all reference to the 'switch' shall pertain to the 'fibre channel switch'	
2	The switch to be configured with minimum of 24 ports with 16 Gbps FC configuration backward compatible to 4/8.	
3	All 24 x FC ports for device connectivity should be 4/8/16 Gbps auto-sensing Fibre Channel ports.	
4	The switch must have hot-swappable redundant power supply & fan module without resetting the switch, or affecting the operations of the switch.	
5	The switch must be able to support non-disruptive software upgrade.	
6	The switch must be able to support state full process restart.	
7	The switch must be capable of creating multiple hardware-based isolated Virtual Fabric (ANSI T11) instances. Each Virtual Fabric instance within the switch should be capable of being zoned like a typical SAN and maintains its own fabric services, zoning database, Name Servers and FSPF processes etc. for added scalability and resilience.	
8	The switch must support up to 16 Virtual Fabric Instances.	
9	The switch must be capable of supporting hardware-based routing between Virtual Fabric instances.	
10	The switch must support graceful process restart and shutdown of a Virtual Fabric instance without impacting the operations of other Virtual Fabric instances.	
11	The switch shall support hot-swappable Small Form Factor Pluggable (SFP) LC typed transceivers.	
12	The switch must support hardware ACL-based Port Security, Virtual SANs (VSANs), and Port Zoning.	
13	The switch must support Smart Zoning such that the entries in the TCAM is significantly reduced and therefore increasing the overall scalability of the SAN Fabric.	
14	The switch must support Power On Auto Provisioning (POAP) and Quick Configuration Wizard for simplified operations.	
15	Inter-switch links must support the transport of multiple Virtual Fabrics between switches, whilst preserving the security between Virtual Fabrics.	
16	The switch must support routing between Virtual Fabric instances in hardware.	
17	The switch shall support FC-SP for host-to-switch and switch-to-switch authentication.	

18	ID and Destination ID. The support for load balancing utilizing the Exchange ID must also be supported.	
19	The switch must be equipped with congestion control mechanisms such that it is able to throttle back traffic away from a congested link.	
20	The switch must be capable of discovering neighbouring switches and identify the neighbouring Fibre Channel or Ethernet switches.	
21	The switch should support IPv6.	

Annexure B.11. Server Load Balancer

S. No.	Minimum Requirement	Compliance (Y/N)
1.	The proposed appliance should be multi-tenanted appliance and have capabilities to support multiple 3rd parties and open source independent virtual instance of Network functions with dedicated Hardware resources for future requirements and scalability.	
2.	The appliance should have minimum 8 x10G SFP+ interfaces from day one. Should have min. 32 GB RAM, 2 TB Hard disk and capability to create up to 16 virtual Network functions from Day 1. Device to provide 20 Gbps throughput.	
3.	The appliance should provide application delivery controllers with features like round robin, weighted round robin, least connection, Persistent IP, Hash IP, Hash Cookie, consistent hash IP, shortest response, proximity, SNMP, SIP session ID, hash header etc. and support for policy nesting at layer7 and layer4, should also have Script based functions support for content inspection, traffic matching and monitoring of HTTP, SOAP, XML, diameter, generic TCP, TCPS. Load balancer should support policies to customize new features in addition to existing feature/functions of load balancer	
4.	Device to have capabilities to support ADC and SSL VPN as independent Network Function and not an integrated solution to ensure required performance. Should also provide machine authentication based on combination of HDD ID, CPU info and OS related parameters like mac address to provide secure access to corporate resources.	
5.	It shall support built-in failover decision/health-check conditions. It shall also support failover and High Availability (HA) requirements. It shall have redundant power supplies. Shall support script based functions support for content inspection, traffic matching and monitoring of HTTP, SOAP, XML, diameter, generic TCP, TCPS.	
6.	Should provide comprehensive and reliable support for high availability with Active- active & active standby unit redundancy mode. Should support both device level and VA level High availability for individual Network Function.	

Annexure B.12. Link Load Balancer

S. No.	Minimum Requirement	Compliance (Y/N)
1.	The proposed device should be a dedicated purpose built Multi-tenanted device which can host multiple different virtual network functions. It should have capabilities to support 3rd party and open source independent virtual network functions with dedicated Hardware resources for future requirements and scalability.	
2.	The appliance should have minimum 8 x10G SFP+ interfaces from day one. Should have built in 32 GB RAM, 2 TB Hard disk to create virtual network functions and capability to create up to 16 virtual Network functions from Day 1. Device to provide minimum 20 Gbps throughput.	
3.	Appliance should Support for multiple internet links in Active-Active traffic balancing and active-standby failover mode for both inbound and outbound traffic using algorithms like round robin, Weighted round robin, target proximity and dynamic detect. Appliance should also support WAN optimization with features of Network de-duplication, TCP optimization with SSL based secure WAN to avoid the repeated content across the WAN and to ensure efficient utilization WAN bandwidth.	
4.	Should support XML-RPC for integration with 3rd party management and monitoring. Should also support SAA, SAML, Hardware binding and AAA support along with SSO. Solution must support machine authentication based on combination of HDD ID, CPU info and OS related parameters i.e. mac address to provide secure access to corporate resources.	
5.	It shall support built-in failover decision/health-check conditions. It shall also support failover and High Availability (HA) requirements. It shall have redundant power supplies. Shall support script based functions support for content inspection, traffic matching and monitoring of HTTP, SOAP, XML, diameter, generic TCP, TCPS.	
6.	Should have IPV6 support with IPv6 to IP4 and IPv4 to IPv6 translation and full IPv6 support. Also should have IPV6 support with DNS 6 to DNS 4 & DNS 4 to DNS 6 translation based health check for intelligent traffic routing and failover.	
7.	Should provide comprehensive and reliable support for high availability with Active- active & active standby unit redundancy mode. Should support both device level and VA level High availability of individual virtual network function.	
8.	Should have capabilities to support independent Virtual Network Functions like WAN Optimization, DDoS etc.	

Annexure B.13. DDoS Solution

S. No.	Minimum Requirement	Compliance (Y/N)
1.	The DDoS solution is expected to constantly monitor the behaviour of the application visitors and prevent common application layer attacks.	
2.	The proposed solution should detect and mitigate both traditional network- layer DDoS attacks and more advanced application layer attacks.	
3.	The proposed solution should have the capability to be configured in detect as well as protect mode and should prevent suspicious outbound traffic for threats and blocking malicious traffic.	
4.	Solution must support the ability to blacklist a host, domain, URL.	
5.	The proposed solution must provide the ability to block bot-originated traffic according to system- supplied signatures.	
6.	The solution should support 25 Gbps SSL Throughput.	
7.	The DDoS solution should be a dedicated hardware with 8 X 10GE SFP+ ports and dual power supply.	

Annexure B.14. Next Generation Firewall

S. No.	Minimum Requirement	Compliance (Y/N)
1.	The Firewall appliance should be a purpose built appliance based solution with integrated functions like Firewall, VPN and User awareness. The product licensing should be device based and not user/IP based (should support unlimited users except for VPN). The Firewall & IPSEC module should be ICSA labs certified. The hardware platform & Firewall with integrated SSL/IPSec VPN application has to be from the same OEM. The quoted NGFW OEM must have NSS Lab's Recommended rating as per latest NSS Labs NGFW Methodology testing with a minimum exploit blocking rate of 95%.	
2.	Throughput capacity of firewall under test conditions should not be less than 50Gbps for IPV4 & IPV6. Threat Prevention throughput (Includes Firewall, Application Control, IPS, Antivirus, Antimalware etc.) capacity of 10 Gbps. Appliance should support Max 50,000,000 concurrent sessions. Appliance should support at least 200,000 connections per second. Solution should be based on multi core processors, Should have adequate memory on day 1 to handle concurrent connections asked	
3.	Solution should have following deployment modes mandatory: a) L3 Mode, b) L2/Transparent Mode. The solution should be deployed in High Availability. NGFW appliance should have inbuilt storage of min. 400 GB SSD / HDD.	
4.	Interface Requirement: 8 x 1G-T Copper Ports, 8 x 10 GB 10G SFP ports from day 1 and support for addition of 1 x Dedicated Management and 1 x Sync Ports	
5.	Firewall Feature: solution should be based on "stateful inspection" technology and must support access control for predefined /services/protocols with capability to define custom services. Must allow security rules to be enforced within time intervals to be configured with an expiry date/time. The communication between the management servers and the security gateways must be encrypted.	
6.	Authentication: schemes must be supported by the security gateway and VPN module: tokens (i.e. -SecureID), TACACS, RADIUS and digital certificates. Should support Ethernet Bonding functionality for Full Mesh deployment architecture. Must support user, client and session authentication methods. User authentication schemes must be supported by the security gateway and VPN module: tokens (i.e. -SecureID), TACACS, RADIUS and digital certificates. Firewall should support the system authentication with RADIUS and local authentication. Both should work simultaneously. Solution must support DCHP, server and relay. Solution must include the ability to work in Transparent/Bridge mode.	
7.	Solution must support gateway high availability and load sharing with state synchronization. Solution must support Configuration of dual stack gateway	

	on a bond interface, OR on a sub-interface of a bond interface. Solution must Support 6 to 4 NAT, or 6 to 4 tunnel.	
8.	User Identity / Awareness: Must be able to acquire user identity from Microsoft Active Directory without any type of agent installed on the domain controllers. Must support Kerberos transparent authentication for single sign on. Must support the use of LDAP nested groups. Must be able to create rules and policies based on identity roles to be used across all security applications. The solution should have the inherent ability to detect multi-stage attacks. For the purpose of detecting multi stage attacks the solution should include static analysis technologies like antivirus, anti-malware/anti bot however in an integrate mode with the solution. The bidder or SI may use additional appliances (at max 2) for the solution but should be provided by the same OEM in the solution.	
9.	The solution should inspect the web sessions (HTTP and HTTPS both) to detect and notify the malicious web activity including malicious file downloads through the internet. Third Party/Separate appliance for SSL offloading will not be accepted. The proposed solution should dynamically generate real-time malware intelligence for immediate local protection via integration with the separate Automated Management and Event Correlation System. This Automated Management and Event Correlation solution must be from the same OEM. Solution should have an ability to remove all the active content and macros sending only a clean document to the end user. Solution should be able to detect & Prevent the Bot communication with C&C.	
10.	Solution should have a Multi-tier engine to i.e. detect & Prevent Command and Control IP/URL and DNS. Solution should be able to detect & Prevent Unique communication patterns used by BOTs i.e. Information about Botnet family. Solution should be able to detect & Prevent attack types i.e., such as spam sending click fraud or self-distribution, that are associated with Bots. Solution should be able to block traffic between infected Host and Remote Operator and not to legitimate destination. Solution should be able to provide with Forensic tools which give details like Infected Users/Device, Malware type, Malware action etc.	
11.	Security Management: A separate centralized management appliance/software needs to be provided for management and logging of NGFW appliance. In case other security components like APT solution etc. are from the same OEM then a single centralized management, logging (and not multiple management system) should manage all such security devices. Security management Hardware can be an OEM appliance or dedicated server with software. The hardware appliance should have minimum 2 TB Hard disk and minimum dual 10/100/1000 Mbps network port. The central management console and should be able to handle 5000 log/sec.	
12.	Security management application must support role based administrator accounts. Management must provide functionality to automatically save current state of Policy each time when any configuration changes in Security	

	policy is enforced, and should have option to revert back to previous state stored state. It must be capable of storing at least last 5 policies. The management must provide a security rule hit counter in the security policy. Solution must include a search option to be able to easily query which network object contain a specific IP or part of it. Solution must have a security policy verification mechanism prior to policy installation.	
13.	The Log Viewer should have the ability view all of the security logs of all functions managed by the solution in one view pane (helpful when troubleshooting connectivity problem for one IP address)	
14.	The Log Viewer should have the ability in the log viewer to create filter using the predefined objects (hosts , network, groups, users...)	

Annexure B.15. Anti-APT Solution

Sr. No.	Minimum Requirement	Compliance (Y/N)
1.	The APT appliance should be a purpose built on premise appliance based solution with integrated support for sandboxing. Cloud based solution will not be accepted.	
2.	The hardware-based solution should provide protection for all incoming and outgoing web and email traffic from /to Internet.	
3.	There should be no requirement for the customer to buy additional Microsoft licences for sandboxing solution	
4.	The quoted APT OEM must have NSS Lab's Recommended rating as per breach detection & prevention system report.	
5.	The APT appliance should be able to handle min 2 Gbps incoming /outgoing traffic (throughput).	
6.	The APT appliance should be able to process min 1,000,000 files/month (either web or mail or both)	
7.	Appliance should have minimum 2 x 1 TB storage and should support RAID.	
8.	The APT appliance should support at least 24 virtual machines running simultaneously	
9.	Min 4 Copper and 2 x 10G Fibber ports should be provided in APT appliances for achieving functionalities mentioned.	
10.	The Hypervisor used by sandboxing solution must not be an OEM solution such as from VMWare ,Hyper-V, Virtual Box, RHEV etc. however it should be a custom Hypervisor purpose built for sandboxing requirement	
11.	The solution must be able to detect and report malware by using multiple images of Windows XP, 7, 8, 10 etc.	
12.	The solution must support prepopulated LICENSED copies of Microsoft windows and office images through an agreement with Microsoft.	
13.	Anti-APT solution should be able to work independently of signature updates from OEM website.	
14.	The solution must be able to support scanning links for zero days & unknown malware and support sandboxing of file sizes of up to 50 MB. Solution should have an ability to remove all the active content, harmful links in documents and macros sending only a clean document to the end user	
15.	The solution should inspect the web sessions (HTTP and HTTPS both) to detect and notify the malicious web activity including malicious file downloads through the internet.	

Annexure B.16. Web Application Firewall

S. No.	Minimum Requirement	Compliance (Y/N)
1.	Solution should be deployed in HA (High Availability) mode and protect the web applications from attacks. WAF solution should filter the HTTP/S traffic based on the rules set defined. Proposed WAF should be able to address top 10 OWASP vulnerabilities.	
2.	Proposed solution shall prevent the following attacks (but not limited to): Brute force, Access to predictable resource locations, Unauthorized navigation, HTTP request format and limitation violations (size, unknown method, etc.) and File upload violations	
3.	Solution should be able to inspect web application output and respond (allow, block, mask and/or alert) based on the active policy or rules, and log actions taken.	
4.	Support dynamic source IP blocking and should be able to block attacks based on IP source and automatic updates (if required) to the signature database, ensuring complete protection against the latest application threats.	
5.	Proposed WAF module should be from different OEM than Firewall for better security.	
6.	Should have positive security model with machine learning capabilities to detect and prevent anomaly in application traffic and unknown attacks. Machine learning should be based on true ML algorithms, and not just automation of dynamically learnt rules.	
7.	Should have 4-10Gig ports and storage capability of 2 TB. Proposed solution should have integrated Redundant power supply.	

Annexure B.17. DLP (Data Leakage Prevention)

S. No.	Minimum Requirement	Compliance (Y/N)
1.	DLP for Endpoints – Proposed solution should address the risks associated with the storage and use of confidential /sensitive data on laptops and desktops across organization. It should prevent confidential/sensitive files from downloading, copying to and from any kind of portable storage device & removable media. Proposed solution should monitor data being copied and pasted from the clipboard to prevent confidential/sensitive data from being pasted to specific application.	
2.	DLP for Web – Proposed solution must block or remove sensitive data from outbound web communications if they violate security policy.	
3.	DLP for Network – Proposed solution must passively inspect network traffic for confidential data that is being sent in violation of security policy.	
4.	DLP for Files shares, Databases and Document Repositories (Storage) – Proposed solution must discover stored confidential data throughout the enterprise; monitor the ownership and use of stored data; and protect sensitive data according to centrally administered policies.	
5.	The Solution should not use any third party proxy Server to provide DLP functionality	
6.	The solution must have identity and role based policy capability.	
7.	The solution should be capable of segmentation of duties, automatic access control.	
8.	The Solution should have comprehensive auto-classification methodology.	
9.	The Solution should have built in automated policy synthesis mechanism and ability to monitor APT	

Annexure B.18. Privileged Identity Management

S. No.	Minimum Requirement	Compliance (Y/N)
1	The solution should have preventions policies applied in breach scenarios or as a way to move from monitoring to prevention for privileged password & The solution must enables organization to closely control and monitor all applications within the environment.	
2	The solution should provide fined grained User Control. The proposed solution must allow controlling actions and access to resources such as target server's/network devices of all privileged accounts such as root / administrator. The solution must track the "real user" even in case of surrogates.	
3	The solution should provide Rights Delegation. The proposed solution must provide the ability to designate specific users as Administrators, Auditors, and Password Managers etc. with appropriate rights. The proposed solution must also provide the ability to designate specific users as Subordinate or Group Administrators, to manage users and file permissions for their group.	
4	The solution should support cross platform management. The proposed solution must support management and policy distribution across various OS platform like Windows, Linux, UNIX, Windows application (Windows Service, Schedule tasks, IIS etc.) security (firewall, IPS, Proxy etc.) & network device (router & switches platforms from a central management console. It must support the deployment of the same policies across multiple servers ensuring consistency of security policies across machines in the enterprise.	
5	The solution should intercept and verify every request to change user identity and maintain a reliable audit trail.	
6	The solution must provide support for IPv6.	
7	The solution should provide exploit prevention techniques to shield the OS, applications and services by defining acceptable behaviors and limited	
8	The solution should support high availability and should not have a single point of failure.	
9	The solution should also support multifactor authentication while logging in utilizing tokens, OTP and passphrases.	

Annexure B.19. IP phone

Sr. No.	Parameter	Minimum Specifications	Compliance (Y/N)
1.	Display	Multiple line phones with eight red/green line/feature indicators around display. 3.5" (diagonal) colour display – 320 x 240 pixels	
2.	Integral switch	10/100 mbps for a direct connection to a 10/100BASE-T Ethernet network through an RJ-45 interface	
3.	Speaker Phone	Yes	
4.	Keys	4 Context Sensitive Soft Keys	
5.	Headset	Wired, Cushion Padded Dual Ear- Speaker, Noise Cancelling headset with mouthpiece microphone, port compatibility with IP Phone	
6.	VoIP Protocol	Supports SIP-AST for enhanced features	
		Supported on selected 3rd-party Open SIP call platforms	
		Supports H.323 /SIP	
7.	POE	Power over Ethernet Class 1, Class2 and support for 802.3az.	
8.	Supported Protocols	SNMP, DHCP, DNS	
9.	Codecs	G.711, G.722, G.729 including handset and speakerphone	
10.	Speaker Phone	Full duplex speaker phone with echo cancellation Speaker on/off button, microphone mute	
11.	Volume control	Easy decibel level adjustment for speaker phone, handset and ringer	
12.	Phonebook/ Address book	Minimum 100 contacts	
13.	Call Logs	Access to missed, received, and placed calls. (Minimum 20 overall)	
14.	Clock	Time and Date on display	
15.	Ringer	Selectable Ringer tone	
16.	Directory Access	LDAP standard directory	
17.	QoS	QoS mechanism through 802.1p/q	

Annexure B.20. IP-PBX

Sr. No.	Minimum Requirements	Compliance (Y/N)
1	The IP telephony system should be a converged communication System with ability to run analogue and IP on the same platform using same software load based on server and Gateway architecture	
2	Proposed Solution should support remote site survivability on local gateways and the survivable system should provide all the telephony features as of main site. Survivability features and options that allow gateways to continue operating even if the primary server fails or in the event a WAN failure affects communications between the gateway and the IP PBX.	
3	System should support High availability and seamless failover from primary server to secondary server. It should allow the administrator to make configuration changes even when primary server is down.	
4	The single IP PBX system should be scalable to support up to 500 stations (any mix/percentage of Analog/IP) to achieve the future capacity	
5	The system should be based on server gateway architecture with external server running on Linux OS. No card based processor systems should be quoted	
6	The voice network architecture and call control functionality should be based on SIP	
7	The call control system should be fully redundant solution with no single point of failure & should provide 1:1 redundancy	
8	The communication server and gateway should support IP V6 from day one so as to be future proof	
9	The entire solution (IP PBX, its hardware, IP Phones, Voice Gateway, recording, Chat bot, etc.) should preferably be from a single OEM	
10	Should support signalling standards/Protocols – SIP, H.323, Q.Sig	
11	Voice Codec support - G.711, G.729, G.729ab, g.722	
12	The System should have GUI support web based management console	
13	The protection of signalling connections over IP by means of authentication, Integrity and encryption should be carried out using TLS	
14	System should support MLPP feature	
15	Proposed system should support SRTP for media encryption and signalling encryption by TLS	
16	Secure HTTP support for Call Server Administration, Serviceability, User Pages, and Call Detail Record Analysis and Reporting Tool. Should	

	support Secure Sockets Layer (SSL) for directory	
17	The administrator logging on to the call control server needs to authenticate by suitable mechanism such as User Login Information and Passwords/ Radius Server	
18	Voice gateway to be provided with 1 PRI card scalable to 3 PRI in future for PSTN (PRI) line termination.	

Annexure B.21. Video Conferencing Solution

Sr.No.	Minimum Requirements	Compliance (Y/N)
1.	Video Standards: H.263, H.264, H.265/H.264 High Profile	
2.	Should support 30 fps & 60fps (frames per second) with 1080p resolution from day one	
3.	Video Features: Ability to send and receive two live simultaneous video sources in a single call, so that the image from the main camera and PC or document camera can be seen simultaneously	
4.	Should support H.239 and BFCP protocols with 1080p resolution	
5.	Video Output: Should have at least 2 HDMI / DVI (High Definition Multimedia Interface) output to connect Full High Definition display devices such as LCD / LED and projectors for both Video and Content. (Dual Monitor Support). The VC unit should be an OEM integrated dual screen with each screen of 65" each or more	
6.	It should be possible to display the main video on one HD screen and the presentation / dual video on the other HD screen.	
7.	Video Input: Should have at least one HD video Input to connect HD camera with full functionalities as mentioned in the camera specifications.	
8.	Should have HDMI & VGA/ DVI (Digital Video Interface) input to connect PC / Laptop directly to the Video conferencing system. If any converter required connecting PC/Laptop, it must be Active Converter along with PC audio.	
9.	Audio standards: G.711, G.722, G.722.1, 64 kbps MPEG-4 AAC-LD or equivalent standards must be supported.	
10.	Audio Inputs: Should support minimum 4 Microphones, connected directly or in array. 4 needs to be supplied from day one.	
11.	1 LAN / Ethernet - 10/100/1000 Mbps	
12.	IP - at least 6 Mbps bandwidth support	
13.	Security: Password protected system menu	
14.	ITU-T standards based Encryption of the video call	
15.	Camera: The camera should be dual camera with automatic voice tracking feature and face recognition cameras and each camera should be 10x optical zoom.	
16.	1920 x 1080 pixels progressive @ 30fps	
17.	Should have at least 65 degrees field of view (horizontal)	
18.	The Camera and codec should be from the same manufacturer	

Annexure B.22. Multiparty conference Unit

Sr. No.	Minimum Requirements	Compliance (Y/N)
1	The Bridging should be running on dedicated Hardware appliance. All the individual components of the centralized infrastructure should be quoted with a dedicated hardware to remove single point of failure.	
2	From day one the bridge must provide 20 full HD video ports @1080p30 fps & 30 audio conference ports on a single chassis. IT should be scalable to 40 ports full HD and 40 audio ports by adding the licenses if required in future.	
3	All necessary hardware to support the above capacity needs to be supplied from day one.	
4	All the ports must be able to connect different sites at different bandwidths and protocols.	
5	The bridge should support room based video end points and its own clients equal to number of ports of MCU. In case additional components are required for this functionality, all additional components required to have this functionality has to be included in the solution	
6	The bridge should have the capability to host meetings with internal and external participants in a secure way such that it should co-exist with the enterprise security policies	
7	The bridge should have components such as the Scheduler as part of the offering from day one.	
8	Should support H.263/H.263+/H.263++, H.264AVC, H.264 High Profile/H.265	
9	Should support video resolution from SD to Full HD to join into a conference	
10	Along with the Support for basic algorithms like G.711 and G.722.1 the bridge should also support wideband Audio protocols like MPEG 4 AAC - LC / MPEG 4 AAC – LD	
11	Must support the ability to allow Video conferencing devices, Clients on Mobile phones, Smart phones and Laptops to join into conference. These clients can be inside the WAN network or even on the Internet without a VPN.	
12	The bridge should support transcoding of different Audio/video Protocols.	
13	The bridge should have H.239/BFCP protocol for sending and receiving dual video streams (Presenter + Presentation).	

14	The bridge must also support advanced continuous presence such that the site that is "on-air" to be seen on a larger window and the other sites are seen in smaller quadrants	
15	The bridge must be a secure Non-PC Hardware with a strong operating system. The Hardware and software & Virtualization (if required) must be from the same OEM.	
16	The bridge should support 128 Bit strong AES encryption for calls and H.235 for authentication	
17	It should be possible for outside agencies (for state government, central government, police department, etc.) to join the bridge for multi-party video conference call securely over internet.	
18	They should be able to join the bridge using standards based VC endpoints using internet (as long as these endpoints are exposed to internet) securely.	
19	It should be possible to connect 20 such external endpoints / locations concurrently at any given point of time.	
20	It should use secure firewall traversal technology.	
21	It should support any standards-compliant SIP or H.323 video conferencing endpoints.	
22	It should support for H.323 SIP Interworking	
23	It should use standards based firewall traversal methods - H.460.18/19	

Annexure B.23. Citizen contact centre

Sr.No.	Minimum Requirements	Compliance (Y/N)
1	Helpdesk system should provide incident management, problem management templates along with helpdesk SLA system for tracking SLA's pertaining to incident resolution time for priority / non-priority incidents.	
2	System should also automatically create tickets based on alarm type	
3	The proposed helpdesk solution must provide flexibility of logging, viewing, updating and closing incident via web interface for issues related to the project.	
4	IT Asset database should be built and managed by the bidder, in order to carry out the scope of work items.	
	Contact Centre Specifications	
1	For up to 20 Agents	
2	Automatic call distribution	
3	Automatic identification of incoming number based on landline and mobile number mapping	
4	Call recording mapped to incident tickets	
5	Customizable agent and supervisor desktop layout	
6	Inbound and outbound capability	
7	Call control	
8	Multisession web chat	
9	Email	
10	Live data reporting gadgets	
11	Phone book	
12	Speed Dial in IP phones	
	Automatic Call Distribution (ACD):	
1	Should be highly available with hot standby and seamless failover in case of main server failure. There should not be any downtime of Contact Centre in case of single server failure.	
2	Should support skill based routing and it should be possible to put all the agents in to a single skill group and different skill groups	
3	ACD support routing of incoming calls based upon caller input to menus, real-time queue statistics, time of day, day of week, ANI, dialled number etc.	
4	ACD should support call routing based on longest available agent, circular agent selection algorithms	

5	ACD should support the playing of customizable queuing announcements based upon the skill group that the call is being queued to, including announcements related to position in queue and expected delay	
6	Agents should be able to chat with other Agents or supervisor from the Agent desktop software	
7	Supervisor should be able to see the real-time status of agents, supervisors should be able to make agent ready or logout from the supervisor desktop	
8	Should support Queuing of calls and playing different prompts depending on the type of call and time in the queue.	
9	The call centre solution should have been implemented in minimum 2 projects of Emergency handling over 50,000 calls per day in India. Documentation proof should be submitted as part of the tender submission	
10	All contact centre related components including ACD, PABX, Gateways, Recording, CTI, softphone, headphones, Chat bot, Notification System etc. must be from same OEM.	
	Interactive Voice Response (IVR):	
1	IVR Platforms should support following standards from Day 1	
	VXML,CCXML,SMIL,SRGS/SISR,MRCP,SIP/H.323,WSDL/SOAP,HTML5	
2	IVR should play welcome messages to callers Prompts to press and collect DTMF digits	
3	IVR should be able to integrate with backend database for self-service, as and when required	
4	GUI based tool to be provided for designing the IVR and ACD call flow	
5	IVR should support Voice XML for ASR, TTS, and DTMF call flows	
6	IVR should be able to Read data from HTTP and XML Pages	
7	IVR should be able to run outbound campaigns.	
	Reporting:	
1	System to provide report of IVR Application Performance Analysis, Call by Call details for all the calls, Traffic analysis reports etc.	
2	Reporting platform to support Agent level reports, Agent login, logout report, report on agent state changes	
3	Queue reports, Abandon call reports all the reports should be summary, tabular and detailed report format to be available for the agents.	
4	Reporting platform to support custom reports using a combination of the Crystal Reports Developer's Toolkit and SQL stored	

	procedures.	
5	Users of the Historical Reports should be able to perform the following functions View, print, and save reports. Sort and filter reports, Send scheduled reports to a file or to a printer. Export reports in a variety of formats, including PDF, RTF, XML, and CSV	
6	Administrator should be able to assign one or more email addresses to a single Queue	
7	Email routing support integration with Microsoft Exchange 2003 or Microsoft Exchange 2007 or 2010	
8	Agents should be able to automatically resume of e-mail processing on voice disconnect.	
9	Agent should be able to save email draft response and resume at a later time	
10	Agent should be able to re-queue email	
11	Supervisor should be able to access real-time reporting for Agent E-Mail mail volume by Queue	

Annexure B.24. Video Management Solution & Video Analytics Solution

S. No.	Parameter	Minimum Specifications	Compliance (Y/N)
1.	System Architecture	The VMS architecture should comprise of centralised or decentralised architecture. The VMS should have system components such as Management Server to manage the system, Recorder or Media Server to stream and store the video feeds from the cameras and Database Server to store meta data information.	
2.		The VMS should support single site or multi-site deployment scenarios. The VMS should have capability to aggregate videos from multiple sites to the central site for recording or monitoring. The VMS should also have the capability to aggregate the system alerts such as video analytics, user created alerts and system health alerts to the central site.	
3.		The VMS should support single or multiple recorder server deployments. The proposed VMS should support unlimited IP and Analog cameras by augmenting the computing and storage hardware. The proposed VMS should support unlimited number of VMS clients.	
4.		The VMS architecture should support automatic assignment of the available cameras on the network to the available Recorder Servers based on the recorder server's resources such as number of cores, available RAM and resource utilisation. The VMS should support dynamic load balancing. No recording server should be kept idle. This should happen without manual intervention.	
5.		The VMS should be computing hardware agnostic and should work on Commercially Off The Shelf (COTS) servers and storage solutions.	
6.		The VMS should support virtual computing environment and should support all the industry leading virtualisation platforms available for Windows, Linux or Unix environment.	
7.		The VMS should support 64 bit architecture OS and hardware environments.	

8.		VMS should support industry standard database, e.g., PostgreSQL, MySQL, MS SQL and Oracle. The VMS should be capable of supporting SQL or Non SQL databases.	
9.		The VMS should support redundancy at each level to avoid single point of failure. The redundancy should be built in to the platform and should offer failover support for Management Servers, Media / Recording Servers, Database Servers and Storage Medium.	
10.		VMS should support Failover against temporary disconnection of DBMS Service, without any loss of camera video. As soon as the DBMS service resumes, all data should automatically be synchronised to the Database.	
11.		Once configured, the Video Management System should not require reconfiguration of any kind when any server passes through a power Off-On cycle.	
12.		The system should provide seamless access to recordings on the failover server for all clients through the same client views once the services are fully started.	
13.		Each media server should have its own storage configuration. It should be possible to select storage location/s out of all available storage locations (including Local, DAS, NAS, and SAN storage) for each media server. The media server should support load balancing and fail-safe operation by distributing the video data on all selected storage locations. So, in case of failure of any storage location, the entire video data is not lost.	
14.		The VMS should support mix of storage technologies such as local / DAS / SAN / NAS storage. Each media server should support such storage locations simultaneously.	

15.		In case of the failure of the Recording Server, the VMS should automatically assign the cameras on the failed recording server to other operational recording servers on the network. Manual intervention of any kind should not be required in such a case. When the failed server becomes active again, the cameras should be automatically allocated to the recorder server again without manual intervention. Deployment of a dedicated redundant server for this purpose should not be required.	
16.		The Media Server should allow recording of camera feeds on network storage. In case the network storage fails, the recording server should start recording on the local storage. The local recording should get synchronised with the network storage as and when it is available again.	
17.		The VMS should have published APIs to interface with external systems such as Command and Control Application, Incident Management System, etc.	
18.		VMS should have Open Interface to send Analytics event alerts and other Maintenance Alerts (Camera disconnection, Storage Full, DBMS disconnection, etc.) over HTTP protocol to any external application running in a different machine in the same LAN. This is required for integration with command & control software or any other 3rd party incident management system.	
19.	General VMS Functions	VMS should be able to detect ONVIF compliant IP cameras automatically.	
20.		VMS should support H.265/H.264 and MJPEG stream for both live view and Recording independently. Compression rate should be manageable.	
21.		The VMS should have ONVIF Profile S & G compliance.	
22.		The VMS should be able to stream standard H.265/H.264/Mpeg4 camera video streams to any external software on demand basis.	
23.		The VMS should support H.265/H.264, and MJPEG CODECs.	
24.		The VMS should manage, display and record multiple streams of various CODECS (Including H.265/H.264 etc.) from a single IP camera or encoder.	

25.		The VMS should offer desktop client and web client.	
26.		VMS should allow managing initial client logon, system configurations, logging, remote administration of recording servers, devices, security, rules, alerts and logging.	
27.	Storage & Recording Functions	The VMS should allow creation of customised recording profile. Such a profile should allow the operator to select multiple available camera streams. It should be possible to assign the recording profile to an individual camera or a group of cameras or all cameras.	
28.		The VMS should allow selection of stream for recording.	
29.		The VMS should support ONVIF Profile G. The VMS should intelligently synchronise the edge recording on the camera with the central recording in case the camera loses the network connection.	
30.		The VMS should allow selection of single or group or all cameras for edge recording.	
31.		The VMS should allow the user to mark certain period of video recording as “critical data”. Such critical data should be retained by the system irrespective of the camera recording storage configuration.	
32.		VMS should store all configuration data of Servers, Analytics Application Settings, Camera Recording Schedules, User Login Credentials, and Archived Video Files etc. in a relational database.	
33.		It should be possible to encrypt the exported video with password protection. The system should keep a record of such exported videos as audit trail.	
34.		It should be possible to create recording schedules on the fly, and assign any schedule to any camera, any group of camera or to all the cameras any time. The recording should be controlled on hourly basis. It should be possible to manage recording on per camera basis, each with different video settings (e.g. format, frame rate and resolution).	
35.		Archive retention period should be configurable on per camera basis. The system should allow both retention based as well as FIFO based deletion policy.	

36.	User Management & Administration	The VMS should support multiple directory access protocols such as Microsoft Active Directory or Lightweight Directory Access Protocol (LDAP).	
37.		The VMS should allow monitoring of the desktop screen activity of a user from the Administrator user console. This feature should replicate the entire user desktop and not just the VMS application window. This feature is required for audit control of the operators. It should also be possible to monitor desktops of multiple users and record the entire activity to a file for any duration required.	
38.		The VMS should have a feature to restrict a user to a particular hardware workstation.	
39.		It should be possible to send messages to a particular user from the Administrator login. In case the user is offline or not logged in, the message should be delivered after the user logs in to the system.	
40.	VMS Client and Operator Functions	The VMS desktop client should be able to configure the entire system without any interface / operations required to be performed at the server level.	
41.		The VMS should allow multi-monitor support for the client workstation.	
42.		The VMS should support screen layouts created and stored for each login user. The stored screen layout should be available on any of the operator workstations.	
43.		The VMS should allow creation of customised, layered maps using standard picture files and it should be possible to drag and drop the cameras on the map for easy navigation based on the location on the map. It should be possible to select any camera or group of cameras on the map for live viewing or archive viewing.	
44.		The VMS should show event notification from the cameras on the map itself. The operator should be able to click on the event notification of a particular camera on the map and the VMS should open the event window on the operator screen.	
45.		VMS should integrate with GIS maps developed for Aligarh smart city project.	

46.		It should be possible to create a group of cameras for simultaneous viewing. So, in case of an alert in one camera, the VMS should open the event window of the camera and also show live video from other cameras in the group in a synchronised manner. It should also be possible for the operator to view the archive video from all the open cameras simultaneously, in a time synchronised manner.	
47.		The system should have PTZ camera control options within the matrix view of all the cameras. The PTZ controls should only be visible for PTZ camera/s. The operator should be able to control the PTZ camera within the matrix view itself.	
48.		The system should retain the VMS client screen state (including Video Analytics alert window, message window, Video Matrix, etc.) in case of an accidental shut down of the machine and should offer the exact same screen to the operator upon logging back into the system.	
49.		The VMS should allow creation of events for any camera from the drop down menu. Such an event, when stored, should be searchable based on the camera, time, and event type. It should be possible to write description about the event.	
50.		The VMS should allow sending the event alert to the designated person or a group of designated persons through SMS or Email.	
51.		VMS should allow transferring the event alert to an administrator or another user registered in the system.	
52.		The VMS should allow monitoring of archive video of the selected camera under categories such as events, motion or continuous recording. The VMS should also show a report of cameras indicating recording status for the selected duration, critical video data and Incident Video data.	
53.		VMS should support multi-layer hyperlinked maps in form of JPEG files. Cameras can be dragged and dropped from directory on the map for click-n-view on Client viewer.	
54.		VMS should allow camera clustering based on Locations as well as Groups independently.	

55.		Each operator should be able to monitor one or several clusters of camera	
56.		VMS should be able to prevent an operator from viewing/managing one or several clusters	
57.		VMS should allow assigning each camera to one or several clusters simultaneously.	
58.		VMS should provide feature-rich administration client for system configuration and day-to-day administration of the system.	
59.		The Client Viewer should provide a Graphical User Interface (GUI) for the convenient access of live and recorded video as well as camera properties and display quality.	
60.		The Client Viewer should support real time simultaneous view of 1, 2x2, 3x3, 4x4, 1+5, etc. multi-screens video display and a simple click should allow enlarging any of the multi-screen displays into a full screen display. On clicking again on the enlarged display, multi-screen display should reappear.	
61.		It should be possible to drag and drop cameras from the camera directory to the display screen.	
62.		The Client Viewer should offer the capability of browsing recordings from cameras on the same panel where other cameras are displayed live. There should be provision to replay multiple such cameras from various timestamps, independent to one another.	
63.		The Client viewer should have the feature to synchronize replay of selected cameras/all cameras in the view panel.	
64.		VMS should select the appropriate video stream from camera for display depending on the display resolution to optimize the network bandwidth.	
65.		The Client Viewer should allow digital zooming on live view as well as on replay view on Fixed as well as PTZ Cameras.	
66.		The Client Viewer should support the use of standard PTZ controller or 3-axis USB joysticks for control of pan, tilt, zoom and auxiliary camera functions.	
67.		The Client Viewer should support the use of keyboard shortcuts for control of standard features.	

68.		The Client Viewer should have the capability to receive multicast streams if a pre-set number of clients are requesting the same live view camera. The Operator should have the option to configure the system to always receive unicast streams at the discretion of the system administrator. The system should have the capability to detect if the network becomes unreliable and to automatically switch to unicast to ensure that the operator is able to receive video.	
69.		The operator should have the ability to use digital zoom where the zooming is performed in the image only on any number of cameras simultaneously. This functionality should be the default for fixed cameras. The use of digital zoom should not affect recording or other users.	
70.		The PTZ control window should allow the user to select pre-defined presents for PTZ cameras and drive the selected camera to the preset.	
71.		The current camera state should be displayed and should indicate whether the camera is in live mode, in recording mode or in stopped mode.	
72.		The Client Viewer should display motion activated sequences for the selected camera in a drop-down menu. A line with the date, start time and duration should represent each sequence. A drop-down preview screen should allow the user to view the recorded sequence.	
73.		The Client Viewer should display Alerts defined as bookmarked events.	
74.		The Client Viewer should display a time line for each camera to represent recorded video sequences. The Client Viewer should indicate whether the video was recorded due to motion activation or recorded without motion or pre and post alarm video. The time line band should be highlighted based on the camera view selected in the display. The Client Viewer should allow video sequences for the displayed cameras to be reviewed simultaneously.	

75.		The Client Viewer should allow an area of interest in an image to be searched for motion by time. Search parameters should include sensitivity and interval. A grid feature should allow only specific regions of interest to be searched.	
76.		The Client Viewer should allow a surveillance report to be printed from the image with specific information including the camera name, capture time, print time, user and user notes.	
77.		The Client Viewer should allow the start and stop time and camera source for the export to be set and provide two format options for exporting video clips.	
78.		VMS should provide options for export format type (AVI/JPEG), timestamp, frame rate (full/half), digital zoom export, and AVI CODEC. Video clip may be exported to desktop/CD/DVD or a specific file path. All audio associated with the video being exported should automatically be included in the AVI export.	
79.		VMS should watermark every frame of the Video files with watermarks to authenticate the source of the video. While exporting video segments to external media (CD/DVD) or to any folder in workstations	
80.		The Client Viewer should allow the digital zoom feature to be used in recordings.	
81.		VMS should allow seamless integration into an external Geographical Information System	
82.		From the GIS console Operators should get an overview of the system and access to all system components.	
83.		Map function can use standard graphical file formats including jpg, gif, png, tif, etc.	
84.		The Map should be a part of the Client viewer application and VMS should allow detaching the map and showing it separately on another monitor connected to the Client viewer machine (in case of Multi-monitor workstation).	
85.		Different level status indication for warnings and errors	

86.		System performance data for cameras and servers including camera resolution, FPS, network usage, disk space, etc.	
87.	Health Monitoring & Audit Trail	The VMS desktop client should show vital system parameters for components such as Database Server, Media Servers and Storage System (all available storages). The client should show the parameters such as CPU Core Usage, RAM Utilisation and Storage Utilisation.	
88.		The VMS should allow sending critical system events to the designated person or a group of designated persons through SMS or Email.	
89.		The VMS client should have automatic or manual selection of decoder mechanism i.e. either software based decoding or hardware based decoding like Intel QuickSync, GPU based decoding etc. for better viewing experience.	
90.		The VMS should have reports such as camera uptime availability, camera recording percentage, recording status, critical events, incident video, etc.	
91.		The System health status like Server failure, Camera Disconnection, Storage Full Indication, etc. should always be displayed within the GUI all the time.	
92.		VMS should maintain a continuous log of Server Status Messages, Camera Connectivity, Storage Status, Recording ON/OFF, User Activity Logs, etc. which should be accessed from the workstations using different filters.	
93.		The VMS should allow for continuous monitoring of the operational status and event-triggered alarms from servers, cameras and other devices. The health monitoring module should provide a real-time overview of alarm status or technical problems while allowing for immediate visual verification and troubleshooting.	

94.		Health monitoring module should provide interface and navigational tools through the client including: o Graphical overview of the operational status and alarms from servers, network cameras and external devices including motion detectors and access control systems o Intuitive navigation using a map-based, hierarchical structure with hyperlinks to other maps, servers and devices or through a tree-view format.	
95.		Health monitoring module should provide intuitive alarm management through the use tools including: • Detailed listing of all active or incoming alarms with available filters for time period, alarm source, operator and alarm state. • Ability to reassign alarms to other operators based on: change of state for one/multiple or all alarms, change of alarm priority, entering incident-specific log information and the suppression (snooze function) of alarms. • Ability to preview, view live or playback recorded images. • Automatically close an alarm based on a corresponding event. • Generate audit trail reports by incident.	
96.		The system should give full audit trail of the user activities in the system.	
97.		The system log should be searchable by Level, Source and Event Type.	
98.		The Audit Log should record remote user activity (searchable by User name, Audit ID, Source and Location)	
99.		The Alert Log should record alerts triggered by rules (searchable by Alert type, Source and Event type)	
100.		The Event Log should record event-related information (searchable by Service name, Source and Event type)	
101.	Video Analytics (VA) Archite	It should be possible to configure video analytics on any of the cameras from the Video Management System desktop client.	
102.		The VMS and VA must have tight integration.	

103.	cture	VA should allow the VA applications to configure and run as per hourly/daily/weekly schedule. Users should be able to create various schedules to deploy the VA applications as required.	
104.		VA should allow multiple video analytics applications to run on a single camera.	
105.		VA should handle analytics both at the edge (in the camera) and at the server.	
106.		Unattended Object Detection The VA should have the capability to detect an unattended object in the camera field of view. The VA should be intelligent to understand the existing objects within the camera field of view and should generate an alert only when a new object is detected for more than the preconfigured duration of time. The existing objects should be learnt by the system based on the training of the system. The VA should generate an alert in such an instance with the evidence video.	
107.	Other Video Analytics Features	VA should support multiple Video Analytics servers running on different machines.	
108.		All the VA servers should form a cluster so that the Master server can allocate the VA processing tasks symmetrically amongst various servers to use available computational bandwidth judiciously. If the master VA server fails, the system should automatically select another master VA server without any manual intervention.	
109.		In case more than one VA server fails, the other servers should share the load of the failed server(s) to provide a failover support for VA applications.	
110.		VA should run on computer networks using industry-standard equipment.	
111.		The VA should be able to use industry standard Database (e.g. PostgreSQL, MySQL) for all database related tasks.	
112.		VA should allow multiple instances of Client Viewer in a single workstation.	
113.		VA should be able to utilize multiple monitors connected to the workstation to perform various tasks simultaneously (e.g. Live viewing, Archive Search, Site map	

		display, etc.)	
114.		VA should be capable of analysing video from megapixel and high-definition enabled cameras.	
115.		VA should provide real-time generation of events to alert operators to irregularities.	
116.		VA should support simultaneous tracking of an reasonable number of targets within the detection regions and/or the cross lines.	
117.		The system should not store redundant Event clips on detection of events if the camera is already in recording mode.	
118.		VA should enable any combination of analytics rules to run on the same camera simultaneously, without limitations.	
119.		VA should enable the operator to define an reasonable number of detection regions per camera. The system should allow setting each region independently to be 'Active for VA' for any given period of time of the day.	
120.		It should be possible to enable different settings for the same VA application on the same camera automatically, based on hour of the day. The schedule to activate various settings at different hours of the day can be created by the user on the fly.	
121.	Video Analytics Management	VA should have an alarm management system enabling operators to view video feeds streamed from multiple video cameras, from any PC on the network.	
122.		VA should enable managing multiple sensors simultaneously and will be capable of:	
123.		Viewing multiple sensors meeting user-specified matching criteria (filtering)	
124.		Applying common configuration settings on multiple sensors at a time	
125.		Capturing a frozen image for multiple sensors.	

126.		VA should display a reference image with reference points for each camera, to facilitate camera identification if there's no live video stream and to align the camera back to its original position if it is moved.	
127.		VA should provide an events history.	
128.		VA should be capable of periodically purging the event database based on the event age or on a limited number of stored events. Purged events should be stored to external files for later viewing with a viewing or reporting mechanism.	
129.		VA should be capable of distributing event notifications to external applications – in particular: email notifications, SMS/MMS.	
130.		For all event types, a report that contains the details for each event and also includes a captured image of the event.	
131.		VA should be capable to generate Statistical analysis of various Events across different hours of the day.	
132.		VA should be capable to compare the occurrences of various Events across multiple days (at least 7 Days).	
133.		Following Video Analytics filters should be provided with the application – o Camera Sabotage o No Parking o Wrong Way Detection o Person Climbing Barricade & Intrusion Detection o Camera Tempering	
134.	Video Analytics Investigation and	The VA should allow the user to bookmark any Event clip for ready reference at any later point of time.	
135.		VA should allow the user to tag critical Event clips so that they do not get removed from the storage based on FIFO/Retention period settings.	

136.	Forensic Analysis	It should be possible to navigate across multiple camera views simultaneously in a systematic way. By a simple copy-paste/drag-drop operation, it should be able to synchronize replays for any two or more cameras. On spot investigation of activities in the scene, with orchestrated use of Sitemap, Message Window and Virtual Matrix should provide users with easy to use investigation tools.	

Annexure B.25. Facial Recognition Solution

Sr. No.	Minimum Requirements	Compliance (Y/N)
1.	Face Recognition System (FRS) shall be designed for identifying or verifying a person from various kinds of photo inputs from digital image file to video source. The system shall offer logical algorithms and user-friendly, simple graphical user interface making it easy to perform the facial matching.	
2.	The system shall be able to broadly match a suspect/criminal from live camera feeds from the database created using photograph images available with Passport, CCTNS, and Prisons, State or National Automated Fingerprint Identification System or any other image database available with police/other entity.	
3.	The Face Recognition Algorithm vendor should have participated and in top 10 rank in all tests, in the latest NIST (National Institute of Standards and Technology, U.S. Department of Commerce), Face In Video Evaluation (FIVE) report. (OEM needs to submit the NIEST report).	
4.	The system shall be able to: Capture face images from CCTV feed and generate alerts if a blacklist match is found. Search photographs from the database matching suspect features Match suspected criminal face from pre-recorded video feeds obtained from CCTVs deployed in various critical identified locations, or with the video feeds received from private or other public organization's video feeds. Add photographs obtained from newspapers, raids, sent by people, sketches etc. to the criminal's repository tagged for sex, age, scars, tattoos, etc. for future searches. The facial recognition system shall be enabled at IP cameras identified by the purchaser.	
5.	The facial recognition system (FRS) should be able to integrate with IP Video Cameras as required in the solution and shall be able to identify multiple persons of interest in real-time, through leading face recognition technology. The system shall be able to recognize subjects appearing simultaneously in multiple live video streams retrieved from IP surveillance cameras. The Facial recognition system should be integrated to the video management system (VMS)/ Command and control system	

	application. Integration means, FRS should be able to send all suspect matching alerts to VMS/ Command and control system application.	
6.	The facial recognition system should be able to work on the server/ desktop OS as recommended by OEM and provided by the System Integrator.	
7.	The user interface of the facial recognition system should have a report management tool without installation of any additional client software. It should be able to generate real time report such as Audit log report, Hit List Report, Daily Statistics Report, and Distribution Report.	
8.	The facial recognition system should be accessible from 5 different desktops/laptops at any given time.	
9.	The system should have ability to handle initial real-time watch list of 50,000 Faces (should be scalable to at least 1 Million faces) and 50 Camera Feeds simultaneously and generate face matching alerts.	
10.	The algorithm for facial recognition or the forensic tool should be able to recognize partial faces with varying angles.	
11.	The system should be able to detect multiple faces from live single video feed	
12.	The system should have short processing time and high recognition rate	
13.	The system should be able to recognize faces regardless of vantage point and any facial accessories/ hair (glasses, beard, expressions)	
14.	Face detection algorithms, modes and search depths should be suitable for different environments such as fast detection, high accuracy etc.	
15.	The system should be compatible with the video management system, for sending matching alerts being proposed by the system integrator	
16.	The system should have capability for 1:1 matching and 1:N matching	
17.	The system should be able to integrate with other systems in the future such as 'Automatic fingerprint identification system (AFIS)' etc.	
18.	The system should be able to support diverse industry standard graphic and video formats as well as live cameras.	
19.	The system shall make it easy for operators to determine if multiple different people have been together / are related in pre-recorded videos.	
20.	The system should be able to match faces from recorded media.	
21.	The system should be able to detect a face from a group photo.	
22.	The system should be able to detect a face from stored videos of all	

	slandered format.	
23.	The system should have bulk process of adding faces in the system	
24.	The system should be an independent system, with capability to integrate with industry standard Video Management Systems (VMS) for alert viewing.	
25.	The system should be able to recognize a person with difference of 20 years of age.	
26.	The system should allow users to search or browse captured faces (based on date or time range), export any captured image for external use with a capability to support a Handheld mobile with app for windows OS or android OS to capture a face on the field and get the matching result from the backend server.	
27.	The query results shall be easily displayed as a map showing where the suitable respondents were seen.	
28.	The system shall display the path of respondents on a map	
29.	The system shall include an advanced alert presentation user interface, both for watch list alerts and tracking alerts, by which the operator shall be able to see where the alert happened (on a map), the context of the alert, the person causing the alert and the person recorded in a watch list or tracked.	
30.	The proposed solution should provide the ability to assign different security levels to people and places. It should alert security staff when someone is spotted in an area where they're not permitted, whilst allowing them free access to non-restricted/public areas.	
31.	The system should have the facility to categorize the images like "Remember this person" or "hit-list" or "wanted".	
32.	The OEM should have support facility in India.	

Annexure B.26. Primary storage

Sr. No.	Parameter	Minimum Requirements	Compliance (Y/N)
1	Converge/ Unified Storage	Storage solution with NSPoF (No single point of failure) Architecture. The Storage solution shall support NAS or SAN as an integrated offering with high availability at each level. The architecture shall allow upgrades of hardware and software for investment protection.	
2	Protocols	Solution shall be configured with required protocols for the solution CIFS/SMB 3/ NFS 4/iSCSI/FCoE/FC. All required protocols required for the solution to be enabled.	
3	Controllers	System to have minimum Two controllers with NSPoF Architecture (NO single point of failure architecture). Storage shall support non-disruptive online firmware upgrade for both Controllers and disk drives.	
4	Operating System	The storage array should support Operating System Platforms & Clustering including: Linux/Windows	
5	Cache Memory	Cache Memory: Each controller/node should be provided with minimum 128 GB RAM h usable protected data cache for disk IO Operations. If NAS controllers with separate controllers additional RAM cache to be provided. The storage array shall have complete cache protection mechanism either by de-staging data to disk/flash or protecting with NVRAM.	
6	Host	The storage system shall be capable of providing host connectivity as per solution offered (Unified/SAN/NAS/Scale out NAS).	
7	Connectivity	Minimum 2 ports per controller to be provided for host connectivity.	
8	RAID Supports	RAID levels Supported: 0, 1, 5, 6, 10 or equivalent	
9	Redundancy	Fans and power supplies: Dual redundant, hot-swappable.	
10	Disk Drive Support	Storage subsystem shall support 8TB/10TB dual ported or higher NL-SAS/SAS/equivalent 7.2K drives in the same device array.	
11	Global Hot Spare	System shall have the capability to designate global hot spares that can automatically be used to replace a failed drive. Storage system shall be configured with	

		required Global Hot-spares for every thirty drives for the different type and no. of disks configured.	
12	Capacity	The capacity should be configured to meet the performance requirement of solution.	
13	Snapshots	Shall be able to take "snapshots" of the stored data. Offered Storage shall have support to make the snapshot in scheduled or auto snaps. Snapshot shall support block or file as applicable for solution.	
14	Replication	The storage array shall have the capability to do remote replication using IP technology.	
15	Software Licenses	All necessary software required for the solution needs to be provided.	
16	Monitoring	Shall support the functionality of proactive monitoring of Disk drive and Storage system for all possible hard or soft failure.	

Annexure B.27 Secondary storage

Sr.No.	Parameter	Minimum Requirements	Compliance (Y/N)
1	Backup Target Device	Vendor may propose external disk based storage with NSPOF for backup storage to yield lower cost per TB	
2	Memory	Minimum 64 GB cache per controller.	
3	Storage	The Backup storage capacity should be configured to backup data with backup policies as per best practices. It should be configured for minimum double disk failure and one hot-spare with each storage node	
		In case of failure, individual drives should be replaced without impacting any other drives.	
		Should use 8 TB or higher capacity dual ported SAS/NL-SAS 7.2K RPM drives.	
4	Network	Minimum 2 * 10 Gbps or 2 * 16 Gbps ports per controller	
5	Redundancy	Should be provided with redundant power supplies and fans.	

Annexure B.28. EMS

S. No.	Parameter	Minimum Requirements	Compliance (Y/N)
1.	General	For effective operations and management of IT Operations, there is a need for an industry-standard Enterprise Management System (EMS). Given the expanse and scope of the project, EMS 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) Network Flow Traffic Monitoring d) Application Performance Management e) Server Performance Monitoring f) Centralized Log Management g) Centralized and Unified Dashboard h) Centralized and Customizable Service Level Reporting I) Help Desk for Incident Management	
		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 IT environment, • Performance and availability management • Correlation and root cause analysis • Service Level Management, notifications • Reporting and analytics • Automation and Customization	
		There should be a tight integration between infrastructure metrics and logs to have the single consolidated console of Infrastructure & security events.	
		Consolidate IT event management activities into a single operations bridge that allows operator quickly identify the cause of the IT incident, reduces duplication of effort and decreases the time it takes to rectify IT issues.	

		The Operator should be able to pull up security events related to a given Configuration Item, from a single console which also has NOC events, and use the security events to triage the problem. This way the Operator gets consolidated system/network event details and security events (current and historical) from the same console and save time in troubleshooting / isolating the issue.	
		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	
		Scalability – The system should be capable of supporting at least 100 thousand network flow per second on single server with capability to capture each unique traffic conversations	
		Scalability – The solution must be scalable , it should be able to support upto 25000 log events per second and also be able to support beyond 25000 EPS by Linearly adding more servers of either reference system type, depending on the size of the expected load	
		The solution shall provide future scalability of the whole system without major architectural changes.	
		The Solution shall be distributed, scalable, and multi-platform and open to third party integration such as Cloud, Virtualization, Database, Web Server, Application Server platforms etc.	
		All the required modules should be from same OEM and should be tightly integrated for single pane of glass view of enterprise monitoring	
		The solution must provide single integrated dashboard to provide line of business views and drill down capabilities to navigate technical operators right from services to last infrastructure components	
		Consolidated dashboard of the proposed EMS solution must be able to do dynamic service modelling of all business critical production services & use near-real time Service Model for efficient cross domain topology based event correlation.	

2.	Consolidated Dashboard	The platform must provide complete cross-domain visibility of IT infrastructure issues	
		The platform must consolidate monitoring events from across layers such as Network, Server, Application, Database etc.	
		The solution should support dynamic discovery to maintains Run-time Service Model accuracy e.g. virtualization and cloud	
		The solution must support custom dashboards for different role users such as Management, admin and report users	
		The solution must allow creating custom data widget to visualize data with user preferences	
		The solution must support multiple visualization methods such as gauge, grid, charts, Top N etc.	
		The proposed solution must support capacity views to find most consumed resources.	
		The solution should provide superior view of infrastructure health across system, networks, application and other IT Infrastructure components into a consolidated, central console	
		The solution should allow for customizable operator perspectives	
3.	Network Performance Management	The proposed solution platform shall provide a single integrated solution for comprehensive management of the wired/wireless access, and rich visibility into connectivity and performance assurance issues.	
		The design functionality shall facilitate creation of templates used for monitoring key network resources, devices, and attributes. Default templates and best practice designs are provided for quick out-of-the- box implementation automating the work required to use OEM validated designs and best practices.	
		The proposed solution must provide comprehensive and integrated management of IT infrastructure components to maximize the availability of IT services and SLA performance.	

		The proposed solution must provide the complete view of the Topology and network elements. The NMS shall have the ability to include the network elements and the links in the visual/graphical map of the department. The visual maps shall display the elements in different colour depending upon the status of the element. It is preferable that green color for healthy and amber/yellow color for degraded condition and red for unhealthy condition is used.	
		The proposed solution must have suitable system level backup mechanism for taking backup of NM data manually of at least one month.	
		The proposed solution must provide the visual presentation of the Network Element's status and the alarms. It shall also present the complete map of the network domain with suitable icons and in suitable color like green for healthy, red for non-operational, yellow for degraded mode of operation etc.	
		The proposed solution must provide Health Monitoring reports of the network with settable periodicity -@24 Hrs, 1 week, 1 month.	
		The proposed solution must provide the graphical layout of the network element with modules drawn using different colors to indicate their status	
		The proposed solution must provide calendar view which allows the operator all the schedule activities such as Reports, Inventory scans etc. It shall also allow to define scheduled report for uptime, link status etc.	
		The proposed solution should have multiple alerting feature to get the notification via email, sms and third party systems	
		The proposed solution must support listening to traps and syslog events from the network devices with retention period upto 6 months.	
		The proposed solution must support defining the data retention period to control storage	
		The solution must support custom device template to support Generic SNMP devices	
		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.	
		It shall provide Real time network monitoring and Measurement offend-to-end Network performance & availability to define service levels and further improve upon them.	
4.	System and Application Monitoring	The solution should offer service driven operations management of the IT environment to manage distributed, heterogeneous systems - Windows, UNIX & LINUX from a single management station.	
		The solution should carry out automated probable cause analysis by picking up feeds from every infrastructure component being monitored and automating the correlation of these alarms Or events to point out the probable cause using remedy actions - E.g. pull the top 5 processes consuming most of the CPU when CPU alarm triggers	
		The solution should provide a centralized point of control with out-of-the-box policy-based management intelligence for easy deployment for the servers, operating systems, applications and services for correlating and managing all the IT infrastructure components of a business service	
		The solution shall be able to monitor Hypervisor host hardware status e.g. fans, disk, memory, CPU etc.	
		The solution must support SNMP v1-3, PowerShell, SSH, JDBC, HTTP, JMX, collected agents for monitoring various type of devices and systems	
		It should also be able to monitor various operating system parameters depending on the operating system being monitored and setting thresholds.	
		The solution should support Virtual platforms - VMware and Microsoft Hyper-V, Citrix Xen, AWS, Azure and provide capability to monitor both Microsoft .NET and J2EE applications from the same platform	
		The solution should provide support for maintenance window and scheduled downtimes	
		The solution should measure the end users' experiences based on transactions without the need to	

		install agents on user desktops.	
		The solution must be able to provide user usage analysis and show how user's success rate, average time and transaction count has changed over a specific period of time such as current week versus previous week.	
		The solution must be able to provide the ability to detect and alert when users experience HTTP error codes such as 404 errors or errors coming from the web application.	
		Solution shall be able to monitor customer transaction by end-user name, and thus able to understand exactly which customers were impacted, their location, type of browser used etc.	
		The solution must simplify complex app topologies through task–relevant views based on attributes such as location, business unit, application component etc.	
		The solution must proactively monitor 100% of real user transactions; detect failed transactions; gather problems that affect user experiences and prevent completion of critical business processes.	
		The solution must determine if the root cause of performance issues is inside the monitored application, in connected back-end systems or at the network layer from a single console view.	
		The solution must provide proactive real-time insights into real user behaviour, trends, log analytics and performance to enhance customer experience across various channels.	
5.	Fault Management	The proposed solution must 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 on the basis of event pairing, event sequencing etc.	

		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 Deduplication • Event aggregation • Event masking	
		The proposed solution must support creating and monitoring of rising or falling thresholds with respect to basic key performance indicators for network, system and application infrastructures.	
		The solution should have predictive analytics and intelligence in-built into it so as to detect any anomaly before it could potentially hit the threshold thereby giving enough lead time to users to resolve the issues before the threshold is breached.	
		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 on the basis of event pairing, event sequencing etc.	
		Powerful correlation capabilities to reduce number of actionable events. Topology based and event stream based correlation should be made available.	
		The solution must offer relevant remedy tools, graphs in context of a selected fault alarm/event	
		The proposed monitoring solution should have capability to configure actions based rules for set of pre-defined alarms/alerts enabling automation of set tasks.	
		The Platform must support Event or Alarm Correlation integrations with service desk to trigger automated creation of incidents, problems management	
		The solution should classify events based on business impact	
		The solution should allow creation of correlation or analytics rules for administrators	

		The proposed solution must provide default event dashboard to identify, accept and assign generated alarms.	
6.	Log Management	The proposed solution must provide a common classification of event irrespective of the log format	
		The proposed solution must provide the ability to store/ retain both normalized and the original raw format of the event log as for forensic purposes.	
		The log data generated should be stored in a centralized server. The period upto which the data must be available should be customizable.	
		The proposed solution must support logs collected from commercial and proprietary applications i.e. Microsoft, Cisco, Brocade, HP, Security System, Firewall, Access Points etc.	
		The proposed solution must support log collection for Directories (i.e. AD, LDAP), hosted applications such as database, web server etc. using agents	
		The proposed solution must support log collection from Network infrastructure (i.e. switches, routers, etc.). Please describe the level of support for this type of product.	
		The system shall support the following log formats for log collection : o Windows Event Log o Syslog o Access Log Data o Application Log data o Any Custom Log data o Text Log (flat file)	
		The solution should be able to collect raw logs in real-time to a Central log database from any IP device including: • Networking devices(router/switches/voice gateways) • Security devices (IDS/IPS, AV, Patch Mgmt., Firewall/DB Security solutions) • Operating systems(Windows 2003/2008,Unix,linux,AIX) • Virtualization Platforms(Microsoft HyperV, VMware Vcenter/VSphere 4.X, vDirector, Citrix) • Databases(Oracle/SQL/MYSQL/DB2)	

		The collection devices should support collection of logs through Syslog, syslogNG and also provide native Windows Agents as well as Agentless(PowerShell) connectors	
		The proposed solution must provide alerting based upon established policy	
		The proposed solution must provide SDK/API to write custom connectors and collectors to pull log and monitoring data from third party system	
		The proposed solution must provide UI based wizard and capabilities to minimize false positives and deliver accurate results.	
		The proposed solution must collect, index the log messages and support full-text searching for forensic investigation	
		The proposed solution must support the ability to take action upon receiving an alert. For example, the solution should support the ability to initiate a script or send an email message.	
		The solution must provide pre-defined log correlation rules to detect suspicious behaviour	
		The solution must support real-time and scheduled alerting time-line while creating a log policy to catch specific log pattern	
		The solution should support applying regex pattern in real-time to extract vendor specific log data for reporting and alerting purpose	
		The system shall have the capability to drag and drop building of custom queries & reports.	
		The system shall be capable of operating at a sustained 10000 EPS per collection device. The system shall provide the ability to scale to higher event rates by adding multiple collection devices	
7.	Network Flow-based Traffic Analysis	The proposed traffic monitoring system must be able to track all flow of traffic on the network and identify malicious behaviour with all IP conversations.	
		The proposed system must provide details of applications, hosts, and conversations consuming WAN bandwidth to isolate and resolve problems.	
		The proposed system must provide eight-hour, daily, weekly, monthly, yearly, or customizable reporting	

		time periods.	
		The proposed solution must be able to monitor and report on a variety of unique protocols (used in the overall deployed solutions) per day and display utilization data for each protocol individually. This capability must be available for each monitored interface uniquely.	
		The proposed solution must keep historical rate and ip to ip, ip to protocol, protocol to protocol conversation data for a minimum of 12 months (most recent) in its current long term operating database. All data in that database must have a maximum 15 minute window granularity.	
		The proposed solution must keep historical rate and protocol data for a minimum of 60 days (most recent) in its short term operating database. All data in that database must have a maximum 1 minute window granularity.	
		Flow collection systems must support a minimum of 6 million flows per minute and be capable of storing gathered information in a common database where all long term reporting information is held.	
		The system must support the ability to create reports that allow the user to search all IP traffic over a specified historical period, for a variety of conditions. o Search for any traffic using a specific configurable destination port, or port range. o Search for any protocol in use by a specific host, interface or list of hosts or interfaces.	
8.	Helpdesk - Incident Management	The proposed helpdesk system shall provide flexibility of logging, viewing, updating and closing incident manually via web interface	
		The proposed helpdesk system shall support ITIL processes like request management, problem management, configuration management and change order management with out-of-the-box templates for various ITIL service support processes	
		Each incident shall be able to associate multiple activity logs entries via manual update or automatic update from other enterprise management tools.	

		The proposed helpdesk system shall be able to provide flexibility of incident assignment based on the workload, category, location etc.	
		The proposed solution should automatically provide suggested knowledge base articles based on Incident properties	
		The proposed solution should automatically suggest available technicians based on workload while assigning tickets	
		The proposed solution should tightly integrate with monitoring system to provide two way integration - E.g. when system down alarm created, it should automatically create ticket and assign it to technician, in case system comes up before ticket is resolved by technician, it should automatically close the ticket to minimize human efforts	
		The proposed system must not create more than ticket for same recurring alarm to avoid ticket flooding from Monitoring system	
		Each escalation policy shall allow easy definition on multiple escalation levels and notification to different personnel via web based console with no programming	
		The proposed helpdesk system shall be capable of assigning call requests to technical staff manually as well as automatically based on predefined rules, and shall support notification and escalation over email	
		The proposed solution should allow administrator to define ticket dispatcher workflow which automatically assign incoming tickets based on rules defined in workflow. E.g. Network fault keyword tickets gets assigned to network technician automatically within NOC team	
		The proposed helpdesk system shall provide grouping access on different security knowledge articles for different group of users.	
		The proposed helpdesk system shall have an updateable knowledge base for technical analysis and further help end-users to search solutions for previously solved issues	

		The proposed solution should allow Technician to relate Incidents to Problem, Change and vice versa to have better context while working on any of ticket type	
		The proposed helpdesk system shall support tracking of SLA (service level agreements) for call requests within the help desk through service types.	
		The proposed helpdesk system shall integrate tightly with the Knowledge tools and CMDB and shall be accessible from the same login window	
		A configuration management database shall be established which stores unique information about each type Configuration Item CI or group of CI.	
		The proposed solution allow scheduling periodic report to check current software and hardware inventory	
9.	Service Level Reporting	The solution must provide Out of the box reporting templates for performance, availability, operation, virtualization and capacity and audit	
		The solution should provide reports that can prove IT service quality levels, such as application response times and server resource consumption	
		The system reports should be accessible via web browser and Reports can be published in PDF and csv format	
		The solution must provide Reports that can be scheduled to publish automatically or they can be produced on demand	
		The solution should be able to report in the context of the business services that the infrastructure elements support—clearly showing how the infrastructure impacts business service levels	
		The solution should provide Business Service Management functionality to track Service quality by logically grouping Network, Server and Application components. The solution should provide correlation between Network, Server and Application to identify the business impact from the specific event or alarm	
		The solution must provide way to define key performance indicators (KPIs) within the Service Quality report.	

		The solution must provide SLA measurement to track service quality from both Availability and Performance perspective.	
10.	Role-Based access control	The solution should have inbuilt role-based access module to enable multiple users with different groups to create dashboards specific to their department	
		The Solution should have way to control and define permission such as read/write for set of devices rather than all the devices for the ease of use.	
11.	Other Key Requirements	The Solution should provide all the modules as a single monitoring engine to correlate events in real-time from Networks, Servers and Applications	
		The solution preferably deployable on Linux operating systems to reduce the overall TCO	
		The solution preferably supplied with bundled datastore to reduce the TCO.	
		The solution must provide way to define key performance indicators (KPIs) within the Business Service Management module.	
12.	Asset Management Application	The system shall provide the capability to define Assets of various types. Assets may be like: IT assets- Switch, Route, server, etc. Non-IT Assets-Cameras, UPS, DG Sets etc. Surveillance system –Cameras, Sensors, Video wall etc.	
		The system shall provide a pre-configured list of typical assets along with their pre-configured attributes. System administrators shall be able to modify/add attributes to already existing asset types and create new ones along with their set of attributes.	
		Asset module shall be fully integrated with the Application events correlation/ workflows / rules engine and shall allow defining various triggers based on specific assets, asset types, asset groups and assets attributes.	
		The system should allow the user to manage the asset in order to deliver services	
		The system should allow the user to extend Or update the life of an asset	
		It shall be possible to associate assets with other assets and sensors	
		The system shall provide an easy method of searching and locating assets	

		The system shall support the correlation between two or more asset group elements for the sake of false alarms reduction.	
		The system shall support a tool to import external information in CSV format into an asset database. If a specific asset in not defined, the tool shall create it based on asset type information – asset types shall be pre-configured.	
		The system should allow the user to create Asset profile such as unique serial no, asset tag, asset owner, asset life, details of assets etc.	
		The system should allow asset reconciliation, i.e. periodic listing of assets and matching against the available asset.	
		The system should allow the user to track assets at any time to know the status of an asset – location, using by whom, contract renewal for maintenance, monitoring of cost on maintenance etc.	
		The system should allow the user to capture the details such as Quantity, Section, Stock Quantity, etc. **Note:** **The MSI must manage all the assets commissioned as the part of project with the capability to increase asset management of other components as required in future**	

Annexure B.29. Variable message board

S. No	Minimum Requirements	Compliance (Y/N)
1.	Central Control Software shall allow controlling multiple VMAS from one console.	
2.	Capable of programming to display all types of Message having alphanumeric character in English and Hindi and combination of text with pictograms signs. The system should have feature to manage video / still content for VMAS display.	
3.	The system shall have capability to divide VMAS screen into multi parts to display diverse form of information like video, text, still images, advertisements, weather info, city info etc.	
4.	Capable of controlling and displaying multiple font types with flexible size and picture sizes suitable as per the size of the VMAS.	
5.	Capable of controlling brightness & contrast through software.	
6.	Capable to continuously monitor the operation of the Variable Message sign board, implemented control commands and communicate information to the Traffic Monitoring Centre via communication network.	
7.	Real time log facility – log file documenting the actual sequence of display to be available at central control system.	
8.	Multilevel event log with time & date stamp.	
9.	Access to system only after the authentication and acceptance of authentication based on hardware dongle with its log.	
10	Report generation facility for individual/group/all VMASs 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.	
11	Configurable scheduler on date/day of week basis for transmitting pre-programmed message to any VMAS unit.	
12	Various users shall 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.	
13	Apart from role based access, the system shall also be able to define access based on location.	
14	Rights to different modules / Sub-Modules / Functionalities shall be role based and proper log report should be maintained by the system for such access	

15	Components of the architecture must provide redundancy and ensure that there are no single points of failure in the key project components. To take care of remote failure, the systems need to be configured to mask and recover with minimum outage.	
16	The architecture must adopt an end-to-end security model that protects data and the infrastructure from malicious attacks, theft, natural disasters etc. provisions for security of field equipment as well as protection of the software system from hackers and other threats shall be a part of the proposed system. Using Firewalls and Intrusion detection systems such attacks and theft shall be controlled and well supported (and implemented) with the security policy. The virus and worm's attacks shall be well defended with Gateway level Anti-virus system, along with workstation level Antivirus mechanism. There shall also be an endeavour to make use of the SSL/VPN technologies to have secured communication between Applications and its end users. Furthermore, all the system logs shall be properly stored & archived for future analysis and forensics whenever desired.	
17	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.	
18	System shall use open standards and protocols to the extent possible	
19	Facility to export reports to excel and PDF formats.	
20	Remote Monitoring	
21	All VMAS shall be connected/configured to Traffic Monitoring system for remote monitoring through network for two-way communication between VMAS 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 broad scope of work to be covered under this component shall include the following, but is not limited to: a) Variable Message Sign Board (VMAS) referred herein) shall be installed at identified strategic locations. The location of VMAS shall be on the key junctions (mostly on the sides without obstructing the traffic) and other strategic locations with large foot fall. The VMAS software application will allow user to publish specific messages for managing traffic and also general informative messages. b) VMAS shall enable ASCL/ Police to communicate effectively with citizens and also improve response while dealing with exigency situations. These shall also be used to regulate the traffic situations across the city by communicating right messages at the right time.	

24	The system shall be capable to display warnings, traffic advice, route guidance and emergency messages to motorists from the ICCC in real time.	
25	The system shall also be capable to display warnings, traffic advice, route guidance and emergency messages to motorist 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	
26	The VMAS shall display text and graphic messages using Light Emitting Diode (LED) arrays.	
27	The System shall able to display failure status of any LED at ICCC.	
28	The System shall support Display characters in true type fonts and adjustable based on the Operating system requirement.	
29	The ICCC workstation shall communicate with the VMAS controller through the network. It shall send out command data to the variable message sign controller and to confirm normal operation of the signboard. In return, the ICCC workstation shall receive status data from the VMAS controller.	
30	VMAS controllers shall continuously monitor the operation of the VMAS via the provided communication network.	
31	Operating status of the variable message sign shall be checked periodically from the ICCC.	
32	It shall be capable of setting an individual VMAS or group of VMAS'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.	
33	It shall be capable of being programmed to display an individual message to a VMAS or a group of VMAS's at a pre-set date and time.	
34	A sequence of a minimum of 10 messages/pictures/ pre-decided sign or group of signs shall be possible to assign for individual VMAS or group of VMAS's.	
35	It shall also store information about the time log of message displayed on each VMAS. The information stored shall contain the identification number of the VMAS, content of the message, date and time at which displayed message/picture starts and ends.	
36	The central control workstation shall perform regular tests (pre-set basis) for each individual VMAS. Data communication shall be provided with sufficient security check to avoid unauthorized access.	

Annexure B.30. Automatic Number Plate Detection System

S. No.	Parameter	Minimum Requirements	Compliance (Y/N)
1.	General	The entire ANPR process shall be performed at the lane location in real-time. The information captured of the plate alphanumeric, date-time, and any other information required shall be completed in approximately a few milliseconds. This information shall be transmitted to the Control Room for further processing if necessary, and/or stored at the lane for later retrieval.	
2.	Lane Coverage	Each camera system covers at least 1 lane having width of 3.5 meter or more.	
3.	Detection Zone	15 m to 20 m for ANPR data	
4.	Maximum Vehicle Speed	System captures clear images of all vehicles moving at a speed up to 150 km/hr.	
5.	Vehicle Detection and Video Capture Module	The System shall automatically detect the license plate of all vehicles in the camera view in real time using video detection and activates license plate recognition software.	
6.	Optical Character Recognition	The system shall perform OCR (optical character recognition) of the license plate characters in real time. (English alpha-numeric characters in standard fonts). OCR accuracy shall be at least 90% during day time and 70% during night time for standard plates. System is able to detect and recognize the English alphanumeric License plate in standard fonts and formats of all vehicles including cars, HCV, LCV and two wheelers. The system is robust to variation in License Plates in terms of font, size, contrast and colour.	
7.	Network	Connectivity from site to control room shall be through proper network and local storage should be provided to account for any data loss.	
8.	Data capture and transfer	The OCR data of all vehicles along with the JPEG image of the vehicle etc. shall be automatically transferred immediately to the nominated server in the Control Room.	

		Each vehicle record shall be a single file and shall contain, as a minimum, an ASCII header that contains the following: a) vehicle registration number b) date and time that the vehicle is identified c) ANPR site location, and It shall be possible to include one or more of the following in the same single vehicle record: a) image of the number plate b) image of the front of the vehicle from the ANPR IR camera, and/or c) wide angle vehicle / lane image (with additional scene camera). A detailed description of the file format can be finalized by the user to further develop post processing software.	
9.	OEM Experience	OEM should have experience with ANPR projects in India and should have at least done 3 such projects. Proper documents should be submitted to prove.	
10.	Hot List creation	The system shall have option to input certain license plates according to hot listed categories like “Wanted”, “Suspicious”, “Stolen” etc. The system can 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.	
11.	Alert Generation	On successful recognition of the number plate, system shall be able to generate automatic alarm to alert the control room for vehicles which have been marked as "Wanted", "Suspicious", "Stolen", etc.	
12.	Data Storage	The System shall store JPEG image of vehicle and license plate into a database management system like MySQL, PostgreSQL etc. along with date timestamp and site location details.	
13.	Data Retrieval and Reports	The system shall enable easy and quick retrieval of snapshots, video and other data for post incident analysis and investigations. Database search could be using criteria like date, time, location and vehicle	

		number. The system shall be able to generate suitable MIS reports as desired by the user. The system shall also provide advanced and smart searching facility of License plates from the database.	
14.	Integration with Third Part VMS	The system should be integrated with the proposed Video Management System.	
15.	Local Server at Intersection for ANPR Processing	The system must run on Outdoor INDUSTRIAL Grade multi core processor based server and should be able to cover at least 4 lanes or complete junction. The entire unit should be capable to perform under overall operating temperature of minimum 70 deg. Letter or test report from OEM in this regard to be submitted along with technical bid. System should be equipped with appropriate storage capacity for transactional data for min. 7 days, with overwriting capability. Images should be stored in tamper proof format only.	

Annexure B.31. Red Light Violation Detection System

S. No.	Parameter	Minimum Requirement	Compliance (Y/N)
1.	General	System should be totally digital	
2.	Vehicle violation criterion at Intersection	The system shall detect and capture vehicle details when: (a) It violates the stop line/zebra crossing (b) It violates the red light signal	
3.	Red Light detection	System shall be Non-Intrusive. It shall not be connected with traffic light and red-light status is detected without any physical connection to traffic light.	
4.	Fair System	Red light system shall be completely fair system with all evidences captured before and after the red light jumping infraction has happened.	
5.	Lane Coverage	Each camera system shall cover at least 1 lane having width of 3.5 meter or more.	
6.	Detecting Vehicle Presence	Red light system should detect vehicle presence without intrusive sensors like magnetic loops. This is to avoid street working during installation and to reduce maintenance cost	
7.	System Mounting	System can be composite unit with all components inside the IP65 box OR comprised of camera or other units mounted on poles or gantries with controller and processors at side poles to make sure all lanes of the road are covered.	
8.	Number Plate Capture	System should be able to recognize automatically the number plate of cars in violation. The system shall perform OCR (optical character recognition) of the license plate characters (English alpha-numeric characters in standard fonts). ANPR system works with Indian number plates	
9.	Accuracy of Number Plate capture (ANPR)	OCR accuracy shall be at least 90% during day time and 70% during night time for standard plates	
10.	Infraction data to be provided by system	Date, time, location of incident image of vehicle, speed, Image of the number plate, text conversion of number plate after OCR	

11.	Context Image	System shall provide Context image (always color to have proof of signal light) of the signal and shall show wide angled context of the offence as well as details of the offending vehicle. Multiple stitched images of the same is possible. The system shall produce, store and transmit a sequence of at least 4 image relatives to red light violation, or a movie in standard format like avi, mp4, mov, vfw etc.	
12.	Data Retrieval and Reports	Database search could be using criteria like date, time, location and vehicle number. The system is able to generate suitable MIS reports as desired by the user.	
13.	IP camera for License Plate Capture	The system shall support all standard brands. One camera shall cover at least 3.5-meter width of lane, and capture the license plates of vehicles which violates the traffic signal and moving at a speed of 0 to 150 km/hr	
14.	Working temperature	0 to +60 deg.C	
15.	Security	Standard Digital signature on each violation to assure data integrity. Strong encryption on data during local storage and data transfer to back office	
16.	Local Storage	Minimum local storage 64 GB. Industrial processing unit should be provided as per solution requirement.	
17.	Communication	Connectivity from site to control room shall be through fibre optic/leased lines or better with minimum uptime of 99.5%	
18.	Alert Generation	On successful recognition of the number plate, system shall generate automatic alarm to alert the control room for vehicles which have been marked as "Wanted", "Suspicious", "Stolen", "Expired".	
19.	Compliance certificate	CE and RoHS compliant certificate	
20.	Proof of infraction	Complete images with time stamp should be available.	

21.	BACK office software	The system should provide facility to privileged users to manually check the entry in database using standard Web browsers and edit the numbers which may be wrongly OCR-read, before the numbers are fed to the Challan generating sub-system. An audit trail should be maintained to record such editing activities. No deletion or addition of data without validation, proper password protection The system should provide facility to search for the cases of violations occurred during any specific span of time, and provide a statistical analysis of the number such incidences occurring during various days of the month	
22.	Challan	System can be integrated with E-challan generating systems with fine generated for each infraction with multiple images clearly showing color of red light signal and violation (i.e. color image of context camera), date, time, vehicle registration number, classification of offence, speed of violating vehicle, notified speed, etc..	
23.	Integration	Integration with RTO database in future should be possible and should also be integrated with the proposed Video Management System.	
24.	Local Server at Intersection for RLVD processing	The system must run on Outdoor INDUSTRIAL Grade multi core processor based server and should be able to cover at least 4 lanes or complete junction. The entire unit should be capable to perform under overall operating temperature of minimum 70 deg. Letter or test report from OEM in this regard to be submitted along with technical bid. System should be equipped with appropriate storage capacity for transactional data for min. 7 days, with overwriting capability. Images should be stored in tamper proof format only.	

Annexure B.32. Speed Violation Detection System

Sr. No.	Minimum Requirement	Compliance (Y/N)
1.	The broad technical and functional specifications of the required speed violation check camera systems given in the following paras	
2.	Traffic violations should be automatically detected by the system. System should provide image of over speeding vehicle with control image for speed test.	
3.	Complete data for each infraction should be provided: data, time, location, speed, with automatic number plate detection mechanism (to recognize vehicle automatically)	
4.	System should generate automatically number plate of the Vehicle	
5.	System can be composite unit with all components inside the IP65 box Or comprised of camera or other units mounted on poles or gantries with controller and processors at side poles to make sure all lanes of the road are covered. Preferred systems will be systems installed at minimum height of 5 meters and above.	
6.	System should work in day and night condition	
7.	-Speed should be measured use advanced forward firing radar technology (a) -Speed should be measured using 3D advanced radar i. Frequency band should be 24.0 to 24.25 GHz or 77 GHz ii. Max. Transmit Power (EIRP)- 20 dBm iii. Operating temp -40 °C ÷ 85 °C (b) Speed: 30 to 320 km/h (c) Range Accuracy typ. <+/-2,5% or +/-0,25m (bigger of) (d) Speed Accuracy: typ. <+/-1% or <+/-0,28m/sec (bigger of) (e) Tracking radar with possibility to take control image (f) Cycle Time. -50 Msec (g) Vibration; 14g rms (h) Power Consumption: 7V ÷ 32V (i) Lanes: Multilane (j) Number of tracked objects: 64	
8.	System should provide color image at least in daytime	
9.	Integrated external Infrared capable to take images in night time and detect automatically number plate for minimum 20 meters.	
10.	Control : speed setup Km/hr, up to 150km/hr ± 3%	
11.	Working temperature -5 to +60 deg.C, 80% and above humidity	
12.	Processor: minimum local storage 64 Gb, multicore processor GUI for configuration and diagnostic Security: Standard Digital signature on each violation to assure data integrity. Strong encryption on data during local storage and data transfer to Datacenter.	
13.	Possibility to import data files and infractions should be provided. Violation	

	retrieval should be available for selected location, time and number series.	
14.	System should be able to recognize automatically the car's number plate of cars in violation the accuracy should be more than 70% in day and 60 %night condition. ANPR system should be capable to work with Indian number plates and should preferably have experience in Indian plates.	
15.	Communication, the system should have proper communication with control room and should be able to provide online infraction reports and live infraction.	
16.	CE and RoHS compliant certificate with third party speed test report	
17.	Test reports for IP 66 for cameras, laser should be provided. this is to support harsh rainy season and dust environment in Delhi	
18.	Certification should be provided for the system (and not for the sensor only) and Road test reports should be tested for speed tests.	
19.	Local Server at Intersection for SVD processing: The system must run on Outdoor INDUSTRIAL Grade multi core processor based server and should be able to cover at least 4 lanes or complete junction. The entire unit should be capable to perform under overall operating temperature of minimum 70 deg. Letter or test report from OEM in this regard to be submitted along with technical bid. System should be equipped with appropriate storage capacity for transactional data for min. 7 days, with overwriting capability. Images should be stored in tamper proof format only.	

Annexure B.33. Echallan System

S. No	Minimum Requirements	Compliance (Y/N)
1.	E-challan software shall work in client- server mode, where the devices units, workstation units will act as clients connected to the server through cellular network for data transfer	
2.	E-challan system shall be able to retrieve vehicle owner's details and vehicle data from RTO data base to minimize data entry.	
3.	E-challan system shall be able to retrieve vehicle system registration details and driving license details by reading appropriate smart card to minimize data entry.	
4.	Server should maintain log of all current devices. Any access to the system must be recorded along with data, time user id and IP address.	
5.	Traffic officer should log in to the hand-held device through the unique user id and password or smart card issued or the purpose.	
6.	A unique Challan number should be generated through client software for each challan.	
7.	As soon as a vehicle registration number is entered, the handheld device should automatically check from the server if the vehicle is stolen, wanted in any criminal case or is in the list of suspicious vehicles.	
8.	The most frequent traffic offences should be kept at the top of the drop-down menu and offence ingredients should be available if required by officer.	
9.	Date, time and GPS coordinates of place of challan should be automatically populated in the relevant fields of client software.	
10.	Compounding amount must populate in the field automatically from master table.	
11.	The successful bidder should develop the GUI and functionality as per requirements.	
12.	It should be possible to integrate payment gate way operator with the system for facilitation of payment.	
13.	The Application Software should work in a web based environment.	
14.	The application software should be user friendly, easy to operate.	
15.	The system will function in web based system where the hand-held device shall work as a node.	
16.	The application software should maintain the logs of user activities to	

	facilitate the audit trail.	
17.	Database server should be able to handle the activities of all the handheld devices at one time simultaneously with huge database size of prosecution, ownerships, driving license etc. without affecting the performance.	
18.	The software should be able to generate various periodical reports, summaries, MIS reports, query reply etc. as per the requirements.	
19.	Administrator should be able to modify the master tables as and when required and should have the capability to push the changes to hand –held devices.	
20.	All database tables, records etc. required for various dropdown menus etc. shall also be created by the vendor.	
21.	E-challan system should show alert on Hand held device in case Speed system detect any violation.	
22.	In case of speed violation, e-Challan system will send alert and SMS to nearby officer using geo-reference.	

Annexure B.34. Hand Held Devices for e-Challan

S No.	Parameter	Minimum Requirements	Compliance (Y/N)
1.	Operating System	Android	
2.	Processor	Min 800 MHz	
3.	Memory (Flash Rom)	Min 8 GB	
4.	RAM	Min 1 GB	
5.	Extend Slot	Micro SD 32 GB	
6.	Display	Min 3.5 inch	
7.	Touch Screen	Yes	
8.	GPS	Yes	
9.	Bluetooth	Yes	
10.	Wifi	Wifi (802.11 b/g/n)	
11.	Thermal printer	Yes	
12.	Barcode scanner	1D and 2D scanner	
13.	Protection class	IP55	
14.	Drop resistance level	1.5m	
15.	Camera	Min 3 MP	

Annexure B.35(1). Public Announcement System

S. No	Parameter	Minimum Requirements	Compliance (Y/N)
1.	General	Public Address system shall be used at intersections, public places, market places or those critical locations as identified by Purchaser to make important announcements for the public. It shall be able to broadcast messages across all PA systems or specific announcement could be made to a particular location supporting single zone /multi zone operations.	
2.		The system shall also deliver pre-recorded messages to the loud speakers attached to them for public announcements. The system shall contain an IP based amplifier and uses Poe power that could drive the speakers. The system shall also contain the control software that could be used to control/monitor all the components of the system that includes Controller, Calling Station & keypad, Amplifier.	
3.		The MSI shall describe in detail the design, operational and physical requirements of the proposed public announcement system to demonstrate compliance with all the specified requirements of RFP.	
4.		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	
5.	Field Side Equipment	IP amplifier with minimum 250 Watts, Class D.	
6.		Native IP connectivity, no convertors to be used	
7.		0 to 55 C Temperature rating for Amplifier	
8.		Automatic Volume Control	
9.		Frequency Response: 50Hzto 15000 Hz for Amplifier	
10.		2Inputs and 1Output relay contacts in Amplifier	
11.		Speaker: Minimum 4 Speakers 20 W capacity	
12.		Frequency Response of Speaker 350 -10,000Hz	
13.		Line Monitoring Facility for speakers	
14.		IP 55 Housing for amplifier	
15.	Control room Side Equipment	Central Software based server application capable of working on virtual environment/cloud with 100% redundancy	
16.		Access control mechanism would be also required to establish so that the usage is regulated.	

17.		Integration with VaMS and Command and control centre or any other component if required	
18.		PA Master Controller to have facility for multiple mic inputs, direct dialling buttons, LCD screen	
19.		Software Client for making Calls to PA and ECB	
20.		Automatic Volume Control	
21.		Transmission bandwidth16000 KHz	
22.		Operating temperature for control desk 0 to +60C	

Annexure B.35(II). Emergency Call Box System

Sr. No.	Minimum Requirements	Compliance (Y/N)
	Field Side Equipment	
1.	Construction: Cast Iron/Steel Foundation, Sturdy Body for equipment	
2.	Call Button: Watertight Large Push Button, Visual Feedback for button press	
3.	Connectivity: GSM/RF/PSTN/Ethernet as per solution offered	
4.	Sensors: For tempering/ vandalism	
5.	IP66, IK09 Protection	
6.	Operating Temperature 0 to 70 C	
7.	Speaking Distance minimum 5 ft	
8.	Inbuilt Class D Amplifier	
9.	Minimum 3 Inputs ad 2 Output relay contacts	
10	ECB should be able to make calls to the PA system	
	Field Side Equipment	
11	Central Software based server application capable of working on virtual environment/cloud with 100% redundancy	
12	Access control mechanism would be also required to establish so that the usage is regulated.	
13	Integration with VaMS and Command and control centre or any other component if required	
14	PA Master Controller to have facility for multiple mic inputs, direct dialling buttons, LCD screen	
15	Software Client for making Calls to PA and ECB	
16	Automatic Volume Control	
17	Transmission bandwidth16000 KHz	
18	Operating temperature for control desk 0 to +60C	

Annexure B.36. Environmental sensor

Sr. No.		Monitor	Description	Parameter	Range / units
		Minimum Requirements			
		Environmental Sensor will be connected on Smart Poles and location of ES would be Smart Pole locations.			
1	1.1	Air Quality Parameters	Chemical Parameters	NO2	upto 10ppm
	1.2			CO	upto 1000 ppm
	1.3			SO2	upto 20ppm
	1.5			O3	upto 1000 ppb
	1.6		Particulate Matter	PM 2.5	0 to 230 micro gms / cu.m
	1.7			PM 10	0 to 450 micro gms / cu.m
2	2.1	Weather Parameters	Physical Properties	Temperature	0 to 60 Deg. C
	2.2			Relative Humidity	upto 70%
	2.3			Pressure	540-1100 Millibars
	2.4		Other Properties	Light	upto 10,000 Lux
	2.5			UV	upto 15 mW/ cm2
	2.6		Chemical Parameters	CO2	upto 5000 ppm
3	3.1	Noise		Noise	upto 130 dB (A)
4	4.1		GPS	Yes	
5	5.1		GSM	Yes	Min. 2G compatible or better
6	6.1		Wi-fi	Yes	
7	7.1		Power	12 V , 2 A DC supply for ES	Option for solar power pack
	7.2			12 V , 3 Amp DC or 230 V, 1 Amp AC	
		Physical Specifications			
8	8		Dimensions	Shall be customized based on requirement.	

9			Mounting	To be located in a housing, on a pole	
10			Construction	IP65	

Annexure B.37. Drone

Sr. No.	Parameter	Minimum Requirements	Compliance (Y/N)
1.	**General Requirements**	Industrial class (enterprise grade) Drone based surveying and mapping system with commercial grade flight controllers, high resolution digital camera for Photogrammetric analysis and having integrated storage for storing the captured data and real time remote transmission of the same to the Ground control station	
2.		Integrated storage for storing the surveyed data and real time remote transmission of the same to the Ground control station, Visible image camera capable of onboard recording of images and videos and real time remote transmission of the same to the Ground control station	
3.		A field deployable rugged industrial grade mobile computing platform like Laptop / Tablet (GCS) with sufficient screen size suitable for easy piloting and observing the images / video streamed by the system shall be provided with each drone system.	
4.		The GCS shall have sufficient storage capacity to store all the transmitted data from the various sensors in the UAV system during its multiple sessions.	
5.		Cloud based management software should support Multiple Drone Command and Control and monitoring from a single central monitoring station. It should offer web based Online and Native GCS App for Mobile Tablet	
6.		Hard and rugged Carrying case and field deployment system (portable operating platform) for keeping the operation and monitoring station including communication equipment etc. of the offered system while carrying out piloting of the UAV.	
7.		Use of equipment and systems / sensors / software with proven design and performance that have a high availability track record under similar service conditions.	
8.		Selection of the equipment and adoption of a methodology shall be in such a way to ensure ease of maintenance.	
9.		Strict compliance with the approved and proven quality assurance norms and procedures during the different phases of the commissioning of the system.	
10.		The system should be capable of rapid deployment under varying terrain conditions and able to perform the inspection/data capturing.	
11.		The data collected/received from the system should also be capable of using for post –production analysis.	

12.		The system should be capable of using Orthophoto / orthoimagery mode or photogrammetric mapping as well as surveillance	
13.	Technical Specifications	GPS for horizontal and vertical position fixing	
14.		Autonomous Flight Termination System or Return to Home (RH) option	
15.		Flashing anti-collision strobe lights	
16.		Geo Fencing capability	
17.		The UAV should be able to fly as per a flight path fed in to the system i.e. fly according to the pre-loaded flight path in addition to the manual operations.	
18.		The UAV should be capable of undertaking autonomous navigation based on GPS navigation waypoints or a. kml file of the route remotely fed into the system through an intuitive user interface in the GCS. It should be possible to preview the flight path in the GCS before actual flying. The UAV flight plan / path should be dynamically adjustable during the flight.	
19.		The UAV offered should not be of fixed wing type and shall be capable of vertical takeoff and landing.	
20.		The UAV shall be able to operate in Manual / Semi-Autonomous / Autonomous mode.	
21.		It shall be able to hover and take geo tagged photographs at a specified point of interest.	
22.		The UAV should be able to stream video to multiple remote locations simultaneously in addition to the local GCS.	
23.		The UAV supplied shall be in such a way that it can be carried around in a rugged easy to carry case in the field.	
24.		The UAV should be capable for operation for minimum of 45 minutes without addition (external) payload and minimum 30 minutes with external payload in a single flight session with a single charge of the battery at its minimum required altitude of operation.	
25.		The UAV supplied should be capable of being assembled at site with basic tools, as far as possible, as and when required. There shall be minimum noise during the operation of the UAV (<45dB at 300 m).	
26.		The UAVs should have plug and play interchange of a range of external sensor options.	
27.	**Sensor Specifications**	Gimbal Mounted RGB Camera(s) o Optical 40+ Megapixel with digital zoom	
28.		Gimbal Mounted Thermal Scan Camera o Min Resolution 336x256 o 3 Axis Stabilized Camera Gimbal	

29.	**GCS and Cloud Software Features**	Multiple Drone Command and Control and monitoring from a single central monitoring station o Web based Online and Native GCS App for Mobile Tablet	
30.		Predefined automated flight profiles and execution o Tower Profile o Grid Profile o Façade Profile	
31.		Automated Historical Mission Archiving	
32.		Automated geo-referencing of Thermal imagery	
33.		Live Video Streaming and remote drone camera/sensor control over the internet	
34.		Integrated Cloud Based Photogrammetry supporting generation of o Point Clouds o Digital Surface And Elevation Models o Textured Digital Surface Models o Ortho-rectified Imagery o Measurement Tools	
35.		Online workspace o Data Management o Visualization and Analysis	
36.		Live Airspace Management and De-confliction	
37.		Role based access (Admin, Pilot, Analyst)	
38.		Custom compliance checklists	
39.		Flight Logging	
40.		Customer Cloud Portal	

Annexure B.38. Adaptive Traffic Control System

Sr. No	Parameter	Minimum Requirements	Compliance (Y/N)
1.	General	The system would be used to monitor and control traffic signals, including signalized pedestrian crossings, using a traffic responsive strategy based on real time traffic flows obtained using vehicle presence sensors.	
2.		All signal controllers under Adaptive Traffic Control System shall be provided with inputs from Thermal Camera based vehicle detection sensors for detecting demand and communications equipment to send the demand data and to receive instructions on the control strategy in near real-time.	
3.		The system should be extensible to add more signals whenever required.	
4.		Any existing infrastructure at the junctions that might help in traffic control, where possible, should be integrated with ATCS.	
5.		ATCS shall use standard communication protocols UG405 or NTCIP or equivalent. It should also provide the functionality of integration with on-ground hardware of any third-party traffic controller that is UG405 or NTCIP or equivalent compliant.	
6.	Traffic detectors	Thermal camera shall be used for vehicle detection	
7.		The detector shall work in all weather conditions including rain, fog, etc. without any drop in accuracy levels	
8.		The detector shall be able to cover up to 4 lanes.	
9.		The detector shall be capable of integration with trigger module which should support vehicle presence, speed, class, ETA, wrong way, etc.	
10.	Traffic signal controller	The controller shall have a facility to list all conflicting phases at an intersection. After configuration, a traffic engineer shall verify that the signal aspects are running as expected, for each program coded in the controller, before being put to use.	
11.		The controller shall be able to take queue inputs from the Thermal Camera and optimize the signal timing based on queue lengths.	

12.		During power up the controller shall initially execute the Flashing Amber / Flashing Red plan for a time period of 3 Seconds to 10 Seconds. The default value of this Starting Amber is 5 Seconds. Facility shall be available to configure the time period of Starting Amber within the given limits at the site.	
13.		Health monitoring should be available for the traffic controller and the signal aspects in all modes of operations.	
14.		A hardware failure leading to a conflict condition (due to faulty devices or short circuit in the output) shall force the signal into Flashing Amber/ Flashing Red.	
15.		The controller shall be able to interface with the Thermal Camera based detector using an industry standard open collector interface as well other standard communication protocols as per the requirement	
16.		The signal controller shall have a police control panel with: 1. Hurry call buttons, 2. Auto/Manual selection button, 3. Manual advance button, 4. Normal/Flashing mode button, and 5. Junction On/Off button.	
17.		The controller shall have the following modes of operation: 1. Fixed time mode - the controller shall execute a pre-set program, which does not consider the inputs from the traffic detectors. 2. Vehicle actuated mode - the controller shall execute pre-set programs that do not have fixed green times. The green time for each approach shall be bound by the constraints of minimum green and maximum green times. The actual green time is determined based on the vehicular demand obtained from the traffic detectors. 3. • ATCS mode - the controller shall execute the programs determined by the ATCS application in the control Centre and shall take inputs from traffic detectors to optimally split green times.	
18.		The controller shall either have a fixed operator console or a portable one to allow traffic engineers to program the controller on-site.	
19.		It should be possible to configure a program and set it	

		remotely from the control centre.	
20.		The controller shall allow interfacing with the ATCS application using an industry standard protocol such as UTMC/UG405 or NTCIP. No proprietary communications protocol shall be allowed, in any case.	
21.	ATCS application	The application is at the core of the system and shall be hosted on a server in the control centre.	
22.		The application should allow creation of green corridors to ensure priority movement of Emergency Response vehicles, such as ambulances, fire engines and police vehicles.	
23.		The application shall interface with a popular microscopic traffic flow simulation software for pre and post implementation analysis and an online simulation for study of the proposed ATCS control strategy at various times of the day. The simulation shall be capable of identifying the impact of any anomaly in the system along with the strategy chosen. The simulation model shall assist the traffic engineers/police to identify the best possible strategy in any unusual/unprecedented event.	
24.		The application shall be estimate a comprehensive network state using data from ANPR, GPS or any other such data collected from other third party sensors/detectors/cameras.	
25.		The application should be capable of running in the following four modes: 1. Connected signals mode: This mode should enable traffic police personnel to remotely configure and control the signal timing plans using the ATCS interface available in the CCC. 2. Automatic plan switching mode: The system should be configured to run the most appropriate signal timing plan for a group of junctions from a library of signal plans. The -system should automatically select the most appropriate plan for the prevalent traffic conditions based on a set of customizable rules. 3. Optimization mode - tactical: Signal timings for a group of junctions should be optimized for pre-defined performance indicators, like delays, travel times etc. Short term prediction models shall forecast the traffic demand for 5, 10 and 15 minutes. The traffic demand shall be input into a	

		traffic simulation model and the outputs of the simulation model shall be employed to establish performance indicators. The optimization model shall use these performance indicators to determine optimal signal timings. 4. • Optimization mode - strategic: The system shall have a short term traffic state prediction model which continually estimates the state of the network, in terms of traffic flows and travel times. The traffic flows and travel times are to be input into a microscopic traffic flow simulation model. If significant changes in the network state are observed, traffic engineers shall be able to run simulation models to perform what-if analysis on pre-defined traffic management strategies.	
26.		The application shall have a Graphical User Interface (GUI) with an underlying GIS map that shall display the network and the traffic signals, traffic cameras/detectors, Variable Message Sign (VMaS) boards and Public Address (PA) systems deployed.	
27.		ATCS application should be capable of displaying live video from CCTV cameras that have been deployed for traffic surveillance.	
28.		The GUI shall provide: • Flexibility to the operators to zoom and navigate with ability to interact with objects on the map. • Interoperability across multiple platforms. • Web browser based access, requiring no local setup • Graphically present signal plan execution and traffic flow at the intersection on desktop	
29.		The GUI shall have the following features: 1. User login – Operator authentication shall be verified at this screen with login name and password. 2. Network Status Display – This online display shall indicate with appropriate colour coding on site map whether an intersection under the ATCS is online or off. 3. On double clicking the intersection a link shall be activated for the traffic flow display for the intersection. 4. Live video feed – The operators shall be able to see the live video feed from CCTV cameras that have been deployed for traffic surveillance. 5. Traffic Flow Display – This online display shall	

		indicate the current traffic flow with animated arrows, mode of operation, stage number being executed and elapsed stage time. 6. Saturation Snapshot – This display shall show the current saturation levels of all intersections in a corridor. 7. Reports Printing / Viewing – This link shall allow selection, viewing and printing of different reports available under ATCS. 8. Time-Space Diagram – The time-space diagram shall display the current stages being executed at every intersection in a corridor with immediate previous history. 9. Junctions shall be plotted proportional to their distance on Y-axis and time elapsed for the stage in seconds on X-axis. 10. ATCS application shall graphically show the execution of the signal plans, in real-time. 11. The solution should include the following reports at a minimum: 12. Stage Timing report – The report shall give details of time at which every stage change has taken place. The report shall show the stage sequence, stage timings and stage saturation of all stages of all cycles for a day. 13. Cycle Timing report – The report shall give details of time at which every cycle has taken place. 14. Stage switching report – The report shall give details of time at which a stage switching has taken place. The report shall show the stage sequence, stage timings and stage saturation for a day. 15. Cycle Time switching report – The report shall give details of time at which a cycle switching has taken place. 16. Mode switching report – The report shall give details of the mode switching taken place on a day. 17. Event Report - The report shall show events generated by the controller with date and time of event. 18. Power on & down: The report shall show time when the master is switched on, and last working time of the master controller. 19. Plan Change – The report shall show the time of change of plan either through keypad or remotely through a PC or Server.	

		20. Mode Change – The report shall show the time when Master controller's operating mode is changed either manually through keypad or a remote server. The typical modes are FIXED, VA, FLASH, LAMP OFF and HURRY CALL. 21. Count & Classification Report – The report shall show the count & classification data on each approach at various times of the day. It shall be possible to extract/integrate this data for other applications. 22. Queue Report – The report shall show the queue lengths at each approach of the junction at various times of the day. It shall be possible to identify the impact of the queue length on the signal timings. 23. Lamp Status Report – The report shall show lamp failure report with date and time of failure, colour of the lamp and associated phase. 24. Detector Failure Report – The report shall show the date and time of detector failure with detector number and associated phase. 25. Conflict – The report shall show the conflict between lamps (RED, AMBER, GREEN) in the same phase or conflict between lamps with other phase. 26. Corridor Performance Report – The report shall show the saturation of all the intersections in a corridor for every cycle executed for the corridor and the average corridor saturation for a day. 27. Corridor Cycle Time Report – The report shall show the Corridor cycle time, Intersection cycle time, Mode of operation and degree of saturation of all the intersections in a corridor for every cycle for a day.	
30.	Traffic signal controller	Traffic signal controller in conjunction with an Outstation Transmission Unit (OTU) should be able to run any ATCS algorithm having demand actuated dynamic signal timing plan selection. The communication between the controller and the ATCS software shall happen over industry standard G405 or NTCIP or equivalent protocols.	
31.		The following specifications are to be adhered with, either directly or using the OTU: 1. Power supply: 230 V AC @ 50 Hz 2. Communication protocol: UTMC/UG405 or NTCIP 3. Number of signal groups:16 minimum 4. Number of signal head outputs: 32 minimum	

		5. Number of phases: 16 minimum 6. Number of signal plans: 32 minimum 7. Number of stages per plan: 16 minimum 8. Number of detector inputs: 16 minimum 9. Interfaces: Ethernet, RS232, USB 10. Signal head compatibility: 230 V AC @ 50 Hz or 12/24/48 V DAC 11. Hurry Call Buttons: Minimum 4 12. Police Control Panel: Yes, with hurry calls and push to change buttons 13. Temperature: 0°C to 60°C 14. Communication standard: UTMC/UG405 or NTCIP protocol over TCP/IP 15. Minimum Media interfaces:1 x 10/100 Ethernet interface 2 x USB2.0 host ports 1 x micro USB 2.0 port 1 x RS232 port 1 x RS485 port 16. RAM: 128 MB SDRAM minimum 17. Storage Capacity: 512 MB minimum 18. Timing Resolution: Minimum 100 msec (input resolution to 2ms) 19.Input Pins for detectors: Minimum 16 Open Collector Interface pins	
32.	Traffic sensor	General: 1. Thermal camera & detector board integrated in compact, esthetical housing 2. Material: 3. Housing: I. Aluminium, with integrated rain/sun shield (optional: additional sunshield) II. Screw Connectors: 3-pins for Broadband over Power Line (BPL) III. Mounting Piece: IV. U-profile, glass fibre reinforced polyamide V. Attached to mounting bracket VI. Retaining straps or bolts to be used for fixation	
33.	Thermal Camera Details:	1. Technology: long wave infrared (7-14µm) 2. Array format: QVGA resolution 3. Pixel pitch: 17µm minimum 4. Frame Rate: 30 FPS minimum	•
34.	Power Supply, Outputs & Communications	1. Broadband over Power Line (BPL) for power supply, communication of output status,	

		configuration & monitoring (streaming video) via interface 2. Input Power 24VDC via interface 3. Current Consumption < 200mA @ 24VDC (< 250mA @ 24VDC peak at start-up) 4. Power Consumption ≤ 5,0W (≤ 6W peak at start-up)	
35.	Image Compression	: 1. Type: H.264, MPEG-4, MJPEG (dual stream) 2. Frame Rate: up to 30FPS 3. Resolution: QVGA 4. Quality: up to 4Mbit/s 5. o Viewable via HTTP webpage	
36.		1. REGULATORY: 2. EMC: Electromagnetic Compatibility - 2004/108/EG 3. FCC: FCC Part 15 class A 4. Shock & Vibration: NEMA II specs 5. Materials: all weatherproof (UV-resistant) 6. Protection Grades: Housing = IP68, Connectors = IP67 7. Temperature Range: from 0°C to +55°C 8. -Humidity: up to 95% non-condensing	
37.	Traffic signal aspect	1. Maximum power consumption for any color aspect - 12 W 2. Temperature compensated power supplies 3. Uniform appearance light diffusing 4. Units operate at 230 V AC @ 50 Hz or 12/24/48 V DC 5. Operating temperature: 0°C to 55°C 6. Signal head ingress: IP 55 7. LED module ingress: IP 65 8. Impact resistance: IR 3 9. EN 12368 certified 10. Auto-night dimming feature 11. ISO 9001 certified OEM 12. UV Stabilized Shield 13. Auto-night dimming feature	
38.	Countdown timer	1. Power Consumption: Maximum 30 Watts per lamp 2. Input Power: 230 V AC @ 50 or 12/24 V DC	

		3. Operating temperature: 0°C to 55°C 4. Humidity: 0% to 95% Relative 5. Digit Height: 210 mm at least 6. EN 12966: Compliant 7. Color:Dual (Green & Red) 8. For pedestrian, integrated unit with alternate timer and stopman/ walkman in dual color 9. • For vehicular traffic, integrated unit with dual color with option of displaying STP or GO as well	

Annexure B.39. Video wall

Sr. No	Parameter	Minimum Requirements	Compliance (Y/N)
1.	Display Wall Screen Size	70" diagonal	
2.	Configuration	ICCC : 5 columns x 3 rows Municipal office : 2 columns x 2 rows	
3.	Projection Technology	DLP Rear Projection	
4.	Native Resolution per cube	1920x1080	
5.	Aspect Ratio	16:9	
6.	Light Source	LED	
7.	Brightness	on screen brightness Minimum 300 cd/m2	
8.	Brightness Uniformity	95%	
9.	Contrast ratio	Typical 1600:1	
10	Color Calibration	Automatic & Continuous colour and brightness management to be achieved inbuilt sensors in each cube	
11	Connectivity	Each display Module shall support 4HD @ 30Hz inputs	
12	Full viewing angle	180°	
13	Lifetime	Normal mode: 60 000h	
14		Eco mode: 80 000h	
15	Inputs	Dual link DVI-D in/out	
16	Power	100 - 240 VAC, 60 - 50Hz, (below values are for 230V; 110V +5%)	
17	Eco mode	Less than 120 Watt	
18	Heat Dissipation		
19	Eco mode	Less Than 400 BTU/h	
20	Operating conditions		
21	Humidity 5)	Up to 80% non-condensing	
22	Temperature	10°C-40°C | 50°F-105°F	
23	Storing conditions		
24	Temperature	0°C-40°C | 32°F-105°F	
25	Remote management through IP	Remote management through IP for parameter adjustment. Each cube should have built-in web server	
26	Access	Rear only	
27	Pixel clock	320 Mhz	
28	Signal Processing	Each cube should have cropping/scaling capability	
29	Screen Half-gain	Hor: 28 degrees +/- 3	
30	Viewing Angle	Ver: 13 degrees +/- 3	

Annexure B.40. Video wall management software.

S. No	Parameter	Minimum Requirements	Compliance (Y/N)
1.	Layouts	The software should be able to pre configure various display layouts and access them at any time with a simple mouse click or schedule/timer based.	
2.	Sources	The software should be able display multiple sources anywhere on video wall in any size.	
3.	Remote Viewing	The video wall content will be able to show live on any remote display Mobile with IE, Chrome or safari	
4.	User management	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	
5.	Software features	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	
6.	Client & Server based Architecture	Should support Multiple clients / Consoles to control the Wall layouts	
7.	Collaboration	The Software should be able to share layouts comprising of multiple sources with workstations / Displays over LAN for remote monitoring	
8.	Scaling	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).	
9.	Display	The software should be able to create layouts and launch them as and when desired	
10.	Remote Control	The Display Wall and sources (both local & remote) should be controlled from Remote PC through LAN without the use of KVM Hardware.	
11.	Support of Meta Data	Software should support display of Alarms	
12.	Authentication	The software should provide at least 2 layer of authentication	
13.	Scenarios	Software should able to Save and Load desktop layouts	

		from Local or remote machines	
14.	Layout Scheduler	All the Layouts can be scheduled as per user convince.	
15.	Layout Scheduler	Software should support auto launch of Layouts according to specified time event by user	
16.	Layout Management	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	
17.	Layouts Configuration	Can be pre-configured or changed in real time	
18.	Scheduling	It should be possible to schedule specific Layout based on time range	
19.	Sharing & Collaboration	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	
20.	Soft KVM	The system shall include complete Soft KVM to permit operators to take mouse & keyboard control of Displays, Screen Scrapped applications and DVI source	
21.	Ticker	It should be possible to create two separate Tickers which run concurrently. These can be positioned at top or bottom and can run independently .The Ticker can be picked from data source through screen scrapping or through typing specific incidence, manually	
22.	OEM Certification	All features and functionality should be certified by the OEM.	
		The Display Modules, Display Controller & Software should be from a single OEM.	

Annexure B.41. Video wall controller

Sr. No	Parameter	Minimum Requirements	Compliance (Y/N)
1.	Display controller	Controller to be able to control cubes	
2.	Redundant Controller	The controller should be based on the latest architecture .	
3.	Platform	Windows Xeon Quad core 3 Ghz or Core i7 3 Ghz above	
4.	Processor	Intel Xeon	
5.	RAM	32 GB	
6.	Chassis Type	19" Rack mount industrial chassis	
7.	Network	2 Network Ports	
8.	Resolution Support For Outputs	Minimum1920 x 1080 or higher	
9.	Ticker	There should be a possibility in the controller to create user defined multiple tickers. It should also be possible to place these tickers anywhere on the wall	
10.	Scalability	The system should be able to add additional inputs as required in the future	
11.	Control	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	
12.	Redundancy	Redundant Hot Swappable HDD in RAID 1 Configuration	
13.	Redundancy	Redundant Hot Swappable Power Supply	
14.	Keyboard & Mouse Extension	Keyboard and Mouse along with mechanism to extend them to 20 Mtrs. operator desk from display controller to be provided	
15.	24 x 7 operation	The controller shall be designed for 24 x 7 operation	
16.	Others	The Video Wall and the Controller should be of the same make to ensure better performance and compatibility	
17.	OEM Certification	All features and functionality should be certified by the OEM. The Display Modules, Display Controller & Software should be from a single OEM.	

Annexure B.42. Field Switch

S.No.	Parameters	Minimum Requirements	Compliance (Y/N)
1.	Switch Architecture and performance	The switch should provide 8 ports 10/100/1000 Mbps T POE+ ports, (with minimum power budget of 240W) and switch should additionally have 4 GE SFP uplinks.	
		Switch should have wire rate switching capacity of minimum 24 Gbps or more	
2.	Layer 2 features	802.1Q VLAN on all ports with supply of minimum 256 VLANs and minimum 1K Mac addresses or higher	
		Spanning tree protocol as per IEEE 801.1d, 802.1s and 802.1w	
		Should support improved resiliency with support of ERPS or equivalent for ring topology	
		Link Aggregation control protocol (LACP) as per IEEE 802.3ad	
		Switch should support IGMP v1/v2/v3 as well as IGMP snooping and minimum 255 IGMP Multicast Groups	
3.	Quality of service (QoS)	Switch should support classification and scheduling as per IEEE 802.1P on all ports ad four egress queues per port. Switch should support mechanism of applying Automatic QoS or equivalent mechanism	
		Switch should support eight hardware based priority queuing or equivalent to guarantee that the highest priority packets are serviced ahead of all other traffic	
4.	Security Features	Switch should support ACL's, TACACS+, RADIUS, IP Route filtering, ARP Spoofing, DHCP snooping, DHCP option 82, Dynamic ARP Inspection (DAI), IP source guard and BDU Guard or equivalent	
5.	Management, Easy-to-use Deployment and Control Features	Switch should have console port, support for SNMP version 1,2 and 3, TELNET, SSHv2, 4 groups of embedded RMON, DHCP server	
6.	Standards	IPv4/IPv6, IEEE1588v2 PTP, IEEE 802.3af, 802.3at,802.3az, NTP, PTP	
7.	Industry Standards	RoHS and IP30	
8.	Certifications	CE, FCC, UL EN 60950-1	
9.	Mount	DIN rail mount	
10.	EMC Compliance	FCC, IEC/ EN 61000-(3-2, 3-3, 4-2 to 4-6, 4-8, 4-11), RoHS	
11.	Operating Temperature	0° C to $+60^{o}$ C	

12.	Shock Vibration	IEC 60068-2-27 IEC 60068-2-64 IEC 60068-2-32	
13.	Relative Humidity	Relative Humidity of 5% or 95% Non-considering	

Annexure B.43. UPS for DC & ICC

S. No	Parameter	Minimum Requirements	Compliance (Y/N)
1.	Certifications	ISO certified	
2.	Technology	True ON-LINE (Double Conversion) with IGBT based inverter and PWM Technology	
3.	Failover	UPS System in (1+1) Redundant Configuration	
4.	Output Wave Form	Pure Sine wave	
5.	Input Power Factor at Full Load	>0.90	
6.	Input	Three Phase 4 Wire	
7.	Input Voltage Range	Three Phase Input 400 V +/- 20%	
8.	Input Frequency	50Hz +/- 10%	
9.	Output Voltage	400V AC, Three Phase	
10.	Output Frequency	50Hz+/- 0.5% (Free running); +/- 3% (Sync. Mode)	
11.	Inverter efficiency	>90%	
12.	Over All AC-AC Efficiency	>85%	
13.	UPS shutdown	UPS should shutdown with an alarm and indications on following conditions 1)Output over voltage 2)Output under voltage 3)Battery low 4)Inverter overload 5)Over temperature 6)Output short	
14.	Battery Backup	30 minutes	

15.	Indicators & Metering	Indicators for AC Mains, Load on Battery, Fault, Load Level, Battery Low Warning, Inverter On, UPS on Bypass, Overload, etc. Metering for Input Voltage, Output Voltage and frequency, battery voltage, output current etc.	
16.	Audio Alarm	Battery low, Mains Failure, Over temperature, Inverter overload, Fault etc.	
17.	Cabinet	Tower type	
18.	Operating Temp	0 to 50 degrees centigrade	
19.	Management Protocol	SNMP Support through TCP/IP	
20.	Additional	OEM should have Centralized Call logging facility	

Annexure B.44. UPS for field

S. No	Parameter	Minimum Requirements	Compliance (Y/N)
1.	Certifications	ISO 9001:2008, ISO 14001 & BIS certified	
2.	Technology	True ON-LINE (Double Conversion) with IGBT based inverter and PWM Technology	
3.	Overall Efficiency (AC-AC)	≥ 85%	
4.	**Input:**		
5.	Input Voltage & Range	160V - 260V AC, Single Phase	
6.	Input Frequency Range	47 to 53 Hz	
7.	Input Phase	Single Phase	
8.	Input Power Factor	0.9 or better	
9.	**Output:**		
10.	Voltage	220V AC/ 230V AC/ 240V AC (Selectable)	
11.	Voltage Regulation	+/- 1% (or better)	
12.	Frequency	50 Hz +/- 0.1% (free running)	
13.	Harmonic Distortion(THD)	< 3% (linear load)	
14.		< 5% (non-linear load)	
15.	Output Waveform	Pure Sine wave	
16.	Crest Factor	3:1	
17.	Load Power Factor	0.8 lag or better	
18.	Battery Backup Minimum battery VAH to be as specified	60 mins. Backup	
19.	DC Bus Voltage	DC Bus voltage of UPS to be specified	
20.	Transfer Time	NIL	
21.	**General:**		
22.	Protections	To be provided for overload/ short circuit; overheating; input over/ under voltage; output over/ under voltage.	
23.	Operating Temperature	0 to 50 Degree C	
24.	Noise level	< 55 dB @ 1 Meter	
25.	Alarms & Indications	All necessary alarms & indications essential for performance monitoring of UPS like mains fail, low battery & fault detection	
26.	Bypass	Automatic Bypass Switch	

27.	Compatibility	UPS to be compatible with DG Set supply and mains supply	
28.	Galvanic Isolation	To be provided through Inbuilt transformer (external transformer not acceptable)	
29.	**Communication Interface:**	RS 232 port for software interface	
30.	Optional	SNMP interface support (for remote monitoring)	
31.	Metering (LCD)	Input/ Output voltage; output frequency; output current; DC current/ voltage.	
32.	Others	Cold start (without batteries)	
33.	Additional	OEM own Service Setup	
34.		OEM should have Centralized Call logging facility	

Annexure B.45. GIS

S.no	Minimum Requirements	Compliance (Y/N)
1	The proposed software should have functions of GIS and Image Processing along with advance functions such as network analysis, terrain analysis, 3D analysis, change analysis, etc.	
2	GIS Software must allow authority to implement a centrally managed GIS providing the advantage of lower cost of ownership through single, centrally managed, focused GIS applications (such as a Web application) that can be scalable to support multiple users and saves the cost of installing and administering desktop applications on each user's machine.	
3	Platform for GIS Application Software should be able to operate on Windows	
4	ODBC compliance enabling interface with RDBMS like Oracle, SQL server, Access etc. should be available.	
5	GUI shall be highly user friendly, self-explanatory and eye catching. It shall provide the sample example wherever it seeks user input and also preserve the history of the inputs. GUI can be made good looking and beautiful by making use of good color scheme and putting functions indicative image (drawing) on button.	
6	The proposed GIS software could be any Industry standard COTS GIS platform and should be easy to handle, operate, maintain & also train the authority staff/end users.	
7	The customized software for authority should have simple user interface both for departmental users as well as for citizens with easy navigation and querying facility.	
8	On-line help shall be provided at all functions and tools.	
9	The proposed software should be OGC compliant and follow the interoperability.	
10	The software should support OGC Services such as WMS, WFS, WCS, CSW, INSPIRE, etc. along with GML, KML, etc.	
11	The software should support all types of raster formats and services like ERDAS IMAGINE, ENVI, PIX, DTED, DEM, CEOS, JPEG, JP2, PNG, Geo-TIFF, & Web Coverage Service (WCS, OGC standard), Web Map Service (WMS), OGC standard.	
12	Should be able to support broad range of clients including browsers, desktops, Mobile Handsets, Palmtops, Tough books, etc.	
13	GIS Functions	
14	The proposed software should support multiple document interface (MDI), User should be able to create multiple views in single project.	
15	The application framework of the software should be such that it should have Dockable/Floating Toolbars, Dockable and Auto Hiding Windows, Unicode	
16	Support for Multilanguage Attributes, Drag and Drop to Rearrange Tools/Toolbars, Create New Toolbars or Menus without Programming, Extend the Applications with Add-ins built with .NET, Java, or Python, Build New GIS Components with .NET or Java or other development platforms.	

17	The proposed software should have capability to create layer as per the data model defined by the authority. User should be able create table structure as per the requirement.	
18	The software should have provision for definition of map projection system and geodetic datum to set all the maps in a common projection and scale.	
19	It should have facility to create custom projection using 3 to 7 parameters.	
20	It should have the facility to display multiple projection coordinates on map click.	
21	The software should provide facility to click on any feature of the map and return a select set of attributes for feature i.e. Identify tool along with pop-up.	
22	Software should have rich geo-processing functions such buffer generation, clip, erase, intersection, dissolve, union, polyline to polygon, etc. It should have facility to perform the spatial intersection analysis like plot area with buffer zone to calculate road-widening impact on adjacent land.	
23	The Software should be able to import / export data from / to various formats like .dwg, ,dxf, .dgn, .shp (shape files), coverage file, .mif (MapInfo), .mdb (GeoMedia), .gml, .kml, .gpx. , Geo PDF GeoJSON, interlis, GeoRSS, SqlLite etc.	
24	The proposed software should have function to import / export tabular data such as .xlsx, .csv, .dbf, etc.	
25	Support of IFC object for BIM applications.	
26	Support 3 D data	
27	Integrated GPS module for desktop and mobile GIS.	
28	Support of Coordinate Geometry (COGO) description for GIS objects creation and store in GIS database.	
29	Facility to define joins between the two tables (graphic / non-graphic) of the database to get integrated information in the table and perform GIS analysis.	
30	The system should provide facility to exchange the GIS Data with other platform applications like Microsoft Word, and Excel to use GIS data and generate reports like graph and charts.	
31	Software should have rich display and navigation tools. It should have zoom in, zoom out, fixed zoom in, fixed zoom out, pan, real time pan, bookmark, Geo link multiple views, swipe, flicker, search by location, cross hair, cursor location value, numeric dump, query cursor etc. It should have support of continuous panning i.e. real time pan.	
32	Software should allow the user to perform undo / redo operations during edits.	
33	The software should have module for geo-referencing of vector and raster data.	
34	Facility to capture the geometry from the layout maps, Building maps by maintaining the coincident geometry i.e. when a new polygon is captured simply by selecting an existing polygon to digitize the common boundary thereby ensuring no slivers or gaps between adjacent area features like parcels.	
35	The software should provide a complete set of drawing & editing tools in order to enable the user to Draw & Modify any or parts of various geographical objects (point, line and polygon) on the map.	
36	The software should have topology creation tool to remove the topological errors from vector data.	

37	The software should have the ability to add data from internet or intranet users to the existing map data so that data from other sources.	
38	The software should allow user to create layers or shortcuts to geographic data that store symbology for displaying features.	
39	A rich legend creation tool should be required in proposed application for thematic mapping. User should apply color and symbology using the attribute attached with the layer based on single, quantile and unique values functions.	
40	A rich annotation tool should be available such as add label, edit label, move label, rotate label, remove all label, etc.	
41	The software should have module of Dynamic Labelling and Rule based Labelling.	
42	The software should have a provision of hyper linking the GIS feature as well as its attribute fields with existing documents, URLs, Images, drawing files or scanned maps related to that feature.	
43	Software should have versioning capability for history tracking.	
44	Query builder tool should be available with the software to perform simple and complex queries.	
45	The customized application should provide the user facility to make dynamic queries on GIS GUI. The application should allow users to store and retrieve standard queries used by them in day to day operation.	
46	Software should have various query tools for queries based on attributes, location, etc.	
47	Software should have map composition / layout tool for printing spatial data at different scales and at adjustable print quality.	
48	Software should allow users to export results to various file formats like EMF, BMP, TIFF, JPEG, PDF, etc.	
49	Image Processing Functions	
50	The proposed software should support HRSI (High Resolution Satellite Imagery) and low resolution satellite images (panchromatic & multispectral) such as IKONOS, Quick bird, Geoeye, Worldview, CARTOSAT, EROS, LISS-IV, LISS-III, AWIFS, RISAT-1, KALPANA-1, INSAT3A, INSAT3D, PROVA-V, etc..	
51	The software should have capability to process optical satellite data as well as microwave image data.	
52	The software should be capable to process and visualize the stereo pair data. It should be able to create DEM from stereo pair and perform ortho-rectification.	
53	The software should support images with More than 8 bits, 11 bit, 16 bits, and 24 bits per band.	
54	The software should support image format such .tif, geotiff, .img, .pix, .hdr, .h4, .h5, DTED, DEM, CEOS, .bmp, .jpeg, etc.	
55	The software should be also support LiDAR data file format such as *.las, *.isd, *.pcg etc…	
56	The software should have projection transformation tool to reproject the image from one projection to other projection system.	
57	Image extraction module should be available in the proposed software which can be performed by defining the extent, inquire box and polygon layer.	

58	The software should have module for image mosaicing and splitting.	
59	Geometric Correction and atmospheric correct module should be available to remove the geometric distortion in the image and atmospheric anomalies such as haze.	
60	It should have Layer stacking to create composite image from a number of band of the satellite imageries.	
61	The software should have image enhancement module to enhance the imageries. It should have enhancement algorithm such as	
62	Linear, Logarithmic, Histogram Equalize, Histogram Matching, Density Slice, Gaussian, Squire root, Tone Balancing	
63	The software should have Image filtering algorithm such as	
64	Convolution, Texture, Adaptive, Crisp, Laplacian, Statistical, FFT, etc.	
65	The software should have image transformation module such Vegetation Index, Principal Component Analysis (PCA), Inverse PCA, Pan sharpening, Wavelet fusion, etc.	
66	The software should have Natural Color image generation module using NIR, Red and Green band of high resolution multispectral image data. This module should have capability to stretch the natural color image into 8 bit.	
67	Proposed software should have image classification modules such as supervised and unsupervised classification along with image segmentation.	
68	The software should be capable to process the temporal or time series image data. The software should provide change detection module such as: Basic Change Detection Advance Change Detection Auto Change Detection	
69	The advance change detection module should be capable to ingest multiple input images to find the change. It also handles the multi resolution satellite image along with mis-registration. It should supports various methods of advance change detection such as single band differencing, cross correlation, Image regression, Image rationing, PCA, Change Vector Analysis (CVA), Magnitude Differencing, Vegetation Index Differencing, Tasseled Cap, Chi-Square, Unsupervised Change Detection, etc.	
70	The change detection module should have capability of Object Library Creation for Object Identification and Automatic Feature Extraction (AFE).	
71	The software should have functions like Linear Algebraic Combination, Change resolution, Bit Conversion, proximity analysis, etc.	
72	The software should have function called Dynamic threshold for analyzing change detection using image. This function is used to categorize the pixels in input image based on the threshold value.	
73	The software should have raster catalogue and vector catalogue tool for raster and vector data management.	
74	The software should have network analysis module to find the shortest and Optimum path using the topologically corrected road network.	
75	The software should have tools for terrain analysis and 3D analysis. The module should be able to create slope/aspect, hillshade, elevation profile, topographic normalize, line of sight, viewshed analysis.	

76	The software should have algorithm for surface generation such as Linear, IDW and Krigging.	
77	Software should support fully automatic and semi-automatic raster to vector conversion tools.	
78	OGC Certified	
79	User Management Tools Add User and Assign Rights	
80	Map Tools Vector and Raster Data Support (Display) Zoom In Zoom Out Zoom to Extent Previous Next ViewView Pan Zoom to box Book Mark Layer Visibility on/off	
81	Measure Tool Measure Distance Measure Area	
82	Advanced Tools Select Tool Unselect Identification Buffer Get XY coordinates Find XY coordinates Labelling	
83	Query Tools Basic Query Feature Query (Spatial and Non Spatial) Advance Query	
84	Spatial Editing Tools Feature Creation Add Feature Edit Feature Delete feature	
85	Non Spatial Editing Tools Attribute Information Editing	
86	Geo-processing	
87	Network Analysis	
88	Real Time Data Support and	
89	Online Spatial Data Creation and Updation Support	
90	Should support internet, intranet, cloud	
91	Multiuser data editing	
92	Data Analysis Look up Table Update	
93	Image Enhancement – Linear, Gaussian, Logarithmic, Density slice, Square Root, Histogram Equalize ,Histogram Matching	
94	Tone Balancing	
95	Image Filtering ,Texture ,Adaptive, Crisp,Statistical,Convolution	
96	Image Classification Unsupervised Classification	
97	Supervised Classification, Threshold , Generate Statistics of ROI/ Create Signature File, Post Classification Smoothing	
98	Contingency Matrix , Signature Reparability, PCT Edit	
99	Scatter Plot ,Class Information, Fuzzy Classification	
100	Fuzzy Convolution ,Segmentation	
101	Change Detection - Cut and Fill Analysis	
102	Conversion Tools	
103	It should have display, navigation, measurement, layer management, draw/edit and GPS functions.	
104	The mobile GIS/GPS application should be able to display the vector data with color and symbology.	
105	User should be able the ingest point, line, polygon and image theme in mobile GIS application.	
106	The application should have functions such as draw point/line/polygon features, attribute editing and delete point/line/polygon features.	
107	The GPS tool of the application should be able to collect point, line and polygon features.	

108	The application should have tools such as query builder, identify, find feature using attribute value, clear selection/refresh and find feature by location.	
109	The mobile application user interface should be customizable as per user requirement.	
110	Should have support for the smart phones and tablet devices with GPS Support. It should have support for	
111	Enterprise GIS Function	
112	The GIS server should be based on a Services Oriented Architecture (SOA).	
113	Should support Java /VB Script, .Net etc. and other latest technologies.	
114	OGC certification and capability to serve and consume OGC complied web services including WMS, WFS, WCS, CSW, INSPIRE, etc.	
115	Should be based on 64 bit architecture or better.	
116	Should support Windows/Linux platform.	
117	Should be able to support broad range of clients including Interoperability and browsers, desktops, Mobile Handsets.	
118	Should support unlimited number of Editing and viewing clients. It should also allow multiuser editing with Advanced Editing Functionalities.	
119	Should support standard Web server/application server like IIS, Apache, Tomcat, Oracle HTTP server, etc.	
120	Should supports unlimited Desktop client connection. Desktop GIS applications with the capability to consume WMS/ WFS services should be able to connect and use data from the server.	
121	Should be capable of maintaining data history, version management and conflict detection / resolution.	
122	Should have geo-processing framework, geo-processing core analysis functionalities, spatial and statistics analysis functionalities.	
123	Should have capability of centrally managed data, models, tools, maps and applications.	
124	Should have the capability to link documents like Adobe pdf, word/power-point JPEG, GIF, PNG, DTED and TIFF files etc. to map features.	
125	Should support database check in–check out/replication functionalities hence maintaining the parent child relationship of Master Database.	
126	Should have open access to extensive GIS capabilities so as to enable organizations to publish and share geographic data(2D&3D),maps, analysis tools, Manipulate data, 3D models etc.	
127	The publisher should have capability to publish the project/data on GIS server and enable OGC services such as WMS, WFS, WCS and CSW in the data layer.	
128	All the Geo-processing and Image processing function such as buffer creation, clip, erase, image enhancement, image filtering, Vegetation Indices Calculation, Linear Algebraic Combination, Band Math, change detection, image extraction, mosaicing, etc. should be performed at server end by sending the request using the web client and should enable the WMS service to display the processed data on web.	

129	Application Server must support Time aware data for Trends / Time Series Analysis. Application Server must support network and perform Routing analysis, Service Area Analysis, and Tracking Analysis.	
130	Should support for GML, RSS (Real Simple Syndication) and KML/KMZ (Keyhole Markup Language).	
131	The server should have in built map caching capability.	
132	It should provide imagery access quickly after acquisition with dynamic mosaicing and on- the-fly processing.	
133	Should support standard Web server/application server	
134	Should have Web Application Functionalities like pan, zoom, identifying features on a map, feature based hyperlink, measure distance, overview window, find place, query attribute, search attribute, editing and geo processing task.	
135	The software should allow visualization of data in 2D, 3D in web as well as desktop application.	
136	Control user access and credentials to data by assigning roles.	
137	Logging records all transactions including log-ins, searches, downloads, uploads, edits, and deletions.	
138	Should support Single sign-on, authentication module.	
139	Should support SSL and signed certificates to ensure complete security from browser to server.	
140	Should enable a secure, private sharing of confidential data that can be deployed on private network to promote collaboration on maps and applications within the organization.	
141	Should provide a web publishing wizard so that registered users can publish websites without coding/programming.	
142	Should be able to create and manage groups to control publishing the data and its services on Data store/workspaces.	

Annexure B.46. Database encryption (HSM Device)

Sr. No	Parameter	Minimum Requirements	Compliance (Y/N)
1.	General	The solution must be able to protect data-at-rest against root/system privileged user account access. It should also protect file level encryption. The DSM should be a hardware device with FIPS level 3 HSM. The solution should be able to support file level encryption in transparent manner. No downtime is expected while data is transformed into encrypted data	
2.		Proposed data protection solution must support fine-grained policy to enable administrator to perform activity like file archive and backup, without access to the data content itself.	
3.		The proposed solution must support a separation of duties (SoD) to meet rigorous compliance rules including PCI DSS, HIPAA/HITECH and government data breach policy. The vendor must provide compliance whitepaper to prove such support capability	
4.		Proposed solution must support multi-tenancy using separate domain with configurable policies, data encryption key management and audit log. Must have a seamless SIEM Integration. Must Protect the unstructured data (file-shares, files and folders) including big data.	
5.	Data Encryption capabilities & token management	The proposed data protection and encryption solution must support transparent data protection on all major operating system include: • Microsoft: Windows Server, 2008, 2012 • Linux: Red Hat Enterprise Linux (RHEL), SuSE Linux Enterprise Server, Oracle RedHat Compatible Kernel and Ubuntu • UNIX: IBM AIX, HP-UX, and SolarisDatabase	

6.		There should not be any changes in the storage space after the encryption.	
7.		Proposed data protection solution must be able to secure both structure database information and unstructured files such as PDF, spreadsheet, scripts, images, audio/video recordings and extract-transformation-load batch files..	
8.		Proposed data encryption solution should have minimum performance impact to database transactions with not more than 10%.	
9.		The data transformation should not involve any downtime and live transformation is expected to achieve high Performance Encryption with 100% System Uptime. - Solution must be able to enforces access controls based on “resources”, “processes”, and “time based access” so that only the defined resources can be accessed with the defined processes and defined users/groups at any given time - Ability to learn the effect of policies (learn mode) before actual encryption is applied is must. -Not only appliance but agent also needs to be FIPS certified	
10.		The data protection solution must support format preserving tokenization	
11.		The data masking solution must support dynamic masking through policy based masks	
12.		The proposed solution should support Teradata V14 and V14.1 database encryption with UDF	
13.		The proposed platform should support vaultless tokenization	
14.		The proposed platform should support vault based tokenization	

15.		The proposed platform should support gateway to encrypt data	
16.	Key Management	the proposed encryption and key management solution must be able to support KMIP client	
17.		The proposed solution must provide centralized key management for Oracle and MSSQL or equivalent TDE master key.	
18.		The security administrator console should support 2-factor authentication with RSA or equivalent.	
19.		The data protection solution must provide centralized audit for security administration access, key creation, policy changes, data access log and so on.	
20.		The proposed solution must provide application encryption support with Java, C/C++, and .Net API.	
21.		The proposed solution support LDAP and Microsoft Active Directory authentication	
22.		Support industry proven cryptograph security standard:3DES, AES128, AES256, ARIA128, and ARIA256 and asymmetric key RSA-4096/2048, SHA-256 algorithm	
23.		The Key management repository must provide virtualization option, with OVF image for deployment option - Hardened Operating System, root account must be disabled, all unnecessary software packages must be removed. A firewall in place that only opens a limited set of required ports.	
24.	Hardware Capabilities	Should be a FIPS 140-2 level 3 and Common Criteria Certified	
25.		Should have support for column level encryption	
26.		Should support RSA 1024, RSA 2048, RSA 4096, AES	

		128, AES 256, 3DES, ARIA 128, ARIA 256	
27.		Should support Clustering for high availability	
28.		Should support multi tenancy	
29.		Should have Secure Web-based GUI, secure shell (SSH), and console	
30.		Should be able to encrypt of all databases	
31.		Should be scalable upto 10000 connectors	
32.		Should have File servers support on Windows, Linux etc.	
33.		Should be a TCP/IP based FIPS certified appliance	
34.		Should Support delegated admin, “M of N” keys. Capable of storing one million keys in hardware.	
35.		Should have support for standard libraries and protocols - PKCS#11, KMIP, REST	
36.		Should support live data transformation (encrypting existing data without downtime)	
37.		Should allow Key Caching, Key rotation, key Versioning, Schedule Key Rotation	
38.		Should support web Service architecture for easy integration with different application	
39.		Should be supplied with redundant power supply	
40.		Should support operating temperature 10° to 35° C (50° to 95° F)	
41.		Should support humidity 8% to 90% (non-condensing)	
42.		Should support FCC, UL, BIS or equivalent certifications	
43.		Should support two factor authentication (for administrator to login to Key manager web console)	
44.		Should support SNMP, NTP, Syslog-TCP	
45.		Should support syslog formats CEF, LEEF, RFC 5424 or equivalent	
46.		The proposed data protection solution must support hardware cryptographic acceleration including • Intel and AMD AES-NI • SPARC encryption • IBM P8 cryptographic coprocessor	

47.		The proposed data protection solution must provide fine-grained auditing records that show system accounts and processes accessing data based on security policy.	
48.		The proposed data protection solution must support integration with SIEM solution and deliver centralized access audit and monitoring report	
49.		The encryption key manager must be Common Criteria (ESM PP PM V2.1) certified	
50.		The encryption key manager should have option with FIPS 140-2 Level 3 HSM in the box.	

Annexure B.47. Outdoor Junction Box

Sr. No.	Parameter	Minimum Requirement Description	Compliance (Y/N)
1	General Requirement	All the junction boxes shall be out door type with IP65 protection from rain, water. Provision for theft prevention. (Expected outdoor temperature 60 degree Celsius)	
2	General Requirement	Should be outdoor type, Floor mounting with 3 point locking option, suitable to mount the switches and required UPS. Opening lever/handles shall be made of metal. Each cabinet will be mounted on a raised height concrete Plinth, 600 -1000 mm high, as per site requirements.	
3	General Requirement	Bidder will propose the suitable sized junction box as per their solution with 19" mounting arrangement for mounting of associated network, power, UPS and Split Battery components securely and safely within the cabinet.	
4	General Requirement	Junction box shall have floor mount type with required mounting accessories to provide a flexible solution for space constrained traffic applications	
5	General Requirement	2 x 5 way/15 Amp PDU's will be provided to support the site equipment. 2 x thermostat controlled 230V AC Fans with 100% Duty Cycle with Filter and 2X Filter units with IP55 Rating with rain Canopy shall be fitted to front door of cabinet to provide ventilation to cool the equipment.	
6	General Requirement	75 mm Rain canopy on Top with all around projection of the enclosure such that that rain water, water logging shall not penetrate in the junction box and hamper working of the system, cable entry with glands.	
7	General Requirement	Small Junction box for mounting Electrical Meter, Fuse and MCB with separate lock for utility power connection	
8	General Requirement	Protection from ants, bugs and other small insects entering the enclosure	
9	General Requirement	Regulatory Standard Compliance: IP55 to EN60529/09.2000, ISO 9001, 14001, 18001 comply with EIA 310, DIN 41494 and IEC 297 standards. The system should not be an end of life / end of service product.	

Annexure B.48. Laser Network Duplex Printer (Heavy Duty)

Sr. No.	Parameter	Minimum Requirement	Compliance (Y/N)
1.	Print speed (A4)	Up to 35 ppm or higher	
2.	Print speed (A3)	Up to 18 ppm or higher	
3.	Print Resolution	Up to 1200 x 1200 dpi or higher	
4.	Duty cycle (monthly-A4)	Up to 65,000 pages or higher	
5.	Duplex printing option	Automatic	
6.	Network Enabled	Yes	
7.	Energy Star	Yes	
8.	Standard memory	Min. 256 MB or higher	
9.	Media Size Supported	A4,A3,B4,B5 and A5	
10.	Processor Speed	750 MHz or higher	
11.	OS	Win 7, 8, 10	
12.	Accessories	USB & power cable	

Annexure B.49. Laser Network Multifunction Duplex Printer

Sr. No.	Parameter	Minimum Requirement	Compliance (Y/N)
1.	Print speed (A4)	Up to 26 ppm	
2.	Print Resolution	Up to 600 x 600 x 2 dpi	
3.	Scan Resolution	Up to 1200 x 1200 dpi	
4.	Scan Type	Flatbed, ADF	
5.	Scan Speed (ADF)	Up to 15 ppm	
6.	Scan File Format	JPEG, TIF, BMP, GIF, PDF, PNG	
7.	Copy Resolution	Up to 1200 x 1200 dpi	
8.	Fax Resolution	203 x 196 dpi	
9.	Fax Speed Dialing, Maximum Numbers	120 numbers	
10.	Duty cycle	Up to 8,000 pages	
11.	Duplex printing option	Automatic	
12.	Network Enabled	Yes	
13.	Standard memory	128 MB	
14.	Media Size Supported	A4, letter and legal	
15.	Processor Speed	500 Mhz	
16.	OS	Win 7, 8, 10	
17.	Accessories	USB & power cable	

Annexure B.50. Multifunctional Kiosk

Sr. No.	Parameter	Minimum Requirement	Compliance (Y/N)
1.	General Mandatory Requirement	Manufacturer/OEM shall enclose copy of certification of ISO 9001:2015, ISO 14001:2015 & OHSAS 18001:2015 to ensure consistent product following all regulatory norms of Government of India.	
2.	Design Requirement	**Design:** The entire design shall be modular consisting of interchangeable and replaceable parts. Design should be extremely rugged to have a minimum life of 10 years for structural stability, moving and non-moving parts, slides & doors. The kiosk must be IP22 compliant to ensure rodentproof enclosure. **Structure** : Structure shall be made up of 2 mm thick heavy duty vertical and horizontal profiles of CRCA. These profiles shall be accurately inserted and welded over 10 mm thick solid HRCA base. Outer shell, including all hinged and non-hinged parts shall be made up of 1.5 mm thick CRCA sheet with formed-in-place foam gasket. **Finishing** : All sheet metal parts must be finished with a durable electrostatic powder coating with an average application of minimum 60 microns over all surfaces as per Powder coating test : ISO 2409, ASTM D 2794 (with 100 Kg Impact Load), ASTM D 552. The coating shall be done using latest conveyorised Nano-Technology Powder Coating Plant & with 9 tank pre-treatment processes to ensure consistent quality & no harm to environment. **Keyboard Mounting Surface** : The sheet must be made up of preformed textured hot dip galvanized strips and sheets of low carbon steel coated on one side with rigid polyvinylchloride (PVC) film and on the other side a coating based on cross linkable polyester resins (sheet thickness 0.6mm & PVC Coating 0.15mm). The sheet must be ASTM E84 certified.	

		Access Doors : Touch Screens shall be accessible from Rear doors with hinges . These doors shall have inbuilt 2-Point lockable system for easy access & maintenance. It shall have three doors for filling and maintenance accessibility. **Keys** : All three doors must be openable with common key and the cash collector must have unique key for the entire lot of 100 numbers. Touch Screens shall be accessible from Rear doors with hinges. **Grouting** : Base shall have concealed provision of grouting to the floor with anchor fasteners. **Modularity: This** is to ensure replacability in an unlikely case of damage. The rigidity and strength must not be compromised despite the modular feature of structure. For Details refer tender drawings. **General Requirements**: Light Leaks, sharp edges and corners shall be deemed un-acceptable. Front Edge of the keyboard shall have moulded polyurethane edge for ergonomic wrist support. All doors, claddings etc. shall be modular and shall be replaceable in an unlikely case of damage. Supplier to put identification codes / stickers / numbers for quick identification & replacement of damaged components. All doors to have Formed-In-Place Foam Gasket to protect the equipment from dust particles.	

3.	Quality Norms, Compliances & Certifications for Kiosk Enclosure	1. The powder coating shall pass 1000 hours FOG - salt spray test as per ASTM B117 (Mandatory for MS). 2. Bare Enclosure shall be RoHS certified from Intertek/ UL to ensure restriction of hazardous material. 3. Equipped Kiosk shall be Seismic Zone 3 tested to ensure that it withstands all direct & indirect vibrations throughout its life cycle. 4. Metal Surface Powder coating Test : Adhesion test : ISO 2409, Impact test : ASTM D 2794 : 100kg, Conical Mandrel Test : ASTM D 522, Scratch test : IS 101-1964 5. Enclosure shall be compliant with UL 2361 (Self Compliance on Safety & Accessibility). 6. Raw material data alone shall not be accepted. 7. All certificates must be from UL / Intertek / Indian Government / NABL accredited lab. 8. The OEM must have supplied kiosks with similar quality norms in last five years. Note: Latest Versions & Norms to be used for testing and compliances purpose and must be submitted along with the bid.	

Annexure B.51. Integrated Command & Control Centre Solution

Sr. No.	Parameter	Minimum Requirement	Compliance (Y/N)
1.	Data Aggregation, Normalization and Access	It is envisaged that the city will implement multiple Smart City use cases over a period of time. The potential example Smart City use cases are- · Smart Outdoor Lighting · Smart Parking · Smart Traffic Management · Smart Energy Metering · Smart Water Metering · Public Safety and Safe City Operations · Connected Public Transport · Public Wi-Fi and Urban Service Delivery over Public Wi-Fi · Kiosks for Citizen Information · Citizen Interactive Kiosks for Urban Service Delivery · Environmental Monitoring · Smart Waste Management Aggregation and abstraction of sensors: provides aggregation of sensors from diverse sensor cloud	
		The Common integrated smart city platform should allow normalization of the data coming from different devices of various OEMs. It should support integration with multiple vendors	
		The City will use various device vendors for various urban services. For example, in the Smart city journey of the city, various vendors of smart elements generate data in their own format. Hence, the unified platform should define its own data model for each urban services like parking, waste, lighting, transport etc. and map data from different device vendors to the common data model. This data must be exposed to application eco system using secure APIs using API keys	
		The attributes of the API key(s) must restrict / allow access to relevant data, i.e. (the attributes can be like: specific domain (either parking or lighting or waste etc. or combination of these), RO / RW /, specific to City (city, street within city etc.)).	
		City operations Dashboard: City software platform Dashboard should display only relevant data (associated geographical data) for the user who logs in.	

		The platform should be able to integrate with any type of sensor platform being used for the urban services irrespective of the technology used. Agnostics to sensor technologies such as LoRA, ZigBee, GPRS, WiFi, IP Camera	
		The platform should allow the manufacturers of the sensors to develop integrations themselves using SDKs without affecting the northbound applications and existing integration.	
		The platform should be able to normalize the data coming from different devices of same type (i.e. Different lighting sensor from different OEMs, different energy meters from different OEMs etc.) and provide secure access to that data using data API(s) to application developers.	
		Platform should support Citizen centric solutions and other integrations as required in the future	
		Data Aggregation system of offered platform should be access/ connectivity agnostic, it should support the connectivity of offered platform through all type of network - Cellular (GSM-2g/3G), Wi-Fi, Wireline Broadband, LPWAN etc.	
		• The platform should support distributed deployment of functions (workflows & policies) across city's network and compute infrastructure with centralized management and control	
2.	GIS Map Support	System should support integration with any Map API services like Google, Esri, Open street etc. It should be possible to visualize all the Assets (Sensor , Devices, Vehicles, Cameras, other city resources) on map . Also these Assets must be provide as layers with ability to switch these layers and visualize the assets of only selected layers.	
3.	Location engine	a. Map services and geospatial coordinates: provides the geographical coordinates of specific facilities, roads, and city infrastructure assets, as well as unmapped facilities b. Geospatial calculation: calculates distance between two, or more, locations on the map c. Location-based tracking: locates and traces devices on the map	
4.	Developer Program tools	Platform OEM should provide online/offline Developer Program tools that help City to produce new applications, and/or use solution APIs to enhance or manage existing solution free of cost. SI must ensure development of new applications for citizen services are compatible with the	

		existing setup.	
5.	Data and Analytics Engine	a) Data archive and logging: stores data feeds from the device engine and external data sources b) Analytics: provides near real time Stream Analytics , time-shifted or offline analytics on the archived data c) Reporting: delivers reports based on events triggered by device engine data and external notifications	
6.	Authentication, Authorization	System should support standard Authentication, Authorization Methods	
7.	Data plan Functionalities	Live data and visual feed from diverse sensors connected to the platform	
8.	Video Display and Integration Capabilities	Integrates with existing cameras and new cameras. Should support multiple video sources from multiple locations. Platform should have no limitation in displaying the number of CCTV video sources	
		Should use dynamic channel coverage specifically for video stream function for efficient bandwidth usage for multiple Remote Control centre	
		Should support Fixed type and PTZ camera. Control PTZ function from the screen to control the camera	
		Should be able to access the CCTV sources both from CCTV Camera and from Video Management software.	
		Should be able to display Alarms from different sources such as Video alarm from cameras, video alarms from VMS, if required	
		Provide configurable intelligent operator console based on the jurisdiction, critical area or sensors to monitor as per situation demands for focused surveillance.	
		Should provide intelligent and actionable emergency response for all alarms	
		Generate Customized reports based on the area, sensor type or periodic or any other customer reports as per choice of the administrators	
		Should be possible for the Supervisor to have an overview of the Event based performance through Dashboards	

		System should allow use of, GIS tool which allows easy map editing for wide area monitoring (Google map, Bing map, ESRI Arc GIS map)	
9.	API Repository / API Guide	• Normalized APIs for the City Application domains should be available (Parking, Outdoor Lighting, Traffic, Environment, Urban mobility etc.) to monitor, control sensor and/or actuators functionality to enable app developers to develop apps on the platform. For example Lighting APIs: Vendor agnostic APIs to control Lighting functionality.	
		Platform should have feature for Application development studio to create new applications for Smart City in Future. It will be responsibility of offered platform bidder to facilitate the future application development on deployed platform to build future applications.	
		• Cross collaboration APIs: Enabling contextual information and correlation across domains and verticals (Multiple vendor and Multi-sensor in future)	
10.	Platform Upgrades and maintenance	The OEM should be able to securely access the platform remotely for platform updates / upgrades and maintenance for the given duration	
11.	Platform Cloud Support	Platform should be Cloud Ready	
12.	Platform functionality	• API management and gateway: Provides secure API lifecycle, monitoring mechanism for available APIs	
		The platform shall support data aggregation systems, management systems (rules engines, alerting systems, diagnostics systems, control systems, fulfilment, messaging system, and events handling system), and reporting / dashboard system to provide actionable information to city administrators and citizens. It will be an ever evolving layer with applications added and integrated in a seamless manner with the existing applications.	
		• User management: Provides different tier of user categorization, authentication, authorization, and services.	
		• Application management: Provides role-based access view to applications on dashboard	
		• Enabling analytics: Time shifted and real-time data available for big data and analytics	
		• The platform should provide other e-governance data as i-frames in the command and control centre dashboard	

		The platform should render a full visualization of all the data on the COC/CCC Dashboard.	
13.	CCC Operations	• The solution should be implemented and compliant to industry open standard commercial-off-the-shelf (COTS) applications that are customizable.	
		• The solution should have the capability to integrate with GIS	
		• The solution shall integrate with GIS and map information and be able to dynamically update information on the GIS maps to show status of resources.	
		• The solution should provide operators and managers with a management dashboard that provides a real-time status and is automatically updated when certain actions, incidents and resources have been assigned, pending, acknowledged, dispatched, implemented, and completed. The above attributes shall be color coded.	
		• The solution shall provide the “day to day operation”, “Common Operating Picture” and situational awareness to the centre and participating agencies during these modes of operation	
		• It shall provide complete view of sensors, facilities, e-governance/erp, video streams and alarms in an easy-to-use and intuitive GIS-enabled graphical interface with a powerful workflow and business logic engine	
		• It shall provide a uniform, coherent, user-friendly and standardized interface	
		• It shall provide possibility to connect to workstations and accessible via web browser	
		• The dashboard content and layout shall be configurable and information displayed on these dashboards shall be filtered by the role of the person viewing dashboard	
		• The solution should allow creation of hierarchy of incidents and be able to present the same in the form of a tree structure for analysis purposes	
		• It shall be possible to combine the different views onto a single screen or a multi-monitor workstation	
		• The solution should maintain a comprehensive and easy to understand audit trail of read and write actions performed on the system	
		• The solution should provide ability to extract data in desired formats for publishing and interfacing purposes	
		• The solution should provide ability to attach documents and other artefacts to incidents and other entities	
		• The solution is required to issue, log, track, manage and	

		report on all activities underway during these modes of operation:	
		• recovery	
		• incident simulation	
14.	Integration capabilities	• The Platform shall also be able to integrate, connect, and correlate information from CCTV, IoT Platform and other IT & non-IT systems, providing rule based information drawn from various sub-systems for an alert.	
		• Platform should support on the fly deployment of Sensors. Platform shall have the ability to add / remove sensors including new vendor types without a need for shutdown.	
		The platform should support all devices which are based on Industry standards. a. Protocol libraries of most standardized M2M Protocols like LWM2M,MQTT,LTN Gateway,DLMS,TR-069,Zigbee,OMA DM etc. b.API Exposure and Interaction Studio (Web GUI) tools to building real time IOT applications	
		• Platform should support the development of Integrations for legacy SCADA systems such as OPC UA and/or serial communication, messaging protocols such as MQTT, Stomp, AMQP etc. This is in order to seamlessly integrate the existing legacy systems and new systems coming in to the Smart City. The integration to the external legacy sub-systems current or futuristic should be on real-time basis and not on offline basis.	
15.	Edge Devices & Application Gateways	Provides standard appliance or software or hardware combination to connect IoT devices / applications, provide secure connection to IT infrastructure. Gateways to provide software modules to interact with control systems and protocols. Provide centralized Device Management from sensor to the IT setup. Provide management tools to view, analyses, report on the device configurations. Gateway software should be agnostic to sensors and devices protocols.	
16.	Resiliency	This architecture should provide the smart city use cases with much needed resiliency	
		Should Provide ways to define policies that make applications or things respond to external environments	

		The Smart City platform should support integration to collaboration tools to bring multiple stake holders and responders to respond an emergency or an urban services event.	
		The Smart city platform should be able to alert any incidents in the network proactively on command and control centre	
		The smart city platform should have integrations with the network layer to proactively monitor any incidents on the network for active troubleshooting and triaging	
17.	API Based Open Platform	• Should Provide urban services' API(s) to develop operation applications for each of the Urban Services domains. For example, the lighting operator of the City should be able to develop a City Lighting management application based on the API(s) provided by the platform. This lighting application should also have the ability to access data from other domains like environment based on the access control configured in the system.	
		• The smart city platform is should be able to provide API access based on roles and access control policies defined for each user and the key issued to that user	
		• The vendor should have already documented different Urban Services APIs using which applications can be developed	
		• The vendor should be able to demonstrate existing applications that are developed using these urban services APIs	
		• Enables the City and its partners to define a standard data model for each of the urban services domains (i.e. Parking, lighting, kiosks etc....)	
		• should eable City and/or its partners to write software adaptors based on the API(s) provided by device vendors and have the ability to control, monitor and collect the data from these street devices.	
		• Platform should have capability to get integrated with Social Media securely using API. Social media feed should be part of overall analytic.	
18.	Trending Service	System should provide trends in graphical representation from data sources over a period of time. Trends should allow to monitor and analyze device performance over time.	

19.	Policies and Events	• System should allow policy creation to set of rules that control the behaviour of infrastructure items. Each policy should a set of conditions that activate the behaviour it provides. System should allow Default, Time-based, Event-based and Manual override policies creation. For example, an operator might enforce a "no parking zone" policy manually to facilitate road repairs.	
		• System should provision to defines a set of conditions that can be used to trigger an event-based policy	
20.	Notifications, Alerts and Alarms	• System should generate Notification, Alert and Alarm messages that should be visible within the Dashboard and the Enforcement Officer Mobile App if required.	
		• All system messages (notifications, alerts and alarms) are visible from the Notifications view, which provides controls that operator can use to sort and filter the messages that it displays.	
		The System delivers message to a set of subscribers. The Notification service supports min two types of notification methods – Email notification and Short Messaging Service (SMS) notification.	
21.	Users and roles	• User's access the platform to perform various tasks, such as adding new locations, configuring new devices, managing adapters, and so on. Each user should be associated with one or more roles and each role is assigned a certain set of permissions.	
		These roles and permissions define the tasks that a user can perform. Additionally, system should assign one or more locations to each role so that the user can perform tasks at the assigned locations only.	
		• The platform should allow different roles to be created and assign those roles to different access control policies.	
		• Since this platform is being used for managing Cities, the platform should allow association of users and locations. For example, the platform should allow creation of locations in the system which correspond to various physical locations in the city and allow the admin to associate different users to different locations with the intent that each user can control only services for a location for which has been given access.	
		• System should support LDAP to be used as an additional data store for user management and authentication.	
22.	Reports	• The platform should have capability to provide access to real time data and historical data from various connected devices for reporting and analytics.	

		The platform should provide a consolidated Single window reporting and Dashboards, correlation and Analytics solution for all non-video applications.	
		• System should allow dashboard to generate reports and have provision to add reports in favourites list	
23.	Standard Operating Procedure	• The Platform should support authoring and invoking un-limited number of configurable and customizable standard operating procedures through graphical, easy to use tooling interface.	
		• Standard Operating Procedures should be established, approved sets of actions considered to be the best practices for responding to a situation or carrying out an operation	
		• There should have provision for automatically logging the actions, changes, and commentary for the SOP and its activities, so that an electronic record is available for after-action review	
		• The users should be able to edit the SOP, including adding, editing, or deleting the activities.	
		• The users should be able to also add comments to or stop the SOP (prior to completion).	
		• The SOP Tool should have capability to define the following activity types:	
		a. Manual Activity - An activity that is done manually by the owner and provide details in the description field.	
		b. Automation Activity - An activity that initiates and tracks a particular work flow and select a predefined flow order from the list.	
		c. If-Then-Else Activity - A conditional activity that allows branching based on specific criteria. Either enter or select values for Then and Else.	
		d. Notification Activity - An activity that displays a notification window that contains an email template for the activity owner to complete, and then sends an email notification.	
		e. SOP Activity - An activity that launches another standard operating procedure	
24.	Collaboration	• The CCC platform should support an ability to bring multiple stake holders on to a common voice conference call as a standard operating procedure in response configured events	
		• Collaboration can also be a standalone application providing all mentioned functionality. Collaboration	

		should have both voice and video presence.	
		• The stakeholders can be on various types of devices like computer, smart phones, tablets or normal phones	
		• The CCC platform should support the capability to bring in multiple stake holders automatically into a common collaboration platform like persistent chat rooms and virtual meeting rooms in response to a SOP defined to handle a particular event.	
		• The operator should also have ability create these collaboration spaces like virtual meeting rooms or chat groups manually.	
		• The platform should allow the stakeholders to be notified of the creation of collaboration spaces using SMSs and announcements over PSTN telephone calls.	
		• The platform must allow configuration of the policy under which such collaboration spaces are created and stakeholders are invited and notified.	
		• The platform support allowing of stakeholders to share content relevant to the issue in the collaboration space. This content may include text, pictures, video, PDF/DOC/DOCX documents etc. and stakeholders should be able to view the content directly from the collaboration space.	
		• The platform should support all stakeholders to invoke a web conferencing session directly from the collaboration space. The web conferencing session should automatically include all stakeholders in the collaboration space.	
		• The platform should support allowing stakeholders to participate in the web conferencing session using any means including smart phones, laptop computers, PSTN telephones, enterprise desk phones etc.	
		• The platform should allow smart city devices (cameras, lights, various sensors etc.) to be added to the collaboration spaces. It should also allow the stakeholders to acquire data from such devices and to Visualise directly from the collaboration space, subject to access privileges for each user and device.	
		• The platform should support allowing the stakeholders to access the collaboration spaces, participate in conversations, share content, create web conferences and control smart city devices from any endpoint (smart phones, laptops and other computers) and from any network location.	

25.	Citizen Engagement	• The System should enable the city operations to seamlessly integrate citizen service request and grievance.	
		• It should be possible to integrate service request from various channels like social media (twitter,facebook, whatspp), email, chat, , etc.	
		• It should be integrated with Citizen Mobile App through which the citizen can make request for various city services. The APIs must be available for carrying out this integration.	
		• It should be possible to integrate the service request to the Incident Management platform for managing and acting on the service request.	
		• It should be also possible to collate this data with social media intelligence to have understanding of the pulse of the citizen	
26.	Enterprise resource planning (ERP) integration	• System should support integration of business process in ERP workflows like property tax collection, etc.	
		• System should allow ERP data visualization at city dashboard	
		• The platform should have the capability to retrieve data directly from ERP systems.	
		• The platform should also have the capability to read data directly from a set of databases (like:- HBase, MongoDB, Oracle, Cassandra, MySQL, Impala, etc.).	
		• System should be able to read data from flat CSV files.	
27.	Video Integration	a. Platform should be capable of integrating the existing & new surveillance camera and providanae viewing of camera feeds on visualization dashboard or display server	
		b. Platform shall have video module to Integrate any vendor video surveillance management solution	
		c. Video module of Platform should dynamically reduce the bit rate and bandwidth for each stream based on the viewing resolution at the remote location	
		d. Video module should POSTS data to Integrated platform on a regular basis for Camera details, notification and status	
		e. City Operation & Control platform should use dynamic channel coverage for video stream function for efficient bandwidth usage and only transmits video stream required to display on monitor to maximize bandwidth efficiency	

		f. Platform shall process and transmit video streams adaptive to each video requests from a display server to optimize network bandwidth usage	
28	Analytics Engine	• Integrated City Operations Platform shall be integrated with analytics engine and which shall support following capability.	
		• Should support flexibility to integrate with other city and government software applications.	
		• Analytics Engine module shall have below intelligence capabilities;	
		• Should predict insights consuming data from city infrastructure viz., Traffic, Parking, Lighting etc.	
		• Should predict and integrate with Smart City solutions helping in driving operational policies creation.	
		• Should support a visualization platform to view Descriptive as well as predictive analysis with trends and dynamic dashboards.	
		• The application should be able to discover, compare, and correlate data across heterogeneous data sources to unravel the patterns that are previously hidden. At a broader level system shall support following tasks:	
		• Connect to a variety of data sources	
		• Analyze the result set	
		• Visualize the results	
		• Analytics Engine should support multiple Data Sources. Min below standard data sources should be supported from day 1 – CSV, TSV, MS Excel, NoSQL, RDBMS	
		• Analytics Engine should provide analysis of data from a selected data source(s).	
		• Analysis enables to define arithmetic and aggregation operations that result in the desired output.	
		• Analytics engine should support Big Data Storage for structure and unstructured storage.	
29.	Analytics Engine Visualizations	• Analytics Engine should provide visualizations dashboard	
		• In the visualization workspace, it should allow to change visual attributes of a graph.	
		• User should not be allowed to alter the graph/visualization definition.	
		• In the visualizations workspace, user should able to do the following operations:	

		a. Change the graph/visualization type	
		b. Print the graph	
		c. Export the graph	
		d. Narrow down on the value ranges	
		e. Toggle the axis labels	
		f. Integrate with other 3rd party applications seamlessly	
30.	Export Formats	Should support export of the analysis into following formats:	
		a. XML/JSON	
		b. Excel	
		c. PDF	
		d. CSV	
31.	API & Interface Security	• The access to data should be highly secure and efficient.	
		• Access to the platform API(s) should be secured using API keys.	
		• Software should support security standards: OAuth 2.0, HTTPS over SSL, and key management help protect the data across all domains.	
		• Should support security features built for many of its components by using HTTPS, TLS for all its public facing API implementations. For deployment where CCC Software API(s) exposed to application eco system, API Management, API security features and API Key management functions are required.	
32.	Infrastructure Security	• System should support following security features	
		a. User encrypted storage volumes.	
		b. Restrict inbound access from public network only on secure ports via DMZ proxy instances	
		c. SSH access is restricted with secure keypair and from designated jump hosts alone.	
		d. User management and authentication is tied to Corporate SSO.	
		e. Platform should have appropriate technical controls in place to prevent attacks that target virtual infrastructure	
		f. Platform should have appropriate controls in place to detect source code security defects, functionalities for any outsourced software development activities from suppliers, open source libraries	

33.	Data Security & Integrity	• Data Governance / RBAC: Platform should support data governance & stewardship model, in which roles, responsibilities are clearly defined, assigned, implemented, documented and communicated	
		• Data Protection / Production Data integrity: Platform should support procedure in place to ensure production data shall not be replicated or used in non-production environment	
		• Data Protection / Data at rest: Platform should support encryption for city data at rest (on disk/storage)	
		• Data Retention: Platform should support capabilities to enforce city data retention policies	
		• Data recover & restore: Platform should support capability to recover and restore data in case of a failure or data loss.	
		• Data disclosure & privacy: Platform should disclose data attributes, elements collected from source. All the attributes should be disclosed & appraised to data owner. With appropriate approval from City authority, Platform should have ability to encrypt sensitive data element at rest.	
34.	Release Operations	• Patch Management: Platform should have capabilities to patch vulnerabilities across VM infrastructure, applications and systems	
		• Patch timeline / notifications: Platform vendor should provide risk-based systems patching time frames to city based on request	
		• Secure SDLC: Platform should support automated source code analysis tool to detect security anomalies / defects in code prior to production	
35.	Scaling, Capacity Provisioning parameters	• Platform should be scalable and should support capacity provisioning additional CPU, RAM to existing VM, Cloud infrastructure	
		• Platform should have tools to monitors the healthiness of the individual tenants and status of CPU, Memory performance	
		• The platform shall send alerts to the user once it exceeds certain limits in terms of CPU and Memory performance	
36.	Business Operations	• Audit & logging: Platform should support centralized logging & auditing framework. Physical and logical user access to audit logs restricted to authorized personnel only.	

		• Legal / Supplier chain agreements: Platform provider vendor should have policies and procedures established, and supporting business processes and technical measures implemented, for maintaining complete, accurate and relevant agreements (e.g. SLAs) between providers and customers	
		• Critical production assets: Platform vendor should maintain complete inventory of critical production assets. Asset could be defined as source code, documents, binaries, configuration data, scripts, supplier agreements, SW Licenses	
37.	Location Tracking System	• Should Support real time tracking of Vehicle or Mobile Resource using GPS . It should be Possible to integrate with any GPS Device , standalone or Mobile based.	
38.	Social Media Intelligence	• Provides analytics based on the social media feed collected from the open source intelligence and collate with the surveillance inputs to alert the responders for immediate action on the ground.	
		Analysis of citizen sentiment across topics should represented through news and social media feeds.	
		Identification of recently emerging and trending topics of interest and local influencers as well.	
		Geo spatial enabled analysis of data collected from social media channels	
		There should be a mechanism to retrieve and cache open social data from Facebook, Twitter, Instagram, Youtube, G+,, Web Sites, News , blogs, etc. The system should have the capability to use the cached social data for analysis	
39.	Support Field Responder Mobile Apps	• Should support integrated Mobile Application for Android and Windows for capturing real-time information from the field response team using Mobile- Standard Operating Procedure_Should integrated Mobile Application for Android, IOS and Windows for Dispatching Incidents, providing complete visibility of the incidents to the field responder, capturing real-time action taken from the field response team using Mobile- Standard Operating Procedure.	
40.	High Availability	• Platform shall meet availability level of 99.90 % for Production environment	
		• Platform shall have no single point of failure.	
		• All functionalities should always available > 99%	
		Software & hardware fault shall not result total system failure	

		• All failure must report relevant error messages to the user	
		• Platform vendor shall provide supporting infrastructure, appropriate tools to measure & monitor system availability and automated notification for system failure and unavailability	
41.	Logging	Platform should support logging frame with following functionalities	
		• Logs shall readable in ASCII plaintext or UTF-8 format	
		• All logs shall be timestamped and use NTP	
		• Log events shall capture user activities, applications, system & network IDPS messages	
		• Centralized & secure log repositories to all log events	
		• System logging shall be provided for all successful and unsuccessful login attempts and for all super user activities	
		• Platform should implement mechanisms to trigger alerts and facilitate users to analyse and review logs efficiently	
		• All critical logs are secured and sent to archive	
		• Centralized logging shall be configurable to report for exceptions and generate reports based on desired filters	
		• Appropriate controls shall be put in place to ensure outage of the central log repository does not result in any loss of logs	
		• The central syslog shall be able to normalize logs from wide variety of platforms / components for monitoring and analysis and support logical data segregation so that the different user groups can only view their own managed equipment logs	
		• Central syslog system shall have sufficient disk storage to keep the logs for 1 year to facilitate incident response investigation	
		• SIEM integration is must.	
		• Logging should have following retrieval time	
		◦ Timeline: Log Duration	
		◦ 6 Hrs: 0 – 30 days	
		◦ 1 day: 30 – 90 days	
		◦ 5 days : Older than 90 days	
42.	Performance	Performance monitoring tool shall include following	

	Monitoring	functionalities	
		• Identify infra and/or application components between the user and backend servers that is causing the problems	
		• Providing key performance indicators	
		• Identify the inter-dependencies between application & infra components	
		• Able to provide network/ system node causing the problem	
		• Provide email, SMS and/or mobile alert mechanism if performances fall below predefined thresholds	
		• Performance monitoring shall not adversely affect the performance of the platform	
43.	Database monitoring	• Platform should support database monitoring tool for DB health checks to monitor	
		◦ Memory allocation, usage and contention	
		◦ Disk I/O usage	
		◦ CPU usage for a particular transition	
		◦ Number of buffers, buffer size and usage	
		◦ Active locks and locks contention, including waiting time	
		◦ List of users (complete or selected) with their access rights	
44.	Platform Environment	• Platform provider shall have 3 environments	
		1. Development environment	
		2. QA environment	
		3. Production environment	
		• All 3 environments shall be physically / logically separated	
		• All should have same system & application software versions	
45.	Platform Software	• Platform provider shall provide complete information on all platform software deployed indicating clearly the software versions, quantity of licenses, functions, type of license (one time or annual recurring)	
		• Platform provider shall transfer all licenses with maintenance service supports to authority	
		• There shall be no use of freeware, shareware .	
46.	Backup and Recovery	• Platform backup and recovery solution functionality shall support following requirements	
		◦ Perform online database backup and recovery	

		◦ Support full, incremental, scheduled and on-demand backups	
		◦ Perform backup verification to ensure integrity of backup	
		◦ Perform automatic drive cleaning using pre-mounted cleaning tape	
		◦ Provide comprehensive reporting and analysis functions	

Annexure B.52. Laptop

S. No.	Parameter-	Minimum Requirements	Compliance (Y/N)
	Processors	Generation: Intel i5 latest available Generation CPU Architecture: x86 Speed: 1.6 Ghz Cache: Min 6 MB Chipset: Intel Wireless Connectivity: 802.11ac Dual Band (2x2) Wi-Fi + Bluetooth 4.1 Sound System: Integrated Stereo Speaker	
	Mother Board	Make: Intel/OEM Memory: 4 GB DDR-IV (2400 MHz) or higher expandable up to 32GB Video Graphics: Integrated HD Graphics card	
	Display	Screen Size: 14.0” or more Display Technology: AG, IPS, eDP, flat, Ultra Slim 220 Nits Resolution: 1920 x 1080 Web Camera: Integrated HD Web Camera (720P HD or higher)	
	4	Ports: 1 USB 2.0, 1 USB 3.1 Gen1, 1 DisplayPort and Power Delivery over USB Type C, HDMI 1.4, VGA, RJ-45, 10/100/1000 Ethernet Card, Microphone, Stereo Head Phone, Media Card Reader and other standard ports. Weight: 1.8 Kg or less with battery Battery Capacity: 42 WHr Prismatic	
	5	Carry case , Charging Adaptor: Good quality Carry Case/carry bag, Charging Adaptor	
	6	Operating System: Preloaded Windows 10 Prof 64 bit Windows	
	7	Hard disk Drive : 1 TB SATA (5400 RPM) or higher capacity	
	8	Minimum Certification: EPEAT, FCC, UL, BIS, TPM 2.0	

Annexure B.53. DG Set

Sr. No.	Item	Minimum Requirements	Compliance (Y/N)
1.	General Specifications	• Auto Starting DG Set mounted on a common base frame with AVM (Anti-Vibration) pads, residential silencer with exhaust piping, complete conforming to ISO 8528 specifications and CPCB certified for emissions. • KVA rating as per the requirement	
2.	Engine	Radiator cooled, multi cylinder, 1500 RPM diesel engine, with electronic/manual governor and electrical starting arrangement complete with battery, conforming to BS5514/ ISO 3046/ IS 10002	
3.	Fuel	High Speed Diesel (HSD)	
4.	Alternator	Self-exciting, self-regulating type alternator rated at 0.8 PF or better, 415 Volts, 3 Phase, 4 wires, 50 cycles/sec, 1500 RPM, conforming to IS 4722/ BS 5000, Windings of 100% Copper, class H insulation, Protection as per IP 23.	
5.	AMF (Auto Main Failure) Panel	AMF Panel fitted inside the enclosure, with the following: It should have the following meters/indicators a. Incoming and outgoing voltage / Current in all phases b. Frequency, KVA and power factor c. Time indication for hours/minutes of operation d. Fuel Level in fuel tank, low fuel indication e. Emergency Stop button f. Auto/Manual/Test selector switch g. MCCB/Circuit breaker for short-circuit and overload protection h. Control Fuses, Earth Terminal i. Any other switch, instrument, relay etc. essential for Automatic functioning of DG set with AMF panel	

6.	Acoustic Enclosure	a. DG set shall be provided with acoustic enclosure / canopy to reduce the sound level and to house the entire DG set (Engine & Alternator set) assembly outside (open-air). b. Enclosure must be weather resistant powder coated, with insulation designed to meet latest MOEF/CPCB norms for DG sets, capable to withstand Hyderabad climate. The enclosure must have ventilation system, doors for easy access for maintenance, secure locking arrangement and easy fuel refilling	
7.	Fuel Tank Capacity	It should be sufficient & suitable for containing fuel for minimum 12 hours continuous operation, Complete with level indicator, fuel inlet and outlet, air vent, drain plug, inlet arrangement for direct filling and set of fuel hoses for inlet and return.	

Annexure B.54. Antivirus with EDR & HIPS

Sr. No	Minimum Requirement	Compliance (Y/N)
1.	The solution should provide layered defense with Signature-based antivirus, Network Threat Protection, Browser protection, Machine Learning, Exploit mitigation, device controls & application control and should eradicate malware on a system to protect against viruses, worms, Trojans, spyware, bots, adware, and rootkits.	
2.	Correlate different linkages between users, files, and websites to detect rapidly mutating threats. By analyzing key file attributes, The solution should accurately identify whether a file is good and assign a reputation score to each file, effectively protecting against targeted attacks.	
3.	The Solution should check for the existence for antivirus software, patches, hot fixes, and other security requirements. For example, the policy may check whether the latest patches have been applied to the operating system.	
4.	The solution should help prevent internal and external security breaches by monitoring application behavior and controlling file access, registry access, processes that are allowed to run, and devices information can be written to and should provide application whitelisting and blacklisting functionalities.	
5.	The solution should automatically detects what location a system is connecting from, such as a hotspot, wireless network, or VPN and adjusts the security to offer the best protection for the environment.	
6.	If any endpoint is having more than three days older virus definition and if such endpoint tries to connect the network, then the solution must immediately install latest virus definition by connecting to the endpoint management server	
7.	If the host is non-compliant with the policies, the solution must automatically initiate remedial action, which may include running isolating it from network, downloading and executing/inserting a software, running scripts, by setting required registries keys. The solution should recheck host for compliance after remediation and grant access for the compliant host to the network.	
8.	Solution should collect and share the threat intelligence from / to external sources using industry formats such as STIX ,TAXII, etc.	
9.	The solution should utilize multiple detection approach by combining virtualization and emulation to capture more malicious behavior across a wider range of custom environments.	
10.	Solution should perform analysis on “known" & "unknown" content. Scanning files using whitelisting, file hash reputation, & static code analysis looking for known good & known bad content and send unknown files & URLs to sandbox for determination in a customized sandbox environment.	

11.	The solution should manage single license for windows, linux and mac Operating Systems and management server should not be separate.	
12.	The solution should detect malware that evades detection by using polymorphic custom packers by unpacking in a light weight virtual environment with no performance over-head.	
13.	The solution should have dashboard with search capabilities, sandbox execution time, event count, tasks complete and risk scores over say last 24 hours.	
14.	Solution should provide anomaly detection to detect and report on suspicious information found in a file. Preferable capabilities to include, TLS callback activity, CVE and exploit detection, shell-code detection, debugger detection, watermark tampering, and non-standard file alignment, RFC compliant etc	
15.	The Solution should provide manage windows, Linux and mac agents from same centralized console.	
16.	The solution should download content updates from the central server when computers are idle so that it does not affect bandwidth	
17.	The solution should have the ability to find whether the endpoint is out of compliance and should accomplish remediation, either via self-contained capabilities or integration with external resources	
18.	The solution's EDR should be able expose advanced attacks with precision machine learning, behavioral analytics and threat intelligence minimizing false positives.	
19.	The proposed solution should support endpoint quarantine from network and bring back the endpoint after remediation using ATP management platform	
20.	Solution should be able to perform EDR and targeted attack protection without installing any additional agents	
21.	Provides security monitoring across physical and virtual servers including real-time file integrity monitoring, configuration monitoring, consolidated event logging, and file and system tamper prevention.	
22.	Protects both physical and virtual servers by delivering application and protected whitelisting, fine grained intrusion detection and prevention; file system and admin lockdown; and file integrity and configuration monitoring.	
23.	Has out of the box Host IDS and IPS Policies. These prebuilt policies for Windows/Linux environments should monitor and prevent suspicious server activity.	
24.	Has sandboxing and process access control to prevent against a new class of threats utilizing comprehensive IPS protection. Must not be dependent on signatures for protecting server from malware.	
25.	Provide protection even when vulnerability or patch is not known. Has file and system tamper prevention and Lock down configuration, settings, and files.	

26.	Has host firewall to control inbound and outbound network traffic to and from servers. Has compensating HIPS controls to restrict application and operating system behavior using policy-based least privilege access control.	
27.	Provides process control based on the application initiating the change, the target file/registry key, the user/group attempting the change and finally based on additional arguments used when starting the application.	
28.	Server Security solution must provide the ability to lock files/key down from all applications, while allowing other applications to edit or read the file/key - so that enterprise admin tools can perform their task without manual intervention.	

Annexure B.55. Fingerprint Scanner

Sr.	Parameter	Minimum Requirement	Compliance (Y/N)
1	General	Compact biometric USB devices	
2	General	Device should use optical technology and fingerprint algorithms, both acknowledged worldwide for their high levels of performance and their exceptional robustness	
3	Optical technology offers superior image quality	High performance sensor: 500 dpi, 256 grey levels Available output formats include RAW, ISO 19794-4 or WSQ compressed (under license) images	
4	Image Compression	Image Compression using WSQ algorithm from FBI/NIST	
5	Biometric Feature Extraction	Feature Extractor is MINEX/FIPS 201 compliant Proprietary, ISO 19794-2 or ANSI 378 template formats available Templates can be stored in the internal database	
6	Biometric Matching	Matcher is MINEX/FIPS 201 compliant 1:1 authentication or 1:N identification (up to N = 5000 users) High accuracy: the false acceptance rate (FAR) is configurable down to 10-8 (depending on the security requirements) and maintained regardless of number of users in database Fast matching (refer to the table on right page) Match-on-Card is available on MSO 1350 V3 / MSO 1350 E3	
7	General	Capability of addressing juvenile fingers	
8	security principles	Symmetric and asymmetric keys, Key derivation, Hashing algorithm, Random number generator,	
9	Template Signature	Template Signature (X9.84 standard) to guarantee the origin and the integrity of the data sent to the Host System	

10	Image Quality	These precision designed, top of the range devices produce a fingerprint Image that is certified PIV IQS by the FBI. The reference standard in terms of single fingerprint image quality (equivalent to ISO 19794-4:2011) was defined to ensure Interoperability between multiple solutions.	
11	OS compatibility	Available for Windows, Linux and Android platforms	
12	General	Should Include a BioAPI interface, Low level protocol (ILV)	

Annexure B.56. SIEM solution

S. No.	Minimum Requirement	Compliance (Y/N)
1.	SIEM and Forensics Platform is required for complete visibility to identify and investigate attacks, the ability to detect and analyze even the most advanced of attacks before they can impact critical data, and the tools to take targeted action on the most important incidents. Complete visibility across logs, packets and end point is critical. Appliance based solution for better performance is required. The solution should collect, analyze, and archive massive volumes of data at very high speed using multiple modes of analysis. The platform should also be able to ingest threat intelligence about the latest tools, techniques and procedures in use by the attacker community to alert government on potential threats that are active.	
2.	Next generation platform should encompass log, packet and end point data with added context and threat Intelligence. Should provide complete network visibility through deep packet inspection high speed packet capture and analysis.	
3.	SIEM for Logs and deep packet inspection should be from Single OEM.	
4.	The solution should be a physical appliance form factor with following components: a. Management & Reporting b. Normalization and Indexing c. Correlation Engine d. Data Management	
5.	There should be no limitation on number of devices to be supported. Any addition in no. of devices should have no cost impact on department.	
6.	The SIEM & Log Monitoring solution should be from a different OEM than the Prevention Security solutions like F/W, IPS, HIPS, AV, DLP, and Encryption.	
7.	The solution should provide an integrated SOC dashboard and Incident analysis system that could provide a single view into all the analysis performed across all the different data sources including but not limited to logs and packets. The Tool should have role based access control mechanism and handle the entire security incident lifecycle.	
8.	Real time contextual information should be used at collection/normalization layer and also be available at correlation layer where any events are matched during correlation rule processing. In addition, solution must provide contextual Hub at investigation layer for all relevant contextual awareness data regarding alerts/incidents available for any information asset like IP/Device etc.	
9.	All logs that are collected should be studied for completeness of information required, reporting, analysis and requisite data enhancement, normalization should be performed to meet the reporting and analysis needs.	
10.	A solution should support minimum 10,000 EPS and scalable up to 20,000 EPS.	
11.	Correlation Engine appliance should be consolidated in a purpose build	

	appliance and should handle 50,000 EPS.	
12.	The solution should incorporate and correlate information that enables the Information Security Team to quickly prioritize it's response to help ensure effective incident handling.	
13.	The solution should be storing both raw logs as well as normalized logs. The same should be made available for analysis and reporting. The proposed solution should be sized to provide both raw logs and normalized logs with minimum 20 TB of storage.	
14.	The monitoring should be cross device and cross vendor and be both out of the box and scalable to cover additional devices and applications as required	
15.	Should be managed and monitored from SIEM unified console for Correlation, Alerting and Administration	
16.	Should be able to provide complete packet-by-packet details pertaining to one or more session of interest including Session replay, page reconstruction, image views, artefact & raw packet and object extractions.	
17.	Should be able to filter the captured packets based on layer-2 to layer-7 header information.	
18.	Should provide comprehensive deep packet inspection (DPI) to classify protocols & application.	
19.	The proposed solution must be able to provide the complete platform to perform Network forensics solution	
20.	The solution must be able to detect malicious payload in network traffic • Detect and reconstruct files back to its original type • Detect hidden or embedded files • Detect and flag out renamed files	
21.	The solution must have the ability to capture network traffic and import PCAP files using the same infrastructure.	

Annexure C: e-Governance Solution Requirements

Annexure C.1. Finance Management

Sl. No		Minimum Requirements	Compliance (Y/N)
C.1.1. Organizational Structure and General Requirements			
		Ability to support multiple Entities / Departments / Branches / Offices	
		Ability to perform consolidation for all the entities / Departments / Branches /Offices	
		Ability to report receipts & payments at various organizational levels	
		Ability to generate an output of all accounting entries for a user specified period (daily/weekly/ Monthly etc.).	
		System should record the Dates of the event, accounting, preparation of the voucher, authorization of the voucher, changes, if any, reference document, reversal, if any etc. on each voucher	
		Ability of system to generate & maintain sequential document numbering based on different business transactions	
		Ability of system to integrate with various other modules such as Procurement, Human resources, Projects etc.	
		Ability of the system with Interface with various third party software / tools & Legacy systems	
C.1.2 General Ledger			
	1.	Ability to create & maintain Ledger Account codes	
	2.	Ability to segregate ledger accounts such as Receipts, Payments, Asset, Liabilities etc.	
	3.	Ability to consolidate information within and across general ledgers for month end reporting purposes	
	4.	Ability to integrate G/L, accounts payable, accounts receivable with all the sub- ledgers and synchronize with the G/L in on-line, real-time manner.	

	5.	Ability to support multiple levels of approval for a journal voucher before posting	
	6.	Ability to maintain approval hierarchy and competent authority approval before the release of payment above the specified amount through journals.	
	7.	Ability to pass the entries in the next period before closing the current period.	
	8.	Ability to track period-end provisions by different voucher series, if required.	
	9.	Option to automatically reverse all provisions in the next period.	
	10.	Ability to automatic carry forward of balances for balance sheet accounts during a year-end closing.	
C.1.3 Accounts payable			
	1.	Ability to fully integrate the Accounts payables system with other financial sub modules like general ledger, cash book, accounts receivable, fixed asset, purchasing, inventory, projects etc.	
	2.	Ability to provide different types of transaction processing like supplier Invoice, Advances, Adjustment JVs, Payments etc.	
	3.	Ability of system to support debit/ credit note for Vendors	
	4.	Ability to provide for automatic adjustment of invoices / credit notes with prepayments/ debit notes.	
	5.	Ability to provide workflow dependent Invoice processing & approvals for Vendor Invoices	
	6.	Ability to capture unlimited line items that can be entered in the journal vouchers	
	7.	Ability to create Vendor master record along with functionality to capture various mandatory details such as PAN, TIN, Bank Details, GST details, etc.	
	8.	Ability to check duplicate master data creation & linkage of other vendor or customer accounts	

	9.	Ability to provide options to enter vendor invoices through various options such as Interfaces, Manual Vouchers etc.	
	10.	Ability of the system to generate ageing analysis for the outstanding invoices	
	11.	Ability to reflect invoice wise outstanding for a particular vendor and for group of Vendors	
	12.	Ability to release part payment against an invoice and balance payment process on a subsequent date	
	13.	Ability to make payment on account to a vendor and later link it to vendor specific invoice or invoices received. Ability to mark invoices as running bills or final bill.	
	14.	Facilitate of centralized payment for all the purchases made for different projects from the same vendor.	
	15.	Ability of system to record deductions from invoices under various accounts like cash discount, rebates, charges etc.	
	16.	Ability to block invoices and vendors for payment	
	17.	Ability to record details of the associated tax and miscellaneous charges.	
	18.	Ability to specify if taxes / charges are to be calculated for each item in the invoice or the entire invoice.	
	19.	Ability to record advances against vendor with reference to a general reference or multiple porforma invoices.	
	20.	Ability to support multiple approval hierarchy for Payment Processing as per the Delegation of Authority of the organization.	
C.1.4 Accounts receivable			
	1.	Ability of the Accounts receivables system to be fully integrated to the other modules like general ledger, the cash & bank book etc.	
	2.	Ability to generate credit/debit notes to customers based on different credit criteria.	
	3.	System should support the functionality of maintaining credit limits in both period and value and to stop processing of	

		invoices in case of over dues (either period or amount)	
	4.	System should support item based credit and debit notes, Interest Calculation, Fines & charges on Late payments etc.	
C.1.5 Cash and Bank Management			
	1.	Ability to create following Cash / bank transactions like Cash receipt, Cash Advance, Employee reimbursement, Misc payment, Office expenses etc.	
	2.	Facility to maintain details of petty cash transactions for multiple locations.	
	3.	Ability to maintain Cash register and Bank register for selected cash/Bank for user defined period.	
	4.	Ability to enter transfer transaction like Cash to Bank, Bank to Cash, Bank to Bank with both side entry confirmation.	
	5.	Ability to Control and monitor Earnest Money Deposit/ Bank Guarantee for the various contracts	
	6.	Ability to interface with finance module for auto generation of Bank Payment Voucher, Bank Receipt Vouchers, and Journal Vouchers	
	7.	Ability to generate a projected monthly cash flow statement	
	8.	Ability to generate payment forecast for the specified periods	
	9.	Ability to perform bank reconciliation	
	10.	Ability to interface with various banks for the purpose of payments & bank Reconciliation	
	11.	Ability to maintain records of the Bank Guarantees received.	
	12.	Ability to maintain Bank Wise / Party wise (by whom / in favour of BG has been Issued/ received)	
C.1.6 Taxation			
	1.	Ability to maintain various types of taxes requirements such as SGST, CGST, Service Tax / (GST provision) or any other tax provision included by Government.	
	2.	Ability to maintain the period for which specific tax rate is	

		applicable	
	3.	Ability to maintain various tax rates applicable for specified type of tax	
	4.	Ability to generate reports on various tax paid, in specified formats, if any – with period, amount, item rate.	
	5.	Ability for generation and reconciliation of TDS certificates (Customers wise/ Monthly / Yearly)	
	6.	Ability to balance GST credit to GST Payable A/c automatically.	
C.1.7 Budget, Funds & Grants			
	1.	Ability of in-built Budget Preparation & Control	
	2.	Ability to maintain budget centers to manage & control budgets	
	3.	Ability to update budget account automatically after utilization	
	4.	Ability to store the previous budgeted data for minimum 5 years	
	5.	Ability to maintain original budget, revised budget, supplementary budget and latest forecast	
	6.	Ability to manage Budget approvals at multiple levels	
	7.	Ability to flag budget if they exceed actual amounts utilized by specific percentage or amounts	
	8.	Ability to manage Funds & track expenses incurred against it	
	9.	Alerts for important events (i.e. renewal of FD etc.) (SMS, Email)	
	10.	Escalation utility for important events	
	11.	Ability to manage Grants & track expenses incurred against it	
	12.	Ability to do Consolidation of bottom-up budgeting requirements from cost centers to units to organizational level.	
	13.	Ability to do top-down allocation of finalized budget to units who are responsible to distribute budget to their cost	

		centers.	
C.1.8 Fixed assets			
	1	Ability of the system to support fixed asset classification by Asset category, Asset type, Asset ID, Physical ID, Asset location, Asset Value, Units (Departments/Section/Office.), Cost centre, Put to use date, Any other user defined field etc.	
	2	Ability of the system to support asset master with the data in respect of Capital Work In Progress (CWIP) references, Asset Classification Depreciation details, Expected Life of asset, Ownership details (Owned / Leased), Lease details, if Leased asset etc.	
	3	Ability of the system to support any number of assets without restriction	
	4	Ability to provide for transfer assets across organization.	
	5	Ability to generate accounting entries automatically for each transfer including capital account and accumulated depreciation.	
	6	Ability of system to allow recording of the disposal or scrapping of assets	
	7	Ability of system to support depreciation rates, schedules and terms for each asset as per statutory requirements	
	8	Ability of asset system to track asset values / schedules as per each of the above depreciation terms separately and individually.	
	9	The system should automatically post depreciation entries based on calculated Depreciation	
C.1.9 Travel & Expenses			
	1	Ability to manage employee advances, Travel bookings, Travel payment	
	2	Ability to handle workflow for pre-travel approvals & travel related payments	
	3	Ability to provide detailed report on Employee travels for In	

		progress, Overdue & paid trips	
	4	Ability to Integrate Human resources module with accounting	
	5	Ability to provide detailed report on payroll processed on various user criteria such as Employee ID, Departments etc.	
C.1.10 Reports			
	1.	Ability to generate financial statements at the various defined levels of the Organization / entities, individually as well as consolidated.	
	2.	Ability to support the generation of internal reports and transactional reports for each of the organizational units by selecting revenue/expense heads, Asset/liability head, projects, Funds ,grants etc.	
	3.	Ability to print / publish reports; and save them as viewable files in PDF, TXT, CVS, and XML formats.	
	4.	Availability of all standard financial reports like Trial Balance, Balance sheet, P&L, schedules of balance sheet etc.	
	5.	All report on net movement by account, showing opening balance at start of month, net transactions value (or detailed transactions) and closing balance.	
	6.	Ability to generate Transaction listing with reporting parameters like by project, by Account, by period, by voucher, by user etc.	
	7.	Ability to generate all statutory reports	
	8.	Capability of supporting multiple calendars years for reporting purposes	
	9.	Cash flow report: Listing period and year to date various cash flows against budget and last year, sub totalled at various levels.	
	10.	Ability to provide for all TDS related reporting	
	11.	Payments due as on a date or range of dates as per user requirement	
	12.	Ability to provide Vendor Listing along with other vendor	

		details as may be Required	
	13.	Cheque Reconciliation Report – Printed upon demand showing detail on all outstanding Cheques, bank wise, party wise.	
	14.	Ability to generate receivables report item wise	
	15.	Ability to generate report on debtors ageing for different parameters.	
	16.	Detailed Aging Balance for each customer category showing open invoice and A/R activity (e.g. payments, debit and credit memos, write-off, and comments).	
	17.	AR Invoice Register - list of automated and manually entered invoices with control totals.	
	18.	Provision for adjustment of Advance payment	
	19.	Ability of the system to generate the desired customer correspondence, like balance confirmation, payment reminders and the automation of the correspondence.	
	20.	Bank balance analysis (bank balances by amount slabs)	
	21.	Ability of the system to generate a comprehensive asset register (as per standard accounting practice)	
	22.	GST/taxes related reports should be generated as per the defined format	

Annexure C.2. HRMS Solution

Sl. No		Minimum Requirements	Compliance (Y/N)
C.2.1 Organization Management			
	1	Supports multiple companies' definition	
	2	Provides for client defined organizational levels	
	3	Provides Web portal communication to all people in the organization	
	4	Provides employee searches by: Employee Number, Last Name & First Name, Organizational Level, Department, Location, Status, Reporting officer etc.	
	5	Provides an on-line organization chart with hierarchies.	
	6	Adds / changes organization entities and easily transfers associates within and / or across entities (including companies).	
	7	Manages organization restructuring including position control.	
	8	Ability to maintain complete organization structure bifurcated Organization unit, department unit, positions, grades, relations, and hierarchy	
	9	Any change in organization structure to be approved based on defined workflows	
	10	Organization unit wise policy/ rule engine, changed based on defined approval Workflows	
	11	Ability to maintain organization wise unit wise approved position list and current status.	
C.2.2 Recruitment process			
	1	Provide facility for online recruitment of employees	
	2	Provide facility to collect online resumes against the vacancy	
	3	Allow for on-line screening & short listing of applications received on-line	
	4	Allow for on-line short listing of applications for recruitment	

		process like written test or interview	
	5	Able to generate Call Letters for Interviews to shortlisted candidates	
	6	Generate the joining forms on-line for the new employee to fill up on his own	
	7	Convert the Applicant data into Employee data on hiring / joining	
	8	Generate Organogram with vacant position mark (Diagrammatically)	
	9	Facility to define the specifications of the vacancy in terms of qualifications, work experience, location considerations, skills/competencies required, additional certifications / professional qualifications, etc.	
C.2.3 Personnel Management			
	1	Ability to maintain common employee database with personal, educational, professional information like Personnel details, address, family, working hours, work schedule rules, pay grades, tax data, pension data	
	2	Ability to maintain as on date employment history starting from joining the organization like promotions, achievement, awards, punishment, etc.	
	3	Ability to capture relevant copy of documents in digital format and linked with the employee data integrated with document management system	
	4	Maintain the information along with photo of the employee and all dependent or family on the system	
	5	Ability to review On-line request for updating / changes. Date gets updated after proper approval using workflow.	
	6	Ability to maintain issuance records of asset like Mobile, Tablets, Vehicle or welfare items like work equipment's, Uniform, safety shoes, raincoats etc.	
	7	While at service all administrative task should be carried out like transfer, special duty assignment, resignation, promotion, NOC issue, etc.	

	8	Generating of Transfer Forms / Orders for transfer of manpower from one location to another	
	9	Issuance of Transfer Order automatically for authorization personnel (Work flow) according to internal hierarchy	
	10	Auto update of the employee master and organization structure on actions like relocation or transfer of an employee from one department to another	
	11	Date wise validity of each transaction to be maintained. The master data need to be time bound with defined start date and end date with time constraints defined for type of record	
	12	Need to cater to the following task of employees: 1. VRS Retirements 2. Disciplinary cases 3. Promotions 4. Confirmation and transfers 5. Government Reservation Compliance 6. Roster for Reserved Categories. 7. Employee Grievances 8. Leave Management 9. Welfare Services 10. Union Matters. 11. Handling of loans, etc. 12. Reports & Returns / Maintenance of Rosters 13. Non-contributed PF	
	13	System to keep record of legal issues and cases for each employee	
	14	System to manage permanent as well as contract employees	
	15	System to generate all statutory Return forms under PF, Contract Labour and other government acts and policies	
	16	System to generate statutory forms for Pension and other settlements	
	17	Bulk data upload/ change should be possible	
C.2.4 Appraisal & Promotions			
	1	System to have employee appraisal and evaluation	

		functionality (along with rules and policy guidelines)	
	2	Appraisee & Appraiser fill up the forms on-line	
	3	Appraisee & Appraiser and/or Reviewer view the form on-line at the same time to facilitate discussion / comments on the same	
	4	Policy for Salary revision, Increments, Promotions be maintained on-line	
	5	System to provide facility for approval for pay fixation on promotion	
	6	System to give the status of promotion with eligibility, advice, trade test, promotion, extension of probation and reversion of promotion	
	7	System to handle employee demotion as a disciplinary action	
C.2.5 Leave Management / Attendance			
	1	Define and maintain a variety of leave types and associated application rules	
	2	Support for Manual and on-line Leave application processing	
	3	Leave Integration with Payroll	
	4	Leave amendments and adjustments by designated authority	
	5	Retain all leave history (approved, rejected, adjusted) based on user defined Criteria	
	6	System to maintain leave ledger	
	7	System to generate the monthly attendance/ absence sheet integrated with time biometric/fingerprint devices	
	8	System capable of generating late coming and early going report, their adjustment as per ASCL/NNA policies	
	9	Management of leave quota management, leave approval, and leave encashment	
	10	System to generate Compensatory -Off balancing and their adjustment as per the ASCL/NNA policies	
C.2.6 Payroll			

	1	Payroll computation based on leave, tax computation, deductions, adjustments etc.	
	2	Accommodate adjustment for the previous period's attendance	
	3	System to calculate statutory deduction for each employee based on deduction Rules	
	4	Both earning and deductions can be of both types i.e. forever and within period (From To dates). There should not be restriction on number of earnings and deductions	
	5	Integrate with different types of loan account for deducting EMI / Instalment Automatic	
	6	EMI / Instalment deduction stop automatically after end of the loan period	
	7	Arrears of salary to be paid for the adjustment of salary for the previous period by giving range of months/ Period	
	8	System to allocate an employee's salary across multiple cost centers by fixed % or specific assignment or manual distribution	
	9	Automatic update payroll calculation rules whenever an employee's grade changes	
	10	Handle multiple pay commission guidelines e.g. 6th pay and 7th pay commission for different set of employees	
	11	Manage all standard and statutory payroll related reports	
	12	Capture employee‘s bank account number and bank details	
	13	Allows to define different salary or wage classes and scales	
	14	Calculation of payroll based on attendance records with possibility of transfer of attendance records to payroll system in batch mode or manually for employees	
	15	System should be able to categorize the deductions like Tax, deductions on uniform, deduction on advance taken, loans from company or external organization, payments for any other purposes to external org. like LIC premiums	

	16	Provision of supporting loan details/advances taken like amount taken, tenure, amount of each instalment	
	17	Provision to set loan and advances repayment schedule with an option to modify the same and payroll calculation accordingly	
	18	Provision to levy deduction (for a user defined period) on items issued to employee e.g. uniform, deduction of loan or advance	
	19	Management of audit Payroll fixation	
	20	Process & generate the Salary certificate, Due Settlement Certificate for an employee / ex-employee	
	21	Daily wage employees payroll management	
C.2.7 Taxation			
	1	Ability to Define tax rules to determine employees tax liability as per changes by the Central Govt./ local statutory legislation for actual tax liability of employee	
	2	Facility to provide investment declaration form in electronic format. The employee will be required to fill and submit the form electronically so as to update salary record and tax calculation automatically by the system.	
	3	The system should ensure support for major statutory reports / Forms and certificates of taxes.	
	4	The system should Record employees' perquisites and other information relevant in computing their tax liability as tax components.	
	5	The system should Complete calculation and deduction of tax automatically / user defined	
	6	The system should Project the tax liability of each employee for the period within a tax calendar based on the employee declaration of savings etc. and providing tax planners to the employee.	
	7	Provision to Manually adjust taxable earnings (in case of income from other sources, investments etc.)	

	8	The system should handle Exemptions and Rebates as per the Income Tax Rules	
	9	Professional tax deductions with exemptions, arrears and generation of related reports and challans	
C.2.8 Retirement Benefits System / Other benefits System			
	1	System to take care for Medical Reimbursement system	
	2	Travel & Expense: Employees to fill details of expenses carried out during a travel, upload of receipts, computation of travel allowances and approvals. Integration with corporate card if issued in future, needs to be done.	
	3	System to provide provision and checks for the employees to be granted LTA / LTC as per company rules	
	4	System to allow payments (Both Advance and Final) towards LTA / LTC either outside or with Payroll and paid as taxable/ nontaxable as per Tax rules	
	5	System to provide facility of making payments of other benefits Like Telephone bills reimbursement either outside or with Payroll	
	6	Manage Entire Provident Fund and Gratuity Accounting Module as part of Payroll system	
C.2.9 Training & development,			
	1	Management of training calendar	
	2	Information of employees called & attended training	
	3	Career path/ skill-wise training schedule for employees and initiation of schedule after transfer or promotion to new position	
	4	System to provide a standard methodology for Training Need Identification	
	5	System to provide provision for the employees/Head of division to give a request/ nomination for training	
	6	Provide facility for online evaluation / feedback on Trainings	

		by the employees	
	7	Ability to send training alerts to employees	
	8	Maintain minimum required training to employees with alert for any repetition of the same or maximum training attended	
	9	A knowledge portal to empower employees taking up new responsibilities with rich knowledge base and anytime accessibility will be provided.	
	10	Provide provision to know the number of days/hours spent by individual & up to group for training	
	11	System to provide provision to know the amount spent on various training activities.	
C.2.10 Employee Self Service & Manager self service			
	1	Employee should be able to access own records, perform necessary functions and raise requests for above-mentioned phases using self-service portal: • Apply Leaves • Viewing salary slips • View leave balance • Viewing Form 16 • Entering travel claims • Employee time and attendance entry • Employee directory • Benefits enrollment • View Service Book • Standard Application of Rules • Benefits Management • Online Learning • Skill Position Matching • Talent Profile & Feedback on Performance	

	2	System to generate service book for employees, downloaded as pdf on request to view in Hindi and English with all necessary updates	
	3	Manager should be able to raise request on employee behalf and approve requests raised by employees online over mobile and web. These will empower Competent Authority to: Number of Employees Present or Absent Filled in Position Distribution in Subordinate Offices Online Communication to Pre-Designated Mailing List Pending Administrative Processes –like TA/DA etc. Pending Work Process Monitoring –like Loan/Advances, GPF etc. Human Resource Budgeting Talent Management -Skill / Competency Assessment, Training	
	4	Employees able to access own records online and raise requests for name change, NOC, address change, leaves with necessary workflow approvals.	

Annexure C.3. Project Management

Sl. No		Minimum Requirements	Compliance (Y/N)
C.3.1 Project Management			
	1	Facility to create new project / review existing project with critical information's like activity / task lists with target dates and resource.	
	2	Ability to track and analyse Project Schedule, Costs, Materials, Equipment and Services	
	3	Ability of handle any number of Projects simultaneously.	
	4	Ability to record, manage and report Accounting Data for all Project-related Transactions	
	5	Facility to record periodic Progress Information from Weekly / Monthly Project Reports	
	6	Facility to import Project Activity Networks exported from commonly-used Project Management Packages such as Primavera, Microsoft Project, etc.	
	7	Facility to identify project milestones and targets	
	8	Ability to define sub-projects within a project	
	9	Facility for multi-user concurrent access to any project, including record locking facilities to avoid concurrent updating of project details	
	10	Ability to analyse individual projects by comparing project plans against progress and produce exception reports.	
	11	Provision to select multiple projects based on selection criteria and display any/specified stored details	
	12	Ability to produce GANTT and PERT charts to display the critical path and float times for all or selected activities	
	13	Reporting facility through which users can define and develop reports related to single or multiple projects (for monitoring progress and performance)	
C.3.2 Project Scheduling			

	1	To provide various date planning functions. Flexible scheduling techniques to be used to calculate earliest/latest dates, floats, or critical paths within projects.	
C.3.3 Capacity and Workforce Planning			
	1	Networks to plan, analyse and level work centre based capacity requirements of the project.	
C.3.4 Material and External Service Planning			
	1	To assign material components to Networks to plan material requirements based on the project schedule, check the material availability, and trigger the material procurement and delivery later.	
C.3.5 Financial Planning			
	1	To provide various techniques for planning costs and revenues in Project System depending on financial planning requirements.	
C.3.6 Budget Management			
	1	Budget is the approved cost structure for a project. One can allocate budget to projects in Investment Management or directly in Project System.	
C.3.7 Confirmations			
	1	In the execution phase of projects confirmations can be used to document the actual work performed and the progress of individual work packages.	
C.3.8 Cost Integration and Billing			
	1	Costs actually incurred are posted directly to project by account assignment of documents in Financial Accounting, Controlling or Materials Management for example.	
C.3.9 Project Reporting			
	1	Project System provides various standard reports for real-time reporting of financial and logistic project data.	
C.3.10 General			
	1	Ability to manually/auto load and selectively change project	

		data (start/end dates, etc.).	
	2	Ability to capture, compute and report real-time actuals (e.g. costs, effort, schedule status)	
	3	Ability to aggregate cost, effort, and schedule data across projects (e.g. Gantt chart data rollup)	
	4	Ability to calculate performance ratios manually or automatically at specified points in time or at project milestones.	
	5	Ability to view of status of all projects with ability to drill down.	
	6	Ability to compute/display estimates of remaining work (hours to completion, percent of wok completed, end-date forecasting, etc.)	
	7	Ability to provide comparison of actual vs. planned progress with variance analysis, alerts, and rule - based notification.	
	8	Ability to provide project reporting/forecasting according to government contracting requirements (e.g., earned value analysis).	
	9	Ability to support risk monitoring and on-going multi-project risk management.	
	10	Ability to use project status and project forecasts to update financial budget forecasts.	
	11	Ability to capture and transmit project costs, expenses, commitments, etc., for accounting.	
	12	Ability to support and billing (e.g., expense reporting).	
	13	Ability to store, populate and update exact latitude and longitude details of the project and pass the information to and from GIS system.	
C.3.11 Project Cost Monitoring			
	1	Facility to record various Cost Data for a project (such as budget amount, expenditure to date, cost to completion, cost estimate of changes, etc.)	
	2	Facility to record Project committed Cost Data from the payment requests received from various sources	

	3	Facility to record release of funds details and maintain project release of funds History	
	4	Facility to record project allocations, advanced payment and bank details	
	5	Provisions to compare the payment requests against the outstanding contract value for a given project/stage/activity	
C.3.12 Project Resource Utilization and Reporting			
	1	Facility to integrate all Material Management functions such as Procurement, Receipt and Storing procedure, Material Reservation, and Inventory Management.	
	2	Facility to declare WIP status and Completion of Project.	
	3	Facility to transfer Project Material to regular Inventory and vice versa.	
	4	Facility to Map Project Item with Regular Item codification.	
	5	Provisions to include left over Material in regular Inventory as Non-Valued / Valued Material as well as Spare or Part of specific Equipment on completion of Project.	
	6	Provisions to track and include Installation / Commissioning / Put to use Date and warranty period and Maintenance schedule along with Details in system on completion of Project.	

Annexure C.4. Utility Billing Management

Sl. No		Minimum Requirements	Compliance (Y/N)
C.4.1 Customer Management			
	1	Service Order Management with Utility Billing	
	2	Service Order Quotation	
	3	Service Order Processing	
	4	Service Confirmation Processing	
	5	Customer Service Processes	
	6	Managing Financial Inquiries in Civic Centre	
	7	Processing Payments - Cheque/Cash/Card Payment	
	8	Generate automatic letters/notices	
	9	Maintain relationships between consumption history and a customer, meter and Premise	
C.4.2 Meter Management			
	1	Entering Meter Readings	
	2	Collecting meter readings in the metering database	
	3	Meter Malfunction Notification / Service Notification	
	4	Provision to interface with AMR	
	5	Spot water meter reading and billing	
	6	Validations for the spot metering and billing data update	
	7	Lifecycle monitoring and testing plan for meters	
	8	MIS generation System should be capable to monitor and track the following: Meter reader's performance, Comparison of input versus expected consumption, variance in consumption for consumers etc.	
	9	Tracking meter location & status	
	10	Adding meter record in batches	

	11	Provision to assign document / text/ drawing related information	
	12	Provision to interface with GIS	
	13	Create service orders from meter reading trouble codes	
	14	Facility to change faulty meter during a billing cycle	
C.4.3 Contract Billing			
	1	Water/Electricity billing	
	3	Meter rent	
	4	Service Contract and Quotation Analysis	
	5	Service Order and Quotation Analysis	
	6	Identifying Account for Utility Service Processes	
	7	Changing Account Data and Business Agreement Data	
	8	Master Data Overview (Account, Business Agreement, Consumption)	
	9	Bill Information/Bill Correction	
	10	Interfacing with spot billing and MRI instruments	
	11	Govt. Taxes and Levies: rates must be configurable and the system must automatically calculate the applicable amounts and apply them on the bills and if necessary show them as separate line items	
	12	Retrospective Billing, Billing reversal / Adjustment, Manual Billing, Unscheduled Billing, Proration Scenario	
C.4.4 Account Management			
	1	Changing Budget Billing Plan	
	2	Service Contract and Entitlement Management	
	3	Complaints and Returns Management	
	4	Warranty Analysis	
	5	Overdue alert	
	6	Accepting change in metering cycle	

	7	Provision to assign document / text/ drawing related information	
	8	Maintain a complete audit trail of all changes	
	9	Store monthly demand data and corresponding charges	
	10	Surcharges and Rebates on components of Water Bills must be configurable by account types	
	11	System provides the ability to bill for multiple meters at a single customer account.	
	12	Consumer connection management (ward-wise, zone-wise, type-wise, size-wise, etc.)	
	13	On the spot discount or waive off for special cases need to be incorporated	
	14	Converting due amount into instalments	
	15	Geographical area wise business rule application (zone/ ward/ sub-ward)	
C.4.5 Reports			
	1	Analysis Reports: I. Demand analysis Report. II. Collections analysis Report. III. Revenue Recovery analysis Report. IV. Water Supply Effectiveness Analysis Report. V. • Customer Service effective analysis Report.	
	2	Executive Management Reports: I. Consolidated view of operational profit & loss for all circle officers II. Drill down from the Transaction level to reports right up to section level III. • Change the sorting order and view the report contents with the new sort Order	
	3	Consolidated Reports: I. Consumption and sales II. Revenue realization, revenue improvement III. Customer complaints and water leakage losses	

		IV. Executive Summary Report V. Demand Vs. Collection VI. Summary information Report VII. • Commercial Performance Report	
	4	Single Parameter Reports: I. Improvement Reports II. Revenue Reports III. • Operations Reports	
	5	Revenue Collection Report: I. Demand raised for the month (As spot billing is done throughout the month cumulative progress is presented) II. % cumulative collection against correct month demand, till date for this month and for the last month III. • Monitoring of cumulative collection for the month till date against the demand raised	
	6	Other Reports: Service Level Benchmarking, monitoring and reporting (KPI) in accordance to MoHUA, GoI. Other reports as per the Client requirements arising from time to time during project life cycle.	

Annexure C.5. Tax Management

Sl. No		Minimum Requirements	Compliance (Y/N)
C.5.1 Taxpayer Identification and Returns Processing - single taxpayer view			
	1	Citizen Registration - citizens can walk in to a civic centre and get himself registered and attach his properties, water connection, drainage connection, birth registration, shops and establishment license, professional license in a single account	
	2	Ability to capture and retain existing unique id for each of the above services, like tenement id, water connection number, water meter id etc.	
	3	Ability to view past records for which data migration from existing applications	
	4	Ability to capture personal details along with Aadhar number, Pan card number, Driving license number etc.	
C.5.2 Agent's access to citizen information			
1		Agent to access citizen records, collect payment, issue returns, raise requests on behalf of citizens for all citizen services in scope.	
2		Provide agents with a complete view of client financial information, outstanding bills, bill details, and payment history across services in a single view	
3		Integration of complaint redressal module with Civic centre module is required, so agents can raise complaints on behalf of citizens in civic centre	
4		Services wise access to civic centre agents should be possible in the system	

C.5.3 Receivables Management and Payment Handling			
1		Process high volumes of payments quickly and accurately	
2		System should handle all payment channels like cash, card, online etc. and provide sophisticated and flexible clearing control	
3		Generate receipts and duplicate receipts for all type of payments both in Hindi and English based on account preference	
4		Agent wise, service wise and civic centre wise reconciliation for all type of payments should be possible as and when required.	
C.5.4 Financial Customer Care and Dispute Management			
1		Process high volumes of payments quickly and accurately	
2		System should handle all payment channels like cash, card, online etc. and provide sophisticated and flexible clearing control	
3		Generate receipts/ licenses/ certificates and duplicate copies on successful completion of for all type of payments both in Hindi and English based on account preference	
4		Agent wise, service wise and civic centre wise reconciliation for all type of payments should be possible as and when required.	
C.5.5 Revenue & Tax management			
1		System should provide quick adjustments, modify contracts, change payment details, set up instalment plans, create credit notes, or mark disputed items as locked to exclude them from automated collections processing.	
2		Fully automate routine volume tasks, such as calculation of interest payments, deductions, discounts, late payment charges etc. and	

		continuously optimize collections	
3		System should enable receivables management and payment handling, assign individual clearing strategies, automate payment reconciliation, and generate reports aligned with accounting principles	
4		Agent wise, service wise and civic centre wise reconciliation for all type of payments should be possible as and when required.	
5		Integration with utility bill payment services on ASCL/NNA websites, enabling tax payers to view and manage their account details	
6		support multiple revenue types with a single view of a taxpayer's obligations	
7		All citizen communication outputs required in both Hindi & English Language	
C.5.6 Property Tax: General			
1.		The application needs to be integrated with Tax and revenue management, accounts receivable and citizen services (CRM)/ civic centre application.	
2.		The module needs to be integrated with GIS with a facility to view the property in geospatial view from within the module.	
3.		All the process steps need to be integrated with Document Management system with each step having facility to view, comment on the document visible on the same process step screen.	
4.		The system to be integrated with tax assessment of ward management & inspection module.	
5.		All property tax rules should be configurable, to be changed as and when regulations are passed following required approval process.	

C.5.7 Others			
12.		Advertisement Hoardings & Contract Management: • Creation of a sales contract and subsequent billing from advertisement hoardings • Registration of media agencies as customers • Functionality for booking an advertisement • Functionality for setting up new hoarding and display of advertisement • Functionality for renewal of advertisement contract	
13.		ASCL/NNA users must be able to carry out processes on the system like Contract Entry, Billing, Collection, Issue Renewal Notices, Contract Renewal, Suspension and Cancellation	
15.		Usage of Telecom Fibre Network: creation of a sales order and raising an invoice for usage of fibre by telecom services providers: • Fixed rental basis • Percentage of revenue basis	
16.		Parking Lots: Creation of a sales order and subsequent billing from parking lots	
17.		Miscellaneous Revenues: Functionality to account for miscellaneous revenues from digital services, or rental for usage of community halls etc.	
19.		Reports as per business requirements of ASCL/NNA relating to Revenue from Property Taxes, Land Sales, Telecom Fibre Usage etc.	
20.		Rent and Lease:	

		• Booking of Estate • Rent Payment schedule • Department process like Contract Entry, Billing, Collection, Renewal Notice, Contract Renewal. • Reports	

Annexure C.6. Audit & Vigilance Management

Sr.No.	Minimum Requirements	
C.6.1 Objection Register		
1	Capability for creating an objection at three levels. It should also capture master details for creating objection like Inward Info, Sub Headers etc.	**Compliance (Y/N)**
3	After generating an Objection no., the Details should be passing to that particular department and also SMS will be sending to respective users with concerned employee	
4	Ability to get Objection Reply from Department	
5	The system should allow Verification - Basically it is used for validating an objection at three levels.	
7	The system should allow decision of making "Filed" or "Return" is final by 3rd Level user.	
8	SMS will be sent to respective users after completion of verification process with Concerned employee	
9	The system should generate MB/SD Objection Summary Report I. Inward With No Objection II. Inward With Objection III. Inward Summary IV. Audit Search Box	
10	The system should have Search I. Search Pension II. Search Service Book III. Search objection IV. Objection Detail V. Objection Pending With Department VI. Objection Pending With Audit	
11	The system should have Inward Outward Status	
12	The system should have Objection Filed Summary	

13	The system should generate Employee Wise Report	
14	The system should generate MB Report	
15	The system should generate New Objection Summary Report	
16	The system should generate Recovery Income Report	
17	An automatic SMS needs to be triggered to concerned officer/ supplier/ contractor in case query is raised by Audit department with last dates and the required documents mentioned. 4-tier names to be assigned for each process.	
18	This module will require integration with Payroll, Financial Management, Project management, Purchase for capturing the necessary audit investigations.	
C.6.2 Query Management & work assignment system		
1.	The system shall have the facility to capture the Queries from Vigilance department and allow the personnel to assign selected query to the respective officers simultaneously for response.	
2.	The system should have capability to alert the department officials through email, alerts, automated SMS messages with reminders on deadlines for query response before the due time.	
3.	Vigilance officer should be able to create daily task for his field of research and assign them to each team member	
4.	Field officer to have an access on tablet on which he can fill the necessary details during the verification visit like details of attendance register, Time-in, Time-out entry which can now be accessed through ERP system.	
5.	Once the response is received from respective officers for a set of queries, the system will allow	

	generating consolidated response letter compiling the responses from each officer in pre-defined format. 1. Once the details are submitted, an automatic report should be made and sent to Vigilance officer for remark and approval. 2. Vigilance officer will approve on the system and the report will be saved on the Document Management System. In the above module, starting point can be based either on complaint received from public, office bearers, commissioner, or task assignment by Vigilance officer. Based on this, the clerk will triage to the relevant team by putting inward number. And Vigilance officer will include the enquiry into his task assignment. In this case, the report will first go to Vigilance officer for approval where he can put his remarks and finally to Commissioner.	
6.	The system should have capability to record/update/close the status of Query.	
7.	The system should have capability to reopen a query which was inappropriately addressed and closed.	
8.	System should be able to generate the reports and data analytics based on user requirements like department wise, employee wise pending queries and ageing.	

Annexure C.7. Document Management System

Sl.No.		Minimum Requirements	Compliance (Y/N)
C.7.1 General			
	1.	Solution to be Unicode compliant with support of Hindi Unicode Font	
	2.	Scalability in terms of number of users, no. of work flows, no. of organizational entities, in-built workflows, and drilldown reporting capabilities.	
	3.	Should support any operating system like Windows, Linux, Unix	
	4.	All components of the proposed solution to be interoperable and seamlessly integrated.	
	5.	Solution to support various user interface options like portal, mobile, tablet, and user friendly forms built into the platform.	
	6.	Ability to create ad hoc reports, generate reports at various organizational levels, facility to download reports in various formats like CVS/PDF/text/XML/etc., and send reports electronically.	
	7.	Support multi-dimensional analysis of data collected for various workflow processes to identify bottlenecks and improve business processes.	
	8.	User should be able to generate dynamic report on basis of requirements without need of development	
	9.	System should support drill down reporting	
	10.	System to support dynamic workflows.	
	11.	System to support delegation management.	
	12.	System to maintain logs of transactions and audit trails.	
	13.	Solution to provide integrated user management and support role based access control.	
	14.	Ability to provide multiple roles to single user and bulk user	

		maintenance and access management options	
	15.	Solution to provide access level security for data at transactional level.	
	16.	System should have inbuilt features like workflows, file tracking, and knowledge repository.	
	17.	Integration required with email gateway, SMS gateway, payment gateway, email solution, collaboration tool, ticketing tool	
	18.	The solution shall support integration with Aadhar card as well as digital and electronic signature for applicable services.	
	19.	System shall support future integration with any digital government initiatives.	
C.7.2 Document Management Requirements			
	1.	The proposed DMS shall support separate Document/Image server for better management of documents and store only metadata information in database.	
	3.	The systems must seamlessly integrate with any or all of the Core applications and shall support interface with other open-standard systems.	
	4.	The system should be format agnostic and should allow storage of any digital data like images, Office Files, engineering drawings, PDF, PDF/A, photographs, video & audio files etc.	
	5.	System should allow exporting documents from scanner, email & Microsoft Office documents directly to DMS.	
	6.	System should allow creation of custom indexing field/tags for different documents at Folder & File level	
	7.	The departmental officials should be able to index folders, files, letters and documents on user-defined indexes like department, Letter No, file no, year, project Id etc.	
	8.	The Scanning Module should allow officers to scan single document as well as document in bulk with facility of segregation of scanned images as different document types	

		like letter, circular, GR, DPR etc.	
	9.	The solution should provide support for automatic document quality analysis so that any bad quality document doesn't get uploaded to the Document Management System. The solution should audit scanned documents for resolution, format/ compression, orientation etc.	
	10.	The scanning system should support Web-based Scanning & Desktop scanning Module which should allow scanning of documents when not connected to Server.	
	11.	System shall provide the standard file hierarchy structure of folders and sub- folders to allow users and groups of users to manage and organize their documents.	
	12.	System should allow search based on different parameters like file name, folder name, project name, index fields, Full text & Wild card search	
	13.	The system should have the capability to save the search queries or search results.	
	14.	System should have comprehensive & easy to set access rights controls at Folders & File level as well as Groups and users with inheritance	
	15.	The system should allow defining multiple levels of access rights (Delete/ Edit/ View/ Print/ Copy or Download) to officers based on their profile.	
	16.	The System should maintain audit-trail of all activities being done in the system, documents etc. by users as well as administrators.	
	17.	The system should manage lifecycle of content through retention, storage, retrieval, and destruction policies along with tracking and managing of physical location of the content using Records Management System	

Annexure C.8. Workflow & Custom Modules

Sl.No.		Minimum Requirements	Compliance (Y/N)
C.8.1 Workflow Management			
1.	Workflow management	System should have workflow capabilities for creation of custom processes	
2.		System should have capabilities in insert process control in customised processes	
3.		System should support creation of the following modules as custom modules	
C.8.2 Knowledge Management System (KMS)			
1	General	KMS should be able to capture content in all possible formats but not limited to followings: I. Audio formats II. Video files III. Image files IV. PDFs V. Office files VI. XMLs VII. Web links VIII. Other structured / unstructured documents (ex: emails) IX. Drawing files (AutoCAD, etc.) X. Spatial Data Files	
2		KMS should be able to store, retrieve, distribute and preserve: I. Scheme/Project Documents II. Reports III. Presentations IV. Images V. Best practices VI. Case studies VII. Acts, Rules, etc. VIII. Drawings IX. Spatial Data X. Other structured / unstructured documents (ex: emails)	
3		KMS should allow knowledge documents to be captured and stored under defined categories or be classified for easy retrieval and / or tagging using the DMS solution	
4		KMS should be bilingual (Hindi and English languages) with regards to the Indian scenario	
C.8.3.Search			
1	Searching Knowledge	Search engine feature should allow for searching based on multiple types of media content: a) Audio b) Video c) Image d) Text e) Document type f) Web links g) KMS Member Profile	
2		Search engine feature should allow for searching based on	

Sl.No.		Minimum Requirements	Compliance (Y/N)
		multiple types of categories: a) file type b) author name c) nature of content d) discussion group based e) project name based etc.	
3		Search engine feature should allow for searching in the Knowledge base using Mobile phones as well	
C.8.4.Sharing			
1	Sharing Knowledge	KMS should facilitate reuse of knowledge	
2		KMS should allow easy loading and sharing of knowledge documents onto the system	
3		KMS' document sharing should be simple and allow sharing multiple files and file formats (audio, video, image, standard text files, multimedia presentations, web links) with multiple users/groups	
C.8.5. Access			
1	Access	Only users with authorized access should be able to log onto the KMS	
2		KMS should allow the feature to add or remove users/groups	
3		The knowledge materials on the KMS should be protected against copyrights and/or intellectual property wherever or whenever required	
4		Only legitimate owners of knowledge articles or the KMS Administrator must be allowed to edit, update or delete their uploaded/published knowledge materials	
C.8.6.Advertising & hoarding management			
1	General	System should have interface with GIS	
2		Portal should have all the information including the processes and documents required for the convenience of citizen.	
3		System should capture all the details required for application.	
4		System should have facility to download required forms.	
5		System should have facility to send the alerts through SMS and email.	
C.8.7 Registration			
1	Registration of Agencies	System should have facility to allow online application or through CFC for registration of media agencies	
2		System should have facility to allow online payment	
3		System should send reminders to agencies 30 days prior for expiry of their registration	
4		System should allow renewal of registration	
5		Integration with Payment & SMS Gateway	
C.8.8.Approval			
1	Approval for	System should have provision of registration of Advt. agencies	

Sl.No.		Minimum Requirements	Compliance (Y/N)
	Hoardings, Adv. Boards on Private Sites	and Locations	
2		System should have the facility to apply online or through CFC for hoardings/ advertisements.	
3		System should allow entering the details of field visit.	
4		System should have interface with workflow system as per process for approval/ rejection.	
5		User will be intimated about the approval by SMS once workflow will approve it.	
6		Integration with workflow and document management system.	
C.8.9. Contracting			
1	Contracting of Advertisement Sites with Relevant Media	System should have the facility to prepare the list of relevant media like hoardings, board, banner, kiosks, etc.	
2		System should have interface with workflow system as per process for approval/ rejection.	
3		System should have interface with e tendering module.	
4		System should allow the online payment to the vendor or through Cheque/DD.	
5		System should allow preparing & generating the report as defined for process.	
5		System should allow all the records to be updated.	
C.8.10.Reports			
1	MIS	List of registered agencies	
2		List of approved sites	
3		Money collected through fees	
4		System should able to generate the any other fixed format and Ad-hoc reports as desired.	
C.8.11.Building Permission			
1	Building Permission & Regulation	System should have interface with GIS system	
2		System should have facility to categorize the building plan under Cinemas, Multiplexes, Marriage Halls, commercial complex, Housing and Hospital, etc.	
3		System should have facility to deliver the service online & through CFC.	

Sl.No.		Minimum Requirements	Compliance (Y/N)
4		The portal should have all the information including the processes and documents required for the convenience of citizen.	
5		System should capture all the details required for application.	
6		System should have the facility to apply online and through CFC.	
7		System should have facility to download required forms.	
8		System should have facility for online payment	
9		System should have facility to send the alerts through SMS and email.	
10		Integration with Accounts & Finance	
11		Integration with Payment gateway	
C.8.12.Empanelment			
1	Empanelment of Architects	System should have facility to capture the empanelment process for the Architects.	
2		System should maintain the records of empanelled architects for all the ULBs.	
3		System should have facility to import the list of empanelled architects	
4		System should allow Architects to make payment online for empanelment	
5		System should allow de-listing of any of the empanelled Architects from the list	
6		System should capture actions taken against any Architects for any violation	
C.8.13Sanction			
1	Sanction of Building Plan	System should have facility for uploading the soft copy of the building plan along with the application.	
2		System should allow uploading other necessary document along with the application.	
3		System should allow municipal officials and empanelled architects to access/download the same for verification of particulars.	
4		Owner of the land /Applicant will upload the building plan as per Building bye-laws with other supporting documents in the prescribed format	
5		Owner / Applicant may have to upload the revised drawing after incorporating the comments given by the ULBs	
6		Interface with e-Office System, SMS & Payment gateway	
7		Integration with Accounts & Finance	
C.8.14.Issuance of certificate			
1	Issuance of Completion	System should allow the owner of the property to upload the progress of construction (photographs of the property) at pre-	

Sl.No.		Minimum Requirements	Compliance (Y/N)
	Certificate	defined stages.	
2		In case of violation of the above, system should send alerts (SMS / e-Mail) to the concerned ULBs.	
3		System should have provision for designated officer to lodge the details of the site visit. Following which the documents needs to be approved by the document management system	
C.8.15.Approval			
1	Approval of Modification and Additional Construction	System should allow the designated officer to enter the field visit details.	
2		System should be able to generate notice to the concerned property owner. The same should be communicated through email and SMS.	
3		System should have the facility to apply online or through CFC for compromise.	
4		System should be able to generate composition fee assessment report as per the details entered.	
C.8.16.Registration of Builders			
1	Registration of Builders	System should allow registration of builders under various categories defined by the ULBs.	
2		System should allow builders/promoters to provide details about the sale of the flats/plots etc.	
3		System should allow tracking of sales/transfers of flats / plots etc.	
4		Interface with e-Office System and SMS application	
5		Property Tax Module	
C.8.17Reports			
1	MIS Reports	System should generate list of empanelled architects and no. & details of building plans approved / rejected by any particular architects.	
2		System should be able to generate a full range of reports relating to sanction of building plan, change of ownership, Issuance of completion certificates, violations, Lat-Longs, etc.	
C.8.18Mobile Towers Regulation System			
1	General	System should have interface with GIS system	
2		System should have facility to deliver the service online & through Citizen Facilitation Centres	
3		Portal should have all the information including the processes and documents required for the convenience of citizen whishing to rent / lease their property for Mobile Towers.	
4		System should capture all the details required for application.	

Sl.No.		Minimum Requirements	Compliance (Y/N)
5		System should have the facility to apply online and through Citizen Facilitation Centres.	
6		System should have facility to download required forms.	
7		System should have facility for online payment and through Citizen Facilitation Centres.	
C.8.19. Shops & Establishment: General			
1		An application giving user option to register, fill application, upload documents and submit fees should be developed.	
2		The documents uploaded should be stored in document management system.	
3		The application should follow the approval workflow with option to citizen to check the status of the application online.	
4		Integration with Financial accounting document is required to capture businesspartner details and to transmit the collection data.	
5		Reminders and notifications for renewal and generate receipt for the payment made.	
6		Functionality to advice professional tax department for raising penalties.	
7		Citizen should get workflow based functionality to get download policy, name change or closure.	
8		System should have facility to send SMS about due date, payment due, etc.	
9		Integration with Accounts & Finance	
10		Integration with Payment gateway	

Annexure C.9. Registration & Licensing

Sl. No		Minimum Requirements	Compliance (Y/N)
C.9.1General			
1.		System should have interface with GIS system	
2.		System should have facility to deliver the service online & through Citizen Facilitation Centres	
3.		Portal should have all the information including the processes and documents required for the convenience of citizen.	
4.		System should capture all the details required for application.	
5.		System should have the facility to apply online and through Citizen Facilitation Centres.	
6.		System should have facility to download required forms.	
7.		System should have facility for online payment and through Citizen Facilitation Centres.	
8.		System should have facility to send the alerts through SMS and email.	
9.		System should have the facility to download form, online filling and submission of form.	
10.		System should maintain the details about Licenses - category wise like commercial unit, rickshaw, trolley, slaughter house, vendors and any other category specified by the ULBs	
11.		System should maintain the details about License holder details, like, owner name, shop /rickshaw, address, purpose, date of issuance, license number etc.	
12.		System should have Facility to create/edit/update the deficiency/Inspection report against the application.	
13.		System should have facility to assign the application to respective Inspector for survey and verification.	
14.		System should have the facility to assign unique identification number based on license type, which will be used for all future transactions of the license.	
15.		System should allow intimating the applicant about the payment of license fee through SMS/ e-Mail.	
16.		System should allow the online payment of license fee.	
17.		System should allow the Generation of receipt for the payment.	
18.		System should allow printing the license, sending the license through e-mail.	
19.		System should automatically send the alerts to the License holder 30 days before the license/registration expiry.	
20.		Interface with e-Office System and SMS application	
21.		Integration with Payment gateway	
22.		Integration with Accounts & Finance	

Sl. No		Minimum Requirements	Compliance (Y/N)
C.9.2.Issuance of License for Trade			
1.		System should allow the SMS alerts to the applicant regarding the date of inspection / visit by the inspector, approval / rejection of the application.	
2.		System should allow the inspector to enter the field visit details and filed visit report should be generated and automatically routed to the superintendent.	
3.		System should allow the approving authority to approve or reject the report.	
4.		System should allow the applicant to apply for a license for multiple years.	
5.		System should allow generation of license and intimation to applicant through SMS or e-mail	
6.		System should sent reminders for renewal of license 30 days prior to the expiry	
7.		System should allow provisions for rebates/discounts etc.	
8.		System should allow generating paper based license.	
9.		Scrutiny of Applications	
10.		Inspection Entry	
11.		Generation of Show cause Notice	
12.		Hearing	
13.		Cancellation of License by Force	
14.		System should allow officials to send the digitally signed certificate to applicants through e-Mail and send details of license through SMS	
15.		Recording the NOC/Installation Permission Details	
16.		Capturing of the license fee/late fee details (Cheque/DD details, online, through banks etc.)	
17.		Issuance of Duplicate License	
18.		Change in Name of Business	
19.		Change in Business	
20.		Cancellation of License	
21.		Maintenance of matrix for license fee details with an option to keep the records even after new rates become affective	
22.		License Details (Ability to maintain the following details with options for addition / Modification / Deletion / Search)	
23.		License Holder's Details – One or multiple owners	
24.		Capture of Mobile No. / E-Mail ID	
25.		License holder's photograph(s) (optional)	
26.		Link to Holding Number	
27.		License Details – Temporary/ Permanent License, Name of Business, Business Address etc.	

Sl. No		Minimum Requirements	Compliance (Y/N)
28.		Trade/ Business Details – License Type, Subtype - multiple levels to define types and sub types.	
29.		License type, sub-type, unit of measure wise license amount	
30.		Calculation of License Fee	
31.		Letter of Intent	
32.		License Certificate	
33.		Interface with document/ workflow management system	
34.		Integration with e-Office System, SMS application and Payment gateway	
C.9.3Approval			
1		System should allow approving or rejecting the report.	
2		System should allow generating paper based license.	
3		Interface with document/ workflow management system	
C.9.4Reports			
1.	MIS Reports	License Register	
2.		List of Defaulters	
3.		Reminder Notice for Renewal	
4.		Demand / Collection Register	
5.		Reports showing Changes in License Types, Business Partners, Cancellation Licenses, etc.	
6.		Facility to forecast the impact of reduction / deduction of License Fee	
7.		Reports w.r.t. Bills / Notices generated	
8.		E-Mail / SMS to be sent to the owner upon transactions	
9.		System should generate the Reports showing the number of licenses approved/rejected.	
10.		System should generate the Report showing the number of license pending for approval/rejection.	
11.		System should generate the reports for which data was submitted after each inspection.	
12.		System should able to generate the any other fixed format and Ad-hoc reports as desired.	

Annexure C.10. Corporate web portal

S. No	Minimum Requirements	Compliance (Y/N)
1.	**Home Page** A clean, visually compelling home page that quickly conveys to the visitor, the ASCL's mission and what ASCL does. It will include (but not limited to) the following information either directly or linked through other pages: I. About ASCL; Corporation, Message from the CMD, Board of Directors, Shareholding pattern, Organogram & Key Personnel II. City Profile III. Master Plan IV. Investment opportunities V. Key statistics VI. Tourist Locations VII. GIS map of the City VIII. Photo Gallery IX. Online Services listing (e-governance services) X. Opportunities; Tenders, Careers, Empanelment, Training XI. Downloads XII. Links to Facebook, twitter etc. XIII. FAQs XIV. Feedback XV. Contact Us XVI. Search XVII. News & Updates XVIII. Log in XIX. Privacy Policy, Disclaimer, Visitors count, Important links, Site map	
2.	**Branding:** Clearly communicates a sense of 'identity' at first glance.	
3.	**Visual appeal:** The site must have an attractive mix of text, images, audio and video.	
4.	**Fast Loading Pages:** Optimization of web pages for a faster browsing experience with compatibility with key industry browsers and platforms.	
5.	**Responsive Design:** The site must be mobile-optimized through responsive design methods. Therefore, it should detect that a mobile device is being used and present the user with the mobile version first. The user should be able to switch to the desktop version and adjust resolution and format accordingly.	

S. No	Minimum Requirements	Compliance (Y/N)
6.	**Bilingual** The portal shall be available in Hindi & English and Unicode complaint.	
7.	**Simple and clear navigation:** The site should be easy to navigate. Information should be grouped and presented in a logical manner and require no more than three levels of "drill down" for the user to find the desired information thus creating a clean, clear, easy and satisfying user experience. This should include drop down menus, so that the visitor can easily find what they are looking for with a few clicks of the mouse.	
8.	**Search Tools:** Provide search capabilities using key words or phrasing that will provide access to content from throughout the site. Additionally, make it possible to download historical and recent data whereby the user can define his/her preference. Platform should allow users to search content of the portal easily and quickly without the need of high speed bandwidth.	
9.	**Important Links:** Links should be placed within the portal to allow individuals to contact institutions affiliated with the ASCL and access to the portal as well the respective departments/agencies/corporations/ministries.	
10.	**News/Update feed:** Constant and dynamic update feed on portal home page. Displays announcements and notifications for new content additions on front page of portal.	
11.	**Calendar and bookings:** A dynamic calendar that displays events as well as filters for searching events and booking any available venues/functions.	
12.	**Contact Form:** Provides a web-based contact form with anti-spam controls and shall allow stakeholders to track the status of request at any point of time, if any.	
13.	**Search capability:** Portal should provide search engine with various search capabilities.	
14.	**Compatibility:** Site must be compatible with common operating platforms including Google Chrome, Microsoft® Internet Explorer 8.0 or higher, Microsoft Edge, Mozilla Firefox, and Safari 5.0 or higher.	
15.	**Mobile Access**: Portal must be "responsively designed" to accommodate mobile users. This also includes accommodations for slower, cellular internet connections. This includes compatibility with iOS, Android and other industry standard platforms.	
16.	**Settings:** Portal must not require plug-ins as a default.	
17.	**Performance:** Portal must be able to handle multimedia (video) with	

S. No	Minimum Requirements	Compliance (Y/N)
	high performance.	
18.	**HTML Compliance:** Full compliance with HTML 5.0 or higher.	
19.	**GIS:** web GIS view of Aligarh Smart City depicting information through various layers would be shown to stakeholders; showing occupied and vacant land parcels, access to information on industries, residential properties, education & health facilities, transportation etc.	
20.	**Content Management System:** **I.** shall have Content Management System to update the content on the Portal which shall have minimum following capabilities: II. Content Authoring III. Content Publishing IV. Content Delivery V. Content Storage Management VI. Content Archival VII. Separation of content from presentation, which allows authors to focus on content rather than web design. VIII. Content storage management of all types of content; text graphic, audio, video etc.	
21.	**Integration with other applications:** Different existing and future applications/modules shall have to be seamlessly integrated with the portal. It is envisaged that GIS and the proposed systems shall work in an integrated manner to allow ASCL to extract maximum benefits from the system.	
22.	**Design and Construction** I. Work closely with the ASCL at each stage of the design to identify user needs and corresponding user interface requirements, workflows, and functionalities II. Ensure integration of all elements including content, information format, compatibility with software platforms used by ASCL and standards for content management III. Platform should allow easy integration of multimedia products and user-friendly administrator interface IV. Concepts should reflect the ASCL's identity, nature and purpose V. Develop corresponding user interface components (web templates, style sheets, scripts, images) as needed VI. Use simple, cost-effective techniques to test designs with representatives of target audience prior to launch of portal VII. Submit the final concept to ASCL for review prior to 'going live'	

S. No	Minimum Requirements	Compliance (Y/N)
	VIII. Secure the existing portal prior to transitioning to the new platform IX. Keep a full backup of the portal through the currency of the Project	

Annexure C.11. Mobile Application

Sr.No.	Minimum Requirements	Compliance (Y/N)
1	Mobile app should mirror the portal and be adapted for optimum viewing on multiple operating systems and device sizes. However the actual application layout design for both mobile and web is the responsibility of MSI.	
2	Mobile app shall be support major mobile platforms like Android, iOS etc.	
3	Mobile app should be in Hindi & English.	
4	Mobile app should be capable of showcasing enriched infographics to its stakeholders.	
5	Mobile app shall be designed in such a manner that it shall address the following key issues: ▪ Caching: Caching unnecessary data on a device that has limited resources ▪ Communication: Failing to protect sensitive data over any carrier ▪ Data Access: Failing to implement data-access mechanisms that work with intermittent connectivity	
6	Mobile app shall be integrated with main core solution proposed. There shall be facility to PUSH through and PULL through mechanism to get and receive information using SMS service.	
7	Mobile app shall provide critical data such as user identification and location information including latitude, longitude and altitude.	
8	The mobile app shall have the ability to take and transmit pictures and videos in real time along with geo-tags from the device.	
9	Mobile app should have capability of - ▪ Image compression, B/w conversion from color images ▪ Auto cropping, Auto orientation, perspective correction, geo capture ▪ Image capture setting (camera resolution, image type)	
10	Mobile app shall have the ability to push information to the mobile app as well as post bulletins and resources on the mobile app through API's.	
11	Platform will provide a report generating tool, which can be used to generate customized reports at any level.	
12	Platform should allow for a graphical interface to view the summary data in MIS reports. This would include trend graphs, graphs indicating how much of the target has been met etc.	

*****End of Document*****

ALIGARH SMART CITY

REQUEST FOR PROPOSAL FOR SELECTION OF MASTER SYSTEM INTEGRATOR FOR IMPLEMENTATION OF INTEGRATED COMMAND & CONTROL CENTER AND e-GOVERNANCE BASED SMART CITY SOLUTION AT ALIGARH

VOLUME-III: SERVICE LEVEL AGREEMENTS

RFP Number: 14/ASCL/2018 : Date: 05/12/2018

Invited by:
Aligarh Smart City Limited (ASCL)
Aligarh
Uttar Pradesh

Disclaimer

The information contained in this Request for Proposal document (RFP) or subsequently provided to Bidder(s), whether verbally or in documentary or any other form by or on behalf of Aligarh Smart City Limited (ASCL) or any of its employees or advisors, is provided to Bidder(s) on the terms and conditions set out in this RFP and such other terms and conditions subject to which such information is provided. This RFP is not an Agreement and is neither an offer nor invitation by ASCL to the prospective Bidders or any other person. The purpose of this RFP is to provide interested parties with information that may be useful to them in making their financial offers (Bids) pursuant to this RFP. This RFP includes statements, which reflect various assumptions and assessments arrived at by ASCL in relation to the Project. Such assumptions, assessments and statements do not purport to contain all the information that each Bidder may require.

This RFP may not be appropriate for all persons, and it is not possible for ASCL, its employees or advisors to consider the investment objectives, financial situation and particular needs of each party who reads or uses this RFP. The assumptions, assessments, statements and information contained in the Bidding Documents, may not be complete, accurate, adequate or correct. Each Bidder should therefore, conduct its own investigations and analysis and should check the accuracy, adequacy, correctness, reliability and completeness of the assumptions; assessments, statements and information contained in this RFP and obtain independent advice from appropriate sources.

Information provided in this RFP to the Bidder(s) is on a wide range of matters, some of which may depend upon interpretation of law. The information given is not intended to be an exhaustive account of statutory requirements and should not be regarded as a complete or authoritative statement of law. ASCL accepts no responsibility for the accuracy or otherwise for any interpretation or opinion on law expressed herein. ASCL, its employees and advisors make no representation or warranty and shall have no liability to any person, including any Applicant or Bidder under any law, statute, rules or regulations or tort, principles of restitution or unjust enrichment or otherwise for any loss, damages, cost or expense which may arise from or be incurred or suffered on account of anything contained in this RFP or otherwise, including the accuracy, adequacy, correctness, completeness or reliability of the RFP and any assessment, assumption, statement or information contained therein or deemed to form part of this RFP or arising in any way for participation in this Bid Stage.

ASCL also accepts no liability of any nature whether resulting from negligence or otherwise howsoever caused arising from reliance of any Bidder upon the statements contained in this RFP. ASCL may in its absolute discretion, but without being under any obligation to do so, update, amend or supplement the information, assessment or assumptions contained in this RFP. The issue of this RFP does not imply that ASCL is bound to select a Bidder or to appoint the Successful Bidder JV or Contractor, as the case may be, for the Project and ASCL reserves the right to reject all or any of the Bidders or Bids without assigning any reason whatsoever.

The Bidder shall bear all its costs associated with or relating to the preparation and submission of its Bid including but not limited to preparation, copying, postage, delivery fees, expenses associated with any demonstrations or presentations which may be required by the Authority or any other costs incurred in connection with or relating to its Bid. All such costs and expenses will remain with the Bidder and the Authority shall not be liable in any manner whatsoever for the same or for any other costs or other expenses incurred by a Bidder in preparation or submission of the Bid, regardless of the conduct or outcome of the Bidding Process.

PART A – GENERAL CONDITIONS OF CONTRACT 7

1. Definition of Terms....7
2. Interpretation....14
3. Conditions Precedent....14
4. Scope of work....15
5. Key Performance Measurements....16
6. Commencement and Progress....16
7. Standards of Performance....16
8. Approvals and Required Consents....17
9. Constitution of Consortium....17
10. MSI's Obligations....18
11. Selection of MSI's Key Personnel:....18
12. Changes in MSI's Key Personnel:....19
13. Exit of MSI's Key Personnel:....19
14. Services provided by OEMs:....19
15. Software, Licenses obtained by MSI....20
16. Powers of MSI's representative(s)/Key Personnel:....21
17. Setting up of Project Office:....21
18. Access to Data Center Site....22
19. Commencement of Installation....22
20. Reporting Progress....22
21. Inspection by the Authority:....23
22. Monitoring of MSI's performance:....23
23. Knowledge of Network Operations Center (NOC), Data Center's Server Room and ICCC....24
24. Project Plan....24
25. Adherence to safety procedures, rules regulations and restriction....25
26. Statutory Requirements....25
27. Authority's Obligations....25
28. Payments....26
29. Intellectual Property Rights....27
30. Taxes....28
31. Indemnity....29
32. Representations and Warranties:....30
33. Term and Extension of the Contract....32

34. Dispute Resolution 32
35. Conflict of interest 34
36. Publicity 34
37. Force Majeure 34
38. Delivery 35
39. Insurance 35
40. Transfer of Ownership 36
41. Exit Management Plan 36
PART B – SPECIAL CONDITIONS OF CONTRACT 38
42. Performance Security 38
43. Liquidated Damages 38
44. Limitation of Liability: 38
45. Ownership and Retention of Documents 39
46. Information Security 39
47. Records of contract documents 40
48. Security and Safety 40
49. Confidentiality 41
50. Events of Default by MSI 41
51. Termination 42
52. Consequence of Termination 43
53. Miscellaneous 44
54. Change Control Note (CCN) 46
PART C – SERVICE LEVELS 48
55. Purpose of Service Levels 48
56. Service Level Agreements & Targets 48
57. General principles of Service Level Agreements 48
58. Service Level Agreements (SLA) 48
59. Measurement of SLA 49
60. Pre Implementation SLA 50
61. SLA Matrix for Post Implementation SLAs 51
62. Operational SLAs 71
63. Definitions: 71
64. Conditions for No Penalties 72
65. Reporting Procedures 72
66. Issue Management Procedures 72

67. Service Level Change Control 73

ANNEXURES.....74

PREAMBLE

This RFP document comprises of the following three parts:

Part A: General Conditions of the Contract
Part B: Special Conditions of the Contract
Part C: Service Levels

Part A: General Conditions of the Contract

This part comprises of the general conditions which will govern the Contract to be executed between the MSI and the Aligarh Smart City Limited.

Part B: Special Conditions of the Contract

This part comprises of the special conditions which will govern the Contract to be executed between the MSI and the Aligarh Smart City Limited.

Part C: Service Levels

This part comprises of the general procedures with respect to the service level agreements, reporting, issue management, service level change control etc.

PART A – GENERAL CONDITIONS OF CONTRACT

1. Definition of Terms

In this RFP, the following words and expressions shall, unless repugnant to the context or meaning thereof, have the meanings hereinafter respectively assigned to them:

1.1. Acceptance of System" means the System, including the hardware, software, solution or any Deliverable accepted or deemed to have been accepted by the Authority, subsequent to its installation, rollout and deployment of trained manpower, when all the activities as defined in Scope of Work have been successfully executed and completed to the satisfaction of Authority and the Authority has given its acceptance by signing the Acceptance Certificate. For further details, refer to RFP Volume II.

1.2. "Acceptance Certificate"- means that document/certificate issued by the Authority signifying acceptance of a hardware, software, solution, or any other Deliverable pursuant to the successful completion of the Acceptance Test of the System;

1.3. "Acceptance Test" or "User Acceptance Test" - means the test, standard procedure, trial runs to be conducted by the MSI as per this RFP or as per Contract in relation to the Works.

1.4. "Affiliate(s)" means, with respect to any Person, any other Person, directly or indirectly controlled by, controlling or under common control with such Person. For purposes of this Agreement, the term "control" means the power to direct the management and policies of a Person, whether through the ownership of voting securities, by agreement or otherwise. An Affiliate shall remain an Affiliate only as long as such control exists.

1.5. "Agreement" means this Master Service Agreement including the Annexures hereto and any amendments thereto made in accordance with the provisions contained in this Agreement and include the documents specified in Clause 3.7 hereinafter;

1.6. "Applicable Law(s)"means all laws in force and effect as of the date hereof and/or laws which may be promulgated or brought into force and effect after the date of execution of the Agreement and includes any statute, law, ordinance, notification, rule, regulation, judgment, order, decree, injunctions, by-laws, approval, directive, guideline, policy, requirement or other governmental restriction or any similar form of decision applicable to the relevant Party and all judgments, decrees, injunctions, and orders of any court, tribunal or any quasi-judicial authority, as may be in force and effect during the subsistence of the Project;

1.7. "Applicable Permits" / "Approvals" means all clearances, licenses, permits, authorizations, no objection certificates, consents, approvals and exemptions under or pursuant to any of the Applicable Laws or from any Government Agency or third party, required to be obtained and/or maintained by the MSI or it's Sub Contractor(s)in order to implement the Project and for undertaking, performing or discharging the obligations

contemplated under the Agreement, including but not limited to clearances required for importing equipment, exemption of tax/duties/levies/work permits/clearances for MSI/MSI's Team;

1.8. "Approved Plan" shall mean the approval given by the Authority to the plan submitted by the MSI for executing the Works under the Contract.

1.9. "Authority"/ "ASCL" means the Aligarh Smart City Limited. The Project shall be executed in Aligarh and shall be co-owned by Aligarh Smart City Limited and Nagar Nigam Aligarh.

1.10. "Bank Guarantee" means an irrevocable and unconditional bank guarantee payable on demand and issued by a bank in favor of the Authority and furnished by the MSI or its Sub Contractor(s) to Authority for guaranteeing the due performance of its obligations under the Agreement;

1.11. "Bid" means the documents in their entirety comprised in the bid submitted by the Bidder in response to this RFP No. RFP Number: 14/ASCL/2018-19 Date: 05/12/2018.

1.12. "Bidder" shall mean Person, organization or consortium submitting the proposal in response to this RFP;

1.13. "Business Day" means the working day in the city of Aligarh.

1.14. "Change Control Note" shall have the meaning as set forth under Clause and in the format specified under Annexure I of this RFP.

1.15. "Commercial Off-The-Shelf (COTS)" refers to software products that are ready-made and available for sale, lease, or license to the general public;

1.16. "Conditions Precedent" shall have the meaning set forth in Clause [3] of this RFP;

1.17. "Confidential Information" means all information including any information (whether in written, oral, electronic or other format) which relates to the technical, financial and business affairs, dealers, suppliers, products, developments, operations, processes, data, trade secrets, design rights, know-how, plans, budgets and information and data which is proprietary to ASCL and which is disclosed to or otherwise learned by MSI in the course of or in connection with the Contract but does not include information (i) which is available lawfully in the public domain; (ii) publicly known through no fault of the MSI; (iii) already known to the MSI from someone other than the Authority who is not bound by confidentiality restrictions; or (iv) independently developed by the MSI without access to or use of the Confidential Information disclosed.

1.18. "Consortium" means a group of Persons/entities who have jointly formed a consortium for submitting a joint bid/proposal in accordance with this RFP for the Project. The Consortium shall be represented/headed by a Prime Bidder and shall be the entity/Person named in the Contract for any part of the Work and/or who has been sublet with the consent in writing of the Authority and shall include it's successors, representatives

(approved by ASCL), heirs, executors, administrators and permitted assigns, as the case may be, unless excluded by the terms of the Contract

1.19. "Consortium Member(s)" means each entity/member who have come together to form the consortium for the purposes of submitting a joint bid in response to this RFP;

1.20. "Contract" means the contract entered into by the Parties for executing and implementing the Works/Project as envisaged in the present RFP and includes (a) the complete RFP documents being Volumes I, II and III of the RFP and Corrigendum and addendum, (b) MSI's offer, (c) letter of acceptance or letter of award or letter of intent issued by the Authority, (d) the acceptance of letter of award from MSI, (e) notice to proceed with the Work, and (f) any other document listed in the Contract data;

1.21. "Contract Value" means the amount quoted by the MSI in its commercial Bid and which has been duly accepted by ASCL for the full and proper performance of its obligations under the Contract;

1.22. "**Date Center"/"DC"/"Data Center Site"/"DC Site"/ "Server Room"** means the data center sites including their respective data center space, wherein the delivery, installation, integration, management and maintenance services as specified under the Scope of Work are to be carried out for the purpose of this Contract. The DC Site will be located at premise along with Integrated Command and Control Centre.

1.23. "Deliverable(s)" shall mean all of the equipment, sub-systems, hardware, software, products accessories, software, source code, documentation, reports and/or other material/items which MSI is required to supply, install and maintain under the scope of the contract.

1.24. "Developed Materials" shall have the meaning ascribed to it in Clause 29.3;

"Document" means any embodiment of any text or image however recorded and includes any data, text, images, sound, voice, codes, databases or any other electronic documents /records as contemplated as per Information Technology Act 2000 and the rules framed under the said Act;

1.25. "Effective Date" means the date on which the Contract is signed or letter of intent is issued by Authority, whichever is earlier and executed by the Parties hereto. If the Contract is executed in parts, then the date on which the last of such Contracts is executed shall be construed to be the Effective Date;

1.26. "Fixes" means product fixes that are either released generally (such as commercial product service packs) or that are provided to MSI or their Subcontractor when performing services (such as workarounds, patches, bug fixes, beta fixes and beta builds) and any derivatives of the foregoing.

1.27. "Force Majeure" or "Force Majeure Event" shall have the meaning set forth in as per Clause [21];

1.28. "Goods" means all of the equipment, sub-systems, hardware, software, products accessories, components, software and/or other material/items and includes their user manuals, technical manuals, operating manuals, service mechanisms, policies and guidelines (such as security related, data migration related) and all its modifications which MSI is required to supply, install and maintain under the Contract;

1.29. "Good Industry Practice" means the practices, methods, techniques, designs, standards, skills, diligence, procedure, efficiency, reliability and prudence which would reasonably and ordinarily be expected from a skilled and experienced contractor engaged in activities of a similar scope and complexity to those that are the subject of the Contract and as envisaged under this RFP and under the same or similar circumstances, where such contractor is seeking to comply with its contractual obligations and all Applicable Laws and regulatory requirements. It would include good engineering practices in the design, engineering, construction and project management and acting generally in accordance with the provisions of this RFP and would include which would be expected to result in the performance of its obligations by the MSI in accordance with the Contract, this RFP, Applicable Laws and Applicable Permits in reliable, safe, environment protected, economical and efficient manner;

1.30. "Go- Live" means installation, testing, commissioning of Project, and commencement of all smart city components, including training as per Scope of Work mentioned in the Contract or this RFP. MSI should have the approval from Authority for carrying out User Acceptance Test.;

1.31. "**Government Instrumentality" / "Government Agency"/ "Government Authority"** means any department, division or sub-division of the Government of India or the Government of Uttar Pradesh or any other State Government, including but not limited to the Nagar Nigam Aligarh, Aligarh Development Authority, Aligarh Smart City Limited, as may be applicable, including any commission, board, body, bureau, authority, agency, instrumentality, court or other judicial or quasi-judicial or administrative body, at central, state or local level, or municipal and other local authority or statutory body including Panchayat under the control of the Government of India or the Government of Uttar Pradesh, as the case may be, and having jurisdiction over the MSI, MSI's Sub Contractor the Project or any portion thereof or the performance of all or any of the Services or obligations of the MSI or MSI's Sub Contractor under or pursuant to this RFP or under the Contract;

1.32. "Integrated Command and Control Center" OR "ICCC" means the integrated/centralized operation center as contemplated under this RFP to implement holistic and integrated solution for multiple (existing and future) IT initiative for ASCL. The IT initiative may be of any department approved by ASCL, such as Nagar Nigam Aligarh or any other authority/body which would conduct inter-alia activities like surveillance on security and civil issues through IOT based network on the entire Aligarh Smart City;

1.33. "Intellectual Property Rights" means all rights pertaining to patent, trademarks, copyrights, trade secrets, service marks, logos, brands, trade names, internet domain names, formulae, designs, software (whether in object code or source code), know-how, processes,

techniques, methods, technical data, databases, proprietary information, utility models, rights in know- how and other intellectual property rights, whether existing as of the Effective Date or arising thereafter, and all of the goodwill associated with the use of, and symbolized by, any of the foregoing, all rights of indemnification with respect to any of the foregoing, the right to prosecute and sue for past, present and future infringements, dilutions, violations or misappropriations with respect to any of the foregoing, all rights corresponding to any of the foregoing throughout the world, and all proceeds of any the foregoing, including licenses, royalties and proceeds of suit, and any right to any of the foregoing granted under any License.

1.34. "Key Personnel" means employees of MSI whether employed directly on rolls of MSI or engaged indirectly, providing services to MSI through a contractor and the key personnel of MSI as referred in Section 3.6.3 of the RFP Volume I proposed.

1.35. "Milestone" or "Project Timeline(s)": means the stipulated time period fixed under the Contract or under the RFP for completion of Works or part of the Works by the MSI.

1.36. "MSI" shall mean the successful bidder (Person, organization, Consortium) who is selected by the Authority at the end of the RFP process for execution of the Project and shall be deemed to include the MSI's successors, agent(s), agency, representatives (approved by ASCL), heirs, Affiliates, executors, administrators and permitted assigns, as the case may be, unless excluded by the terms of the Contract.

1.37. "MSI's Team" means the team established/formed by MSI for executing the Works under the present RFP and the Contract and shall include any and/or all of the employees of MSI, agent(s), agency, authorized service providers/partners and representatives or other Personnel employed or engaged either directly or indirectly by MSI for the purposes of the Contract;

1.38. "Notice" means a written notice, consent, approval or other communication required to be sent to the parties under the Contract;

1.39 "OEM" means the original equipment manufacturer of any equipment/system/software/product who is/are providing such Goods to the Authority under the scope of this RFP or the Contract;

1.40. "O & M": shall mean operation and maintenance.

1.41. "Person" includes any individual, company, corporation, partnership, joint venture, trust, unincorporated organization, government or Governmental Authority or Government Agency or any other legal entity;

1.41. "Performance Bank Guarantee"/"PBG" means performance bank guarantee as defined under Annexure 5 of the RFP Volume I

1.42. "Prime Bidder" means the member of the Consortium who is heading/representing the Consortium and who shall bid on behalf of the Consortium and represent the Consortium before the Authority and shall act as the interface between the Consortium and the Authority

1.43. "Project" means the project of implementation of ICCC in Aligarh City by the MSI in pursuance of the terms and conditions of this RFP/Contract.

1.44. "Project Location(s)" shall mean the location(s)/ site(s) where the Works are to be executed by the MSI.

1.45. "Project Manager"/ "Authority's Representative" shall mean the person appointed by the Authority for supervising and managing the affairs in relation to the Project.

1.46. "Project Office" means the site office to be set up by the MSI for the execution of the Project. The Project office shall be set up by the MSI at a location to be suggested by the Authority;

1.47. "Project Report(s)" shall mean the report(s) or the updates to be submitted by the MSI in relation to the Works at regular intervals;

1.48. "Project Team" means the MSI's Key Personnel, team members or any other person duly authorized by the Authority for the execution of the Works and the Project.

1.49. "Project Plan" or "Plan" or "Revised Plan" or "Work Plan" or "Program of Work(s)": means the plan/ schedule, methodology, design documents, specifications, or any other document submitted by the MSI to the Authority for executing the Works under the Contract or for the fulfillment of its various obligations under the Contract.

1.50. "Replacement Service Provider" means the organization or agency replacing MSI in case of termination of the Contract for any reasons whatsoever;

1.51. "RFP" means this Request for Proposal for the selection of MSI for implementation of the Project;

1.52. "Scope of Work" shall have the meaning as set forth in Clause [4.] of this RFP;

1.53. "Service Levels": shall mean the level of service to be provided/rendered by MSI for executing/completing the Works and for meeting it's various obligations under the Contract and shall include the meaning set forth in Part C of this RFP;

1.54. "Service(s)" or "Activity" or "Activities" : shall means the Works/Services to be carried out or rendered by the MSI pursuant to this RFP and the Contract or any other specific assignment awarded by the Authority to MSI;

1.55. "Service Specifications" shall mean the specifications as set out in PART C-SERVICE LEVELS of this RFP;

1.56. "Schedule of Requirements" or "Scheduled Requirement(s)" or "Schedule Requirement(s): shall have the meaning as set forth under_____;

1.57. "Steering Committee" or "High Powered Committee" or "Project Information Committee" shall mean a committee formed to supervise/monitor the work of the Project Management Committee and also the Project Manager. It shall consist of 5 numbers of members and shall act as the appellate body over the decision rendered by the Project Management Committee;

1.58. "Sub-Contractor" shall mean the entity or agency working on behalf of MSI and who is named in the Contract for any part of the Scope of Work or any Person to whom any part of the Contract has been sublet with the consent in writing by the Authority and shall include the heirs, legal representatives, successors and assignees of such Person;

1.59. "Work(s)" or "Program of Work(s)" means the entire work or a part of it to be undertaken by MSI for implementation of the ICCC Project in Aligarh City as envisaged in the present RFP and the Contract together with all Annexures, Schedules, referenced documents and all amendments, corrigendum, addendums and changes thereto.

2. Interpretation

2.1. In this RFP unless a contrary intention is evident:

a. "Party" shall mean MSI or ASCL individually and "Parties" shall mean MSI and ASCL collectively;

b. the clause headings are for convenient reference only and do not form part of the Contract;

c. unless otherwise specified a reference to a clause number is a reference to all of its sub-clauses;

d. the word "include" or "including" shall be deemed to be followed by "without limitation" or "but not limited to" whether or not they are followed by such phrases;

e. unless otherwise specified a reference to a clause, sub-clause or section is a reference to a clause, sub-clause or section of the Contract including any amendments or modifications to the same from time to time;

f. a word in the singular includes the plural and a word in the plural includes the singular;

g. a word importing a gender includes any other gender;

h. a reference to a person includes a partnership and a body corporate;

i. a reference to legislation includes legislation repealing, replacing or amending that legislation;

j. Where a word or phrase is given a particular meaning it includes the appropriate grammatical forms of that word or phrase which have corresponding meanings.

k. In the event of an inconsistency between the terms of the Contract and the RFP and the Bid, the terms of the RFP shall prevail.

l. In case there is a contradiction between the clauses mentioned in the RFP, the below hierarchy of clauses in order of precedence shall be applicable:

   i. Pre-bid clarification and Corrigendum, if any

   ii. Volume III of RFP

   iii. volume II (Project Components and Functional Requirements)

   iv. Annexures of RFP volume II (Detailed Scope)

   v. RFP volume I

3. Conditions Precedent

3.1. The payment and other obligations of ASCL under the Contract shall take effect upon fulfillment of the following conditions precedent by MSI:

3.11. Furnishing by MSI, an unconditional and irrevocable Performance Bank Guarantee (PBG) as per (Annexure 5 of the RFP Volume I) from a nationalized bank and in a form and manner which is acceptable to the Authority, which would remain valid until such time as stipulated by the Authority;

3.12. Obtaining of all statutory Approvals and Permits required for the performance of the Services under the Contract; this may include Approvals/clearances, wherever applicable, that may be required for execution of the Contract e.g. clearances from Government authorities for importing equipment, exemption of tax/duties/levies, work permits/clearances for Bidder/Bidder's team, etc.

3.13. Furnishing by MSI, the notarized copies of any/all contract(s) duly executed by MSI and its OEMs existing at the time of signing of the Contract in relation to the Project. Failure to do so within stipulated time of signing of Contract would attract penalty

3.14. Furnishing of such other documents by MSI as the Authority may specify/demand.

3.2. The Authority reserves the right to waive any or all of the conditions specified in Clause 3.1 above in writing and no such waiver shall affect or impair any right, power or remedy that the Authority may otherwise have.

3.3. In the event that any of the conditions set forth in Clause 3.1 hereinabove are not fulfilled within 1(one) month from the date of the Contract, or such later date as may be mutually agreed upon by the Parties, the Authority may terminate the Contract and upon such termination, MSI shall have no right to claim any damages from the Authority on such account.

4. Scope of work

4.1. The Scope of the Work under the Contract shall be as defined in RFP Volume II and Annexures thereto of the said RFP.

4.2. The Authority has engaged MSI to provide services related to implementation of ICCC and Smart Components in Aligarh City, using which the Authority intends to perform its business operations. MSI with prior written approval of the Authority would have the right to appoint a Sub Contractor for subcontracting any part of the Works/Services to such nominated Subcontractor. The Sub Contractor to be appointed and the subcontract shall be in a form and manner acceptable to the Authority. The Subcontractor shall fully abide by the terms and conditions of the Contract. It is a fundamental term of the Contract that appointment of a Sub Contractor would not absolve MSI of any obligations to be performed by the Sub Contractor under the Contract, and MSI shall be responsible for all acts of the Sub Contractor and indemnify the Authority for losses, damages, claims suffered by the Authority due to any acts of omission and commission by the Sub Contractor while performing its obligations under the subcontract.

4.3. In addition to the above scope of work mentioned in Clause 4.1 of this RFP, Authority may require MSI to provide such Goods, Products, Services and support as the Authority may deem fit and proper and necessary, during the Term of the Contract, and may include all such processes and activities which are consistent with the proposals set forth in the Bid, the Tender and the Contract and are deemed necessary by the Authority, in order to meet its business requirements related to the Project.

5. Key Performance Measurements

5.1. Unless specified by the Authority to the contrary, MSI shall deliver the Goods, perform the Services and carry out the Scope of Work in accordance with the terms of the RFP and the Contract.

5.2. If the Contract, Scheduled Requirements, Service Specification includes more than one Document, then unless the Authority specifies to the contrary, the later in time shall prevail over a Document of earlier date to the extent of any inconsistency.

5.3. The Authority may propose to amend any of the terms and conditions in relation to the Contract/Service Specifications which shall be amended in consensus and mutual consent of MSI and may issue any such directions which are not necessarily stipulated therein if it deems necessary for the fulfilment of the Schedule of Requirements and if such directions are resulting in extra time/fund requirement on part of MSI/ consortium members; accordingly Authority shall by way of issuing a change request or otherwise extend the timelines and/or increase the price.

6. Commencement and Progress

6.1. Subject to the fulfillment of the Conditions Precedent under Clause 3.1 above, MSI shall commence the performance of its obligations in a manner as per the Scope of Work specified under Clause 4 above.

6.2. MSI shall proceed to carry out the Activities/Services with diligence and efficiently in accordance with any stipulation as to the time, manner, mode, and method of execution contained in the Contract.

6.3. MSI shall be responsible for and shall ensure that all Activities/Services are performed in accordance with the Contract, Scope of Work, Scheduled Requirements and Service Specifications and that MSI's Team complies with such Service Specifications and all other standards, terms and other stipulations/conditions set out in this RFP and or the Contract.

7. Standards of Performance

7.1. MSI shall perform the Activities/Services and carry out its obligations under the Contract with due diligence and in accordance with Good Industry Practices. MSI shall employ appropriate advanced technology and engineering practices, shall maintain high safety standards, safe and effective equipment, machinery, material and methods and shall always

act, in respect of any matter relating to this Contract, as faithful advisors to the Authority and shall, at all times, support and safeguard the Authority's interests in any dealings with third parties.

8. Approvals and Required Consents

8.1. The Authority shall extend all necessary support to MSI to obtain, maintain and observe all Applicable Permits/Approvals as may be necessary for MSI to fulfill all its obligations under the Contract and/or for providing Goods and Services to the Authority. The costs of such Applicable Permits/Approvals shall be solely borne by MSI. Authority shall provide all reasonable co-operation, support and information available with it for obtaining such Approvals.

8.2. In the event, despite the support provided by the Authority, the Applicable Permit/Approval could not be obtained by MSI, MSI and the Authority shall discuss and co-operate with one another for achieving a reasonable alternative arrangement at the earliest, so that there is minimal disruption of Work or business operations, until such Approval(s) is/are obtained. However, if for any reason, no alternative arrangement could be achieved, Parties shall mutually decide the further course of action, however, until then, MSI shall not be relieved of its obligations to provide the Services and to achieve the Service Levels.

9. Constitution of Consortium

9.1. A group of Persons/entities may form a Consortium for submitting a bid under the present RFP. The Consortium shall be headed and represented through a Prime Bidder who shall act as the interface between the Consortium and the Authority. Unless the Authority deems fit and the Contract requires otherwise Prime Bidder shall be solely and absolutely accountable to the Authority for the performance of all obligations under the Contract.

9.2. The Consortium Members have agreed that Prime Bidder is the prime point of contact between the Consortium Members and the Authority and it shall be primarily responsible for the discharge and administration of all the obligations contained herein. The Authority, unless it deems necessary shall deal only with the Prime Bidder. *However, the Lead bidder and consortium members shall be jointly and severally liable to the Authority*. Notwithstanding the foregoing, the Lead Bidder would have the sole responsibility of ensuring the delivery of products and services mentioned in all volumes of this RFP and each consortium member will only be responsible/liable for their scope of work.

9.3. Without prejudice to the obligation of the Consortium Members to adhere to and comply with the terms of the Contract, the Consortium Members have executed and submitted a power of attorney in favor of the Prime Bidder authorizing him to act for and on behalf of such members of the Consortium and to do all acts as may be necessary for fulfillment of obligations under the Contract.

No agreement/contract executed within the consortium members be amended, modified and/or terminated without the prior written consent of the Authority. An executed copy of

each of such agreements/contracts shall, immediately upon execution be submitted by SI to the Authority.

9.4. Where, during the term of the Contract, Prime Bidder terminates any contract/arrangement or agreement relating to the performance of Services, Prime Bidder shall be responsible and severally liable for any consequences resulting from such termination. Prime Bidder shall in such case ensure the smooth continuation of Services by providing a suitable replacement to the satisfaction of the Authority at no additional charge and at the earliest opportunity.

10. MSI's Obligations

10.1. MSI's obligations shall include performance of all the Services as specified in the Scope of Work under Clause 4 of this RFP and also under the other clauses of the RFP (Volume I, II and III), the Contract and any amendments/changes thereof to enable the Authority to meet the objectives and operational requirements in the Contract. It shall be MSI's responsibility to ensure the proper and successful implementation, performance and continued operation of the proposed solution in accordance with and in strict adherence to the terms of its Bid, the RFP and the Contract. In addition to the aforementioned, MSI shall provide Services to manage and maintain the said system and infrastructure as mentioned in RFP Volume II.

10.2. MSI shall ensure that the Services are performed through the efforts of MSI's Team/Key Personnel and are in accordance with the terms hereof and to the satisfaction of the Authority. Nothing in this RFP or the Contract will relieve MSI from its liabilities or obligations under the RFP or the Contract to provide the Services in accordance with the Authority's directions and requirements and as stated in the Contract and the Bid to the extent acceptable by the Authority and MSI shall be liable for any non-performance, non-compliance, breach or other loss and damage resulting either directly or indirectly by or on account of its team.

10.3. MSI shall be fully responsible for deployment/installation/development and integration of all the software and hardware components and for resolving any problems/issues that may arise due to integration of components.

10.4. In addition to the aforementioned, MSI shall provide Services to manage and maintain the said system and infrastructure as mentioned in Section 1 of RFP Volume II.

11. Selection of MSI's Key Personnel:

11.1. MSI shall ensure that MSI's Team/Key Personnel is/are competent, professional and possesses the requisite qualifications, skills and experience appropriate to the task they are required to perform under the Contract.

11.2. The Authority reserves the right to interview and reject, if found unsuitable, the Key Personnel proposed by MSI that shall be deployed as part of the Project team. .

11.3. MSI shall submit profiles of only those Key Personnel who are to be deployed on the Project.

12. Changes in MSI's Key Personnel:

12.1. The Authority reserves the right to require changes in MSI's Key Personnel, which shall be communicated to MSI.

12.2. With the prior approval of the Authority, MSI may make additions to the Project team. MSI shall provide the Authority with the resume of the proposed Key Personnel and provide such other information as the Authority may reasonably require.

12.3. In case of change in MSI's Key Personnel/team members, for any reason whatsoever, MSI shall also ensure that the exiting team members are replaced with at least equally qualified (preferably better) and professionally competent members with due approval from Authority.

12.3. In case of change in its team members and for ensuring a smooth transition between outgoing team members with a new team member, MSI shall ensure a minimum of 30 days of time overlap in activities to ensure proper knowledge transfer and handover/takeover of documents and other relevant materials between the outgoing and the new member.

13. Exit of MSI's Key Personnel:

13.1. MSI shall ensure that none of the Key Personnel and manpower exit from the Project during the first 6 (six) months of the beginning of the Project. In cases where such exit is unavoidable, MSI shall replace such Key Personnel and manpower with a suitable replacement with prior written approval from the Authority. In case the Authority is not satisfied with the replacement provided, MSI shall have to compensate the Authority by paying a compensation of INR 2 lacs per such replacement.

14. Services provided by OEMs:

14.1. MSI shall ensure that the OEMs supply all Goods, including associated accessories and software required for the execution of the Works and shall support MSI in the installation, commissioning, integration and maintenance of these components during the entire period of Contract.

14.2. MSI shall ensure that the COTS supplied by the OEMs support MSI in the installation/deployment, integration, roll-out and maintenance of the software applications during the entire period of Contract. It must clearly be understood by MSI that warranty and O & M of the System, Products and Services incorporated as part of System would commence from the day of Go-Live of the respective phase including all the solutions proposed.

14.3. MSI would be required to explicitly display that it/they have a back to back arrangement for provisioning of warranty/O&M support till the end of Contract period with

the relevant OEMs. The annual maintenance support shall include patches and updates of the software, hardware components and other devices.

15. Software, Licenses obtained by MSI

15.1. All the software licenses that MSI proposes to obtain or use for the purposes of fulfilling its various obligations under the Contract have to be genuine and should be perpetual in nature. The software licenses shall not be pirated or restricted based on location and the Authority should have the flexibility to use them for other requirements if necessary. All Applicable Permits/Approvals/software licenses shall be obtained by MSI in the name of Authority only unless the Authority expressly agrees to give its consent in writing to do otherwise.

15.2. All the OEMs that MSI proposes should have dealer possession licenses.

15.3. The Authority reserves the right to review the terms of the warranty and annual maintenance agreements entered into between MSI and OEMs and no such agreement/contract shall be executed, terminated and/ or amended / varied to the detriment of the Authority, without the prior written consent of the Authority. An executed copy of each of such agreements/contracts and any amendments thereto shall, immediately upon execution be submitted by MSI to the Authority

15.4. MSI shall ensure that none of the components and sub-components is declared end-of-sale or end-of-support by the respective OEM at the time of submission of Bid. If the OEM declares any of the products/solutions end-of-sales subsequently, the MSI shall ensure that the same is supported by the respective OEM for Contract period.

15.5. If a product is de-supported by the OEM for any reason whatsoever, from the date of Acceptance of System till the end of Contract, MSI shall replace the products/solutions with an alternate that is acceptable to the Authority at no additional cost to the Authority and without causing any performance degradation.

15.6. MSI shall ensure that the OEMs provide the support and assistance to MSI in case of any problems/issues arising due to integration of components supplied by it with any other component(s)/product(s) under the purview of the overall solution. If the same is not resolved for any reason whatsoever, MSI shall replace the required component(s) with an equivalent or better substitute that is acceptable to Authority without any additional cost to the Authority and without impacting the performance of the solution in any manner whatsoever.

15.7. MSI shall ensure that the OEMs shall provide for all hardware servers/equipment supply and/or installation of all types, updates, patches, fixes and/or bug fixes for the firmware or software from time to time at no additional cost to the Authority.

15.8. MSI shall ensure that the OEMs for hardware servers/equipment or Bidders trained engineers conduct the preventive maintenance on a quarterly basis and break-fix maintenance in accordance with the Good Industry Practices. MSI shall ensure that the

documentation and training services associated with the components shall be provided by the OEM partner or OEM's certified training partner without any additional cost to the Authority. The training mentioned in clause 13.8 above shall be conducted using official OEM course curriculum, mapped with the hardware/software product(s) to be implemented in the Project.

15.9. MSI and their Personnel/representative shall not alter/change/replace any hardware component proprietary to the Authority and/or under warranty or during operation and maintenance of third party without prior consent of the Authority.

15.10. MSI shall keep and provide the required critical spares/components at the designated Data Center Sites/Project locations/office locations of the Authority (Collectively "Facilities") for meeting any unforeseen eventuality and for ensuring the various compliances and obligations under the Contract.

16. Powers of MSI's representative(s)/Key Personnel:

16.1. MSI's representative(s) shall have all the powers requisite for the execution of Scope of Work and performance of Services under the Contract. MSI's representative(s) shall liaise with the Authority's representative for the proper coordination and timely completion of the Works and on any other matters pertaining to the Works.

16.2. MSI's representative(s) shall extend full co-operation to Authority's representative in the manner required by them for supervision/inspection/observation of the equipment/goods/material, procedures, performance, progress, reports and records pertaining to the works. MSI shall also have complete charge of MSI's Team engaged in the performance of the Works and to ensure compliance of rules, regulations and safety practice. MSI's representative(s) shall also cooperate with the other service providers/vendors of the Authority working at the Authority's office locations & field locations and DC Site. Such MSI's representative(s) shall be available to the Authority's Representative at respective Data Center during the execution of Works.

16.3. MSI shall be responsible on an ongoing basis for coordination with other vendors and agencies of the Authority in order to resolve issues and oversee implementation of the same. MSI shall also be responsible for resolving conflicts between vendors in case of borderline integration issues.

17. Setting up of Project Office:

17.1. MSI shall set up a Project Office at the location to be suggested by the Authority at Aligarh within 30 days from the signing of the Contract. The technical manpower deployed on and necessary at the Project Office for the execution of the Works shall work from the said Project Office. However, some work may be carried out by MSI from its other offices during the Contract period.

18. Access to Data Center Site

18.1. Data Center Site would include Data Center's Server Room and ICCC.

18.2. The Authority's representative upon receipt of request from MSI intimating commencement of activities at various locations shall give to MSI access to as much of the DC Sites as may be necessary to enable MSI to commence and proceed with the installation of the Works in accordance with the Program of Work or for performance of facilities management services. Any reasonable proposal of MSI for access to DC Site to proceed with the installation of any Works in accordance with the Program of Work shall be considered for approval and shall not be unreasonably withheld by the Authority. Such requests shall be made to the Authority's representative in writing at least 7 (seven) days prior to start of the Work.

19. Commencement of Installation

19.1. MSI shall co-ordinate with the Authority and stakeholders for the parallel setup of DC Site along with the installation of other areas as mentioned in RFP Volume II document.

19.2. As per guidelines of Telecom Regulatory Authority of India (TRAI), resale of bandwidth connectivity is not allowed. In such a case tripartite agreement should be entered into between the Authority, MSI and internet service provider(s). Tripartite agreement to be provided later.

19.3. The plan and design documents thus developed shall be submitted by MSI for approval by the Authority.

19.4. After obtaining the approval from the Authority, MSI shall commence the installation of products.

20. Reporting Progress

20.1. MSI shall monitor progress of all the activities related to the execution of the Contract and shall submit to the Authority progress reports with reference to all related work, Milestones and their progress during the implementation phase.

20.2. Formats for all above mentioned reports and their dissemination mechanism shall be discussed and finalized along with Project Plan. The Authority on mutual agreement between both Parties may change the formats, periodicity and dissemination mechanism for such reports.

20.3. Periodic meetings shall be held between the representatives of the Authority and MSI once in every 15 days during the implementation phase to discuss the progress of implementation. After the implementation phase is over, the meeting shall be held as an ongoing basis, as desired by Authority, to discuss the performance of the Contract.

20.4. MSI shall ensure that the respective solution teams involved in the execution of Works are part of such meetings.

20.5. Several review committees involving representative of the Authority and senior officials of MSI shall be formed for the purpose of the Project. These committees shall meet at regular intervals, as decided by the Authority at a later stage, to oversee the progress of the implementation of the Project. Any erroneous reporting discovered during review meetings/any other time Client will impose penalty of INR 0.01 % of the financial implication due to such erroneous reporting per finding.

20.6. All the Goods, Services and manpower to be provided/deployed by MSI under the Contract and the manner and speed of execution and maintenance of the Work and Services are to be conducted in a manner to the satisfaction of Authority's representative in accordance with the Contract.

21. Inspection by the Authority:

21.1. The Authority reserves the right to inspect and monitor/assess the progress/performance of the Works/Services/Project at any time during the course of the Contract. The Authority may demand and upon such demand being made, MSI shall provide documents, data, material or any other information which the Authority may require, to enable it to assess the progress/performance of the Works/Services/Project.

22. Monitoring of MSI's performance:

22.1. At any time during the course of the Contract, the Authority shall have the right to conduct, either itself or through another agency as it may deem fit, an audit to monitor the performance by MSI of its obligations/functions in accordance with the standards committed to or required under the Contract and MSI undertakes to cooperate with and provide to the Authority or to the said agency any Document(s) and other details as may be necessary/required by them for this purpose. Such audit shall not include 'MSI's books of accounts.

22.2. Should the rate of progress of the Works or any part of it, at any time falls behind the stipulated time for completion of any Milestone related to the Works or is found to be too slow to ensure completion of the Works by the stipulated time, or is in deviation to Tender requirements/standards, the Authority's representative shall so notify MSI in writing.

22.3. MSI shall send reply to the written notice giving details of the measures it proposes to take to expedite the progress so as to complete the Works by the prescribed time or to ensure compliance to RFP requirements/Contract. MSI shall not be entitled to any additional payment for taking such steps. If at any time it should appear to the Authority or Authority's representative that the actual progress of the Works does not conform to the Approved Plan, MSI shall produce at the request of the Authority's representative a revised Plan showing the modification to the Approved Plan necessary to ensure completion of the Works within the time for completion or steps initiated to ensure compliance to the stipulated requirements

22.4. The submission seeking approval by the Authority or its representative of such Plan shall not relieve MSI of any of its obligations or responsibilities under the Contract.

22.5. In case during execution of Works, the progress falls behind schedule or does not meet the Tender requirements, MSI shall deploy extra manpower/resources to make up the progress or to meet the RFP/Contract requirements. Plan for deployment of extra man power/resources shall be submitted to the Authority for its review and approval. All time and cost effect in this respect shall be borne, by MSI within the Contract value.

23. Knowledge of Network Operations Center (NOC), Data Center's Server Room and ICCC

23.1. The Authority shall grant MSI access to the Data Center's Server Room and ICCC for inspection of such facilities before commencement of installation. Upon such inspection a plan shall be drawn up mutually by the Parties.

23.2. MSI shall be deemed to have familiarized itself with the knowledge of the Network Operations Center, Data Center's Server Room, and ICCC and its surroundings and information available in connection therewith and to have satisfied itself the form and nature thereof including, the data contained in the Bidding Documents, the physical and climatic conditions, the quantities and nature of the Works and materials necessary for the completion of the Works, the means of access, etc. and in general to have obtained itself all necessary information of all risks, contingencies and circumstances affecting its obligations and responsibilities therewith under the Contract and its ability to perform it. However, if during pre-installation survey/during delivery or installation, MSI detects physical conditions and/or obstructions affecting the Work, MSI shall take all measures to overcome them.

24. Project Plan

24.1. Within 15 (fifteen) calendar days of Effective Date of the Contract/issuance of letter of intent/ Letter of Award, MSI shall submit to the Authority for its approval a detailed Project Plan with details of the Project showing the sequence, procedure and method in which it proposes to carry out the Works. The Plan so submitted by MSI shall conform to the requirements and timelines specified in the Contract. The Authority and MSI shall discuss and agree upon the work procedures to be followed for effective execution of the Works, which MSI intends to deploy and shall be clearly specified. The Project Plan shall include but not be limited to Project organization, communication structure, proposed staffing, roles and responsibilities, processes and tool sets to be used for quality assurance, security and confidentiality practices in accordance with Good Industry Practices and delivery schedule in accordance with the Contract. Approval by the Authority's Representative of the Project Plan shall not relieve MSI of any of its duties or responsibilities under the Contract.

24.1. If MSI's Work Plans necessitate a disruption/shutdown in Authority's operation, the Plan shall be mutually discussed and developed so as to keep such disruption/shutdown to the barest unavoidable minimum. Any time and cost arising due to failure of MSI to develop/adhere such a Work Plan shall be to its account.

25. Adherence to safety procedures, rules regulations and restriction

25.1. MSI's Team shall comply with the provision of all Applicable Laws including labour laws, rules, regulations and notifications issued there under from time to time. All safety and labour laws enforced by statutory Government Agencies and by Authority shall be applicable in the performance of this Contract and MSI's Team shall abide by these Applicable Laws.

25.2. Access to the Data Center's Server Room, ICCC shall be strictly restricted. No access to any person except the essential members of MSI's Team who are duly authorized by the Authority and are genuinely required for execution of the Works or for carrying out management/maintenance shall be allowed entry. Even if access is required to be provided to such unauthorized personnel of MSI, the same shall be with prior approval of Authority's Representative and restricted to the pertaining equipment of the Authority on a need basis only. MSI shall maintain a log of all activities carried out by each of its team/ Key Personnel.

26.3. No staff of MSI, except the essential staff who have genuine work-related need, should be given access to the facilities. All such access should be logged in a loss free manner for permanent record with unique biometric identification of the staff to avoid misrepresentations or mistakes.

25.4. MSI shall take all measures necessary or proper to protect its Key Personnel, Work and facilities and shall observe all reasonable safety rules and instructions. MSI's Team shall adhere to all security requirement/regulations of the Authority during the execution of the Work. Authority's employees shall also be required to comply with safety procedures/policy.

25.5, MSI shall report as soon as possible any evidence, which may indicate or is likely to lead to an abnormal or dangerous situation related to the Works/Project and shall take all necessary emergency control steps to avoid such abnormal situations.

26. Statutory Requirements

26.1. During the tenure of the Contract nothing shall be done by MSI or its team including Consortium Members in contravention of Applicable Laws or any amendment thereof governing inter-alia customs, stowaways, foreign exchange etc. and shall keep Authority indemnified in this regard.

27. Authority's Obligations

27.1. Authority or its nominated representative shall act as the nodal point for implementation of the Contract and for issuing necessary instructions, approvals, commissioning, acceptance certificates, payments etc. to MSI.

27.2. Authority shall ensure that timely approvals are provided to MSI as and when required, which may include approval of Project Plans, implementation methodology, design documents, specifications, or any other document necessary in fulfillment of the Contract.

27.3. The Authority's representative shall interface with MSI, to provide the required information, clarifications, and to resolve any issues as may arise during the execution of the Contract. Authority shall provide adequate cooperation in providing details, coordinating and obtaining of approvals from various governmental agencies, in cases, where the intervention of the Authority is proper and necessary.

27.4. Authority may provide on MSI's request, particulars/information/or documentation that may be required by MSI for proper planning and execution of the Works and for providing Services covered under the Contract and for which MSI may have to coordinate with respective vendors.

27.5. Authority shall provide to MSI only sitting space and basic infrastructure not including, stationery and other consumables at the Authority's office locations.

27.8. Authority reserves the right to procure the hardware, including devices on quarterly basis in first year, based on actual deployment and O&M shall be applicable whenever the devices are procured and deployed till end of the Contract.

27.9. Readiness of the Project site: Authority hereby agrees to make the Project sites ready as per the agreed specifications, within the agreed timelines. Authority agrees that MSI shall not be in any manner liable for any delay arising out of Authority's failure to make the site ready within the stipulated period.

28. Payments

28.1. Authority shall make payments to MSI at the times and in the manner set out in the Payment schedule as specified under Payment Milestones in RFP Volume II subject to the penalties as mentioned under Clause 42 of Section C- Service Levels of Volume III. Authority shall make all efforts to make payments to MSI within 45 (forty-five) days of receipt of invoice(s) and all necessary supporting documents.

28.2. All payments agreed to be made by Authority to MSI in accordance with the Bid shall be inclusive of all statutory levies, duties, taxes and other charges whenever levied/applicable, if any, and Authority shall not be liable to pay any such levies/other charges under or in relation to the Contract and/or the Services.

28.3. No invoice for extra work/change order on account of change order shall be submitted by MSI unless the said extra work/change order has been authorized/approved by the Authority in writing in accordance with Change Control Note (as mentioned under Annexure I of this section of the RFP)

28.4. In the event of Authority noticing at any time that any amount has been disbursed wrongly to MSI or any other amount is due from MSI to the Authority, the Authority may without prejudice to its rights recover such amounts by other means after notifying MSI or deduct/adjust such amount from any payment falling due to MSI. The details of such recovery, if any, shall be intimated to MSI. Similarly, MSI shall also be entitled to receive the

payment of any undisputed amount under subsequent invoice for any amount that has been inadvertently omitted in previous invoice on the part of the Authority or MSI.

28.5. All payments to MSI shall be subject to the deductions of tax at source under Income Tax Act, and other taxes and deductions as provided for under Applicable Laws. All costs, damages or expenses which Authority may have paid or incurred, for which under the provisions of the Contract, MSI is liable, the same shall be deducted/set off by Authority from any payments/dues payable to MSI. All payments to MSI shall be made after making necessary deductions as per terms of the Contract and recoveries towards facilities, if any, provided by the Authority to MSI on chargeable basis.

29. Intellectual Property Rights

29.1. Except for any ownership rights in any intellectual property that have been expressly granted to the MSI under the Framework Agreement, the Authority shall exclusively retain all rights, title and interest in and to any third party licensed technology, including all worldwide technology and Intellectual Property Rights which has been used for the Project.

29.2. Preservation of notice: MSI shall not remove, efface or obscure any copyright notices or other proprietary notices or legends from any licensed technology or materials provided under the Contract, and shall reproduce all such notices and legends when incorporating licensed technology or materials into any integrated products.

29.3. Authority shall exclusively own and have a right in perpetuity to use all newly created Intellectual Property Rights which have been developed solely during execution of the Contract, including but not limited to all processes, software, technology, processes, methodologies, process improvements, ideas, concepts, products, specifications, reports and other documents which have been newly created and developed by MSI or its Subcontractor solely during the performance of Services/execution of the Contract (hereinafter “Developed Materials”) and for the purposes of inter-alia use during the Project. MSI shall have no rights in such Developed Materials and undertakes to promptly disclose to the Authority all such Intellectual Property Rights/Developed Materials created during the performance of the Services/Works. MSI shall promptly assign, completely and in writing to Authority any such Developed Materials and shall execute all such agreements/documents and obtain all permits and approvals that may be necessary to perfect Authority’s rights in the Developed Materials. It is a fundamental provision of the Contract that MSI will not violate or breach any Intellectual Property Rights of the Authority. Should MSI use or provide unauthorized access to the Developed Materials or breach any of the confidentiality of these Developed Materials, the Authority shall have the right to terminate the Contract forthwith and seek injunctive and other equitable reliefs.

29.4. Pre-existing work: All Intellectual Property Rights existing prior to the Effective Date of the Contract shall belong to the Party that owned such rights immediately prior to the Effective Date. Subject to the foregoing, the Authority will also have rights to use and copy all Intellectual Property Rights, process, specifications, reports and other document, drawings, manuals etc. provided or used by the MSI / Consortium / Sub-Contractors as part of the Scope

of Works under the Contract for the purpose of the Contract on non-exclusive, non-transferable, perpetual, royalty-free license to use basis.

29.5. Commercially off the Shelf (COTS): / third party products: All COTS products and related solutions and fixes provided pursuant to the Contract shall be licensed according to the terms of the license agreement packaged with or otherwise applicable to such products. Such licenses shall be brought on behalf of and in the name of the Authority or mentioning the Authority as the end user of such licenses. MSI shall be responsible for arranging any licenses associated with products. Unless otherwise specifically restricted by the licensing terms of the COTS products, all Intellectual Property Rights in any development/enhancement/customization etc. done on the COTS products pursuant to the Contract shall be owned by the Authority.

29.6. Further, the MSI shall be obliged to ensure that all Applicable Permits which are, inter-alia, necessary for use of the Deliverables, Goods, Services, applications works etc. provided/undertaken by the MSI / Consortium / Sub-Contractors under the Contract shall be acquired in the name of the Authority and to use such permits till the term of such permits on behalf of the Authority solely for the purpose of execution of any of its obligations under the terms of the Contract. However, even subsequent to the Term/expiry of the Contract, such Approvals/Applicable Permits shall endure to the exclusive benefit of the Authority.

29.7. MSI shall not copy, reproduce, translate, adapt, vary, modify, disassemble, decompile or reverse engineer or otherwise deal with or cause to reduce the value of the Products except as expressly authorized by Authority in writing.

30. Taxes

30.1. MSI shall bear all personal taxes levied or imposed on its Personnel, or any other member of MSI's Team, etc. on account of payment received under the Contract. MSI shall bear all corporate taxes, levied or imposed on MSI on account of payments received by it from the Authority for the Work done/Services provided under the Contract.

30.2. MSI shall bear all taxes and duties as may be levied or imposed on MSI under or in relation to the Contract and under the Applicable Laws including but not limited to Goods & Services Tax (GST) (including any IGST,CGST & SGST) and all Income Tax levied under Indian Income Tax Act – 1961 or any amendment thereof during the entire Contract period and thereafter till such time the liability relates to MSI's obligation under the Contract, i.e., on account of Goods supplied and Services rendered and payments received by it from the Authority under the Contract. It shall be the responsibility of MSI to submit to the concerned Indian authorities the returns and all other connected documents required for this purpose. MSI shall also provide the Authority such information, as it may be required in regard to MSI's details of payment made by the Authority under the Contract for proper assessment of taxes and duties as may be imposed under Applicable Laws. The amount of tax withheld by the Authority shall at all times be in accordance with Indian Tax Law or any other Government Agency and the Authority shall promptly furnish to MSI original certificates for tax deduction at source and paid to the Tax authorities.

30.3. MSI agrees that it shall comply with the Indian Income Tax Act or any other Applicable Laws in force from time to time and pay Indian Income Tax or other applicable taxes and duties, as may be imposed/levied on them by the Indian Income Tax Authorities/Government Authorities, for the payments received by them for the Works performed under the Contract.

30.4. Bidders shall fully familiarize themselves about the taxes applicable to the Bidders under Applicable Laws on the amounts payable by the Authority to them under the Contract. All such taxes must be included by Bidders in their financial proposal. (Bidder to find out applicable taxes for the components being proposed.)

30.5. Should MSI fail to submit returns/pay taxes in times as stipulated under applicable Indian/State Tax Laws, and consequently, any interest or penalty is imposed by the concerned authority on Authority/MSI, MSI shall bear the same. MSI shall indemnify Authority from and against any and all claims, liabilities, losses or damages arising out of the Contract or in connection with such taxes, including interest and penalty levied/assessed by any such tax authority against the Authority/MSI.

30.6. The goods and services tax (GST) on Works (central or state) if levied on supplies made from indigenous vendors for the Works shall be borne by MSI within the Contract price. Any other tax/duty, if applicable, shall be payable extra, at actuals by the Authority in accordance with the conditions of the Contract and upon submission of proof of payment of such taxes.

30.7. The Authority shall if so required by Applicable Laws in force, at the time of payment, deduct income tax payable by MSI at the rates in force, from the amount due to MSI and pay to the concerned tax authority directly.

31. Indemnity

31.1. MSI hereby agrees to indemnify defend and hold harmless the Authority and its Affiliates, respective officers, directors and agents and their respective successors and assigns from and against any and all claims (including from third parties), losses, liabilities of any kind howsoever suffered, fees (including reasonable attorneys' fees, disbursements and costs of investigation), damages, cost and expenses (collectively “Losses”), arising or incurred inter alia during and after

Contract period in connection with:

a) any negligence or wrongful act or omission by MSI or any third party associated with MSI in connection with or incidental to the Contract;

b) MSI or its Sub Contractor’s actual or alleged failure occurring after the Effective Date to observe or perform any duties or obligations required to be observed or performed by MSI or its Subcontractor under or with respect to any obligations under the Contract;

c) the damage to or loss or destruction occurring after the Effective Date of any real or tangible personal property in the possession or under the control of MSI, or any Affiliate thereof;

d) the death or bodily injury occurring after the Effective Date of any agent, employee, Subcontractor's employee, visitor of MSI or its Subcontractor;

e) any breach of MSI's representations and warranties set forth in the Contract occurring after the Effective Date to the extent caused by MSI or its Affiliates, or its or their agents, employees or Subcontractors;

31.2. MSI agrees to indemnify, defend and hold harmless the Authority and/or its Affiliates from and against all losses incurred by the Authority and/or its Affiliates as a result of any allegations that the software, data, intellectual property or other materials supplied by the MSI or used by MSI infringes, misappropriates, or violates any patent, copyright, trademark or trade secret or other intellectual property of any third party. In the event of any third party claim against the Authority and/or its Affiliates in respect of the use of such software data, intellectual property or other materials, in addition to the indemnification obligations set forth herein, the Authority, at its option, may: (a) obtain a right to use such software or materials without obligation on the part of the Authority to the owner of the allegedly infringed Intellectual Property; (b) modify the software or materials, without materially diminishing the functionality or performance thereof, to become non-infringing at MSI's sole expense; or (c) require that the MSI discontinue the use of the infringing software or materials. Notwithstanding the foregoing, the Authority will have no liability for any third party claim of infringement based upon: (i) modifications of the software or materials that are not made by the Authority; (ii) the use of software or materials in connection with another product or service (the combination of which causes the infringement) if the Authority did not approve of such use; or (iii) MSI's non-compliance with the Authority's specific instructions. MSI shall take commercially reasonable steps to mitigate damages arising from the liability arising under this clause.

31.3. Regardless of anything contained (except for MSI's liability for bodily injury arising out of gross negligence or willful misconduct for which it is legally liable and it's liability for infringement of any Intellectual Property Rights including of any third party in accordance with the terms of the Contract), the total liability of MSI, is restricted to the total value of the Contract.

32. Representations and Warranties:

32.1. MSI represents that it is a company duly organized, validly existing and in good standing under the Applicable Laws and has full corporate power and authority to implement the terms hereof. It is specifically agreed between the Parties that MSI has all the Approvals and Permits required to execute the Works/provide the Services under the Contract.

32.2. MSI warrants that it is not currently in breach of, in default under, or in violation of, and the execution and delivery of the Contract and the performance of its obligations thereunder will not constitute or result in any breach of, default under or violation of, any Applicable Laws, rule or regulation of any governmental unit, or the provisions of the MSI's articles of association or bye-laws, or any franchise or license, or other agreement by which it is bound to abide with.

32.3. It is fundamental term of the Contract that MSI has been and shall continue to comply with all the Applicable Laws, including all the applicable labour laws and regulations, and shall keep the Authority indemnified from all acts of commission, breaches and/or any claims and expenses to which the Authority may be put or involved due to MSI's non-compliance of the such laws and regulations.

32.4. A comprehensive warranty applicable on Goods supplied under the Contract shall be provided by the MSI for the remaining period of Contract from the date of acceptance of respective system by the Authority.

32.5. Technical support for software applications shall be provided by MSI/ the respective OEMs for the period of Contract. The technical support should include all upgrades, updates and patches to the respective software applications.

32.6. The MSI warrants that the Goods supplied under the Contract are new, non-refurbished, unused and recently manufactured; shall not be nearing end of sale/End of support; and shall be supported by the MSI and respective OEM along with Service and spares support to ensure its efficient and effective operation for the entire duration of the Contract.

32.7. The MSI warrants that the Goods supplied under the Contract shall be of the highest grade and quality and consisted with the established and generally accepted standards for materials of this type. The Goods shall be in full conformity with the specifications and shall operate properly and safely. All recent design improvements in Goods, unless provided otherwise in the Contract, shall also be made available.

32.8. The MSI further warrants that the Goods supplied under the Contract shall be free from all encumbrances and defects/faults arising from design, material, manufacture or workmanship (except insofar as the design or material is required by the Authority's specifications) or from any act or omission of the MSI, that may develop under normal use of the supplied Goods in the conditions prevailing at the respective Data Center Sites.

32.9. The Authority shall promptly notify the MSI in writing of any claims arising under this warranty.

32.10. Upon receipt of such notice, the MSI shall, with all reasonable speed, repair or replace the defective Goods or parts thereof, without prejudice to any other rights which the Authority may have against the MSI under the Contract.

32.11. If the MSI, having been notified, fails to remedy the defect(s) within a reasonable period, the Authority may proceed to take such remedial action as may be necessary, at the MSI's risk and expense and without prejudice to any other rights which the Authority may have against the MSI under the Contract.

32.12. Any (OEM) specific warranty terms that do not conform to conditions under the Contract shall not be acceptable.

32.13. MSI shall provide adequate supervision to ensure correct execution of the Works/performance of the Services in accordance with the prevailing instructions agreed upon between the Authority and the MSI. Further, MSI and its Key Personnel shall take

utmost care in the performance of the Works/Services and ensure that none of the properties of the Authority gets damaged due to any action taken or any failure to act on its part.

33. Term and Extension of the Contract

33.1. The Contract Term/period shall commence from the date of signing of contract or issuance of letter of intent/letter of award , whichever is earlier, and shall remain valid for 68 (Sixty Eight) months including 60 (Sixty) Months of Operations and Maintenance from the date of signing of the Contract (hereinafter "Term"). MSI shall complete all Works stipulated under the Contract within the time period specified under this clause.

33.2. If any delay occurs due to circumstances beyond control of MSI such as strikes, lockouts, fire, accident, defective materials, delay in obtaining Applicable Permits/Approvals or any cause whatsoever beyond the reasonable control of MSI, a reasonable extension of time/ Term, upon a request being made by MSI in writing at least three months in advance shall be granted by the Authority in writing.

33.3. Notwithstanding what has been stated under Clause 31.2, the Authority shall reserve the sole right to grant any such extension to the Term above mentioned and shall notify in writing to MSI, at least 3 (three) months before the expiration of the Term hereof, whether it shall grant MSI an extension of the Term or not. The decision to grant or refuse the extension of the Term shall be at the Authority's sole discretion and such extension of the Contract, if any, shall be as per terms agreed mutually between the Parties.

33.4. Where the Authority is of the view that no further extension of the Term should be granted to MSI, the Authority shall notify MSI of its decision at least 3 (three) months prior to the expiry of the Term. Upon receipt of such notice, MSI shall continue to perform all its obligations hereunder till the duration of the Term. During the notice period, the Authority shall either appoint an alternative agency/Replacement Service Provider/reappoint MSI for a short extension or create its own infrastructure to operate such Services as are provided under the Contract.

34. Dispute Resolution

34.1. In case, a dispute is referred to arbitration, the arbitration shall be under the Indian Arbitration and Conciliation Act, 1996 and any statutory modification or re-enactment thereof.

34.2. If during the subsistence of the Contract or thereafter, any dispute between the Parties hereto arising out of or in connection with the validity, interpretation, implementation, breach or any alleged breach of any provision of the Contract or regarding any question, including as to whether the termination of the Contract by one Party hereto has been legitimate/valid, the Parties hereto shall endeavor to settle such dispute amicably through joint discussion and/or by Conciliation to be governed by the Arbitration and Conciliation Act, 1996. However, despite such efforts, if the dispute, differences or controversy still remains unresolved for a period of 30 days of its having been raised, then the same shall be referred to Arbitration.

34.3. The Arbitration proceedings shall be held in the following manner:

i. The Arbitration proceedings shall be held in Aligarh, Uttar Pradesh, India.

ii. The Arbitration proceeding shall be governed by the Arbitration and Conciliation Act, 1996 and any re-enactment(s) and/or modification(s) thereof and of the Rules framed thereunder shall apply to arbitration proceedings.

iii. The proceedings of Arbitration shall be in English language.

iv. Any dispute, difference or question to be referred to arbitration shall be initially referred to a mutually acceptable sole arbitrator. In case the Parties are unable to agree upon the sole arbitrator, then each Party shall appoint one arbitrator each and the two arbitrators so appointed shall appoint the third arbitrator, who shall be the Presiding Arbitrator. The consortium of the three Arbitrators shall form the Arbitral Tribunal and preferably located in Aligarh.

v. In case, a Party fails to appoint an arbitrator within 30 days from the receipt of the request to do so by the other Party or if the two Arbitrators so appointed fail to agree on the appointment of third Arbitrator within 30 days from the date of their appointment upon request of a party, the Chief Justice of the Uttar Pradesh High Court or any person or institution designated by him shall appoint the Arbitrator/Presiding Arbitrator upon request of one of the Parties.

vi. Any letter, notice or other communications dispatched to MSI relating to either arbitration proceeding or otherwise whether through the post or through a representative on the address last notified to the Authority by MSI shall be deemed to have been received by MSI although returned with the remarks, refused 'undelivered' where about not known or words to that effect or for any other reasons whatsoever

vii. If the Arbitrator so appointed dies, resigns, incapacitated or withdraws for any reason from the proceedings, it shall be lawful for the Authority to appoint another person in his place in the same manner as aforesaid. Such person shall proceed with the reference from the stage where his predecessor had left if both Parties consent for the same; otherwise, he shall proceed de novo.

viii. It is a term of the Contract that the Party invoking arbitration shall specify all disputes to be referred to arbitration at the time of invocation of arbitration and not thereafter.

ix. It is also a term of the Contract that neither Party to the Contract shall be entitled for any interest on the amount of the award.

x. The Arbitrator shall give reasoned award and the same shall be final, conclusive and binding on the Parties.

xi. The fees of the arbitrator, costs and other expenses incidental to the arbitration proceedings shall be borne equally by the Parties.

35. Conflict of interest

35.1. MSI shall disclose to the Authority in writing, all actual and potential conflicts of interest that exist, arise or may arise (either for MSI or MSI's Team) in the course of providing Goods and performing the Works/Services as soon as practical after it becomes aware of that conflict.

36. Publicity

36.1. MSI shall not make or permit to be made a public announcement or media release about any aspect of this Contract unless the Authority first gives MSI its written consent.

37. Force Majeure

37.1. Force Majeure shall not include any events caused due to acts/omissions of MSI resulting in a breach/contravention of any of the terms of the Contract and/or MSI's Bid. It shall also not include any default on the part of MSI due to its negligence or failure to implement the stipulated/proposed precautions, as were required to be taken under the Contract.

37.2. The failure or occurrence of a delay in performance of any of the obligations of either Party shall constitute a Force Majeure event only where such failure or delay could not have reasonably been foreseen and shall mean an occurrence beyond the reasonable control and without the fault or negligence of either Parties affected and which the other Party is unable to prevent or provide against by the exercise of reasonable diligence including, but not limited to: war, or hostility, acts of the public enemy, civil commotion, sabotage, fires, floods, vandalism (due to law & order situation), terrorism, explosions, epidemics, quarantine restriction, strikes, lockouts or act of God, or where despite the presence of adequate and stipulated safeguards the failure to perform obligations has occurred at any location in scope (hereinafter referred to as "Force Majeure Event(s)"). In such an event, the affected Party shall inform the other Party in writing within 5 (five) days of the occurrence of such event. Any failure or lapse on the part of MSI in performing any obligation as is necessary and proper, to negate the damage due to projected Force Majeure Events or to mitigate the damage that may be caused due to the above mentioned events or the failure to provide adequate disaster management/recovery or any failure in setting up a contingency mechanism would not constitute Force Majeure, as set out above.

37.2. In case of a Force Majeure Event, all Parties shall endeavor to agree on an alternate mode of performance in order to ensure the continuity of the Service/ Works and implementation of the obligations of a Party under the Contract and to minimize any adverse consequences of Force Majeure.

38. Delivery

38.1. MSI shall bear the cost for packing, transport, insurance, storage and delivery of all the Goods for "RFP" for Implementation of the Project in Aligarh City" at all locations identified by the Authority in Aligarh City.

38.2. The Goods under the Contract shall conform to the standards mentioned in the RFP, and when no applicable standard is mentioned, to the authoritative standards, such standard shall be approved by Authority.

38.3. MSI shall only procure the hardware and software after approvals from a designated committee/Authority.

38.4. MSI's Key Personnel shall have the required experience and proper qualifications to perform the Services, and the Authority shall have the right to reject any such Personnel if found unfit by Authority to provide the Services. MSI shall also impart the appropriate training to its engineers and Personnel on the current and emerging technologies, concepts and configurations in order to provide the Services in a more efficient manner.

39. Insurance

39.1. The Goods supplied under the Contract shall be comprehensively insured by MSI at its own cost, against any loss or damage, for the entire period of the Contract. MSI shall submit to the Authority, documentary evidence issued by the insurance company, indicating that such insurance has been taken.

39.2. MSI shall bear all the statutory levies like customs, insurance, freight, etc. applicable on the Goods and also the charges like transportation charges, GST etc. that may be applicable till the Goods are delivered at the respective sites of installation shall also be solely borne by MSI.

39.2. MSI shall take out and maintain at its own cost, on terms and conditions approved by the Authority, all necessary insurance against the risks, and for the coverage's, as specified below:

a. at the Authority's request, shall provide evidence to the Authority showing that such insurance has been taken out and maintained and that the current premiums therefore have been paid; and

b. Employer's liability and workers' compensation insurance in respect of the Personnel of the MSI, in accordance with the relevant provisions of the Applicable Laws including personal accident and death in respect of its Personnel or any other insurance as may be appropriate and the proof of such insurances shall be provided to Authority, when so requested. Notwithstanding the above, the Key Personnel of MSI shall be and shall remain the employees of MSI and MSI alone shall be responsible for the payment of all dues with respect to them or meeting any statutory obligations under the Applicable Laws with respect to such Personnel.

40. Transfer of Ownership

40.1. All Commercially off the Shelf (COTS) products/ Open Source Solutions and related solutions and fixes provided pursuant to this Agreement shall be licensed according to the terms of the license agreement packaged with or otherwise applicable to such products. Such licenses shall be brought on behalf of and in the name of ASCL or mentioning ASCL as the end user of such licenses. MSI shall be responsible for arranging any licenses associated with products. "Product" means any computer code, web-based services, or materials comprising commercially released, pre-release or beta products (whether licensed for a fee or no charge) and any derivatives of the foregoing which are made available to the Purchaser for license which is published by product owner or its affiliates, or a third party. "Fixes" means product fixes that are either released generally (such as commercial product service packs) or that are provided to you when performing services (such as workarounds, patches, bug fixes, beta fixes and beta builds) and any derivatives of the foregoing. Unless otherwise specifically restricted by the Licensing Terms of the COTS products/ Open Source Solutions, all intellectual property rights in any development/enhancement/customization etc. done on the COTS products/ Open Source Solutions pursuant to this Agreement shall be owned by ASCL. Further, the MSI shall be obliged to ensure that all approvals, registrations, licenses, permits and rights which are, inter-alia, necessary for use of the Deliverables, goods, services, applications, services etc. provided by the MSI / Consortium / subcontractors under this Agreement shall be acquired in the name of the ASCL and MSI shall have the non-exclusive, limited right to use such licenses till the Term on behalf of the ASCL solely for the purpose of execution of any of its obligations under the terms of this Agreement. However, subsequent to the term of this Agreement, such approvals etc. shall endure to the exclusive benefit of the ASCL.

40.2. Forthwith upon expiry or earlier termination of the Contract and at any other time on demand by the Authority, MSI shall deliver to the Authority all Documents provided by or originating from the Authority and all Documents produced by or from or for MSI in the course of performing the Services, unless otherwise directed in writing by the Authority at no additional cost. MSI shall not, without the prior written consent of the Authority store, copy, distribute or retain any such Documents.

41. Exit Management Plan

41.1. An Exit Management plan shall be furnished by MSI in writing to the Authority within 90 (ninety) days from the date of signing of the Contract, which shall deal with at least the following aspects of exit management in relation to the Contract as a whole and in relation to the Project implementation, and Service Level monitoring:

a a detailed program of the transfer process that could be used in conjunction with a Replacement Service Provider including details of the means to be used to ensure continuing provision of the Services throughout the transfer process or until the

cessation of the Services and of the management structure to be used during the transfer;

b plans for provision of contingent support to Project and Replacement Service Provider for a reasonable period after transfer;

c Exit Management Plan in case of normal termination of Contract period;

d Exit Management Plan in case of any eventuality due to which Project is terminated before the Contract period; and

e Exit Management Plan in case of termination of MSI.

41.2. Exit Management Plan at the minimum shall adhere to the following:

a. 3 (Three) months of the support to Replacement Service Provider post termination of the Contract;

b. all reasonable assistance necessary to ensure that an orderly transfer is achieved with minimal disruption, to Replacement Service Provider, of the Services, functions and operations that were provided prior to termination of Contract/exit of MSI from Project, complete handover of the planning documents, bill of materials, functional requirements specification, technical specifications of all equipment, change requests if any, sources codes, wherever applicable, reports, documents and other relevant items to the Replacement Service Provider/Authority; and

c. Certificate of acceptance from authorized representative of Replacement Service Provider issued to MSI on successful completion of handover and knowledge transfer.

41.3. In the event of termination or expiry of the Contract, Project implementation, or Service Level monitoring, both MSI and Authority shall comply with the exit management plan.

41.4. During the exit management period, MSI shall use its best efforts to deliver the Works/Services.

PART B – SPECIAL CONDITIONS OF CONTRACT

42. Performance Security

42.1. To guarantee its performance under the Contract, the MSI shall provide to Authority in its favour a Performance Bank Guarantee (PBG) which is unconditional, unequivocal and irrevocable for an amount equivalent to 10% of the order value of the Contract in the format prescribed in RFP issued by any of the nationalized banks only. The Performance Bank Guarantee shall be kept valid for the Term of the Contract and any extension of the Term and up to a period of 6 (six) months after the termination or expiry of the Contract. The Performance Bank Guarantee shall be encashed by the ASCL in the event of MSI's failure to complete obligations or breach by MSI of any of the terms and conditions of the Contract.

43. Liquidated Damages

43.1. If MSI fails to supply, install or maintain any or all of the Goods or fails to complete the Works or fails to provide the Services as per the Contract, within the time period(s) specified in the RFP Vol II, the Authority without prejudice to its other rights and remedies under the Contract, deduct from the Contract price, as liquidated damage per week of 0.2% of the CAPEX of Contract / request order value per week for first 4 (four) weeks and 0.3% per week for every subsequent week till such time the default continues.

43.2. The deduction shall not in any case exceed 10 % of the Contract value.

43.3. The Authority may without prejudice to its right to effect recovery by any other method, deduct the amount of liquidated damages from any payments due to MSI in its hands (which includes the Authority's right to claim such amount against MSI's Bank Guarantee) or which may become due to MSI at a prospective date. Any such recovery or liquidated damages shall not in any way relieve MSI from any of its obligations to complete the Work or from any other obligations and liabilities under the Contract.

43.4. Delay not attributable to MSI shall be considered for exclusion for the purpose of computing liquidated damages.

44. Limitation of Liability:

44.1. Limitation of MSI's Liability towards the Authority:

a. Except as otherwise provided in the Contract or in cases of gross negligence or willful misconduct on the part of MSI or on the part of any person or company acting on behalf of MSI in carrying out the Services, in no event either Party shall be liable to the other Party for any special, exemplary, punitive or similar damages, indirect or consequential

loss or damage (including loss of revenue and profits) arising out of or relating to the Contract;

44.2. MSI, with respect to damage caused by MSI to Authority's property, shall not be liable to Authority:

a. for any indirect or consequential loss or damage; and

b. For any direct loss or damage that exceeds the total payments payable under the Contract to MSI hereunder.

44.3. This limitation of liability shall not be applicable or restrict MSI's liability in any manner for injury, loss of life caused to any person or damage to third party's property or infringement of any Intellectual Property Rights caused by MSI or any Person (including MSI's Subcontractor) acting on behalf of MSI in carrying out the Services

44.4. The Authority's liability under the Contract, tort, negligence, default etc. whatsoever shall be limited to the amount of fees remaining to be paid to the MSI under the Contract.

45. Ownership and Retention of Documents

45.1. The Authority shall own the Document(s), prepared by or for MSI arising out of or in connection with the Contract.

45.2. Forthwith upon expiry or earlier termination of this Contract and at any other time on demand by the Authority, MSI shall deliver to the Authority all Documents provided by or originating from the Authority and all Documents produced by or for MSI in the course of performing the Services, unless otherwise directed in writing by the Authority at no additional cost. MSI shall not, without the prior written consent of the Authority store, copy, distribute or retain any such Documents.

46. Information Security

46.1. MSI shall not carry any written/printed document, layout diagrams, compact disk, hard disk, storage tapes, other storage devices or any other goods/material proprietary to Authority into/out of any Project Location without written permission from the Authority.

46.2. MSI shall not destroy any unwanted documents, defective tapes/media present at any location on their own. All such documents, tapes/media shall be handed over to the Authority.

46.3. All documentation and media at any location whether at the Project Location or otherwise, shall be properly identified, labeled and numbered by MSI. MSI shall keep track of all such items and provide a summary report of these items to the Authority whenever asked for.

46.4. Access to Authority's data and systems, internet facility by MSI at any location shall be in accordance with the written permission by the Authority. The Authority shall allow MSI

to use its facilities in a limited manner subject to availability. It is the responsibility of MSI to prepare and equip itself in order to meet the requirements of providing the Services.

46.5. MSI must acknowledge that Authority's business data and other Authority proprietary information or materials, whether developed by Authority or being used by Authority pursuant to a license agreement with a third party (the foregoing collectively referred to herein as "proprietary information") are confidential and proprietary to Authority; and MSI along with its team agrees to use reasonable care to safeguard the proprietary information and to prevent the unauthorized use or disclosure thereof, which care shall not be less than reasonable care used by MSI to protect its own proprietary information. MSI recognizes that the goodwill of Authority depends, among other things, upon MSI keeping such proprietary information confidential and that unauthorized disclosure of the same by MSI or its team could damage the goodwill of Authority, and shall be considered as a material breach of the Contract terms and conditions by MSI. MSI may come into possession of such proprietary information, even though MSI does not take any direct part in or furnish the Services performed for the creation of said proprietary information and it shall limit access of such proprietary information thereto only such employees with a need to such access to perform the Services . MSI and or its Key Personnel shall use such information only for the purpose of performing the said Services.

46.6. MSI shall, upon termination of the Contract for any reason, or upon demand by Authority, whichever is earlier, return any and all information provided to MSI by Authority, which would include any Confidential information or any proprietary information including any copies or reproductions, both hardcopy and electronic of such information.

46.7. By virtue of the Contract, MSI team may have access to information of the Authority and/or a third party which would include any Confidential Information or any proprietary information of such parties and will use such information only with prior approval of the Authority on a need only basis and to the extent required for performing the Services.

47. Records of contract documents

47.1. MSI shall at all-time make and keep sufficient copies of the process manuals, operating procedures, specifications, Contract documents and any other documentation as may be required to fulfil the obligations under the Contract.

47.2. MSI shall keep on the DC Site at least 3 (three) copies of each and every specification and copy of the Contract, in excess of it's own requirement and those copies shall be available at all times for use by the Authority's representative and by any other person authorized by the Authority's representative.

48. Security and Safety

48.1. MSI shall comply with the directions issued from time to time by the Authority and the standards related to the security and safety, in so far as it applies to the provision of the Services.

48.2. MSI shall upon reasonable request by the Authority, or its nominee(s) participate in regular meetings when safety and information technology security matters are reviewed.

49. Confidentiality

49.1. MSI shall not, either during the Term or after expiration of the Contract, disclose any proprietary or Confidential Information relating to the Services/Contract and/or Authority's business/operations, information, application/software, hardware, business data, architecture schematics, designs, storage media and other information/documents without the prior written consent of the Authority.

49.2. The Authority reserves the right to adopt legal proceedings, civil or criminal, against MSI in relation to a breach of obligation by MSI under this clause

49.3. MSI shall do everything reasonably possible to preserve the confidentiality of the Confidential Information including execution of a confidentiality agreement with the Authority to the satisfaction of the Authority.

49.4. MSI shall notify the Authority promptly if it is aware of any unauthorized disclosure of the Confidential Information otherwise than as permitted by the Contract or with the authority of the Authority.

49.5. MSI shall be liable to fully recompense the Authority for any loss of revenue arising from breach of confidentiality.

50. Events of Default by MSI

50.1. The failure on the part of MSI to perform any of its obligations or comply with any of the terms of the Contract shall constitute an Event of Default on the part of MSI. The events of default are but not limited to the following:

a. MSI/MSI's Teams failure to perform/ adhere to any instructions or directives issued by the Authority which it deems proper and necessary to execute the Scope of Work or provide Services under the Contract, or

b. MSI/MSI's Teams failure to confirm/adhere to any of the key performance indicators as laid down in the Key Performance Measures/Service Levels, or if MSI has fallen short of matching such standards/benchmarks/targets as the Authority may have designated with respect to the System or any Goods, task or service, necessary for the execution of the Scope of Work and performance of Services under this Contract. The above mentioned failure on the part of MSI may be in terms of failure to adhere to performance, quality, timelines, specifications, requirements or any other criteria as defined by the Authority; or

c. MSI's failure to remedy a defect or failure to perform its obligations in accordance with the Service Specifications as per this RFP or any other specifications issued by the Authority, despite being served with a default notice which laid down the specific

deviance on the part of MSI/MSI's Team to comply with any stipulations or standards as laid down by the Authority; or

d. MSI/MSI's Teams failure to adhere to any amended direction, instruction, modification or clarification as issued by the Authority during the term of the Contract and which the Authority deems proper and necessary for the execution of the Scope of Work under the Contract; or

e. MSI/MSI's Teams failure to demonstrate or sustain any representation or warranty made by it in the Contract, with respect to any of the terms of the Bid, the RFP and the Contract.

f. There is a proceeding for bankruptcy, insolvency, winding up or there is an appointment of receiver, liquidator, assignee, or similar official against or in relation to MSI; or

g. MSI/MSI's Team's failure to comply with or is in breach or contravention of any Applicable Laws.

50.2. Where there has been an occurrence of such defaults inter alia as stated above, the Authority shall issue a notice of default to MSI, setting out specific defaults/deviances/omissions/non-compliances/non-performances and providing a notice of 30 (thirty) days cure period to enable MSI to rectify such default committed.

50.3. Where despite the issuance of a default notice to MSI by the Authority, MSI fails to remedy the default within the cure period provided to the satisfaction of the Authority, the Authority may, where it deems fit, issue to MSI either another default notice or proceed to terminate the Contract forthwith.

51. Termination

50.1. The Authority may, terminate the Contract in whole or in part by giving MSI a prior written notice indicating its intention to terminate the Contract under the following circumstances:

a. Where the Authority is of the opinion that there has been such Event of Default on the part of MSI/MSI's Team which would make it proper and necessary to terminate the Contract and may include failure on the part of MSI to adhere to any part of its obligations under its Bid, the RFP or under the Contract.

b. Where it comes to the Authority's attention that MSI (or MSI's Team) is in a position of actual conflict of interest with the interests of the Authority, in relation to any of terms of MSI's Bid, the RFP or the Contract.

c. Where MSI's ability to survive as an independent corporate entity is threatened or is lost owing to any reason whatsoever, including *inter-alia* the filing of any bankruptcy proceedings against MSI, any failure by MSI to pay any of its dues to its creditors, the institution of any winding up proceedings against MSI or the happening of any such events that are adverse to the commercial viability of MSI. In the event of the happening

of any events of the above nature, the Authority shall reserve the right to take any steps as are necessary, to ensure the effective transition of the sites, pilot site to a successor agency, and to ensure business continuity.

d. Termination for Insolvency: The Authority may at any time terminate the Contract by giving written notice to MSI, without compensation to MSI, if MSI becomes bankrupt or otherwise insolvent, provided that such termination shall not prejudice or affect any right of action or remedy which has accrued or shall accrue thereafter to the Authority.

e. MSI may, subject to written approval by the Authority, terminate the Contract before the expiry of the Term by giving the Authority a prior and written notice at least 3 (three) months in advance indicating its intention to terminate the Contract.

f. In case of Deliverables/ milestone which is approved by the Authority and payment is undisputed, the MSI may terminate the Contract in case of non-payment after 90 (ninety) days of serving the notice to ASCL.

52. Consequence of Termination

52.1. In the event of termination of the Contract due to any cause whatsoever, whether consequent to the stipulated term of the Contract or otherwise the Authority shall be entitled to impose any such obligations and conditions and issue any clarifications as may be necessary to ensure an efficient transition and effective business continuity of the Project which MSI shall be obliged to comply with and take all available steps to minimize loss resulting from that termination/breach, and further allow and provide all such assistance to the Authority and/or the successor agency/service provider, Replacement Service Provider as may be required, to take over the obligations of MSI in relation to the execution/continued execution of the requirements of the Contract.

52.2. Where the termination of the Contract is prior to its stipulated term on account of a default on the part of MSI or due to the fact that the survival of MSI as an independent corporate entity is threatened/has ceased, or for any other reason, whatsoever, the Authority, through unilateral re-determination of the consideration payable to MSI, shall pay MSI for that part of the Services which have been authorized by the Authority and satisfactorily performed by MSI up to the date of termination. Without prejudice to any other rights, the Authority may retain such amounts from the payment due and payable by the Authority to MSI as may be required to offset any losses caused to the Authority as a result of any acts of omissions or commission by MSI. In case of any loss or damage due to default or inability on the part of MSI in performing any of its obligations with regard to executing the Schedule of Requirements under the Contract, MSI shall compensate the Authority for any such loss, damages or other costs, incurred by the Authority. Additionally, members of its team shall continue performing all its obligations and responsibilities under the Contract in an identical manner as were being performed before the default occurred due to acts of MSI as described above in order to execute an effective transition and to maintain business continuity. All third parties shall continue to perform all/any functions as stipulated by the

Authority and as may be proper and necessary to execute the Schedule of Requirements under the Contract in terms of MSI's Bid, the Bid Document and the Contract.

52.3. Nothing herein shall restrict the right of the Authority to invoke the Bank Guarantee and other guarantees furnished hereunder and pursue such other rights and/or remedies that may be available to the Authority under the Applicable Law.

52.4. The termination hereof shall not affect any accrued right or liability of either Party nor affect the operation of the provisions of the Contract that are expressly or by implication intended to come into or continue in force on or after such termination.

52.5. Upon termination or after expiration of Contract, MSI shall forthwith return to the Authority, all papers, material and other properties held by/provided to MSI during the Term of the Contract, including all Confidential Information and proprietary information provided to MSI for its use during the Project.

53. Miscellaneous

53.1. Under this Contract, the relationship between the Parties is that of independent contractors and no other relationship is intended, including a partnership, franchise, joint venture, agency, employee/employer, fiduciary, master/servant relationship, or other special relationship. Neither Party shall act in a manner, which expresses or implies a relationship other than that of independent contractors, nor bind the other Party. MSI shall take care of all liabilities, statutory or otherwise, in relation to persons employed by it or otherwise and the Authority shall not be responsible for the same in any manner whatsoever.

53.2. MSI or any of its Affiliates shall not directly or indirectly, solicit for employment or engagement any employees of the Authority. The provisions of this clause shall be applicable during the Term of the Contract and shall survive the termination of the Contract for a period of 2 years from the date of termination. In addition, MSI shall not proceed to conduct operations/business similar to the Authority with any employee and/or consultant of the Authority who has knowledge of the Confidential Information, without the prior written consent of the Authority.

53.3. It is also agreed between the Parties that the Authority is under no obligation, whatsoever, to procure Services/execute Works from MSI alone. By executing the Contract, the Authority does not commit/guarantee any minimum amount of payments due to MSI for the Services/Works performed by MSI and holds the right to increase or decrease the Scope of Work provided under the Contract and in these cases, the Parties shall mutually agree upon any amendment to the charges which are payable to MSI for the Works/Services performed.

53.4. The Authority reserves the right to propose amendment or modification, of the terms of the Contract or any part of it by giving MSI a notice in writing. No variation, amendment, modification or addition to the Contract shall be effective or binding on either of the Parties unless set forth in writing and executed by them through their authorized representatives.

53.5. The Contract shall be governed by and construed in accordance with the laws of India. The Parties agree to accept the non-exclusive jurisdiction of the competent courts of Aligarh.

53.6. The Contract sets forth the entire agreement and understanding between the Parties as to the subject matter therein and shall supersede and override all previous communications, negotiations, commitments, agreements, and understandings, either oral or written, between the Parties with respect to the subject matter of the Contract.

53.7. Notice

I. Unless otherwise provided herein, all notices or other communications to be given pursuant to the Contract shall be made in writing, in English and by letter/email (save as otherwise stated) and shall be deemed to be duly given or made, in the case of personal delivery of the letter, when delivered; in the case of email, when sent, or, in the case of a letter, 3 (three) Business Days after being deposited in the post (by registered post, with acknowledgment due), postage prepaid, to such Party at its address or facsimile number specified herein or at such other address or facsimile number as such party may hereafter specify for such purposes to the other by notice in writing.

The addresses referred to above are:

a) In the case of a notice to the Authority:

Address : [●]

Attention : [●]

Telephone : [●]

Email : [●]

b) In the case of the MSI

Address : [●]

Attention : [●]

Email : [●]

II. A notice or other communication received on a day other than a Business Day, or after business hours in the place of receipt, shall be deemed to be given on the next following Business Day in such place.

III. The address or email address for serving notices can be changed by any Party by properly serving notices on the other Parties informing them of the changes of address.

IV. In the event that a Party refuses delivery or acceptance of a notice, request or other communication, under the Contract, it shall be deemed that the notice was given upon

proof of the refused delivery, provided the same was sent in the manner specified in the Contract.

53.8. No failure by either party to enforce any rights hereunder shall be construed as a waiver of such right(s).

53.9. If any provision of the Contract is held to be inoperative or unenforceable as applied in any particular case because it conflicts with any other provision hereof or any statute, ordinance, rule of law or public policy, or for any other reason, such holding shall not have the effect of rendering the provision in question inoperative or unenforceable in any other case, or of rendering any other provision herein contained inoperative or unenforceable to any extent whatsoever. The invalidity of any one or more phrases, sentences or Clauses contained in the Contract shall not affect the remaining portions of the Contractor any part hereof, and they shall otherwise remain in full force and effect.

53.10. Neither MSI nor its employees or its Subcontractor shall have the right, power, or authority to create any contract or obligation, express or implied, on behalf or, in the name of or binding on Authority.

53.11. The rights and obligations under the Contract are personal to MSI and shall not be assigned by it, to any third party, without the express prior written authorization of the Authority.

54. Change Control Note (CCN)

54.1. This applies to and describes the procedure to be followed in the event of any proposed change to Contract, site Implementation, and Service levels. Such change shall include, but shall not be limited to, changes in the scope of services provided by MSI and changes to the terms of payment.

54.2. Change requests in respect of the Contract, the site implementation, or the Service levels shall emanate from the Parties' representative who shall be responsible for obtaining approval for the change and who shall act as its sponsor throughout the Change Control Process and shall complete Part A of the CCN (Annex I, Section 3 of the RFP). CCNs shall be presented to the other Party's representative who shall acknowledge receipt by signature of the authorized representative of the Authority.

54.3. MSI and the Authority while preparing the CCN, shall consider the change in the context of whether the change is beyond the scope of Services including ancillary and concomitant services required. The CCN shall be applicable for the items which are beyond the stated/implied scope of work as per the RFP document.

54.4. MSI shall assess the CCN and complete Part B of the CCN. In completing Part B of the CCN MSI shall provide as a minimum:

a. a description of the change;

b. a list of Deliverables required for implementing the change;

c. a timetable for implementation;

d. an estimate of any proposed change; or any relevant acceptance criteria;

e. an assessment of the value of the proposed change;

f. Material evidence to prove that the proposed change is not already covered within the scope of the RFP, Contract and Service Levels.

54.5. Prior to submission of the completed CCN to the Authority or its nominated agencies, MSI shall undertake its own internal review of the proposal and obtain all necessary internal approvals. As a part of this internal review process, MSI shall consider the materiality of the proposed change in the context of the Contract, the sites, Service levels affected by the change and the total effect that may arise from implementation of the change.

54.6. Each Party shall be responsible for its own costs incurred in the quotation, preparation of CCNs and in the completion of its obligations described in this process provided MSI meets the obligations as set in the CCN. In the event MSI is unable to meet the obligations as defined in the CCN then the cost of getting it done by third party shall be borne by MSI. Change requests and CCNs shall be reported monthly to each Party's representative who shall prioritize and review progress.

PART C – SERVICE LEVELS

55. Purpose of Service Levels

55.1. The purpose is to define/measure the levels of the Service provided by MSI to the Authority for the duration of the Contract. The benefits of this are:

a. Implement a process to define Service level parameters or permissible threshold within which MSI would be required to perform the Services, and failure of performing the Services by MSI within the said acceptable parameters would be considered as a deficiency in Services;

b. help the Authority control the levels and performance of MSI's Services; and

c. alert MSI to improve its Services and/or remove deficiencies in Services in case the Service Levels agreed between the Authority and MSI are breached by MSI

56. Service Level Agreements & Targets

56.1. This section is agreed to by Authority and MSI as the key performance indicator for the Project. This may be reviewed and revised according to the procedures detailed in Clause 69 (Service Level Change Control).

56.2. The following section reflects the measurements to be used to track and report system's performance on a regular basis. The targets shown in the following tables are for the period of Contact.

56.3. The procedures in Clause 34 shall be used if there is a dispute between Authority and MSI on what the permanent targets should be.

57. General principles of Service Level Agreements

The Service Level Agreements have been logically segregated in the following categories:

58. Service Level Agreements (SLA)

58.1. SLA shall become the part of Contract between ASCL and the MSI. SLA defines the terms of the MSI's responsibility in ensuring the timely delivery of the Deliverables and the correctness of the same based on the agreed Performance Indicators as detailed in this section.

58.2. The MSI has to comply with service level requirements to ensure adherence to Project Timelines, quality and availability of services, throughout the period of this Contract

i.e. for a period mentioned in the project timeline of Volume II of this RFP. The MSI has to supply appropriate software/hardware/automated tools as may be required to monitor and submit reports of all the SLAs mentioned in this section.

58.3. For purposes of the SLA, the definitions and terms as specified in the Document along with the following terms shall have the meanings set forth below:

i. "**Total Time**" - Total number of hours in the quarter (or the concerned period) being considered for evaluation of SLA performance.

ii. "**Uptime**" – Time period for which the specified services/outcomes are available in the period being considered for evaluation of SLA. Formulae for calculation of Uptime: Uptime (%) = {1-[(Downtime)/(Total time- scheduled maintenance time)]}*100

iii. "**Downtime**"- Time period for which the specified services/components/outcomes are not available in the concerned period, being considered for evaluation of SLA, which would exclude downtime owing to Force Majeure & Reasons beyond control of the successful bidder.

iv. "**Scheduled Maintenance Time**" - Time period for which the specified services/components with specified technical and service standards are not available due to scheduled maintenance activity. The successful bidder is required to take at least 10 days prior approval from ASCL for any such activity. The scheduled maintenance should be carried out during non-peak hours (like post mid-night, and should not be for more than 4 hours. Such planned downtime would be granted max 4 times a year.

v. "**Incident**" - Any event/abnormalities in the service being rendered, that may lead to disruption in normal operations and services to the end user.

vi. "**Response Time**" - Time elapsed from the moment an incident is reported in the Helpdesk over phone or by any applicable mode of communication, to the time when a resource is assigned for the resolution of the same.

vii. "**Resolution Time**" - Time elapsed from the moment incident is reported to Helpdesk either in person or automatically through system, to the time by which the incident is resolved completely and services as promised are restored.

59. Measurement of SLA

59.1. The SLA metrics provided specifies performance parameters as baseline performance, lower performance and breach. All SLA calculations will be done on quarterly basis.

59.1. The SLA also specifies the liquidated damages for lower performance and breach conditions.

59.3. Payment to the MSI is linked to the compliance with the SLA metrics. The matrix specifies three levels of performance, namely:

a. The MSI will get 100% of the Contracted value if all the baseline performance metrics are compiled and the cumulative credit points are 100;

b. The MSI will get lesser payment in case of the lower performance. (For e.g. if SLA point score is 80 then the MSI will get 20% less on the quarterly payment – The formula calculating the deductions is "(100 – SLA Point Score)%")

c. If the performance of the Agency in respect of any parameter falls below the prescribed lower performance limit, debit points are imposed for the breach.

59.4. The credit (+) points earned during the quarter will be considered for computing penalty. The quarterly payment shall be made after deducting the liquidated damages as mentioned above.

59.5. The aforementioned SLA parameters shall be measured as per the individual SLA parameter requirements and measurement methods, through appropriate SLA Measurement tools to be provided by the MSI and approved and audited by ASCL or its appointed Consultant for accuracy and reliability.

59.6. ASCL shall also have the right to conduct, either itself or through any other agency as it may deem fit, an audit / revision of the SLA parameters. The SLAs defined, shall be reviewed by ASCL on an annual basis after consulting the MSI, Project Management Consultants and other experts. All the changes would be made by ASCL after consultation with the MSI and might include some corrections to reduce undue relaxation in Service Levels or some corrections to avoid unrealistic imposition of liquidated damages, which are noticed after Project has gone live.

59.7. Total liquidated damages to be levied on the MSI shall be capped at 10% of the total contract value. However, ASCL would have right to invoke termination of the Contract in case the overall liquidated damages equals 10% of total contract value. Liquidated damages to be levied during Post Implementation period shall be capped at 10% of the OPEX value. ASCL would also have right to invoke termination of Contract in case cumulative debit point (breach points) are above 30 in 2 consecutive quarters.

60. Pre Implementation SLA

Timely delivery of the Scope of Work shall be as under:

Definition	Timely delivery of Deliverables would comprise entire bill of material and the application systems, and as per successful UAT of the same.
Service Level Requirement	All the Deliverables defined in the Contract has to be submitted on-time on the date as mentioned in the Contract with no delay.

Measurement of Service Level Parameter	To be measured in Number of weeks of delay from the timelines mentioned in the section "Project Timelines"
Penalty for non-achievement of SLA Requirement	Any delay in the delivery of the Project Deliverables (solely attributable to vendor) would attract a liquidated damage per week of 0.2% of the CAPEX of Contract / Request Order value per week for first 8 weeks and 0.3% per week for every subsequent week. If the liquidated damage reaches 10% of the total Contract value, Authority may invoke termination clause. Liquidated Damage will be computed on Capex value of Contract/ Request order value of the particular phase

SLA Matrix for Post Implementation SLAs

61.1. These SLAs shall be used to evaluate the performance of the Services on monthly basis.

61.2. Penalty levied for non- performance as per SLA requirements shall be deducted through subsequent payments due from ASCL or through the Performance Bank Guarantee.

61.3. The SLA parameters shall be measured for each of the sub systems' SLA parameter requirements and measurement methods, through appropriate SLA measurement tools. All such required tools should be provided by the MSI. ASCL will have the authority to audit these tools for accuracy and reliability.

61.4. The upper limit of penalty would be capped at 10% of the opex value for each quarter. In case the calculated penalty crosses 10% penalty of the opex value in 2 subsequent quarters, ASCL reserves the right to invoke the termination clause.

61.5. SLAs for street IT infrastructure such as CCTV Cameras, Variable Message Display (VMD) boards, Environmental Sensors, Public Address system, ECB, Other equipment etc.

#	Uptime SLA (Monthly)	Penalty Clause
1	Uptime >= 98%	No Deduction
2	Uptime <98%	(98%- Uptime %) of monthly Operational Expense for the component. For example if uptime of component is 95%, then penalty imposed will be 98%%-95% i.e. 3% of operational expense.

61.6.

Service Level Agreement				
.A. Penalties for Non/Under Performance				
A.1A maximum level of performance penalties is established and described in this section.				
Severity Level	**Penalty as a percentage of applicable payment milestone**			
9	Event of default and termination			
8	5.0%			
7	2.0%			
6	1.0%			
5	0.5%			
4	0.4%			
3	0.3%			
2	0.2%			
1	0.1%			
0	No Penalty			
A.2Performance Penalty for not meeting a measurement parameter for any two months in consecutive quarters shall result in twice the penalty percentage of that respective measurement parameter in the third quarter for all the three months				
A.3Maximum Penalty applicable for any quarter shall not exceed 10% of the 'applicable fees' for the respective quarter.				
.A4 The payment to the agency shall be on Quarterly basis however the penalty shall be calculated on monthly basis as per the SLAs stated in the RFP.				
B. Measurement & Targets				
B.1 Implementation phase related performance levels				
Sr. No.	**Measurement**	**Definition**	**Target Penalty**	

1.	Team Mobilization And Commencement of Work	MSI is expected to mobilize project team for commencement of work Commencement of work would mean reporting and availability of MSI's resources (90% Key Personnel as per the RFP requirement) at ASCL's office for the project within defined period of 15 days and remaining10% in next 15 days)	Within 15 days of issuance of LoI or contract agreement, whichever is earliest	Delay beyond 15 calendar days = 0.2%of the contract value Delay between 15 to30 calendar days =0.5% of the contract value Delay beyond 30days may lead to Termination of the Contract at the discretion of ASCL
B.2. Data Centre (DC) / Disaster Recovery (DR) Centre				
Sr. No.	**Measurement**	**Definition**	**Target**	**Severity Level**
1	• ASCL fiber Network • Routers • Switches • Servers • Storage • Backup drives • Virtualization platform • IOT platform including all field level devices • Enterprise network • Firewalls/Intrusion Prevention System • Cyber Security components • Any other ICT based components commissioned as part of the project scope	DC/DR components (availability for a month is defined as total time (in minutes) in a month less total down time (in minutes) in a month excluding planned data center down time. DC/DR is considered available when all the services in full capacity are functional. DC/DR Availability (%) = (Total minutes during the month –Planned downtime – Downtime minutes during the month) *100/ Total minutes during the month Total Time shall	99.98% > 99.98 = < 99.98 to 97 = < 97 =	0 5 9

		be measured24x7 basis for DC/DR depending upon functional requirement. Planned data center Downtime refers to unavailability of data center services due to infrastructure maintenance activities such as configuration changes, upgradation or changes to any supporting infrastructure. Details related to such planned outage shall be agreed with ASCL and data center Measurement Tool: Reports from EMS		
B.3. Network related performance levels				
Sr. No.	**Measurement**	**Definition**	**Target**	**Severity Level**
1.	• Network Availability for all field level devices to ICCC &DC/DR connected over the ASCL fiber network which would be installed & commissioned by the MSI as a part of the scope • Connectivity/ uptime between DC & DR site • Connectivity/ uptime of the internet connectivity at DC/DR site	Network components (availability for a month is defined as total time (in minutes) in a month less total down time (in minutes) in a month excluding planned network downtime. Network is considered available when all services in full capacity are available. Network Availability (%) = (Total minutes during the month – Planned downtime - Downtime minutes during the month) *100 / Total	> 98.5% uptime measured on a monthly basis	0
			≤98.5% to >97.0% uptime measured on a monthly basis	4
			≤97.0% to >95.0% up time measured on a monthly basis	5
			≤95.0% to >93.0% up time measured on a monthly	7

		minutes during the month Total Time shall be measured 24x7basis. Planned Network Component Downtime refers to unavailability of network services due to infrastructure maintenance activities such as configuration changes, upgradation or changes to any supporting infrastructure Details related to such planned outage shall be agreed with ASCL. Measurement Tool: Reports from EMS	basis	
			< 93.0% up time measured on a monthly basis	8
2.	Network Quality of Service	Quality of Service (QoS) refers to the capability of a network to provide traffic engineering to selected network traffic from a. Field Level Infrastructure and Access Point b. Access point to DC/ DR and ICCC switch and optical fiber c. Leased Line between Switch at ICCC and DC / DR.	99% throughput of minimum stipulated bandwidth during 24*7 hours	0
		The primary goal of QoS is to provide priority including dedicated bandwidth, controlled	≥97% and <99%	5
			<97%	6

		jitter, latency and improved loss characteristics. Measurement Tool: Reports from EMS	Average Packet loss exceeding 0.5% over a month (at Data Centre and LAN/WAN level)	4
			Latency Delay> 150 ms (every instance) (at Data Centre and LAN/WAN level)	4

B.4Service Level for ICT Solutions

Sr. No.	Measurements	Definitions	Target	Severity Level
	Availability of various Application Software for/at Integrated Command Control Centre (ICCC) With: • Video Management System • Video Analytics System • RLVD Application System • ANPR Application System • SVD Application System • e Challan System • Adaptive Traffic Management System • GIS solution platform for Aligarh Smart City • Variable Messaging Signboard Management system • Public Address Management System	Uptime = {1 - (Application downtime maintenance downtime) / (Total Time – maintenance downtime)} Application Downtime shall be measured from the time the equipment becomes unavailable (due to any reasons whatsoever attributable to MSI) for Business processing to the end user to the time it becomes fully available. Any downtime for maintenance shall	Minimum 98% uptime measured on monthly basis ≥96% to < 98% uptime measured on monthly basis ≥93% to < 96% uptime measured on monthly basis < 93% uptime measured	0 5 7 9

	• Environmental sensors • Emergency Box/ Panic Box Management System • Applications & Systems for Integration & Management of other smart solution components • e-Governance Solution • Multipurpose kiosk • CCC Application	be with prior written intimation to ASCL. Please note that continuous downtime of every 2 hours (from7am to 12 midnight) would raise the severity by one level. e.g. the severity level will raise from 0 to 1. Please note that continuous downtime of every 4 hours (from midnight to 7am) would raise the severity by one level. e.g. the severity level will raise from 0 to 1 Measurement Tool: Reports from EMS	on monthly basis	

2	Availability of other software including: • Anti-virus & end device security software • Software based security items • SLA, asset management tool, helpdesk & EMS • Virtualization software • IBMS	Uptime = {1 - (Application downtime maintenance downtime) / (Total Time – maintenance downtime)} Application Downtime shall be measured from the time the equipment becomes unavailable (due to any reasons whatsoever attributable to the MSI) for Business processing to the end user to the time it becomes fully available. Any downtime for maintenance shall be with prior written intimation to ASCL. Please note that continuous downtime of every 2 hours (from7am to 12midnight) would raise the severity by one level. E.g. the severity level will raise from 0 to 1Please note that continuous downtime of every 4 hours (from	Minimum 97% uptime measured on monthly basis ≥96% to < 97% uptime measured on monthly basis ≥95% to < 96% uptime measured on monthly basis < 95% uptime measured on monthly basis	0 4 6 7

		midnight to 7am) would raise the severity by one level. e.g. the severity level will raise from 0 to 1 Measurement Tool: Reports from EMS		

3	Availability of Integrated Command and Control Centre (ICCC) including 1. Work Stations 2. Video Wall 3. Cameras 4. Phones 5. Biometric Access Control System 6. UPS/DG sets 7. Air Conditioner 8. All other non IT components installed in ICCC & DC	Uptime = {1 - (Equipment downtime maintenance downtime) / (Total Time – maintenance downtime)} Equipment Downtime shall be measured from the time the equipment becomes unavailable (due to any reasons whatsoever attributable to the MSI) for Business processing to the end user to the time it becomes fully available. Any downtime for maintenance shall be with prior written intimation to ASCL. Please note that continuous downtime of every 2 hours (from7am to 12midnight) would raise the severity by one level. E.g. the severity level will raise from 0 to 1Please note that continuous downtime of every 4 hours (from	Minimum99% up time measured on monthly basis ≥96% to <97% up time measured on monthly basis ≥95% to <96% up time measured on monthly basis < 95% uptime measured on monthly basis	0 4 6 7

		midnight to 7am) would raise the severity by one level. e.g. the severity level will raise from 0 to 1 Measurement Tool: Reports from EMS		
4	Fire Detection and Suppression system uptime	Availability of fire detection and suppression system in the ICCC. Periodic audits would be done by the agency to check the availability of these system Measurement Tool: Random Check	100% availability measured periodically Any incident of noncompliance	0 5
5	Availability of field infrastructure	Uptime = {1 - (Equipment	Minimum 97% uptime	0

	including: • CCTV Cameras & including poles • Public Address System • GPS based handheld/ Mobile Device • Environmental Sensors • Smart Traffic Detectors, Sensors & Controllers • Variable Message Signboard • Electricity supply to all field devices • Multipurpose Kiosks • UPS at all field devices • IP Phones • All sensors & IoT devices	downtime maintenance downtime) / (Total Time – maintenance downtime)} Equipment Downtime shall be measured from the time the equipment becomes unavailable (due to any reasons whatsoever attributable to the MSI) for Business processing to the end user to the time it becomes fully available. Any downtime for maintenance shall be with prior written intimation to ASCL. Please note that continuous downtime of every 2 hours (from7am to 12midnight) would raise the severity by one level. e.g. the severity level will raise from 0 to 1Please note that continuous downtime of every 4 hours (from midnight to 7am) would raise the	measured on monthly basis ≥96% to < 97% uptime measured on monthly basis ≥95% to < 96% uptime measured on monthly basis < 95% uptime measured on monthly basis	4 6 7

		severity by one level. e.g. the severity level will raise from 0 to 1 Measurement Tool: Reports from EMS		
6	Repair/replacement of field/ICCC/DC/DR infrastructure including but not limited to: • CCTV Cameras & including poles • Public Address System • GPS based handheld/ Mobile Device • Environmental Sensors • Smart Traffic Detectors, Sensors & Controllers • Variable Message Signboard • Equipment for electricity supply • UPS • IP Phones • All sensors & IoT devices • All active & passive ICT devices • Other equipment commissioned as a part of the project scope	MSI should keep minimum 10% spare at any given point of project execution. Infrastructure equipment should be replaced or repaired after complaint login from ASCL officials Measurement Tool: System Generated Call Log at Help Desk	Within 4 business hours of logging compliant 2 to 4 business days of logging compliant More than 4 days of logging compliant	0 5 7

7	Battery Replacement for all equipment/devices procured	Replacement of various equipment batteries. This excludes the regular maintenance of the UPS and its Batteries Measurement Tool: SLA Monitoring Tool for inventory Management.	Batteries to be replaced every 3rdYear	5
8	Asset/Inventory Management	Provide Monthly MIS of Asset Inventory to check Asset Inventory level Measurement Tool: SLA Monitoring Tool for Inventory Management Conduct Annual Physical Asset verification once in a year and give report within 2 months from the date of verification	≥ 95% of the minimum required inventory level should be available measured on monthly basis <95% of the minimum required inventory level	0 3 (Severity level would Increase by 1 for every 5% drop in inventory level)
B.5Help Desk				
Service	**Parameter**	**SLA**	**Validation**	**Penalty**

Help Desk Availability	Help Desk should be available and all incidents/events raised with the IT Help Desk shall; be logged into the system and service ticket number should be provided to the employee	100% calls to be logged and service ticket no, shall be generated	Reports generated From ticket logging system	95%-99%calls are logged and ticket is generated: Penalty of 2%of O&M Charges 90%-95%calls are logged and ticket is generated: Penalty of 5%of O&M Charges
	Resolution of ticket logged asper the severity definition chart	99%	Reports generated from ticket logging system	95%-99% calls resolved in specified time: Penalty of 2% of O&M Charges 90%-95%calls resolved in specified time: Penalty of 5% of O&M Charges < 90% calls resolved in specified time: Penalty of 10 % of O&M Charges
Problem	Supplier shall analyze all	100% timely	Root cause	5% penalty

Management	the incidents and provide a root cause report every month if there are more than 10 incidents of the same type.	submission covering all incidents logged in that month	report Incident Report stating problems faced by the User	on monthly of O&M charges of that project area, if the supplier does not submit a problem report for that month 5% penalty on monthly of O&M charges of that project area if the supplier does not submit a problem report for that month.
B.6Camera feed and quality wherever installed				
Sr. No.	**Measurements**	**Definitions**	**Target**	**Severity Level**
1	Ratio of Live cameras v/s Total Cameras at any point of time (To be measured every 1 hour)	Number of live working cameras divided by total number of cameras Measurement Tool: Log from VMS tools wherein alerts to the control room shall be generated on non-functioning of	≥98% ≥95 % to <98% < 95%	0 3 5

		camera		
2	Average Frame rate maintained for Recording	Average frame rate is 25 FPS to be maintained by all cameras calculated on a Monthly Basis Measurement tool: Log from VMS	≥90% ≥85 % to <90% < 85%	0 3 4
3	Average Frame rate maintained for Recording	Average frame rate is 25 FPS to be maintained by all cameras calculated on a Monthly Basis Measurement tool: Log from VMS	≥95% ≥90 % to < 95% < 90%	0 3 4
4	Video stream Latency	Time required for transmission of video feed from one point to another Measurement tool: Report from EMS	≤40ms >40ms to ≤60ms >60ms	0 3 4
5	Change of Screen from one camera Source to another	Time required for transmission of screen from one camera source to another Measurement tool: Log from VMS	≥2s >2s to ≤5s >5s	0 3 4

6	Video Feed Query Retrieval Response Time	Time taken for receiving response to a query raised for video feed Measurement tool: Log from VMS	≤10s >10s to ≤20s >20s	0 3 4
7	ANPR for Standard Roman Number plates (3 wheelers & above) for RLVD & SVD system	Capability accurately read the number plates	>=90% <70% <50%	0 4 8
8	ANPR for Standard Roman Number plates (2 wheelers) for RLVD & SVD system	Capability accurately read the number plates	>=80% <50% <30%	0 4 8

.B7 Availability of Manpower proposed as part of the project

B.7.1 Manpower availability Service Levels

The manpower deployed by MSI for carrying out and providing FMS services shall necessarily be on direct payroll of the bidder organization and should not be outsourced / subcontracted in any circumstances except for the following manpower category:

1. Help Desk Support Staff
2. Electrical Assistant
3. Housekeeping

Only the above mentioned categories may be outsourced / subcontracted by the bidder organization. MSI shall appoint as many team members, as deemed fit by them, subject to the minimum manpower specified below to meet the SLA requirements. The tendering authority would not be liable to pay any additional cost for this. MSI shall provide detailed CV of each of the resource being provided to tendering authority before deployment of the resource at datacenter and CCC.

MSI shall always maintain minimum manpower on-site throughout the period of the contract.

Note: Every resource has to hand over his shift to other resource if there is availability of resource in next shift.

The resources shall be deployed by the MSI to manage the CCC and data center 24 *7 and maintain the service level requirements. Provisions of leave reserve, providing leaves and other facilities / perks shall be as per MSI prevailing policies / practices which shall be taken care by MSI without any liability and/or financial implications on the part of Purchaser.

The team deployment plan shall be prepared by MSI periodically and shall obtain approval from tendering authority prior to its implementation.
No resource shall be absent without prior permission of the designated authority.
Penalty on non-availability of any resource shall be as under:

No. of absence per role in a quarter	**Applicable Penalty / Actions**
> 0 but <= 10	No. of absence x INR 1500 per person per day
> 10 but <=30	No. of absence x INR 3000 per person per day
> 30	No. of absence x INR 4500 per person per day

B.7.2 An absence of more than half an hour from the work place, without having permission of Officer-In-Charge of project shall be considered as absent for the shift.

B.7.3 Manpower Change

The replacement of resources by MSI after deployment will be allowed (without penalty) only in case, the resource leaves the organization by submitting resignation with the present employer. In case of failure to meet the standards of the purchaser, (which includes efficiency, cooperation, discipline and performance) bidder may be asked to replace the resource without any penalty for replacement/exit.

The penalty per resource would be imposed in case of exit/replacement of resource from the project as per the details given below:

Resource Type	**Applicable Penalty when resource is leaving**	
	Within 6 months	**After 6 months of DOJ**

	of DOJ	
Manpower resources for specialized services	10 times of the penalty mentioned in Sr. no. B.7.1 of above table	5 times of the penalty mentioned in Sr. no. B.7.1 of above table

.CReporting Procedures

C.1MSI representative shall prepare and distribute Service level performance reports in a mutually agreed format by the 5th working day of subsequent month. The reports shall include "actual versus target" Service Level Performance, a variance analysis and discussion of appropriate issues or significant events. Performance reports shall be distributed to ASCL management personnel as directed by ASCL. Also, MSI may be required to get the Service Level performance report audited by a third-party Auditor appointed by ASCL.

.DIssue Management Procedures

D.1. General

This process provides an appropriate management structure for the orderly consideration and resolution of business and operational issues in the event that quick consensus is not reached between ASCL and MSI.

Implementing such a process at the beginning of the outsourcing engagement significantly improves the probability of successful issue resolution. It is expected that this pre-defined process shall only be used on an exception basis if issues are not resolved at lower management levels.

D.2. **Issue Management Process**

a. Either ASCL or MSI may raise an issue by documenting the business or technical problem, which presents a reasonably objective summary of both points of view and identifies specific points of disagreement with possible solutions.

b. Any unresolved issues/disputes concerning the Project/Contract between the Parties shall first be referred in writing to the Project Manager for his consideration and resolution. If the Project Manager is unable to resolve any issue/dispute within 5 days of reference to them, the Project Manager shall refer the matter to the Program Management Committee. If the Program Management Committee is unable to resolve the issues/disputes referred to them within 15 days the unresolved issue/dispute shall be referred to Steering Committee / high powered committee/Project Implementation Committee for resolution. The Steering Committee within 30 days of reference to them shall try to resolve the issue/dispute.

.EService Level Change Control

E.1**General:**

It is acknowledged that this Service levels may change as ASCL's business needs evolve over the course of the contract period. As such, this document also defines the following management procedures:
a. A process for negotiating changes to the Service Levels
b. An issue management process for documenting and resolving particularly difficult issues.
c. ASCL and MSI management escalation process to be used in the event that an issue is not being resolved in a timely manner by the lowest possible level of management.
d. Any changes to the levels of service provided during the term of this Agreement shall be requested, documented and negotiated in good faith by both parties. Either party can request a change.
E.2 **Service Level Change Process:** The parties may amend Service Level by mutual agreement in accordance. Changes can be proposed by either party. Unresolved issues shall also be addressed. MSI's representative shall maintain and distribute current copies of the Service Level document as directed by ASCL. Additional copies of the current Service Levels shall be available at all times to authorized parties.
E.3**Version Control / Release Management**: All negotiated changes shall require changing the version control number. As appropriate, minor changes may be accumulated for periodic release or for release when a critical threshold of change has occurred.

61. Operational SLAs

i. The proposed storage for all the production related applications should be on latest generation technology. The latency of storage should always be less than 1ms for all transactions.

ii. The proposed solution for backup should be cost optimized to provide lowest cost per TB of capacity. It should provide flexibility to schedule policy and retention levels as required and mandated from time to time.

iii. The proposed backup solution should include features like deduplication, compression and encryption. The proposed backup solution should also allow flexibility to migrate the backups from one CSP to another CSP without needing to de-duplicate, compress and encrypt the data again.

62. Definitions:

i. Severity 1: ICCC or Smart City applications down for more than 70% users.
ii. Severity 2: ICCC or Smart City applications down for more than 30% users.
iii. Severity 3: Modules of ICCC not functional for users.
iv. Severity 4: Minor functionality issues with ICCC or Smart City applications

v. Response Time: Response time is defined as the time the support vendor takes to respond from the time that ticket was raised.

vi. Resolution Time: Resolution time is defined as the time the vendor takes to resolve the issue or provide acceptable workaround for the issue.

63. Conditions for No Penalties

a. Penalties shall not be levied on the Bidder in the following cases:

i. There is a Force Majeure event effecting the SLA which is beyond the control of the MSI. Force Majeure events shall be considered in line with the clause mentioned RFP.

ii. The non-compliance to the SLA has been due

iii. To reasons beyond the control of the successful bidder.

iv. Theft cases by default/vandalism would not be considered as "beyond the control of MSI". Hence, the MSI should be taking adequate anti-theft measures, spares strategy, Insurance as required to maintain the desired Required SLA.

64. Reporting Procedures

64.1 MSI representative shall prepare and distribute Service level Performance Reports in a mutually agreed format by the 5th working day of subsequent month. The Reports shall include "actual versus target" Service Level Performance, a variance analysis and discussion of appropriate issues or significant events. Performance Reports shall be distributed to Authority management personnel as directed by Authority.

64.2 Also, MSI may be required to get the Service Level Performance Report audited by a third-party Auditor appointed by the Authority.

65. Issue Management Procedures

65.1 General

a. This process provides an appropriate management structure for the orderly consideration and resolution of business and operational issues in the event that quick consensus is not reached between Authority and MSI.

b. Implementing such a process at the beginning of the outsourcing engagement significantly improves the probability of successful issue resolution. It is expected that this pre-defined process shall only be used on an exception basis if issues are not resolved at lower management levels.

65.2 Issue Management Process

a. Either Authority or MSI may raise an issue by documenting the business or technical problem, which presents a reasonably objective summary of both points of view and identifies specific points of disagreement with possible solutions.

b. Any unresolved issues/disputes concerning the Project/Contract between the Parties shall first be referred in writing to the Project Manager for his consideration and resolution. If the Project Manager is unable to resolve any issue/dispute within 5 days of reference to him, the Project Manager shall refer the matter to the Program Management Committee If the Program Management Committee is unable to resolve the issues/disputes referred to them within 15 days, the unresolved issue/dispute shall be referred to Steering Committee/High Powered Committee/Project Implementation Committee for resolution. The Steering Committee or the High Powered Committee / Project Implementation Committee within 30 days of reference to them shall try to resolve the issue/dispute.

c. If the Steering Committee or the High Powered Committee / Project Implementation Committee fails to resolve a dispute as per the above clause, the same shall be referred to arbitration. The arbitration proceedings shall be carried out as per the Arbitration procedures mentioned in Clause 34 of this of RFP.

66. Service Level Change Control

66.1 General

a. It is acknowledged that this Service levels may change as Authority's business needs evolve over the course of the Contract period. As such, this document also defines the following management procedures:

   i. A process for negotiating changes to the Service Levels

   ii. An issue management process for documenting and resolving particularly difficult issues.

   iii. Authority and MSI management escalation process to be used in the event that an issue is not being resolved in a timely manner by the lowest possible level of management.

b. Any changes to the levels of service provided during the Term of the Contract shall be requested, documented and negotiated in good faith by both Parties. Either Party can request a change.

c. Service Level Change Process: The Parties may amend Service Level by mutual agreement. Changes can be proposed by either Party .Unresolved issues shall also be addressed. MSI's representative shall maintain and distribute current copies of the Service Level document as directed by Authority. Additional copies of the current Service Levels shall be available at all times to authorized parties.

d. Version Control/Release Management: All negotiated changes shall require changing the version control number. As appropriate, minor changes may be accumulated for periodic release or for release when a critical threshold of change has occurred.

ANNEXURES

Annexure I: Change Control Note

Change Control Note	CCN Number:
Part A: Initiation	
Title	
Originator	
Sponsor	
Date of Initiation	
Details of Proposed Change	
(To include reason for change and appropriate details/specifications. Identify any attachments as A1, A2, and A3 etc.)	
Authorized by Authority	Date
Name	
Signature	
Received by the Bidder	Date
Name	
Signature	
Change	
Change Control Note	**CCN Number:**
Part B: Evaluation	
(Identify any attachments as B1, B2, and B3 etc.) Changes to Services, payment terms, payment profile, documentation, training, service levels and component working arrangements and any other contractual issue.	
Brief Description of Solution:	
Deliverables:	
Timetable:	
Charges for Implementation:	
Other Relevant Information: (including value-added and acceptance criteria)	
Authorized by Authority	Date
Name	
Signature	
Change Control Note	**CCN Number:**
Part C: Authority to Proceed	
Implementation of this CCN as submitted in Part A, in accordance with Part B is: (tick as appropriate)	
Approved	
Rejected	

Requires Further Information (as follows, or as Attachment 1 etc.)	
For Authority and its nominated agencies	**For MSI**
Signature	Signature
Name	Name
Title	Title
Date	Date

Annexure II: FORM OF AGREEMENT

This **Agreement** (hereinafter "Framework Agreement") made on this _____day of _____, 2018 BETWEEN Aligarh Smart City Limited (hereinafter referred to as the **"Authority",** which expression shall include its successors and assigns) of the One Part;
AND
_____ (hereinafter referred to as the "**MSI**" which expression shall include its successors and assigns) of the Other Part.
AND WHEREAS, the Authority invited bids for the selection of Master System Integrator (MSI) for implementation of Integrated Command & Control Center (ICCC) and E-Governance based Smart City Solution at Aligarh.

AND WHEREAS, pursuant to the bid submitted by the MSI, vide _____ (here in after referred to as the "Bid or Offer") for the execution of Works, the Authority by its Letter of Acceptance dated _____ accepted the offer submitted by the MSI for the execution and completion of such Works as specified in the RFP documents and on the conditions in accordance with the documents listed in para 2 below.

AND WHEREAS, the MSI by a deed of undertaking dated _____ has agreed to abide by all the terms of the Bid, including but not limited to the amount quoted for the execution of Contract, as stated in the Bid, and also to comply with such terms and conditions as may be required from time to time.

AND WHEREAS, pursuant to the Bid submitted by the MSI vide _____ (hereinafter referred to as the "the Offer"), the Authority has by its Letter of Acceptance no. _____dated _____ accepted the Offer submitted by the MSI for the execution and completion of such Works and the remedying of any defects therein, on terms and conditions of the Framework Agreement;

AND WHEREAS, the MSI has agreed to undertake such Works and has furnished a Performance Bank Guarantee / PBG pursuant to clause 40 of the Section II.

NOW THIS AGREEMENT WITNESSETH as follows:

1. In this Framework Agreement words and expressions shall have the same meanings as are respectively assigned to them in the conditions of Contract hereinafter referred to;

2. The following documents shall be deemed to form and be read and constructed as part of this Framework Agreement viz. (a) Complete Request for Proposal (RFP) documents being Volumes I, II and III of the RFP and Corrigendum and addendum, (b) MSI's Offer, (c) Letter of Acceptance or Letter of Award OR Letter of Intent issued by the Authority, (d) the acceptance of Letter of Award from MSI, (e) Notice to Proceed with the Work, and (f) Any other document listed in the Contract Data.

3. The foregoing documents shall be constructed as complementary and mutually explanatory one with another. Should any ambiguities or discrepancy be noted then the order of precedence of these documents shall subject to the condition of particular application be as follows:

(a) Complete Request for Proposal (RFP) documents being Volumes I, II and III of the RFP and Corrigendum and addendum, (b) Framework Agreement, (c) MSI's Offer, (d) Letter of Acceptance or Letter of Award or Letter of Intent issued by the Authority, (e) the acceptance of Letter of Award from MSI, (f) Notice to Proceed with the Work, and (g) Any other document listed in the Contract Data.

4. In consideration of the payments to be made by the Authority to the MSI as hereinafter mentioned, the MSI hereby covenants with the Authority to execute and complete the Works and remedy any defects therein in conformity in all respect with the provisions of the Contract.

5. the Authority hereby covenants to pay the MSI in consideration of the execution and completion of the Works and the remedying of defects therein the Contract price or such other sum as may become payable under the provisions of the Contract at the times and in the manner prescribed by the Contract.

IN WITNESS WHEREOF, the Parties here to have caused this Framework Agreement to be executed on the day and year first before written.

For and on behalf of	**For and on behalf of**
Aligarh Smart City Limited	MSI (Company Name)
By……..	By……..
Signature	Signature
……..	…….
Print Name	Print Name
……..	…….
Title	Title
Witness……..	Witness……..
Print Name	Print Name
……..	…….
Print Address	Print Address
……..	…….

Annexure III: Non-Disclosure Agreement

This Non-Disclosure Agreement ("Agreement") is made and entered into **____ day of ……., 2018** by and between

……having its office at _____(hereinafter referred to as "Client"')

And

……..,having its office at _____(hereinafter referred to as :Master System Integrator" and/or "MSI")

"Client" and "MSI" shall be individually referred to as **Party** and collectively as **Parties** to this Agreement.

Whereas, the Parties have entered into a Contract bearing reference number _____ dated _____ for _____provision of _____ (hereinafter referred to as 'Contract'); and

Whereas, during the execution of the Contract, PARTIES may disclose to each other certain information which is confidential and proprietary in nature and as such they wish to protect such information from unauthorized disclosure and use;

NOW, THEREFORE, in consideration of the foregoing and the covenants and agreements contained herein and in the Contract, the Parties agree as follows:

1. **Definitions.** As used herein:

(a) The term "Confidential Information" shall include, without limitation, all information and materials, furnished by a Party ("Discloser") to another Party (Recipient) in connection with Government/corporates/citizen/users/persons/customers data, products and/or services, including information transmitted in writing, orally, visually, (e.g. video terminal display) or on magnetic or optical media, and including all proprietary information, customer & prospect lists, trade secrets, trade names or proposed trade names, methods and procedures of operation, commercial or marketing plans, licensed document know-how, ideas, concepts, designs, drawings, flow charts, diagrams, quality manuals, checklists, guidelines, processes, formulae, source code materials, specifications, programs, software packages, codes and other intellectual property relating to such Party's data, computer database, products and/or services. Confidential Information shall also include results of any tests, sample surveys, analytics, data mining exercises or usages etc. carried out by Discloser in connection with the Recipients' or any government department's / Corporates information including citizen/users/persons/customers personal or sensitive personal information as defined under

any law for the time being in force.

(b) The term, "MSI" shall include the directors, officers, employees, agents, consultants, contractors and representatives of MSI including its affiliates, subsidiary companies and permitted assigns and successors.

2. **Protection of Confidential Information.** With respect to any Confidential Information disclosed by the Discloser to the Recipient or to which any Party has access, both the Parties agree that it shall:

(a) Use the Confidential Information only for accomplishment of the Services to be performed under the Contract and in accordance with the terms and conditions contained herein;

(b) Maintain the Confidential Information in strict confidence and take all reasonable steps to enforce the confidentiality obligations imposed hereunder, but in no event take less than reasonable care than it takes to protect the confidentiality of its own proprietary and confidential information and that of its Clients;

(c) Not make or retain copy of any Confidential Information except as necessary, under prior written permission from other Party in connection with the Services to be performed under the Contract, and ensure that any such copy is immediately returned to the other Party even without express demand from such Party to do so;

(d) Not disclose or in any way assist or permit the disclosure of any Confidential Information to any person or entity without the express written consent of discloser except as provided in clause 6 below; and

(e) Return to Discloser, or destroy, at Discloser's direction, any and all Confidential Information disclosed in a printed form or other permanent record, or in any other tangible form (including without limitation, all copies, notes, extracts, analyses, studies, summaries, records and reproductions thereof) immediately upon the earlier to occur of:

(i) expiration or termination of the Contract, or
(ii) on request of Discloser.

(f) Not discuss with any member of public, media, press or any other person about the nature of arrangement entered between the Parties or the nature of services to be provided by the MASTER SYSTEM INTEGRATOR / MSI to the Authority/ CLIENT.

3. **Onus.** Recipient shall have the burden of proving that any disclosure or use inconsistent with the terms and conditions hereof falls within any of the exceptions provided in clause 4 below.

4. **Exceptions.** The obligations of confidentiality as mentioned in this Agreement shall not apply to any information:

(a) Which has become generally available to the public without breach of this Agreement by Recipient; or

(b) Which at the time of disclosure to Recipient was known to Recipient free of confidentiality restriction as evidenced by documentation in Recipient's possession;

or

(c) Which either Party agrees in writing is free of such confidentiality restrictions.

5. **Remedies.** The Parties acknowledge and agree that

(a) any actual or threatened unauthorized disclosure or use of the Confidential Information by Recipient would be a breach of this Agreement and may cause immediate and irreparable harm to Discloser;

(b) Damages from such unauthorized disclosure or use may be impossible to measure accurately and injury sustained by Client may be impossible to calculate and remedy fully. Recipient acknowledges that in the event of such a breach or threatened breach of any provision of this Agreement, Discloser shall be entitled to specific performance by Recipient of Recipient's obligations contained in this Agreement. Recipient shall indemnify, save, hold harmless and defend Discloser promptly upon demand and at its expense, at any given point in time from and against any and all suits, proceedings, actions, demands, losses, claims, damages, liabilities, costs (including reasonable attorney's fees and disbursements) and expenses (collectively "Losses") to which Discloser may become subject to, in so far as such Losses arise out of, in any way relate to, or result from breach of obligations under this Agreement by Recipient . Such Party shall also be entitled, without the requirement of posting a bond or other security, to seek preliminary and final injunctive relief, as well as any and all other applicable remedies at law or equity, including the recovery of damages.

6. **Need to Know**. The Parties shall restrict disclosure of Confidential Information to its employees and/or consultants who have a need to know such information for accomplishment of Services under the Contract provided such employees and/or consultants have agreed to abide by the terms and conditions of this Agreement and agree that they shall not disclose such Confidential Information to any affiliates, subsidiaries, associates and/or third party without prior written approval of Discloser.

7. **Intellectual Property Rights Protection.** No license to Recipient, under any trademark, patent, copyright, design right, mask work protection right, or any other intellectual property right is either granted or implied by the conveying of Confidential Information to Recipient by the Discloser .

8. **No Conflict**. The Parties represent and warrant that the performance of their obligations hereunder do not and shall not conflict with any other agreement or obligation of the respective Parties to

which they are a party or by which the respective Parties are bound.

9. **Authority.** The Parties represent and warrant that they have all necessary authority and power to enter into this Agreement and perform their obligations hereunder.

10. **Governing Law.** This Agreement shall be interpreted in accordance with and governed by the substantive and procedural laws of India and the Parties hereby consent to submit to the exclusive jurisdiction of Courts and/or Forums situated at ALIGARH, UTTAR PRADESH, INDIA only.

11. **Entire Agreement.** This Agreement constitutes the entire understanding and agreement of the Parties, and supersedes all previous or contemporaneous agreement or communications, both oral and written, representations and under standings among the Parties with respect to the subject matter hereof.

12. **Amendments.** No amendment, modification and/or discharge of this Agreement shall be valid or binding on the Parties unless made in writing and signed on behalf of each of the Parties by their respective duly authorized officers or representatives.

13. **Binding Agreement**. This Agreement shall be binding upon and inure to the benefit of the Parties hereto and their respective successors and permitted assigns.

14. **Severability**. It is the intent of the Parties that in case any one or more of the provisions contained in this Agreement shall be held to be invalid or unenforceable in any respect, such provision shall be modified to the extent necessary to render it, as modified, valid and enforceable under Applicable Laws, and such invalidity or unenforceability shall not affect the other provisions of this Agreement.

15. **Waiver.** If either Party should waive any breach of any provision of this Agreement, it shall not thereby be deemed to have waived any preceding or succeeding breach of the same or any other provision hereof.

16. **Survival.** The Parties agree that all of their obligations undertaken herein with respect to Confidential Information received pursuant to this Agreement and obligations of indemnity shall survive for a period of 10 years after any expiration or termination of this Agreement.

17. **Non-solicitation.** During the term of this Agreement and thereafter for a further period of two (2) years post termination/expiry of Term of the Contract in case the Parties execute the Contract, the Parties shall not solicit or attempt to solicit each other's employees and/or consultants, for the purpose of hiring/contracting with such employees and/or consultants. In addition, MSI shall not proceed to conduct operations/business similar to the Client with any employee and/or consultant of the Client who has knowledge of the Confidential Information, without the prior written consent of the Client. This section will survive irrespective of the fact whether there exists a commercial relationship between MSI and Client.

18. **Term.** This Agreement shall come into force on the date first written above and, subject to aforesaid clause 16, shall remain valid up to two (2) years from the expiry or termination of the Contract.

IN WITNESS HEREOF, and intending to be legally bound, the Parties have executed this Agreement to make it effective from the date and year first written above.

For CLIENT,	For: Master System Integrator
Name:	Name:
Title:	Title:

WITNESSES:

1.

2.