Bihar Urban Infrastructure Development Corporation Limited

A Government of Bihar Undertaking

RFP for Supply, Construction, Fabrication,Installation of Traffic Light System and Control Room including all Associated Civil, Mechanical Electrical Works with Three (3) Years Annual Maintenance Contract at Sasaram

RFP No: BUIDCo/SIU-4/Yo-54/16

Bid Summary	
Estimated Project Cost	**Rs. 6.58 Crore**
Non-Refundable Tender Cost	**Rs. 10000/- (Ten thousand only)** through A/c payee demand draft from a scheduled bank, drawn in favour of Executive Engineer, BUIDCo Rohtas
Non- Refundable Tender Processing Fee	**Rs. 17,700/- (Sixteen thousand Seven hundred only)** through e-Payment mode (i.e. NEFT / RTGS, Net Banking, Credit / Debit Card) only.
Sale of RFP document	All working days during office hours starting from 02/01/2020 to 22/01/2020 up to 3:00 p.m.
EMD/ Bid Security	**Rs. 13,16,000 /- (Rupees Thirteen Lakh sixteen thousand only)** in the form of Bank Guarantee/ Demand Draft in favour of Executive Engineer, BUIDCo. Rohtas.
Performance Bank Guarantee (PBG)	Performance Guarantee will be submitted in the form of Bank Guarantee@ of 10% of Project Order Value by successful bidder.
Bid validity Period	**120 Days**
Last Date of Submission of written queries on Bid document	**24/01/2020 till 3:00 PM.**
Pre bid conference	**08/01/2020 at 3.00 PM**. **Venue:.** Chief Engineer (south) , Buidco office : West Boring Cannal Road , Patna
Last date for submission of Bid (Only through e-Procurement)	**23/01/2020 till 4:00 PM Only**. Through website www.eproc.bihar.gov.in
Last date for submission of hard copy of Bid	**24/01/2020 till 3:00 PM Only.**
Date and time of opening of Technical Bids	**24/01/2020 at 4:30 PM.** Through website www.eproc.bihar.gov.in
Date and time of opening of Financial Bids	To be communicated later

TABLE OF CONTENTS

1 Introduction

Ineffective operation and maintenance of traffic signals may have safety implications and contributes annually to millions of hours of unnecessary traffic delays, congestion, fuel consumption and air and noise pollution. In order to have an efficient system, State Government should create a system which is capable of providing a benchmark for, and to promote good traffic signal operations and maintenance practices.

Looking at the perennial traffic problem at various location of Sasaram, Government has envisaged a project with the objective of providing a system to assist in prioritizing the operations and maintenance objectives and performance measures to evaluate staffing and resource needs required to effectively operate and maintain traffic signal systems. Clearly defining traffic signal operations and maintenance are essential to understanding the staffing and resource needs to support these functions. Traffic signal operations are the active prioritization of objectives and active collection of information to efficiently manage traffic signal infrastructure and control devices to maximize safety and throughput while minimizing delays. Traffic signal maintenance includes the preventative and responsive activities to preserve traffic signal infrastructure and control devices necessary for the safe and efficient utilization of arterial, collector and local roadways.

Proposals with comprehensive solutions are requested for Installation and maintenance of Traffic Light System, CCTV Camera and establishment of Central Control Room.

1.1 IT enabled Surveillance System for City Security

1.1.1 Scope of Work

- Supply, construction, fabrication, installation & maintenance of Traffic Light System at 6 locations (The locations and installation phase of Traffic Light points are described in **Annexure- 2**) in Sasaram including all associated Civil, mechanical, Electrical works
    - 6 locations will have adaptive traffic control

a) Infrastructure Details for Traffic Lightening System

Fixed lighting system

1	Signal Pole
2	Controller
3	Junction box and power supply
4	Signal Head pair
5	Flashers pair
Adaptive Lighting system	
1	Signal Pole
2	Controller
3	Junction box and power supply
4	Signal Head pair
5	Flashers pair
6	Vehicle detection camera
7	Expansion board (for camera)

- Supply, Installation, Commissioning and maintenance of the CCTV Cameras at junction points. A mix of High definition (HD) IP based Fixed and PTZ cameras will be used for the purpose. Both IP based CCTV Camera should work with Wireless and Fiber based Network or mix of wireless or fiber network.

Type of Camera	**No of Cameras**
PTZ Camera	6
Fixed Camera	20
Detection camera	20

Deployment of Camera is based on the view generated at the installation points. It is advisable to install fixed cameras at all arms at round about junctions and one PTZ camera at the junctions at where view to all arms of junction is clear. The above mentioned numbers of cameras are tentative. Actual numbers of cameras along with its calcification need to be provided by the bidder before actual execution.

All the cameras will be connected to a Command & Control Centre which will be equipped with video management modules and storage modules. Provisions will be made to record and view live incidents at all surveillance premises. Recorded clips can also be viewed readily on requirement. The Command & Control Centre will be equipped with LCD display units to aid the officials in monitoring events. Abnormal activities should identify and indicated by the system.

The proposed installation of CCTV Camera system shall function in such a way that following functionalities are available at the operator desk:

- The Video Management System (VMS) server proposed for the CCTV should be such that the required CCTV feeds can be seen from the operator desk, when required.
- The operator should have functionality to Pan, Tilt or Zoom the PTZ Cameras from his workstation itself.
- Operator shall be able to see the video from a specific camera by clicking on the camera icon while sitting at the operator desk itself.

- To enable hybrid connectivity, as per feasibility i.e. Fiber and Wireless based network will be preferred. This network should be zero interruption based communication for links among Control room, IP Cameras and Traffic lights installed & spread over various locations in the city.
  - The successful bidder shall be responsible for end-to-end implementation of connectivity of all the locations under this RFP and shall quote and provide/ supply any item(s) of latest make and model not included in the bill of materials, but required for successful implementation and commissioning of the system as well as its management. For such item(s), which have not been quoted by the successful bidder in the bid, but are required for successful completion of the project, the Bidder shall not pay for the same.
  - The supply of all the installation material/accessories/ consumables necessary for the installation of the systems.
  - The required networking equipment for end to end connectivity from Control room to individual Camera &Traffic light shall also be provided by the bidder at each location.
  - The complete ownership of the network proposed on wireless/fibre will that be of BUIDCo Bihar. Therefore proposed Network has to be a private Network build for Bihar Govt. and not hired from a Telecom Operator. However complete maintenance will be in the scope of the bidder including rectification of minor or major faults/breakages in the network equipment. There is provisioning of usage of existing tower infrastructure which has been created for BUIDCo of the state and can be referred in "**Annexure-4**" of this document.

- Carry out installation of active components, passive components and accessories supplied as per standards for successful integration and implementation of the systems at each locations connected under this RFP.
- Configuring and fine-tuning of subsystems to achieve overall optimal network performance with high level physical & cyber security.
- CPE (Customer Premise Equipment) shall have enough gain to provide strong signals for the video &Traffic Light signal communication.
- Wireless Communication should be fully secure and shall support 128-bit encryption or better.
- Minimum bit-rate of streaming shall be 2 Mbps.
- All the locations are connected through wireless or wired medium (fibre) with Local Control Room.
- Access Point shall be placed in such a way that it covers the entire locations which is under surveillance. Associated planning and diagrams of placement of Access Points shall be provided by bidder.
- Product offer by bidder must fulfill functional requirement of entire project for successful implementation and commissioning of the project as well as its management. For meeting such functional requirement in case any components /items is not specified in this RFP, it must be quoted as a separate item along with its price.
- Connectivity between Police Control Room and SP office, other Senior Official, link to be provided for displaying dashboard for alert messages to BUIDCo all Senior officials by extending link from control room to nearest S.P office at Sasaram City

- Establishment of Control room including all associated Civil, mechanical, Electrical and IT works. Land for Control room will be provided by BUIDCo. The function of the control room is the following:
  - Program the phasing of the individual lights
  - Monitor flow of traffic on a continual basis through large screens and take corrective measures as needed in terms of re-phasing
  - Monitor junctions for any malfunction and appropriately action repair / servicing work

- Monitor junction for any untoward incident, traffic pile up and take appropriate measures in collaboration with local police and traffic police.

Below is a screen shot of video at a control room and some high light.

- 6 display units gives integrated view of Surveillance cameras and graphical user interface for better traffic management.
- Changes in timing parameters of adaptive system can be made
- Changes in parameters for timetable schedule in controller can also be modified from control room
- The server capable of controlling and collecting data from 6 signal junctions
- 7 Traffic police personnel to be trained as operators, working across 3 shifts (5 each in two shifts of 8 hours each, 2 people in the night shift)
- The system is capable of generating a temporary Green Wave on VIP routes

- Supply, Installation, Commissioning and maintenance of connectivity between Police Control Room at SSP office and CCTV Cameras using wired / wireless connectivity.
- Annual Maintenance for a period of 3 years of all equipment \application supplied by bidder at all locations.
- Manpower (1 Per Shift) at Control room for providing technical support.

1.2 Objective

1. To offer proactive approach to improve traffic management in Sasaram.

2. To enable tactical and effective communication between authorities.
3. To deploy technology solutions to sense, analyse and enable a coordinated response to handle perennial traffic jam problems at the intersections of the city.
4. Intelligent infrastructure to command & control & gainrapidin puts from ground units.

2 General Terms and Conditions

2.1 Eligibility Criteria

The Bidders must fulfil the following conditions with supporting documentary proof along with the tender document.

Sr. No.	Pre-qualification Criteria	Document Required
1	The Bidder can be a consortium or an individual company. 1. In case of individual company/firm or in case of consortium all members of the consortium should be legal entities and must have been registered under the Indian Companies Act, 1956 / The Partnership Act 1932 / Limited Liability Partnership Act, 2008. 2. Company/firm or in case of consortium all members of the consortium should be registered with the Service Tax Authorities. 3. Other than Prime Bidder only **One more** consortium partner is allowed.	1. Certificate of Incorporation. 2. GST Certificate 3. Consortium Agreement
2	The Prime Bidder should be an IT Company and in Business forlast Five (5) years on the date of submission.	Purchase Order / work order/LOA/Completion Certificate / Certificate of Incorporation.
3	The Prime Bidder should have turnover of atleastRs. 3.29 Crores during each of the last three financial years (i.e. 2016-2017, 2017-18, 2018-19).	Audited Balance sheet

Sr. No.	Pre-qualification Criteria	Document Required
	(In case Annual Accounts for FY 2018-19 is not audited, the audited Balance Sheet for FY 2015-16, 2016-2017, 2017-18 can be submitted.)	
4	Net worth of Prime Bidder should be minimum of Rs. 0.8 Crores for each of the last three years financial years(i.e. 2016-2017, 2017-18, 2018-19). (In case Annual Accounts for FY 2018-19 is not audited, the audited Balance Sheet for FY 2015-16, 2016-2017, 2017-18 can be submitted.)	CA Certificate with CA's Registration Number & Seal
5	The Prime Bidder should have executed at least3(Three) IT projects value of Rs. 1Crores involving multiple locations for Central OR State Governments OR Government Organizations in India in Last Five Year as on 31/09/2019	Work Completion Certificates from the client; OR Work Order + Phase Completion Certificate from the client
6	The Prime Bidder/Consortium partner should have completed Traffic Lighting System Installation project of more than Rs. 2.5 Crores in India out of which any single order value must be more then Rs. 1.25 crores in india during the last Five Years as on 31/09/2019	Work Completion Certificates from the client; OR Work Order + Phase Completion Certificate from the client
7	The prime bidder must have an office in Sasaram, Bihar or should furnish an undertaking that the same would be established within one month of signing the contract.	Documentary Proof / Undertaking Letter

Sr. No.	Pre-qualification Criteria	Document Required
8	The Prime bidder/consortium partner should have a CMMi Level 3 and above certification /any ISO certificate	CMMi Level certificate/ISO CERTIFICATE
9	The Prime bidder must have at least 100 qualified IT professionals on regular roles as on 31.07.2019.	Undertaking letter from HR
10	Bidder or both consortium partners should not have been declared blacklisted / ineligible during last two financial years by any State/Central Govt. or \PSU due to unsatisfactory performance, breach of general or specific instruct / fraudulent or any other unethical business practices.	Self Declaration Certificate
11	The Consortium Partner should have an annual turnover of at least Rs. 2 Crores during each of the last three financial years (i.e. 2016-2017, 2017-18, 2018-19).	Audited Balance sheet/ Annual Report / CA Certificate with CA's Registration Number & Seal
12	The consortium partner should be ISO 9001:2008 certified company.	Valid ISO Certified
13	OEM or its authorized service partner shall have at least three Service centres / repair facility in India	List of Service center to furnished by OEM
14	OEM shall be an registered company in India , Existence in country for more than 5 years	1. Certificate of Incorporation. 2. GST Certificate
15	OEM shall be ISO 9001:2000 certified or an CMMi Level 3 and above certified organization	Valid ISO\CMMi Level Certificate

Pre-Bid Conference

A pre-bid conference will be held in the office of "**Chief Engineer (south) , Buidco office : West Boring Cannal Road , Patna.**" office at 15.00 hours on 08/01/2020 with the prospective Bidders to clarify the technical or any other related matters. These questions/clarifications should be submitted in writing along with soft copy before 17.00 hours on Same Day.

Any decision on the discussion requiring modification; amendments for tender document will be uploaded on the websites www.eproc.bihar.gov.in

2.2 Submission of Tender (Two-Bid System)

2.2.1 Tendering Process

BUIDCo now invites proposals from interested eligible bidders through e-procurement process for **Supply, Construction, Fabrication, Installation of Traffic Light System, Surveillance system and Control Room including all Associated Civil, Mechanical Electrical Works with Three (3) Years Annual Maintenance Contract at Sasaram.**

1. Bidders shall submit the General, Pre-qualification and Technical details as part of General cum technical bid and Commercial bid through www.eproc.bihar.gov.in
2. Bidder shall submit separate General cum Technical bid and commercial bid for the Project through www.eproc.bihar.gov.in.
3. The bidders shall submit their eligibility and qualification details, commercial bid etc., in the online standard formats displayed in e-Procurement web site. The bidders shall upload the scanned copies of all the relevant certificates, documents etc., in support of their eligibility criteria/technical bids and other certificate/documents in the e-Procurement web site. The bidder shall electronically sign on the statements, documents, certificates, uploaded by him, owning responsibility for their correctness/authenticity. The bidder shall attach all the required documents for the specific tender after uploading the same during the bid submission as per the tender notice and bid document.

2.2.2 E-Procurement process related instructions.

1. The bidder shall submit his bid/tender on e-Procurement platform at www.eproc.bihar.gov.in.
2. The bidder must have the **Class II/III Digital Signature Certificate** (DSC) and e-Tendering User-id of the e-Procurement website before participating in the e-tendering process. The bidder may use their DSC if they already have the DSC. They can also take DSC from any of the authorized agencies. For user-id

they have to get registered themselves on e-procurement website www.eproc.bihar.gov.in and submit their bids online on the same. Offline bids shall not be entertained by the Tender Inviting Authority for the tenders published in e-procurement platform.

3. The bidders shall submit their eligibility and qualification details, Technical bid, Financial bid etc., in the online standard formats given in e-Procurement web site at the respective stage only. The bidders shall upload the scanned copies of all the relevant certificates, documents etc., in support of their eligibility criteria / technical bids and other certificate /documents in the e-Procurement web site. The bidder shall digitally sign on the supporting statements, documents, certificates, uploaded by him, owning responsibility for their correctness/authenticity. The bidder shall attach all the required documents for the specific tender after uploading the same during the bid submission as per the tender notice and bid document.
4. All the required documents should be attached at the proper place as mentioned in the e-forms otherwise the tender of the bidder will be rejected.
5. Tender Processing Fee (TPF) to be paid through e-Payment mode (i.e. NEFT / RTGS, Net Banking, Credit / Debit Card) only.
6. Cost of Tender Document Fee to be paid through A/c payee demand draft from a scheduled bank, drawn in favour of Managing Director, BUIDCo.
7. “Earnest Money Deposit (EMD) to be paid through A/c payee demand draft from a scheduled bank, drawn in favour of Managing Director, BUIDCo or in the form of Bank Guarantee as per Annexure-20.

   Note: "Bids along with necessary online payments must be submitted through e-Procurement portal www.eproc.bihar.gov.in before the date and time specified in the NIT/RFP. The BUIDCo/Tendering Authority doesn't take any responsibility for the delay / Non Submission of Tender / Non Reconciliation of online Payment caused due to Non-availability of Internet Connection, Network Traffic / Holidays or any other reason. Hard Copy of Bids should be submitted on **24/01/2020 till 3:00 PM**, along with DD/BG for tender document fee and EMD, failing which tender will be rejected.
8. The tender opening will be done online only.
9. Any corrigendum or date extension notice will be given on the e-Procurement website only.
10. For support related to e-tendering process, bidders may contact at following address “e- Procurement HELP DESK First Floor, M/22, Bank of India Building, Road No-25, Sri Krishna Nagar, Patna-800001

Ph. No: 0612-2523006, Mob- 7542028164" or may visit the link "Vendor Info" at www.eproc.bihar.gov.in.

2.2.3 General cum Technical Bid

The General cum technical bid should not be furnished with commercial quote.

The General cum technical bid should contain the following:

1. Tender Document fee of Rs. **10000/-**(Ten thousand only) in the form of DD have to be submitted along with the Technical bid.
2. EMD in the form of Bank Guarantee/ Demand Draft (DD)of Rs.**1316000/-(** Thirteen Lakhs sixteen thousand only) from a Scheduled bank, have to be submitted along with the Technical bid.
3. Duly filled in Annexure - 1(Profile of the company) with relevant details and enclosures.
4. Digitally signed Tender proposal along with credentials and supporting documents.
5. Authorisation letters from Original Equipment Manufacturers (OEMs).
6. Technical solution document detailing about the solution offered.
7. Company Registration certificate
8. Company Profile
9. Latest sales tax clearance certificate
10. Order copies with satisfactory letter
11. Last three years IT returns
12. Last three years Audited financial document.
13. Datasheet of the quoted products
14. Compliance Certificate for the Technical Specification of Items
15. Power of attorney to the authorised person granting the person signing the proposal the right to bind the bidder as the 'Constituted attorney of the Directorate'.

2.2.4 Commercial Bid

The Commercial Bid as prescribed e-form should be filled up& uploaded on the website www.eproc.bihar.gov.in along with the required enclosures.

2.3 Earnest Money Deposit (EMD)

Earnest Money Deposit of Rs.**1316000/-(** Thirteen Lakhs sixteen thousand only) by Demand Draft (DD) or Bank Guarantee from a Scheduled Bank drawn in favour of "The Managing Director, BUIDCo Ltd. payable at Patna" should be enclosed with the Technical bid. The EMD will be returned at their own expense to such of those Bidders who are found not qualified on the technical bid. The EMD is not liable to earn any interest.

2.4 Forfeiture of Earnest Money Deposit:

If the successful Bidder fails to act according to tender conditions in any aspect or backs out after the tender was accepted, the EMD will be forfeited by BUIDCo limited.

2.5 Details to be furnished and mode of presentation

1. The bid document should contain particulars like name and addresses of the Bidder, cost including sales tax, surcharge, freight, insurance and such other levies applicable for delivery.
2. The tender quote should be valid for a period of 120 days from the last date of submission the Bid of the Tender.
3. The quote both in words and figures for each item with make, model and specifications should be indicated in Commercial bid.
4. Technical specifications and Brochures for each item quoted should be enclosed in the Technical Bid.
5. Increase or revision of any duties, taxes and surcharges will be borne by the Bidder alone till delivery period.
6. The supply of equipment for Installation of Traffic Light System, CCTV Camera and Establishment of Control Room at Sasaram, Installation & commissioning and the scope of work shall be as per the tender requirement.
7. Submission of any additional documents will not be entertained after tender opening unless required by the purchaser .The website will not accept any document after closure of submission schedule.

2.6 Opening of Tender

The tenders received on the date and time specified in the tender document will be opened in presence of the Committee members of BUDICo Ltd. through the website www.eproc.bihar.gov.in.

The Technical bids of Bidders, which are correct and qualified in all respects, will be evaluated and those who qualify on the basis of technical bid will be informed through the decision on the website the, date and time of opening of their commercial bids. The Commercial bids of the technically qualified Bidders will be opened. The decision of the Managing Director, BUDICo Ltd shall be final in this regard.

2.7 Technical Evaluation for Equipment and Accessories

The Bidder should make all necessary arrangements for technical evaluation of Installation of Traffic Light System, CCTV Camera and Establishment of Control Room with related equipment and accessories including all the possible samples quoted in the tender document. The evaluation will be conducted by the BUIDCo evaluation team. Non-compliance will be summarily rejected.

2.8 Rejection Criteria

1. Tenders submitted without furnishing any of the required details specified in **clause 2.3.3** will summarily are rejected.
2. Tenders should be submitted with digitally signed document and seal of the Bidder in the tender document and also in the Technical and Commercial e-forms in separate schedules .The Tenders received without being duly certified by the Bidder for fully accepting the terms and conditions of the tender and for abiding by the rules laid down, will summarily be rejected.
3. The tenders submitted without EMD and tender document fee will summarily be rejected.
4. Tenders submitted without the specification for each item quoted or compliance statement in the technical bid will be summarily rejected.
5. Tenders with incomplete information, subjective and conditional offers/bidder’s own terms &conditions including partial offers will be liable for rejection.
6. Tenders submitted without audited financial statements for the previous 3 years along with IT returns copy, STCC copy will summarily be rejected.
7. The Tenders submitted with incomplete details against the required specifications in Technical bid will summarily be rejected.
8. Tenders with variance / contradiction between Technical and Commercial Bids will be liable for rejection.

9. In addition to the above rejection criteria, non-compliance in any aspect of this tender document will make the tender liable for rejection.

2.8.1 Special Terms

BUIDCo reserves the right to increase or decrease the quantity requirements to the extent it feels the exigency of the new project of any quantity in terms of products & services.

2.9 Tender Evaluation Criteria

The Committee member of BUIDCo limited will prepare a list of firms based on the compliance of detailed Technical specifications and company profile furnished in tender.

Technical bid documentation shall be evaluated in two sub-steps.

Firstly, the documentation furnished by the vendor will be examined prima facie to see if the offer made, products proposed, technical skill base and financial capacity and other vendor attributes claimed therein are consistent with the needs of this project.

In the second step, BUIDCo may ask vendor(s) for additional information, visit to vendors site and/or arrange discussions with their professional, technical faculties to verify claims made in bid documentation.

BUIDCo may also ask the bidders to give presentation on the understanding of the project scope, technical and financial strengths, proposed solution, manpower and infrastructure deployment etc. date and Time will be intimated separately.

The Bidders who do not conform to the technical specifications or tender conditions or Bidders without adequate capabilities for supply shall be straight away rejected. All eligible Bidders will be considered for further evaluation on the merits of the following aspects:-

S. No.	Criteria/Sub Criteria	Description	Point System	Max Point
1	Past Experience of Prime Bidder/Consortium partner			80
a.	System Integration projects	Prime Bidder/Consortium Patner should have completed at least one projects for implementation	>=INR 5 Cr >=INR 2.5 Cr&<INR 5 Cr <2 Cr	10 7 4

S. No.	Criteria/Sub Criteria	Description	Point System	Max Point
		of an integrated turnkey naturein e-Governance field/incident management/Emergency Response system executed in India		
b.	Similar Project	Prime Bidder/Consortium partner should have completed Similar Traffic Signal Deployment and Implementation (All Successfully completed in India supported by satisfactory completion/ operation certificate from client- would be considered.)	Total No of Traffic Signals deployed: >=200 >=150 &<200 >=75 &<150 >=50 &<75 <50	20 15 10 5 0
c.			Single order value >=3 Cr >=2Cr &<4 Cr >=2 Cr & 3 Cr	20 10 5
d.	Turnover	Prime Bidder average Turnover of the last three financial years (i.e. 2016-2017, 2017-18, and 2018-19).	>= INR 7 Cr > =INR 3.3 Cr but less than INR 5Cr	15 10 5

S. No.	Criteria/Sub Criteria	Description	Point System	Max Point
e.	Certification	The prime bidder should have folloeing certification.	CMMi Level 5 CMMi Level 4 CMMi Level 3	10 7 5
f.	Office	The prime bidder must have an office in Sasaram, Bihar or an undertaking to be provided stating that a local office will be started at bihar within 1 month of signing the contract.	Office in Sasaram / Undertaking to open a local office	5
Note: 1. For all the above project, bidder has to submit (Work Completion Certificates from the client) / (Work Order + Phase Completion Certificate from the client) of the projects completed in the last 5 years as on Bid Submission date.				
2	Solution Proposed & Technical Presentation			10
a.	Proposed solution	Requirements addressed as mentioned in different parts of the RFP and the quality of the solution	Evaluation Committee will evaluate whether all the points/ requirements mentioned in the RFQ are addressed well and award points accordingly	5
b.	Proposed Approach and methodology	Evaluation Committee will evaluate whether the implementation methodology is in line with the requirement. The important parameters being:- - Plan for meeting the SLA	Evaluation Committee will evaluate whether all the points/ requirements mentioned in the RFQ are addressed well and award	5

S. No.	Criteria/Sub Criteria	Description	Point System	Max Point
		norms. - Redundancy and failover options. - Spare equipment availability plans	points accordingly	
3	Proposed plan			10
a.	Project Management	The overall approach	The overall project management approach adopted by the responding firm to implement the project to meet the timelines.	5
b	Team Deployed	The description and quality of resources to be deployed	Evaluation will be based on the qualification, Experience of Project Manager to deployed in similar kind of projects	5
Total Marks				**100**

2.10 Sequence of Technical Bids Evaluation

a) The bidders technical solutions proposed in the bid document will be evaluated as per the scope of the work and requirements of the BUIDCo by the technical committee.

b) The technically qualified bidders will be considered for opening of financial bid. The criteria for technical qualification is as described below

- Bidders must score at least 70 Marks out of 100 in the technical scores

Note: In the event BUIDCo does not receive minimum bids with minimum 70 marks then BUIDCo reserves the sole right to relax this condition. In that case BUIDCo might consider the evaluation and processing of three bids with maximum marks which qualify clause no 2.11 for Commercial Bid.

The bidders who will qualify the Technical Bid criteria will be eligible for Financial Bid evaluations. Commercial bid will be submitted by the bidder in prescribed format as mentioned below in the tender

2.11 Award of project

a) The Financial Bids of technically qualified bidders will be opened on the prescribed date in the presence of bidder representatives.

b) Financial Bids that are less than 30% of the average bid price will be disqualified (the average bid price is computed by adding all Financial Bid values of ALL the qualified bidders and dividing the same by the number of bidders).

2.11.1 For the purpose of QCBS evaluation

a) The bidder with highest qualifying technical score (H1) will be awarded 100% score Technical Scores for other than H1 bidders will be evaluated using the following formula:

b) Technical Score of a Bidder (Tn) = {(Technical Score of H1/Technical Score of the Bidder) X 100}% (Adjusted upto two decimal places)

c) The bidder with lowest qualifying financial bid (L1) will be awarded 100% score (amongst the bidders which did not get disqualified on the basis of point b above). Financial Scores for other than L1 bidders will be evaluated using the following formula:

d) Financial Score of a Bidder (Fn) = {(Commercial Bid of L1/Commercial Bid of the Bidder) X 100}% (Adjusted upto two decimal places)

e) Only fixed price financial bids indicating total price for all the deliverables and services specified in this bid document will be considered.

f) The bid price will include all taxes and levies and shall be in Indian Rupees and mentioned separately.

g) Any conditional bid would be rejected

h) Errors & Rectification: Arithmetical errors will be rectified on the following basis: “If there is a discrepancy between the unit price and the total price that is obtained by multiplying the unit price and quantity, the unit price shall prevail and the total price shall be corrected. If there is a discrepancy between words and figures, the amount in words will prevail”.

2.11.2 Combined and Financial Evaluation

a) Technical and financial scores secured by each bidder will be added using weightage of 70% and 30% respectively to compute a Composite Bid Score.

b) The bidder securing the highest Composite Bid Score will be adjudicated as the most responsive Bidder for award of the Project. The overall score will be calculated as follows:-

Bn = 0.70 * Tn + 0.30* Fn

Where

Bn = overall score of bidder

Tn = Technical score of the bidder (out of maximum of 100 marks)

Fn = Normalized financial score of the bidder

c) In the event the bid composite bid scores are 'tied', the bidder securing the highest technical score will be adjudicated as the Best Value Bidder for award of the Project.

2.12 Acceptance of Tender and Withdrawals

1. The final acceptance of tender is entirely vested with Managing Director, BUDICo limited, Patna, who reserves the right to accept or reject the tenders without assigning any reason. There is no obligation on the part the BUIDCo to communicate with the rejected Bidders. After acceptance of the Tender, the Bidder shall have no right to withdraw his Tender or claim higher price.
2. The tender accepting authority may also reject the tenders for reasons such as changes in the scope of procurement with advanced technology equipment, lack of anticipated financial resources, court orders, accidents or calamities and other unforeseen circumstances.

2.13 Contract Agreement

1. The successful Bidder will be informed by a provisional order to execute an agreement on a stamp paper to fulfil the contract as enclosed in the format within 15 days from the date of issue of LOI. The non-execution of contract agreement within the prescribed period will entail cancellation of the order and EMD will be forfeited by considering the Bidder as not responded.
2. Expenses incidental to the execution of the agreement shall be borne by the Bidder.

3. The conditions stipulated in the contract agreement form should be strictly adhered to and any violation of the conditions will entail termination of the contract without prejudice to the rights of PURCHASER and to recover any consequential loss from the successful Bidder.

2.14 Performance Security

The successful Bidder will remit the Performance Security of 10 % of the Project Order Value in the terms of Bank Guarantee from a Scheduled Bank drawn in favour of "**The Managing Director, BUDICo limited**, Bihar State, payable at Patna"should be enclosed with the contract agreement within fifteen days from the date of receipt of the provisional order.

a) The Performance Security remitted by the Bidder will be returned after the expiry of warranty period and on the performance satisfaction by the user.

b) The Earnest Money Deposit will be forfeited if the Bidder fails to remit Performance Security within 15 days or to act on the tender conditions or to complete the project.

2.15 Release of work Order

Work order (W.O.) will be issued to the successful Bidder after execution of contract agreement along with the Performance Security.

2.16 Pre despatch inspection

BUIDCo, at its discretion, may ask the Bidder to make arrangements for Technical evaluation by the technical team of the BUIDCo or any party authorized by BUIDC of or all the equipments, Installation of Traffic Light System, CCTV Camera and Establishment of Control Room and related equipment at factory site or at the Bidders warehouse prior to despatch.

2.17 Supply, Installation and Commissioning

1. The Supply of equipments including all accessories should be as per the specifications.
2. The equipment and its related accessories should be supplied, installed and commissioned at the Control Room at the risk of the Bidder.
3. Bidder shall be responsible for commissioning the new equipment and accessories with interface compatible to the existing equipment and accessories with the concurrence and co-ordination of the liaison officer of the BUIDCo for the implementation of project at respective sites during installation.

4. All relevant documents such as operation and user manuals, schematic and circuit diagram, service manual including trouble shooting shall be supplied by the Bidder for each equipment at free of cost.
5. If the supply, installation and commissioning of the equipment are not completed within the given time frame from the date of issue of the LOI, the user BUIDCo shall have the right to cancel the order and also take any such action which will be deemed fit according to the circumstances.
6. One Project Manager for running project for 36 months will be provided by Bidder from the date of handing over the project to the BUIDCo.
7. 2 systems Engineer for running project in three shifts on 24x7 operations for 36 months will be provided by Bidder from the date of handing over the project to the BUIDCo.

2.18 Timelines

The Contract is to comprise of 6 traffic signal sites in the city of Sasaram. The milestones in the contract are as follows:

- **Milestone 1** - Duration: 2months from the date of Issue of LOI
  - To complete the installation and commissioning of traffic signals & CCTV surveillance unit within an area of the city comprising 6signal junctions connected to the Control room and information centre through a leased transmission network.
  - Establishment of Control room
  - Establishing Wired\Wireless Connectivity
  - Providing of Manpower

2.19 Payment terms

Sr. No.	Percentage (%) of payment	Condition/Event
1	10% of the work order	Mobilization Advance payment against bank guarantee.
2	40% of Capex	On delivery& Installation and after 5% random sample verification (Original, Duly sealed & signed).
3	10% of Capex	After Completion of FAT.
4	40% of Capex + OPEX	Amount will paid into 12 Quarters.

- **No payment shall accrue until after the performance guarantee bond has been furnished.** The selected bidder shall be responsible to invest in the project to implement and operate the facilities, for the entire project period and on completion of **FAT** (**Final Acceptance Test**), the ownership of the Infrastructure will be transferred to BUIDCo. During contract period, the bidder shall have full responsibility for the delivery of the services, including all operational, maintenance, and management activities, etc.
- The bidder shall be paid Quarterly Payment at the end of the quarter on quarterly basis which has been accepted in the Final Acceptance Test, at the rates specified by the vendor.

2.20 Quarterly Payment

- Payment will be made at the end of the quarter on quarterly basis after successful completion of FAT.
- Vender has to provide attendance of manpower certified by BUIDCO official.
- The selected operator shall be paid on quarterly basis at the end of each quarter for **OPEX Portion(as mention in clause 5.10 from Sr. No. 1 to Sr.No. 8)**and remaining **CAPEX Portion (as mention in clause 5.10 Sr. No. 9)** at the rates specified by the bidder
- The Selected operator shall make a payment request after the end of each quarter with the following supporting document:
  - Attendance of manpower verified by BUIDCo officials.
  - SLA compliance report as prepared by the Agency appointed by the BUIDCo.

2.21 Acceptance Test Criteria

After successful implementation of all hardware/software / networking and their related services as defined in the RFP, Bidder will run Hardware, Software, Services and solution defined in Scope of work and as per proposed BOQ, mentioned in the RFP for a minimum period of 7 days continuously at the site. The bidder will submit acceptance test plan in line with scope of work mentioned in RFP including, but not limited to Compliance check, functionality check, quantity check etc. to BUIDCo for conducting Acceptance Test (AT). BUIDCo will start AT process at the site with authorized representative of the bidder and the consultant. The AT certificate will be released by BUIDCo to the Bidder/Service provider of this project, after .successful completion of.

2.22 System Documentation

2.22.1 General

1. The system documentation shall comprise the following covering each of the sub systems provided by this Contract namely ATC system and Control Room Systems and all associated equipment including:-
    - Final System Proposal (FSP),
    - Operator's Manuals,
    - Hardware Manual ,
    - Maintenance and Routine Servicing Manual,
    - Software/Firmware Manual.
2. All documentation shall be provided for Milestone 1 and shall be equally applicable to Milestone 2 operations the exception to this is the provision of as built drawings which shall be provided on the completion of each relevant Phase. The system documentation shall be provided in stages and these are defined as follows:-
    - The Bid return shall include a Preliminary System Proposal providing at least 95% of the detail intended to be included within the systems comprising the bid.
    - After Contract Signing:- The Contractor shall be required to submit two copies of the Final Systems Proposal with in 2 (Two) weeks from the date of issuance of LOI.
    - Before completion tests of a sub-system or item are commenced, parts of the system documentation, or preliminary documentation, relating to the sub-system or item, shall have been supplied to the Engineer, not less than two week prior to such tests.
    - Before final acceptance tests, additional documentation not already supplied shall be provided so that the Engineer holds two complete sets of all system documentation.
    - After acceptance of the system, the Engineer will return one copy approved by the Authority of the draft documentation to the Contractor, with any agreed amendments. Final system documentation, incorporating any amendments shall be provided within two months of the issue of the Takeover Certificate.
3. The system documentation shall be written and bound in such a manner that superseded parts may be easily replaced. Each volume shall contain an amendment record sheet and contents sheet. Each sheet

shall have a page number and, if it has been amended, an amendment number, and shall be clearly marked with a date and issue number.

4. All documentation shall be printed in English, and shall be of such detail as to enable third party maintenance contractors to fully maintain the system. The Contractor shall include with the Bid return, samples of typical documentation, produced to the same standard as that proposed for this contract.

2.22.2 Final System Proposal (FSP)

1. The Engineer shall approve the document containing Final System Proposals, assessing all aspects of the system design, and advise the Contractor where the requirements of the Contract have been misinterpreted.
2. The FSP proposals shall be divided into sections reflecting both in-station and outstation equipment associated with the Fully Adaptive Traffic control systems provided as part of this Contract and shall deal with the phased (Milestone 1 followed by Milestone 2) implementation program. This shall include but not be limited to:

    - Functional descriptions of all items of in-station equipment
    - Any comments the Contractor may wish to make regarding the proposals for the layout of the Control Room. In particular the Contractor shall outline his proposals for his Control Room design illustrating the features he has provided.
    - Details of the Contractor's power and system interconnection cabling, including a full definition of power supply requirements. (Full Connectivity Diagrams).
    - Details of the shape and dimensions of the equipment, and any constraints placed on equipment layout.
    - Details of the Contractor's proposals for the layout and method of installing the equipment at all external sites. Implementing a standard layout/method of installation consistent throughout the Contract.
    - Details of the Contractor's requirements for power and system cable interconnection at the outstation showing standard configurations.
    - Details of the Contractors method of tracing all system equipment from manufacture to delivery through commissioning in the form of a statement.
    - Details of the transition plan proposal for changeover from the old system to new system. This transition plan shall include a time-line for equipment changes and controlling modes at each

intersection. The transition plan shall provide a timely change between the old and the new systems while maintaining safe operations

3. A complete and comprehensive description of the overall systems shall be supplied which shall include but not be limited to individual system block diagrams, wiring schedules and core allocations.
4. Subsequent to the submission of the FSP, details of any amendment shall be submitted to the Engineer for approval once final design has been completed and before implementation is initiated.

2.22.3 Operator's Manual

1. The operator's manual shall be written such that the system operator can follow the manual in a step-by-step process to carry out the day to day operation and tests of any of the systems supplied. The manuals shall be written in plain English for use by persons with no previous technical knowledge of the systems. These manuals shall describe in non-specialist language all operator procedures, inputs, the results of these inputs, alarms and outputs not related to operator inputs. The manuals shall detail the procedures for carrying out the operator's functions specified.
2. The operator's manuals shall provide cross-references to the other documentation provided for information, which is not essential to the operator's function. All documents relating to the Adaptive Traffic Control system shall be the version of the ATC System supplied by the Contractor. In addition the Contractor shall supply four copies of the basic ATC System documentation inclusive of operator handbooks, technical descriptions and full system operational descriptions. All documents shall be clearly marked with a title, date, issue number and signature of a representative of the Contractor.
3. The manuals shall list specific procedures, which must be followed:
    - to start up and shut down the systems, ATC and Data Transmission ;
    - to carry out permitted system functions;
    - Explanation of all unsolicited fault or other system messages.
4. The manual shall be compiled in parts to cover all levels of operator control.
5. The fully documented procedures for making alterations to the system to allow for expansion of the system, editing plans, timetables, and ATC data are to be fully described, with examples. Where appropriate, flow diagrams of the order of database preparation shall be provided.
6. The manuals shall detail a full explanation of diagnostic messages generated during database processing.

2.22.4 Manual for Traffic Signal Equipment, CCTV and Connectivity

1. The Hardware Manuals shall be in two parts, in-station and outstation equipment.
2. Each unit of hardware shall be clearly labelled on at least two configuration drawings in block form. Each unit of hardware shall have a detailed description as to its function and operation.
3. The interaction of units shall be clearly shown on a configuration diagram and described in detail.
4. Logic diagrams and circuit diagrams of each part of the system shall be included with descriptions of the functions of each.
5. Parts lists and wiring schedules shall be provided, which shall follow a consistently standard colour coding across all items of similar equipment across the whole system.
6. In particular it is required that the manuals shall detail the following:-
    - The interconnectivity of equipment within buildings and cabinet housings.
    - Cross referencing with the maintenance and routine service manual, together with the software manual.
    - Use of data transmission equipment (data and video) shall be described in detail.
    - Software/firmware used in the system must be described in detail, including a description of how this software/firmware controls the system and how it can subsequently be modified.

2.22.5 Manual for Maintenance and Routine Servicing of Equipment

1. The Contractor in performing his maintenance duties as required by this Contract shall comply with the requirements of the Hardware Manuals wherever appropriate. All maintenance and frequency of routine servicing shall comply with the requirements set out in Section 14.14 of this document Maintenance during the Warranty Period and extended Maintenance Period for all items provided as part of this Contract.
2. The manuals shall detail the procedure for the replacement of faulty parts. Special attention shall be paid to ensure that a step-by-step procedure for the replacement of faulty parts is described.
3. Fault diagnosis routines shall be documented and shall be related to the observable effects of faults.
4. Operational adjustments of equipment shall be detailed. The operation of test equipment for maintenance and routine servicing shall be described.
5. Procedures for testing each item of equipment and the interaction between associated equipment to determine correct functioning shall be detailed, as shall the procedures for testing the interaction of two or more items of equipment.

6. The operational facilities provided by the Engineer control and selection equipment and Engineers monitor shall be described in detail.
7. This manual shall contain reasonable first, second and third line documentation and any additional information necessary to allow the Contractor to carry out his maintenance responsibilities detailed in this Contract, including the following:
    - Routine service procedures for each item of equipment, including recommended frequency of routine system diagnostics.
    - Details of the operation of the in-station and out-station test sets and their use in fault location and identification.
    - Details of other fault diagnosis, location and identification procedures related to observable effects of faults.
    - List of equipment connected to the system including details of all test dates and work done to the equipment.
    - Details of setting up and adjustments including the actions to be taken for those items on which first line maintenance is to be carried out.
    - Diagnostic programs to be used in fault analysis.
    - Details of the procedure for replacement of faulty parts.
    - Circuit diagrams of all non-propriety equipment.
    - Details of the operation of test equipment for maintenance and routine servicing.
    - Detailed procedures for testing each item of equipment and the interaction between associated equipment and also the interaction between two or more items of equipment so as to determine correct functioning.

2.22.6 Equipment Manual No.1

1. This manual shall describe the overall capability of the ATC System and the functions carried out and shall identify the role of all units of equipment. Twelve copies shall be provided.
2. The manual shall be suitable for use by engineers as an introduction to other parts of the documentation and management as a system description and reference guide.
3. The manual shall give a complete specification of the system facilities in terms of system operator inputs, outputs to associated equipment, inputs from associated equipment and displays/outputs to the operator. The Specification shall include details of data stored and of system checks carried out to establish the validity of the various stages of the control process.

2.22.7 Equipment Manual No.2

1. This manual shall be in two parts, one covering all control centre equipment one per control office and the other covering all outstation equipment. This latter part shall be suitable for use on street under adverse weather conditions.
2. The manual shall cover the following:
    - Each unit of equipment shall be clearly labelled on at least one configuration drawing in block form.
    - Details of the location of all units and boards within their cabinets and racks shall be given.
    - The interaction of units shall be clearly shown on a configuration diagram.
    - The method of connection of peripheral equipment to the computer system
    - The method of transfer of data between the out-stations and the various computer system
    - Interconnections between equipment
    - Detailed technical and functional descriptions of the data transmission test equipment.
    - Cross-referencing with Maintenance and Routine Service Manual.
    - For each individual item of non-propriety equipment, detailed technical and functional description shall be given together with logic and circuit diagrams.
    - Parts lists and cabling schedules covering the whole of the system.
    - All timings of data transmission equipment
    - Interaction timings between systems
    - Layout of all equipment with full details of all equipment interfaces including identification of cables at these interfaces.
3. As a minimum requirement all logic and circuit diagrams shall conform fully to the relevant British or other International Standards as appropriate for use in India or the Country of original manufacture of the equipment.

2.22.8 Updating of Manuals

1. The Contractor shall undertake, without additional charge, to update and replace in appropriate circumstances all manuals and documentation supplied under this Contract.
2. Such appropriate instances may be taken to result from but shall not be limited to:
    - Modifications to correct deficiencies which have become apparent during the use of the system either in Sasaram or elsewhere;

- Development of improvements subsequent to installation, but excluding any which extends the functions of the system.

2.22.9 Alternative Documentation Formats

Alternative formats of documentation will be considered, but any such alternatives shall be fully described by the Contractor.

2.22.10 Software/Firmware Manuals

All system software and firmware shall be supplied on a licensed basis in an "Executable File Format". User manuals shall include full descriptive listings of all systems supplied. The Contractor shall also include complementary flow diagrams and an accompanying descriptive commentary for each describing how to use and maintain the system.

2.22.11 As Built Drawings

The Contractor shall provide as built drawings for all elements of the work he has carried out and the systems he has provided as part of this Contract.

2.23 Training

The Bidder shall arrange for a training free of cost to the Call Centre Agents, Supervisors, Technical staff and officers of Police BUIDCo either at the time of installation and handing over or at a common place on the operation and use of systems and software utilities (30 persons for operation side and 10 persons for maintenance side with training materials on operation and maintenance of equipment for a period of one week and refresher training of 3 days on the 7^{th} month of handover).

2.24 Penalties for delay in implementation

If the Operator fails to offer the system for Partial Acceptance Test as specified in the agreed implementation plan, BUIDCo may, without prejudice to its other remedies under the Agreement, levy as Penalties, a sum equivalent to 1.25 % of the project value payable under the Agreement, for each week or part thereof of delay, until actual delivery of performance. The maximum penalty for delay shall not exceed 10% of the project value any unreasonable delay in completing the projects may entail blacklisting of Bidder.

2.25 Penalty for non-fulfilment of conditions

Penalty will be levied at 10% on the total value of the equipment or the actual loss incurred by the BUIDCo whichever is lower if the conditions stipulated in the Contract Agreement are not fulfilled or observed till the project is completed with satisfactory performance and handed over.

2.26 Warranty

1. Warranty periods of 36 months should be allowed against the continuous working with satisfactory performance for all the equipment and accessories used for commissioning the systemsfrom the date of handing over the completed project.
2. If any defects in manufacturing or technical aspects are noticed within the warranty period, the Bidder is liable to rectify or replace free of cost.

2.27 SLA Requirement

1. Service Level Agreement (SLA) is the contract between the BUIDCo and the Implementation Agency. SLA defines the terms of the operator's responsibility in ensuring the performance of the Traffic Light System, CCTV Camera and Central Control Room based on the agreed Performance Indicators as detailed in the Agreement. This section defines various Service Level Indicators for Traffic Light System, CCTV Camera and Central Control Room, which can be considered by the State in the Service Level Agreement with operator.
2. The Table below summarizes the Indicative Performance Indicators for the services to be offered Operator. The detailed description of the performance indicators, SLA Terms and their definitions are discussed in the following sections. Availability should be recorded electronically & physically both as indicator of SLA by Operator.

2.27.1 SLA for Traffic Light System

S. No	Indicative SLA Parameter	SLA Target
1	Availability of traffic Signals including Power during 24x7x No. of installed camera in that Quarter.	99%

2.27.2 SLA for CCTV Camera and Control Room

S. No	Indicative SLA Parameter	SLA Target
1	Availability of services other than Camera, connectivity and Manpower during 24x7 = 168 Hours in a Quarter of year for Quarterly Payment calculation.	99%
2	Availability of CCTV Camera including Power and connectivity during 24x7x No. of actually installed	99%

	camera in that Quarter.	
3	Availability of Man Power	98%

2.28 Measurement of SLA

The Measurement of SLA shall be performed by a third party agency, independent of the Operator, to be identified by the BUIDCo.

The Operator shall establish a Network Management System for monitoring and measurement of the SLA parameters identified for this project. The NMS implemented for the project shall conform to the open network management standards such as Simple Network Management Protocol and Remote Monitoring (RMON) features. Buidco reserves the right to periodically change the measurement points and methodologies it uses without notice to the Operator

2.29 Penalties

Description	**Availability**	**Penalty**
Availability of Traffic Signals including Power during 24x7x No. of installed camera in that Quarter.	99% **(Maintenance downtime is allowed for 2 Hours for Traffic Signals& ALLIED EQUIPMENTS)**%	Rs.200 per Hour per Camera(Including Power)
Availability of Surveillance Services during 24x7 = 168 Hours in a Quarter of year for Quarterly Payment calculation.	>= 99%	Nil
	Less by 1%	5% of the Quarterly Payment
	Less by >1% but < 1.5%	10% of the Quarterly Payment
	Less by >1.5% but <2%	20% of the Quarterly Payment
	Less by >2% but <2.5%	25% of the Quarterly Payment

	>2.5%	No payment
Availability of CCTV Camera including Power and connectivity during 24x7x No. of installed camera in that Quarter.	99%**(Maintenance downtime is allowed for 2 Hours for CCTV Camera & ALLIED EQUIPMENTS)**%	Rs.200 per Hour per Camera (Including Power and Network for which video is not available to central control room)
Availability of Man Power	>= 99%	Nil
	Less by 1%	5% of the Quarterly Payment
	Less by >1% but < 1.5%	10% of the Quarterly Payment
	Less by >1.5% but <2%	20% of the Quarterly Payment
	Less by >2% but <2.5%	25% of the Quarterly Payment
	>2.5%	No payment

2.30 Operational Penalties

In the event the operator is unable to meet any one of the SLA parameters defined in this RFP & corrigendum for 10% or more of the operational period of this project during two quarters in a year or four quarters during the three years of the contract, BUIDCo reserves the right to terminate the contract.

2.31 Penalties for Misuse

In case of any fraud, such as theft or misuse of data or issue of fake documents, etc. by the vendor, action will be taken.

2.32 Change Orders

BUIDCo may at any time, give written order to the selected bidder to make changes for providing additional Hardware specifically required, but not falling within the general scope of the this RFP/Contract.

3 Special Conditions for Contract

3.1 General Obligations of the Successful Bidder

1. The successful bidder shall provide all such information as may reasonably be necessary to effect as seamless a handover as practicable in the circumstances to the client or its nominated agencies or its Replacement Operator and which the Operator has in its possession or control at any time during the exit management period.
2. The successful bidder shall commit adequate resources to comply with its obligations under this Exit Management Schedule.

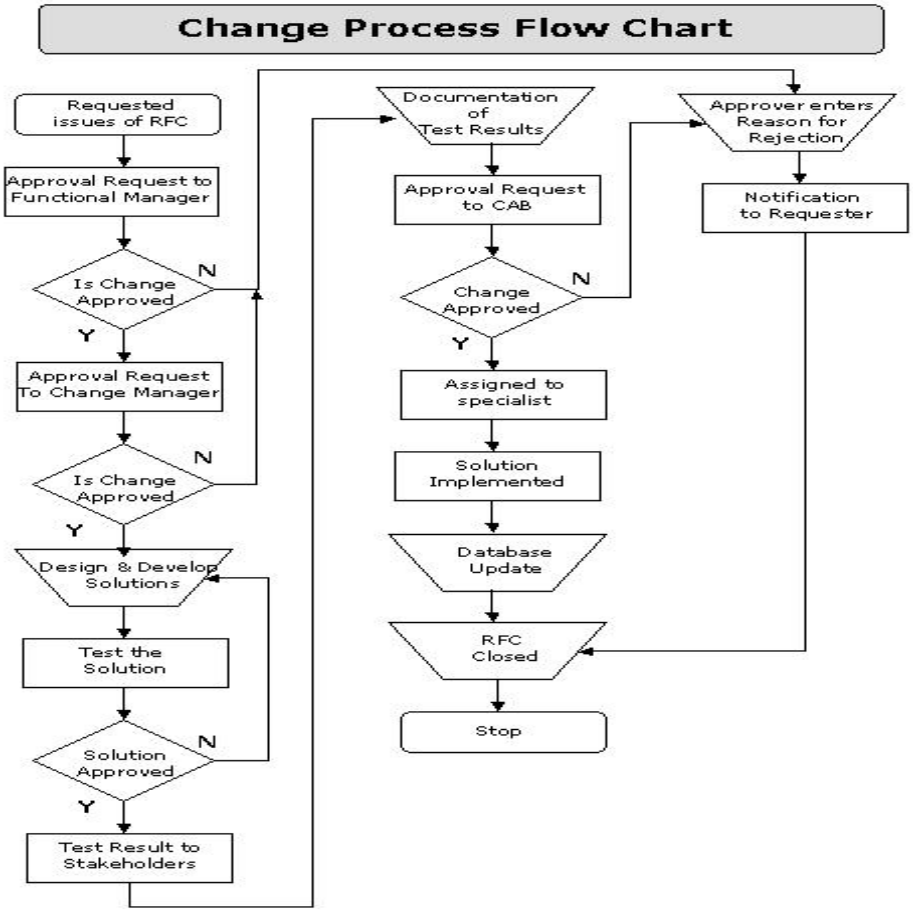
3.2 Change Management

Bidder has to ensure that suitable Change Management methodologies are being practised in Project, in order to carry out changes economically, timely and with minimal risk. As it has been observed in IT industry, that most of the high proportion of problems have always been traced back to some changes in the system or environment. Therefore bidder has to ensure effective change management practice has to be followed religiously.

In order to bring about Change Management following tasks are undertaken:

1. Receive and record Request for Change (RFC)
2. Assess the overall process, costs, benefits and risks of planned changes
3. Expected Impact analysis report with every RFC
4. Update the change plan
5. Coordinate and control the implementation in Change Advisory Board (CAB). The CAB will consist of Operator and the representative from Client and consultant.
6. Monitor the success of implementation and report on it
7. Update the configuration management database
8. Complete and review the RFC (post-implementation review).

An indicative Problem Management flow is defined in flow chart below as:



3.3 Bankruptcy and Insolvency

BUIDCo Limited can terminate the contract if the bidder becomes bankrupt and/or losses the desired state of insolvency with a notice of 15 days. BUIDCo Limited, in such cases of termination, will not be responsible for any loss or financial damage to the service provider resulted due to the termination. The BUIDCo Limited will also, in such cases have the right to recover any pending dues by invoking the performance bank guarantee or any such instrument available with the BUIDCo.

3.4 IPR and Copyrights

BUIDCo will retain all the IP rights of all the applications as part of project, trade mark, service mark and logos. BUIDCo will not be liable for any copyrights or IPR infringements of any third party software component used by the bidder for supplying applications as part of the project. The source code of all the applications, design documents, Data populated as part of the project will handed over to BUIDCo in working and integrated condition at the end of the contract period.

1. BUIDCo will be owner of IPR for any Application Developed

2. Source Code along with executable file will be kept with BUIDCo
3. BUIDCo will be owner of any documents generated for this project.

3.4.1 Data Rights

The BUIDCo reserves the Data Rights in the following areas-

1. The right to information of Data subject: The BUIDCo reserves the right of full knowledge of the collected data, its nature and prior authorization by the BUIDCo to collect, store and process them.
2. The right to prevent processing: The BUIDCo reserves all the rights to prevent the processing or reprocessing of the data collected, stored and under process.
3. The right to prevent collection, storage and processing for direct marketing and/or indirect marketing: The BUIDCo reserves all the rights to prevent any or all data collected, stored and processed for any sale, lease, rent or any other monetary or non-monetary transfer of data without it's written permission with explanation of grounds for such sale, lease, rent, transfer for monetary or non-monetary basis. The BUIDCo, however can sale, lease or rent the data for monetary or non-monetary gains
4. The right to compensation: The BUIDCo reserves all the rights to extract compensation for loss or damage, whether full or partial, of the data by the service provider or any person authorized on behalf of the service provider.
5. The right to rectification and other remedies for inaccuracy: The BUIDCo reserves complete authority to ask the service provider to make up for the wrong or tempered or manipulated or distorted or illegitimate data with or without any compensation on finding the data bearing any evidence of deviation at any time, irrespective of the fact that BUIDCo has accepted the same data at any prior time from the date of issuing letter to service provider to make any change or replacement in the data. The BUIDCo also reserves rights to take action through a court to rectify, block, erase or destroy inaccurate data.

The BUIDCo reserves all the rights to give order pertaining to manner and methodology for data collection, storage and processing to the service provider at any time within the contract period, which may not be a part of the Agreement.

3.5 Taxes and Duties

All the taxes, duties, levy and all other charges applicable and shall be valid for delivery on for basis to the designated delivery points. All payments will be subjected to tax deduction at source as applicable/required at the prevailing tax rates.

BUIDCo shall not pay any increase in duties, taxes and surcharges and other charges on account of any revision, enactment during the period of validity of the Bids and also during the contract period. The decision of BUIDCo in this regard will be final and binding and no disputes in this regard will be entertained.

3.6 Guarantee

The goods/equipments ordered for supply / delivery must be new and should be from the manufacturer's current product line. The vendor /s should guarantee that the Goods supplied are new, unused and conform to technical specifications of design, materials and workmanship mentioned in the quotation. The Supplier should also guarantee that the Goods supplied should perform satisfactorily as per requirements mentioned in the specification during implementation and operation & maintenance period. All hardware and software must be supplied with their originals along with complete original printed documentation and licenses.

3.7 Language of the Proposal

The Bidder has to submit their proposals in the English only. All communications in regard with the RFP will be entrained only in English language.

3.8 Local Conditions

a. Each bidder is expected to get fully acquainted with the local conditions and factors that would have an effect on the performance of the contract and / or the cost.

b. The bidder is expected to know all conditions and factors, which may affect the execution of the project.

c. Neither any change in the time schedule of the contract nor any financial adjustments arising thereof shall be permitted on account of failure of the bidder to know the local laws / conditions.

d. The bidder is strongly advised to visit and examine the locations of the project sites and its surrounding and obtain all information that may be necessary for preparing the response to this RFP at their own interest and cost.

e. The Bidder will bear the cost and all expenses incurred for preparing and submitting the bid documents and presentation/demonstration. BUIDCo will not entertain any claims/money of any bidder for preparation and submission of bid document in any situation.

3.9 Confidentiality

a. As used herein, the term "Confidential Information" means any information, including information created by or for the other party, whether written or oral, which relates to internal controls, computer or data processing programs, algorithms, electronic data processing applications, routines, subroutines, techniques or systems, or information concerning the business or financial affairs and methods of operation or proposed methods of operation, accounts, transactions, proposed transactions or security procedures of either party or any of its affiliates, or any client of either party, except such information which is in the public domain at the time of its disclosure or thereafter enters the public domain other than as a result of a breach of duty on the part of the party receiving such information. It is the express intent of the parties that all the business process and methods used by the Bidder in rendering the services hereunder are the Confidential Information of the Bidder.

b. The Bidder shall keep confidential any information related to this tender with the same degree of care as it would treat its own confidential information. The Bidders shall note that the confidential information will be used only for the purposes of this tender and shall not be disclosed to any third party for any reason whatsoever.

c. At all times during the performance of the Services, the Bidder shall abide by all applicable security rules, policies, standards, guidelines and procedures. The Bidder should note that before any of its employees or assignees is given access to the Confidential Information, each such employee and assignees shall agree to be bound by the term of this tender and such rules, policies, standards, guidelines and procedures by its employees or agents.

d. The Bidder should not disclose to any other party and keep confidential the terms and conditions of this Contract agreement, any amendment hereof, and any Attachment or Annexure hereof.

e. The obligations of confidentiality under this section shall survive rejection of the contract.

3.10 Insurance

The equipment and services supplied under the contract shall be fully insured by the bidder against loss or damage incidental to manufacture or acquisition, transportation, storage, delivery and installation. The period

of insurance shall be up to the date the supplies are accepted and the rights of the property are transferred to BUIDCo.

The responsibility to maintain adequate insurance coverage on comprehensive all risk basis at all times during the project period in all respects shall be that of the bidder alone.

Goods supplied under the contract shall be also fully insured on all risks including fire, theft, flood, earth quake and other natural calamities at his own cost basis during inland transit up to destination defined in the purchaser's country. The supplier must insure the goods in an amount equal to 110% of CIF/EXW price of goods.

3.11 Arbitration

a. All disputes, differences, claims and demands arising under the contract shall be referred to arbitration of a sole arbitrator to be appointed by the mutual consent of both Parties. All arbitration will be held in Patna.

b. If the parties cannot agree on the appointment of the Arbitrator within a period of one month from the notification by one party to the other of existence of such dispute, then the Arbitrator shall be nominated by the BUIDCo. The provisions of the Arbitration and Conciliation Act, 1996 will be applicable and the award made there under shall be final and binding upon the parties hereto, subject to legal remedies available under the law. Such differences shall be deemed to be a submission to arbitration under the Indian Arbitration and Conciliation Act, 1996, or of any modifications, Rules or re-enactments thereof.

3.12 Consortium

Consortium is allowed with maximum number of 2 parties from IT field in the consortium. Bidders have to give details of roles & responsibilities of individual party in the consortium for this particular project. If selected, bidder cannot change the composition of the consortium or inclusion of the other party in the composition of Consortium without prior approval of BUIDCo. Bidder has to give, in writing, the detailed explanation of such changes and only after approval by BUIDCo such changes will be effective.

3.12.1 Consortium Criteria:

The following are the requirements for a Consortium:

a) The number of members in a consortium shall not be more than Two (2). However, the System Integrator (SI) shall be the prime bidder and shall be solely responsible for all implementation of the entire scope of the project.

b) The bid should contain details of all the members of the consortium including their legal status and specify their roles and responsibilities in the project.

c) The members of the consortium shall enter into a Memorandum of Understanding (MoU) for the purpose of submitting the proposal and the same shall be submitted to BUIDCo with the proposal.

d) Lead member of the consortium shall be a signatory to the agreement and be solely responsible for all obligations under the agreement.

3.13 Sub-Contracting

Bidder is allowed to give part of work on sub-contract to other persons who are not part of bidding process. But the details, profile and experiences of Sub-Contracted Party and agreement with that Party should be clearly indicated in the Technical Proposal and financial details of sub-contracting should be indicated in Commercial proposal.

3.14 Force Majeure

Neither party shall be responsible to the other for any delay or failure in performance of its obligations due to any occurrence commonly known as Force Majeure which is beyond the control of any of the parties, including, but without limited to, fire, flood, explosion, acts of God or any Governmental body, public disorder, riots, embargoes, or strikes, acts of military authority, epidemics, strikes, lockouts or other labour disputes, insurrections, civil commotion, war, enemy actions. If a Force Majeure arises, the Bidder shall promptly notify bidder in writing of such condition and the cause thereof. Unless otherwise directed by bidder, the successful bidder shall continue to perform his obligations under the contract as far as is reasonably practical, and shall seek all reasonable alternative means for performance not prevented by the Force Majeure event. The successful bidder shall be excused from performance of his obligations in whole or part as long as such causes, circumstances or events shall continue to prevent or delay such performance.

3.15 Termination

The Tendering Authority reserves the right to change any bid condition including technical specifications even after inviting the bids with/without prior notification. The Tendering Authority also reserves the right to

Terminate/Cancel RFP at any time/stage of Bid without giving any reasons. In such case, the EMD shall be returned to the bidder. However, the RFP document fee shall remain non-refundable.

3.15.1 Termination for Default

The Tendering Authority, without prejudice to any other remedy for breach of Contract, by written notice of default sent to the selected bidder, may terminate the Contract fully or in part:

1. If the selected bidder fails to deliver any or all Contracted services as per service standards specified in the Contract or
2. If the selected bidder/ fails to perform any other obligation(s) under the Contract, or
3. If the selected bidder in the judgment of the Tendering Authority has engaged in corrupt or fraudulent practices in competing for or in executing the Contract.

In such type of event Tendering Authority can terminate the Contract and would be free to fully take over operations without giving any compensation to the selected bidder.

3.15.2 Termination for Insolvency

Tendering Authority may at any time terminate the Contract by giving written notice to the selected bidder if the selected bidder becomes bankrupt or otherwise insolvent. In this event, termination will be without compensation of any type to the selected bidder, provided that such termination will not prejudice or affect any right of action or remedy which has accrued or will accrue thereafter to the Tendering authority.

3.15.3 Events of Default, Rectification and Termination

If there is breach which translates into default as per Management Service Agreement (MSA) in provisioning of services and / or default as per this MSA in provisioning of services on account of matters related to the provision of other IT and non-IT services by the bidder under the project, continuously for more than seven days or more than a cumulative period of ten days in a month, except in conditions of force majeure, the same shall attract liquidated damages.

In case the rectification is not carried out within 30 days of the applicability of the inoperability clause, it would constitute a material breach by the bidder, which shall entitle the Purchaser to, at its sole option, forthwith terminate MSA on the expiry of such stipulated period, unless the SI has in the meantime rectified, removed or cured, as the case may be, such material breach. The Purchaser may at its sole option, debit or set off the amounts of liquidated damages, if any, against the payments as defined the RFP/ MSA, and/ or through invocation or forfeiture of the performance security, in full or part, as the case may be.

In the event of any invocation of the performance security by the Purchaser, the bidder shall be required to forthwith replenish or top up the existing performance security, failing which the same shall constitute a material breach by the bidder, which shall entitle the Purchaser to terminate MSA. Failure to replenish/ top up within 15 days will invite liquidated damages of Rs.5,000/- per day and penal interest @ 18% for the delayed period for the amount of deficit in the performance security. Failure to Replenish/ top up beyond 30 days will be material breach and may lead to termination of agreement.

3.15.4 Effects of Termination

1. The termination provisions set out in MSA shall apply mutatis mutandis to the Service Level Agreements.
2. Upon termination of MSA, the Parties will comply with the Exit Management Schedule, as outlined in the MSA.
3. Upon the expiration or any termination of MSA, vendor shall undertake the actions set forth in MSA to assist the Purchaser to procure replacement services as provided hereunder:
    - The bidder undertakes to negotiate in good faith with the Purchaser and any relevant Replacement bidder in respect of commercial terms applying to all bidder Intellectual Property Rights and which the Purchaser and any relevant Replacement bidder require to enable them to provide or receive services substantially equivalent to the Services hereunder.
    - In respect of bidder third party Intellectual Property Rights, bidder undertakes to assist the Purchaser to secure such consents or licenses from such third parties as are necessary to enable Purchaser / Replacement bidder to receive services substantially equivalent to the Services hereunder.
    - The bidder shall hand over to the Purchaser or its designated agency in accordance with the terms of MSA, any asset or deliverable, including the software, (and including any data, ownership, source code and associated documentation which is the work product of the development efforts involved in the Project) in which the Purchaser has the right, title and interest and that is in the possession or control of the bidder.
    - Notwithstanding anything contained herein above and without prejudice to the right to terminate MSA, if the bidder fails to set up and operationalize the system in accordance with RFP document, the Purchaser may in its sole discretion, instead of terminating MSA, engage

another person to fulfil the remaining obligations (or part of the remaining obligations) as may be decided, at the risk and cost of the bidder. The additional cost incurred by the Purchaser shall be recoverable from the Performance Security or any amount payable or due to the bidder, and in case such Performance Security or amount is not adequate, the SI shall make good the shortfall.

- The action as provided in this clause above shall not be construed or treated as waiver of any right of the Purchaser and the right to terminate this MSA shall subsist even if an action in accordance with this clause had been taken.

3.16 Limitation of Liability

1. There shall be no limitation of liability in respect of the bidder in case of any damages for bodily injury (including death) and damage to real property and tangible personal property, other than as applicable under the relevant laws.
2. Neither MSA nor the Agreements grants or creates any rights, benefits, claims, obligations or causes of action in, to or on behalf of any person or entity (including any third party) other than between the respective Parties to MSA, as the case may be.
3. Any claim or series of claims arising out or in connection with MSA shall be time barred and invalid if legal proceedings are not commenced by the relevant Party against the other Party within a period of 3 years from the date when the cause of action first arose or within such longer period as may be permitted by applicable law without the possibility of contractual waiver or limitation.
4. The Purchaser shall be entitled to claim the remedy of specific performance under MSA.

3.17 Indemnification

1. Subject to Clause 3.17.2 below, System Integrator (the "Indemnifying Party") undertakes to indemnify BUIDCo (the "Indemnified Party") from and against all Losses on account of bodily injury, death or damage to tangible personal property arising in favor of any person, corporation or other entity (including the Indemnified Party) attributable to the Indemnifying Party's performance or non-performance under this Agreement or the SLA to the extent of the Indemnifying Party's comparative fault in causing such Losses.
2. The indemnities set out in Clause 3.17.1 shall be subject to the following conditions:

a. The Indemnified Party as promptly as practicable informs the Indemnifying Party in writing of the claim or proceedings and provides all relevant evidence, documentary or otherwise;

b. the Indemnified Party shall, at the cost of the Indemnifying Party, give the Indemnifying Party all reasonable assistance in the defence of such claim including reasonable access to all relevant information, documentation and personnel provided that the Indemnified Party may, at its sole cost and expense, reasonably participate, through its attorneys or otherwise, in such defence;

c. if the Indemnifying Party does not assume full control over the defence of a claim as provided in this Article, the Indemnifying Party may participate in such defence at its sole cost and expense, and the Indemnified Party will have the right to defend the claim in such manner as it may deem appropriate, and the cost and expense of the Indemnified Party will be included in Losses;

d. The Indemnified Party shall not prejudice, pay or accept any proceedings or claim, or compromise any proceedings or claim, without the written consent of the Indemnifying Party;

e. All settlements of claims subject to indemnification under this Article will:

- be entered into only with the consent of the Indemnified Party, which consent will not be unreasonably withheld and include an unconditional release to the Indemnified Party from the claimant or plaintiff for all liability in respect of such claim; and
- Include any appropriate confidentiality agreement prohibiting disclosure of the terms of such settlement;

3. The Indemnified Party shall account to the Indemnifying Party for all awards, settlements, damages and costs (if any) finally awarded in favour of the Indemnified Party which are to be paid to it in connection with any such claim or proceedings;

4. The Indemnified Party shall take steps that the Indemnifying Party may reasonably require to mitigate or reduce its loss as a result of such a claim or proceedings;

5. in the event that the Indemnifying Party is obligated to indemnify an Indemnified Party pursuant to this Article, the Indemnifying Party will, upon payment of such indemnity in full, be subrogated to

all rights and defences of the Indemnified Party with respect to the claims to which such indemnification relates; and

6. If a Party makes a claim under the indemnity set out under Clause 3.17.1 above in respect of any particular Loss or Losses, then that Party shall not be entitled to make any further claim in respect of that Loss or Losses (including any claim for damages).

3.18 Exit Management

1. The Purchaser shall be entitled to serve notice in writing on the bidder at any time prior to the date that is 30 days prior to the end of the exit management period requiring the bidder to transfer and hand over the terms to the Purchaser or its nominated agency at the appropriate time, in accordance with the terms of the MSA any Asset or Deliverable, in which the Purchaser has the right, title and interest and that is in the possession and/ or control of the bidder.
2. Performance security in the event the MSA is terminated due to the bidder being in breach as stated above and the Purchaser shall return the performance security if the MSA is terminated due to the Purchaser being in breach as stated above or due to a Force Majeure Event, or on normal expiry of MSA.
3. Upon service of a notice the following provisions shall apply:
    - All risk in and title to the Assets, other than those that are to be transferred to the Purchaser, shall remain with the bidder after the last day of the exit management period.
    - The Purchaser shall pay to the bidder on the last day of the exit management period the amounts due for services already rendered as stated in the Financial Provisions Section of MSA.
    - The Purchaser shall withdraw all services and the bidder shall cease to have any right whatsoever to render such services under or pursuant to this Agreement.
4. The employees of the bidder / its sub-contractors shall continue to be their respective employees / counter parties and Purchaser shall have no obligation in respect of such employees.
5. The bidder shall ensure that sub-contractors, agents, representatives and respective associated entities carry out their respective obligations during the Exit Management Period

6. Save as otherwise expressly provided in this MSA, the bidder shall be entitled to retain all physical infrastructure; hardware, software, technology, networks, connectivity, all contracts with any non-Government content and services providers belonging to/ owned by it.

3.18.1 Exit Management Plan

1. The successful bidder shall provide the client with a recommended exit management plan ("Exit Management Plan") which shall deal with at least the following aspects of exit management in relation to the SLA as a whole and in relation to the Project Implementation, the Operation and Management SLA and Scope of work definition.
    - A detailed program of the transfer process that could be used in conjunction with a Replacement Operator 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;
    - Plans for the communication with such of the Operator's, staff, suppliers, customers and any related third party as are necessary to avoid any material detrimental impact on Project's operations as a result of undertaking the transfer;
    - Plans for provision of contingent support to Project and Replacement Operator for a reasonable period after transfer.
2. The successful bidder shall re-draft the Exit Management Plan annually thereafter to ensure that it is kept relevant and up to date.
3. Each Exit Management Plan shall be presented by the bidder to and approved by the client or its nominated agencies.
4. The terms of payment as stated in the Terms of Payment Schedule include the costs of the successful bidder complying with its obligations under this Schedule.
5. In the event of termination or expiry of SLA, Project Implementation, Operation and Management SLA or Scope of Work each Party shall comply with the Exit Management Plan.
6. During the exit management period, the successful bidder shall use its best efforts to deliver the services.

7. Payments during the Exit Management period shall be made in accordance with the Terms of Payment Schedule.
8. Exit Management plan shall be furnished in writing to the client or its nominated agencies within 90 days from the Effective Date of LoI/LoA.

3.18.2 Cooperation and Provision of Information

During the exit management period the successful bidder will allow the client access to information reasonably required to define the then current mode of operation associated with the provision of the services to enable the client to assess the existing services being delivered;

3.18.3 Confidential Information, Security and Data

The successful bidder will promptly on the commencement of the exit management period supply to the client or its nominated agencies the following:

1. Information relating to the current services rendered and customer satisfaction surveys and performance data relating to the performance of the services;
2. Documentation relating to Project's Intellectual Property Rights;
3. Project data and confidential information
4. All current and updated Project data as is reasonably required for purposes of the Project or for transitioning of the services to its Replacement Operator in a readily available format
5. All other information (including but not limited to documents, records and agreements) relating to the services reasonably necessary to enable Project or its nominated agencies, or its Replacement Operator to carry out due diligence in order to transition the provision of the Services to Project or its nominated agencies, or its Replacement operator (as the case may be).

3.18.4 Employees

1. Promptly on reasonable request at any time during the exit management period, the Operator shall, subject to applicable laws, restraints and regulations (including in particular those relating to privacy) provide to the client a list of all employees (with job titles and communication address) of the Operator dedicated to providing the services at the commencement of the exit management period;

2. To the extent that any Transfer Regulation does not apply to any employee of the Operator, the client or its Replacement Operator may make an offer of employment or contract for services to such employee of the Operator and the Operator shall not enforce or impose any contractual provision that would prevent any such employee from being hired by the client or any Replacement Operator.

3.18.5 Rights of Access to Information

At any time during the exit management period, the Operator will be obliged to provide an access of information to the client, and/or any Replacement Operator in order to make an inventory of the Assets (including hardware / Software / Active / passive), layouts, diagrams, schematics, documentations, manuals, catalogs, archive data, IP addressing, Live data, policy documents or any other material related to Project.

3.19 Spares support

The Bidder shall undertake to supply the necessary lifetime spares required to maintain the equipments for a period of 10 years.

The Bidder must sign and affix the seal in every page of the Tender document duly signed and completed original Tender Documents must be submitted in respective cover without fail.

4 Technical Specification of Equipment

4.1 Traffic Light System

4.1.1 Purpose

The primary objective of the System is to control and monitor traffic signals and equipment, including signalled pedestrian crossings, using a traffic responsive strategy – fully adaptive real time system, based on real time traffic flow and vehicle presence information. However, the system shall also be capable of operating under fixed time plan by time of day (green wave etc) as defined subsequently in this specification.

Within the scope of this contract the real time fully adaptive control system is defined as a system with the capacity to calculate in real time the optimal cycle times, effective green time ratios, and change intervals for all system traffic signal controllers. Such calculations will consist of simulations carried out in the central control computer, or individual traffic signal controller, based on a negative feedback control engineering principle for data and information transmitted by the vehicle detectors at the intersections controlled by the system.

In the operation of the real time control system, except for the system start up, traffic data shall not be necessary since the computer shall instantly calculate the best signals arrangements for any time, optimising the traffic performance in real time for the entire controlled area.

The variation if appropriate of green transitions and change intervals within the real time control system shall occur at least once every traffic signal cycle, while the adjustment of cycle time will occur, at least, once every two and half minutes.

The real time control system shall be capable of producing minor and frequent changes of the traffic control parameters, smoothly becoming suitable for the traffic variations without disrupting the flow. Systems based on vehicle actuation, whereby the green phase times are determined according to the number of “extensions” given by the vehicle detectors will qualify as real time control systems provided that they do not only optimise the traffic at each intersection locally, and in isolation from the rest of the system.

In order for a system to be considered a real time control system, it is necessary that the values for at least two of the parameters (green splits, offsets, and cycle times) be computed in real time by the central computer, based on traffic levels at each instant in time (milliseconds). With the exception of the initial values (system start-up), it shall not be necessary to furnish the system any value for the said parameters.

The system shall permit any combination of the following degrees of real time adaptive control optimisation by operation from the Traffic Police Control Room; -

1. Split optimisation on/off (node basis)
2. Offset optimisation on/off (node basis)
3. Cycle time optimisation on/off (region basis)
4. Limitation of the minimum permitted cycle time (region basis)
5. Limitation of the maximum permitted cycle time (region basis)
6. Set single/double cycling restraint (to prevent the system from double cycling nodes within the overall region cycle time, node basis)

The Contract for the Fully Adaptive Traffic Control System shall include the design, manufacture, supply, acceptance testing, installation, commissioning, validation/calibration and documentation of the following as described in the Bill of Quantities :-

1. Traffic Control Computers and peripherals;
2. System software including the latest version of the Contractor's fully adaptive ATC software which must be capable of providing Bus Priority facilities;
3. Operator terminals:-
    - using a graphical user interface (GUI) for screen displays;
    - Graphical display utilities for operator terminals;
    - Operator terminals to operate over a local area network ie Ethernet or similar**;**

1. Data transmission equipment directly associated with the ATC system, including any new in-station, out-station equipment, and test sets
2. Lamp and system failure monitoring facilities.
3. ATC software for fully adaptive operation, including traffic control, pedestrian facilities, Bus Priority, diversion routing, emergency traffic plans and emergency vehicle priority on selected routes".
4. Collection of traffic data;
5. Congestion detectors and all other detectors necessary for the operation of the system;
6. Traffic signals and on-street traffic controllers
7. Other on-street traffic equipment necessary for the system to function in accordance with the specification

8. The Traffic Signal Controller equipment shall provide a microprocessor based solid state traffic signal lamp switching and a conflict monitoring facility to ensure that conflicting, dangerous or disallowed traffic signal displays are not shown. The conflict control facilities shall be independent of the microprocessor and the Bidder shall detail how they are met in the design of the controller. The controller shall consist of a rack mounted, controller logic module, housed in a zinc electroplated steel cabinet which provides a frame for termination to field cables.
9. The Contractor shall provide a single type of traffic signal control equipment which shall be capable of operating:-
    - A computer linked, co-ordinated system under fully adaptive control strategies;
    - Linked locally to adjacent controllers with vehicle detection facilities;
    - in an isolated mode;
    - in fixed time or vehicle actuated mode with detection facilities;
    - in night time mode of flashing red/amber mode

Features	Specifications
General Specification	Equipment shall be designed to function correctly in a wide range of climatic conditions. In particular the equipment shall operate reliably in extremes of temperature and humidity. It shall operate in a temperature range of -10 and +60 degrees Centigrade external ambient temperature, and relative humidity to 95 percent, non-condensing.
Controller Firmware	The controller design shall be based on modern high performance microprocessor and all logical functions necessary external to the microprocessor shall be performed by solid state devices. Timing functions shall be based on digital techniques implemented by the microprocessor system. Site specific configuration data shall be stored in a single easily installed memory unit (EPROM). This data will comprise non-volatile time settings and data tables required to configure the operation for the particular junction or intersection. The data stored in the memory unit shall be protected by a checksum test. The site specific configuration data shall be prepared on a PC based configuration platform. Data in the site-specific data EPROM shall correspond to hardware programmed intersection number and revision level in the controller housing, for the controller to start operation when mains power is

	applied.
Controller Functionality:	The standard controller shall allow expansion from 4 phases/signal groups up to a maximum of at least 16 phases/signal groups. Each phase/signal group output shall be configurable to be either a vehicle phase/signal group or a pedestrian phase/signal group, within the limits of a maximum of 16 vehicle/pedestrian phases/signal groups, or combination thereof. Each phase/signal group output shall provide 3 triac drives (or similar), which may be used for switching either vehicle or pedestrian lantern displays, Red/Amber/Green for vehicle phases/signal groups and Red/Wait/Green for pedestrian phases/signal groups. The pedestrian phases/signal groups will be configured for flashing red aspect during pedestrian clearance. The solid state switches used shall be able to drive loads consisting of resistive and inductive elements. That is, the lamp switching outputs shall be able to drive Tungsten, Quartz Halogen, LED and Neon lamp loads, or combinations of these. All phase/signal group outputs must be rated accordingly.
Phase/signal Group Drives - Software Control	The controller software shall provide control for a maximum of 16 vehicle/pedestrian phases/signal groups or combination thereof. The numbers of vehicle and pedestrian phases/signal groups are specified by separate entries in the controller site specific data. Each lamp switching output may be configurable via the controller EPROM, to drive a vehicle phase/signal group or a pedestrian phase/signal group.
Phase/signal Group Drives – Configuration	The signal aspects shown to vehicular traffic shall be: • red, green, amber, red; • the sequence to pedestrians shall be red standing man, green walking man, flashing red standing man, red standing man; • The green walking man shall indicate a protected pedestrian crossing movement; • The flashing red walking man shall indicate a clearance period between the termination of the pedestrian green signal and the start of the pedestrian red signal; The flashing amber signal shall be presented to traffic in coincidence with the flashing red walking man signal and may be continued for an adjustable period (seconds) after the termination of the flashing red man signal. • Flashing red (night time operation) pedestrian signals shall be extinguished. Each phase/signal group must be configurable to any of the normal displays described below. The normal displays are:- • Red, green, Amber (3-aspect vehicle signal); • Red, Green, Flashing Red or Red (pedestrian signal).

	• Flashing Amber (to main roads), Flashing Red (to side roads), Flashing Red Man to pedestrians. • Filter Green Arrow for left turning traffic; • Filter Green Arrows for left, ahead and right traffic; • Filter Green Arrow for right turning traffic (see above); • Flashing Filter Amber arrows for left turning traffic.
Protection of Conflicting Phases/signal Groups	The Contractor shall confirm if simple green-green conflict monitoring is provided, or a more extensive monitoring function covering other dangerous voltage combinations are possible.
Phases/signal Groups - Appearance Criteria	Any phase/signal group shall be configurable in the site-specific data, to be introduced automatically or only upon demand. Each phase/signal group shall be displayed for a fixed or variable duration according to traffic flow or demand, in accordance with the data entered in the controller configuration EPROM. Typically the duration of phase/signal group green displays will be determined by the duration of the stage(s)/phases in which the phases/signal groups receive right of way. The controller configuration EPROM shall provide for filter green arrow for left or right turning traffic. The filter green left or right arrow may have an associated vehicle phase/signal group and can be configured such that it will not terminate until right of way for the associated vehicle phase/signal group is granted. Where a filter green arrow phase/signal group is defined as having 3 aspects, it shall not be possible for the phase/signal group to terminate from green to red without intermediate amber. The controller configuration EPROM shall provide for flashing filter amber arrow for left turning traffic. The filter amber left turn arrow may have an associated vehicle or pedestrian phase/signal group and can be configured such that it will not terminate until right of way for the associated vehicle or pedestrian phase/signal group is terminated.
Stage/phase - Phase/signal Group Timing Intervals	The controller configuration EPROM shall provide comprehensive stage/phase – phase/signal group timing interval facilities compatible with the system design.
Stages/Phases	The Controller shall provide facilities for a number of stages/phases or phases/signal groups, which may include all red stages/phases. The available phases/signal groups are allocated to these stages/phases or phases/signal groups in any combination subject to the method of control, with the traffic characteristics and safety considerations as necessary to meet the individual site requirement. The controller shall provide a minimum of 7 stages/phases, within which any combination of phase/signal group displays are permitted in any

	stage/phase. Phases/signal groups shall be able to be specified for simultaneous appearance within a stage/phase, for appearance after a specified delay, or for early termination within a stage/phase. It shall also be possible for phase/signal group displays to overlap a number of stages/phases. Specified phases/signal groups shall also be able to provide Leaving Amber and All Red displays independent of the running stage/phase Each stage/phase shall be capable of conditional and alternative phase/signal group displays, as defined by condition table entries in the controller site-specific configuration data. Complex phase/signal group or staging/phasing designs shall be possible with the appearance of phases/signal groups in multiple stages/phases being conditional on specified conditions at the junction, such as presence of particular demands or the state of special control signals. Conditioning - Each stage/phase shall be configurable to appear automatically or upon demand from specified detector inputs within the controller. The controller shall provide facilities for a combination of phase/signal group equipment any or all of which may be:- • fully actuated by on street demands and extensions; • demand dependent (vehicle or pedestrian Phases) • fixed time phases (vehicle or pedestrian Phases); • Hurry call or other priority calls demand; • Fully Adaptive Control Each phase/signal group may provide control for one of the following:- • vehicular movements; • pedestrian movements; • vehicular movements controlled by Green Arrow signals; • vehicular movements controlled by Amber Arrow signals; • Dummy phase. A dummy phase/signal group is used where timings or detector operation have to be associated with a particular traffic movement which is not uniquely signalled. It may be used to provide suitable time periods or to condition stage/phase changes even though no signal aspect is associated with the phase. Timers shall be allocated to phases/signal groups. The timers shall control the following timed periods of each phase but shall not be limited to only these:- • minimum green time; • extension time; • maximum green time;

	Timers shall control the appearance and disappearance of phases/signal groups during the inter stage period. Such timers shall generate the phase/signal group to phase/signal group inter green periods and introduce any further delays to offset phases/signal group with respect to the stage/phase end point. The controller shall respond to vehicle detectors with associated with phases/signal groups which may be:- • demand a phase/signal group; • extend a phase/signal group; • demand and extend a phase/signal group; • introduce a hurry call facility; • be associated with an all red condition; • demand via call/cancel; • priority demand of stage/phase; • uni-directional demand for stage/phase; • speed measuring extensions.
Vehicle Detection	The detector equipment is a separate logic unit, which may be integrated into the controller, or alternatively mounted in its own housing. The outputs of the detectors indicate to the controller the presence and passage of vehicles and are used to influence the operation of the controller and shall generate demands and extensions for right-of-way. Means shall be provided so that a detector may be connected to demand and / or extend a phase movement as specified. Uni-directional detection shall comprise of a combination of detectors, which may be connected to have this effect. The logic for this may be incorporated within the controller. The operator facility shall provide means by which continuous artificial demand and extensions may be applied to any phase/signal group of phases/signal groups and a means by which the effect of a detector may be inhibited. Detectors may be associated with the following demanding conditions and facilities:- • be associated with an all red condition; • demand a phase/signal group; • extend a phase/signal group; • introduce a hurry call; • introduce a priority stage/phase; • call/cancel demands either latching or non latching, subject to delay before and after; • uni-directional demand for stage/phase; • to arrange that the demand for a turning phase/signal group is only active if there is a demand for another specified stage/phase;

	• to arrange that a request for right-of-way from a nominated detector input shall be ignored until a single specified stage/phase has been reached; • speed measuring extensions • to provide for adaptive control
Stage/phase Selection	The controller shall examine phase/signal group demand requests and identify those stages/phases, which will satisfy these demands. Stage/phase changes shall normally occur to serve the next stage/Milestone 1n cyclic order subject to the following conditions:- • to enable a particular stage/phase always to follow another • to enable a particular stage/phase to always precede another • to prohibit certain stage/phase to stage/phase moves and substitute alternative moves so that the desired stage/Milestone 1s eventually served. Fixed time or Local control will follow the stage/phase pattern and timings set out in the controller configuration for each specific site and shall be independent of other modes of control.
Controller Functional Requirements Operational Facilities	Modes of Operation - The controller shall provide the following modes of operation:- • Hurry Call • Manual • FATC mode • Cable-less Linking • Vehicle Actuation. • Fixed Time • Night Time Flashing
Controller User Interface	Facilities within the Controller Cabinet - Access to the controller housing shall be by a controller key, which fits a secure, vandal proof compression lock at the top and bottom of the traffic signal controller opening door. Facilities either external to the cabinet door or located inside the controller casing beneath a flap secured by key shall permit the local controller lamps to be switched On or Off, to select NightTime operation, to assume Normal Operation (modes priorities) and to permit the selection and control of Manual mode. Monitoring - The controller front panel shall display Red, Amber and Green LEDs for each phase/signal group output to allow easy monitoring of the drive signals to the signal displays. Status LEDs shall be provided to give indication of the state of the hardware and software. The status LEDs include:- • CPU is operating normally • Conflict detected • Communications synchronised

	• Power is OK • Lamp Alarm (i.e. a lamp fault exists) • System Shutdown (due to an internal system fault)
Design Life	All components must be rated for minimum 15-year life, excluding the standby battery, which shall have a minimum life of 5 years.
Fault Log and Diagnostic Facilities	The controller must provide a Fault Log in battery backed RAM. The Log will provide storage for Faults, which cause the signals to be blacked out. Storage is also provided for Errors, which are detected, including Hurry Call Requests and Watchdog time-out. These would not cause the signal displays to be blacked out. The control shall also provide an historical fault log, which shall be battery backed. The historical fault log shall have no effect on controller operation but shall provide an event list of previous faults Fault Diagnostics - The controller Fault Log will store relevant diagnostic data concerning each Fault entered into the Log. Each Fault is identified by a unique fault code, which will allow each fault to be quickly assessed as to the likely cause. Diagnostics are available that identify: • Green Conflicts • Phase Monitor Faults • Memory Corruption/Failure • Plan and Timetable Data Faults • Real Time Clock Failure • Hurry Call Request • Special Facility faults Detector Fault Monitor - Detector fault monitoring shall be a system function supported directly by the controller. The system will provide periodic messages from the ATC System to the controllers to interrogate the controller for current detector alarms. The control shall also provide an historical detector fault log, which shall be battery backed. The historical detector fault log shall have no effect on controller operation but shall provide an event list of previous detector faults
Electrical Specification	Mains Power Supply - The controller shall be designed to operate with wide variations in nominal mains supply and be tolerant to variations of +/- 15% of the nominal supply voltage and frequency. An interruption in the mains power of less than 50ms will not cause any disruption to normal controller operation. The controllers will shutdown in an orderly fashion as a consequence of a power failure. At such time as mains supply is restored to the controller the controller shall be capable of resuming operation with interference. The controller must be protected against overvoltage on the mains power supply of 800 Volts, 50 microsecond pulses, (5 ohm source impedance)

	randomly phased. The controller must survive these overvoltage transients and continued to operate correctly without damage. All terminals that provide an interface to equipment external to the controller shall be isolated by opto-couplers, which will provide protection from transients of +/- 75V for 1 minute. A main fuse and switch rated to a minimum of 20 Amps will be provided. The Main switch will remove power from all circuits within and fed from the traffic controller. The following schedule of fuses shall be provided:- • 32 Amp HRC fuse for all junction control equipment; • 16 Amp HRC fuse for all pedestrian control equipment;
Lamp Circuit Isolation/Protection	A Lamps Circuit Breaker will be provided to switch off the signal lamps and any pedestrian push button units or WAIT indicators without affecting the operation of the controller logic. The lamp circuits (red/amber/green) for each phase will be protected by separate fuses, 10.28.2 Signal Lamp Switching shall be by solid state, triac load switches. The Triac load switches must be rated in excess of five million switching operations and to 40 amps during switching. The rated lamp load must be at least 4 Amperes continuous for each aspect for each phase at voltages in the range 32V to 250V. Signal Lamp Dimming shall be provided for all signal displays, including WAIT indicators, but excluding regulatory/secret signs. The battery shall protect the real time clock and RAM against loss of power. Data will not be corrupted in either the clock or the RAM due to loss of mains power, or the removal of any circuit cards from the logic module.
Mechanical Specification	Controller Housing - The traffic signal controller must be an integrated system with all necessary control, communications, input/output and termination facilities located within the one base mounted cabinet. Physical Design - The controller shall be housed in a cabinet fabricated from 2mm thick mild steel, zinc seal steel electro-galvanized to an appropriate international standard with a powder coated baked enamel finish. The cabinet shall be supplied with all fixtures and fittings to mount internal equipment and to fix it to the base plinth. All fittings and fixtures supplied with the cabinet shall be protected against corrosion. The cabinet shall be convection ventilated with air entry through a channel at the base of the door, and air exit around the top cover. The base design shall provide frangible mountings to minimise accident damage. Cabinet weatherproofing shall be to a minimum of IP65 standard or equivalent international standard.

	The standard cabinet shall provide field wiring terminals in 4 phase/signal group increments to a capacity of 24 phase/signal group outputs, or alternatively may be available to allow connection of larger phase/signal group drive capacity where appropriate. Manual control of the controller shall be possible by either a key flap revealing a manual control panel or alternatively by a 5 position key-switch "facility key". The lock shall be flush mounted to a side panel of the controller cabinet. The lock shall be protected against water and dirt ingress. The manual panel or key-switch shall provide the following switched functions as a minimum: • AUTO (Normal operation, key can be removed in this position) • FLASH (Flash amber / red, controller continues to run, key may be removed in this position) • OFF (lamps off, controller continues to run. The key may be removed in this position). • MANUAL (select manual control) (key not able to be removed in this position) Cable Termination and Earthing - Cable clamps bars and cable trunking shall be provided for all internal cabinet wiring. Termination points shall be provided for all incoming and outgoing cables. A minimum of 40 termination points for incoming / outgoing cables. Mains voltage lamp output terminal units shall be separate from loop terminal and auxiliary input/output terminal units. Lamp output terminal units shall be provided in each controller cabinet. Each shall have terminal positions for four 3-aspect phases, Red/Amber/Green for vehicles and Red/Wait/Green for pedestrians. Three screw terminals shall be provided at each position for incoming cables. Alternatively spring load terminations can be used.
Traffic Signal Heads	Arrangement of Aspects Vehicle Signals, each signal face shall, unless otherwise specified, contain three aspects arranged vertically. The coloured lens of the upper aspect shall be red, the middle one amber, and the lower one green. In addition, red, amber, green arrow or amber arrow aspects may be used. All aspects on each vehicle signal face shall be of the same diameter. Aspect diameters shall be 300 mm as defined for each intersection on plans. Pedestrian Signals Each signal face shall contain two aspects arranged vertically. The aspects shall be circular with a diameter of 300 mm. The upper aspect shall show a standing red man on a black background. The lower aspect shall show a walking green man on a black background.

	Optical Performance The design of the optical system shall be such that when a signal aspect is installed with its visor, under all normal conditions experienced in Sasaram Bihar it shall give a clear and unambiguous indication to all road users including buses, goods vehicles and pedestrians when viewed from all normal viewing angles up to a distance of 80 m from the aspect and shall be made from unbreakable polycarbonate. In particular: When an aspect is switched off it shall give a uniform, near black appearance with no visible phantom or spectral reflection. For the pedestrian and coloured arrow aspects, when switched on, the contrast between the illuminated and non-illuminated portions of the aspect shall be such that the intended indication is completely clear. Construction of Signal Heads and Visors (Hoods) The materials used and the form of construction used shall be such as to ensure that the signal head (including visors, which are required) has adequate mechanical strength and durability to withstand the conditions of installation, operation and maintenance. In particular it shall be capable of withstanding winds of up to 145 km/h. The colour of the signal body and visors shall be black UV stabilised high impact or impact modified Polypropylene. The lenses shall be acrylic, and reflectors shall be polycarbonate with stainless steel or Polypropylene fixings. The signal head shall be of modular construction, permitting signal head configurations to be built from standard building designed to be safe, vandal resistant and easy to install and maintain. Aspect lenses shall be available in 300mm sizes. It shall comply with the requirements of BS505 as amended by TRO102 and BS873, EN12368, BS1376, DIN6163 or other International Standard appropriate for use in India. The signal head shall achieve a precise beam distribution, which produces high intensities of light in the centre of the optic. The displayed symbols shall offer some form of protection against the adverse effects of phantom illumination of aspects.
Signal Poles	All poles and posts shall comply with or exceed the requirements of BS505 or similar international approved specification as appropriate for use in India with regard to fabrication and steel content and shall be galvanised steel Class B, to BS729 or similar International standard. Signal poles shall have a diameter of 115mm with a height of 6m and a strength and rigidity at least equivalent to that for a seamless steel tube of 115mm outside diameter and 4.4mm thickness and a tensile strength of 375MN/m². Signal poles shall be of a uniform diameter. An exception may be made to increase the diameter of the lower part of any post at a signal installation to accommodate, for example, electrical services

	and/or termination assemblies. Poles shall be shot blasted with a crossover adhesive and dipped in a fluidised bed of PVC, to a thickness of 250/300 microns with a bitumen finish applied to the internal surfaces of the pole, alternatively a fully galvanised pole in accordance with BS729 or to a similar International standard shall be provided. All poles shall be polyethylene sleeved for protection. The signal pole shall be designed and constructed as to provide adequate support and stability for the signal head and shall be fitted with weather - proof cap. The interior of the steel poles shall be protected by:- • a finish complying with the requirements of BS729 or equivalent International standard; or • an anti-corrosive paint which shall be effective over the temperature range minus 25^{O}C to 70^{O}C. The exterior portion of the steel poles below ground level and extending to at least 450mm above ground level shall be protected prior to the application of the outer plastic coating.:- • by spraying with molten zinc to BS5269, Part 1 or equivalent International standard or The pole cap shall be constructed in such a way that it will not become loose due to vibration or adverse weather conditions. The pole cap shall be of internal captive nut / thread construction allowing the pole cap top to fix to the assembly without a hole being required in the top of the pole cap. Thus reducing risk of moisture reaching the terminal blocks.
LED Signal Aspects	The provision of LED signal heads shall be to the specifications detailed in EN12368 (European standard) and the further detailed requirements of TR2206A or other equivalent International Standards. The LED signal heads are to be compliant with Class A (-15 to + 60) for use in a class A environment, provide a luminosity of intensity of 400cd, have a medium intensity distribution, a luminous uniformity of 1:10, phantom class 5 and an impact resistance of 0.51kg dropped from IR3 (1300mm). All the previously stated requirements for conventional signal aspects shall apply equally to LED signals such as optical performance, physical materials and construction standards, fixings and similar.
Cable Installation	Contractor shall install and test the cables specified in accordance with the plans. Cables shall be laid in HDPE and G.I./M.S. conduits as shown in the plans. Contractor's scope of work includes unloading, laying, fixing, jointing, bending and terminating of cables. Contractor shall also supply necessary materials and equipment required for jointing and terminating of cables.
Signal Cable /	Signal Cable/Control shall be rated for 650/1100 V Grade Solid Copper

Control Cable/power cable	Conductor, PVC insulated and sheathed armoured cables as per IS 1554 Part I – 1976. The recommended sizes are: 3 C X 2.5 sq. Mm 8 C x 1 sq. mm 16 C x 1 sq. Mm
Vehicle Detectors	Vehicle detectors shall be provided data for the ATC algorithm and for all other vehicle detection requirements such as:- Vehicle actuation; Traffic Counting; Congestion Monitoring; Fully adaptive control The type of vehicle detectors, their location and function shall be defined as per the specific requirements of the Contractors fully adaptive traffic control system
Full Graphic Count Down Timer	CPU – 8bit Micro-Controller Structural Material - Polycarbonate strengthened against UV rays Dimensions - 360 mm x 370mm x 220 mm Lamp Diameter - 300 mm Height of Man Figure - 150-165 mm Digit Height - 150-190 mm Display Type - Full Graphic, Dual Colored (Red & Green) LED Diameter - 5 mm LED Viewing Angle - 30 Degree LED Wave Length - 630-640 nm (Red), 505-520nm(Blue –Green) LED Dice Material - AII n Gap 9Red), InGaN (Blue-Green) LED Life Time - 1,00,000 hrs from the date of Commissioning Power Consumption - 25-30 Watt nominal per lamp Input Power - 85 to 260 Volt AC, 50 Hz Operating Temperature - -20 Degree to +60 Degree C Humidity - 0 % to 95% Relative Humidity Water & Dust Ingress - IP 65 The Vehicular countdown timer should be dual colour, Red for STOP or

	STP and Green Colour for GO. These should have alternate Red and Balance Phase Time for STOP or STP in flashing. Alternate Green and Balance Phase Time for GO in flashing. The Pedestrian Countdown timer should be dual color with RED MAN & balance phase time in flashing and GREEN MAN & balance phase time in flashing.
Traffic Signal Equipment Installation	The Contractor shall agree the final placing on site with the Engineer of all traffic signal pole positions and the locations of traffic signal controller cabinets as illustrated in the detailed junction drawings prior to any works commencing. The Contractor shall be required to remove all redundant traffic signal equipment and cable from each individual site once any new equipment has been fully cabled and commissioned. The equipment shall be removed with care to avoid damage and delivered to the Employer. If on the instruction of the Engineer the equipment is not required by the Employer, the Contractor shall make his own arrangements for disposal.
Inspection Chambers	The Contractor shall provide details of proposed chamber locations marking these on the traffic signal drawings. The locations of ground chambers shall be in accordance with the following: • Located in footways • Adjacent to Traffic Signal Controller • Adjacent to Traffic Signal Poles • At detector loop collection points • Significant changes in direction • Each end of carriageway crossings • Intervals of not more than 40m. Inspection Chamber covers shall be of a composite construction, black in colour, and fitted with in a galvanised steel frame. The cover and frame shall meet the requirements of 12.5 tonne loading in accordance with EN 124 Grade B or equivalent loading.
Civil Engineering Works	The Contractor will be responsible for the implementation of all necessary civil engineering works to implement the project. This will include:- • The installation of the hardware necessary for the ATC system itself such as signal controller bases, signal poles, cables and cable ducts. • The provision of a fully ducted network for traffic signal infrastructure in the form of ducts and chambers in line with the detailed standards outlined in this specification.

4.1.2 2.0 KVA Online Ups System Specification

Description	Specification

Technology	True On Line UPS with double conversion technology
	Rectifier and inverter should be based on IGBT
Power Rating	2000 VA / 1600 W
Input	
Voltage Range	160 VAC – 300 VAC @ 100% Load, 110 VAC – 300 VAC @ 50% Load
Frequency	40 Hz ~ 70 Hz
Power Factor	≥ 0.95
Output	
Voltage Range	220/230/240 VAC ± 2%
Voltage Distortion	≤ 3% (Linear Load) ≤ 6% (non Linear Load)
Frequency	47.5 ~ 52.5 Hz
Power Factor	0.8
Crest Factor	3:1
Inverter Overload	
Transient Response	Less or equal to 3% for 100% nonlinear load (Battery mode)
Battery	
Type	Sealed Maintenance Free, Valve Regulated Lead Acid
Number of Battery cells	One set of 8 Batteries of 12V
Rated Voltage	96 VDC
Backup Time	240 min 9600 VAH
Protection	Inbuilt protection for surge suppression and EMI/RFI filter provided
Environmental and Other	
Audible Noise	Less than 45dB at 1 meter
Operating temp & Humidity	20 – 90%RH @ 0 – 40°C (non condensing)
LCD Display	UPS Status, Load level, Battery level, Input / Output voltage, Discharge Timer & Fault conditions
Management	

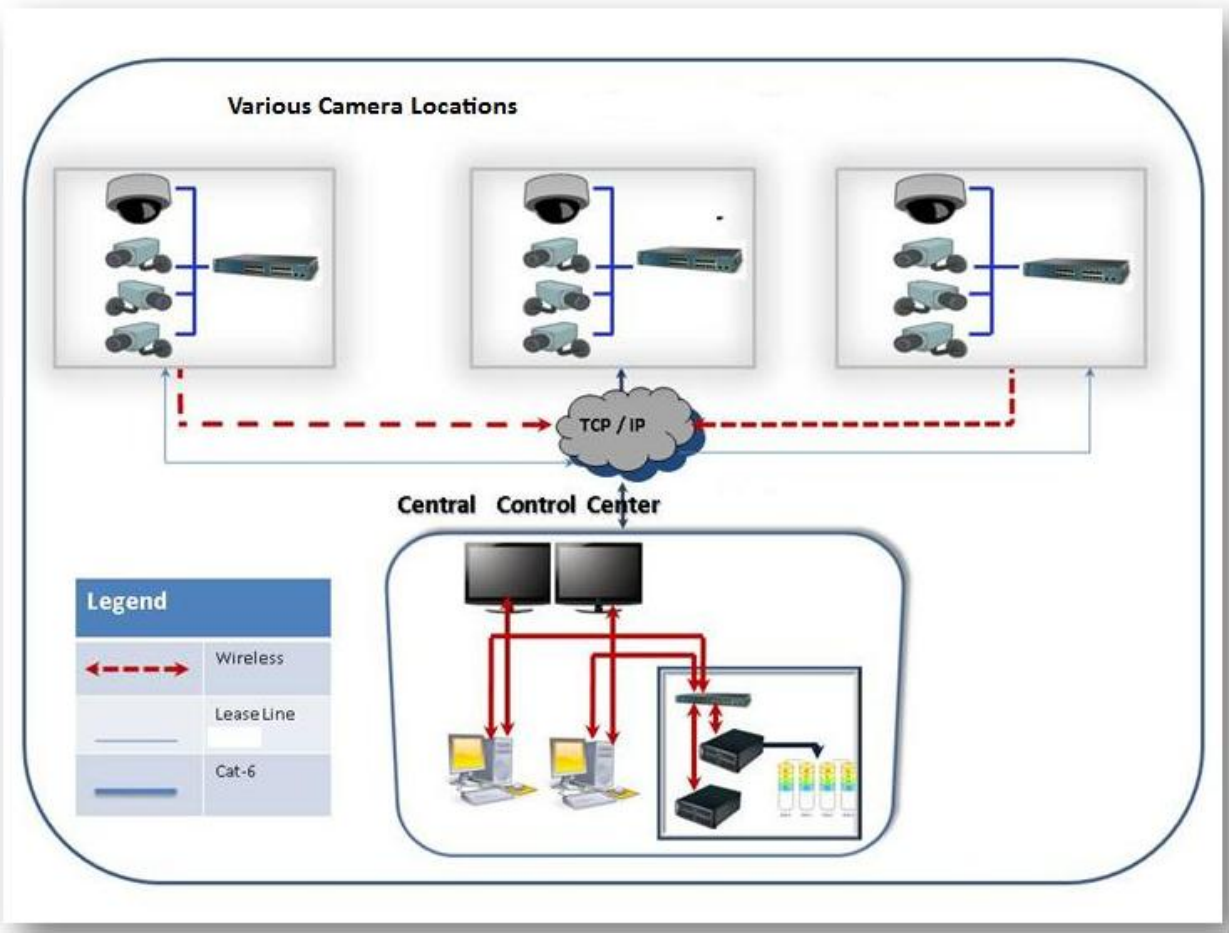
SMART RS 232USB Port	Supports Windows, Novell, Linux and FreeBSD
SNMP	Power Management from SNMP manager and web browser option should be present
Power Outlet	Should have programmable power management outlet for independent control of load segment.
ECO Mode	Should be capable of operating in ECO mode for energy saving.
Credentials	Manufacturer Should be ISO 9001:2000 certified
	Manufacturer Should be ISO 14001 certified, SAMEER/GOVT Lab certified
Battery	4 hr backup at junction.

4.2 Surveillance System

4.2.1 CCTV Solution and Architecture

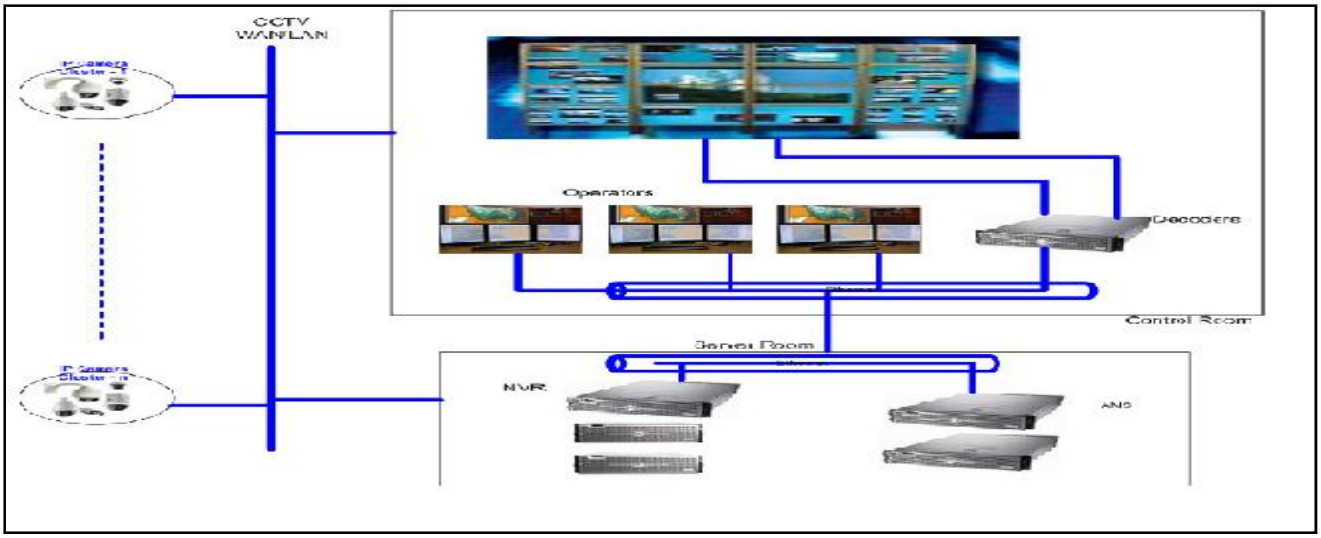
- Open Architecture based system.
- Future Expandability possible.
- Failover Management.
- Complete Command and Control operation.

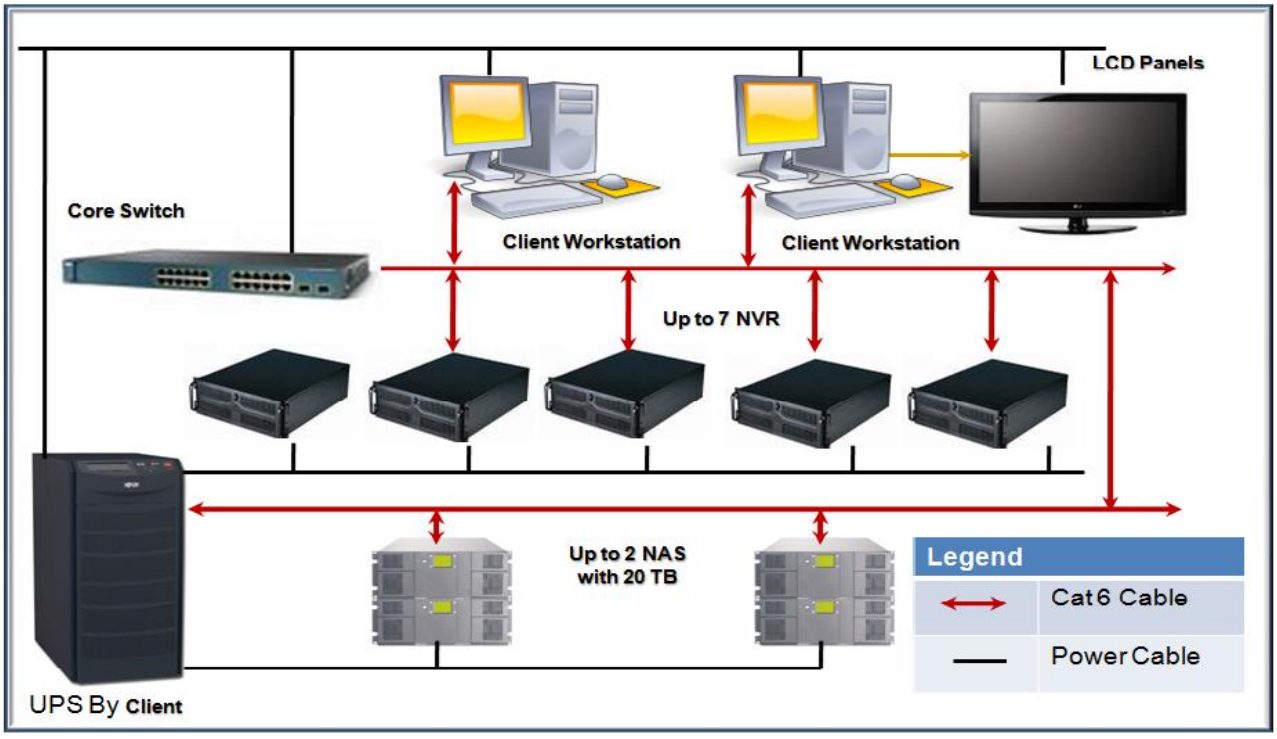
4.2.2 CCTV System Architecture



As per above Architecture all cameras are connected to central command and control station via redundant network connectivity through Wireless/wired network, where complete recording of all the camera feeds are taking place with viewing at multiple locations across the city. Provision for storage should be made at edge also along with central however the edge storage should be for minimum 3 days. The data stored locally should automatically update the central data on restoration of connectivity. Bidder should plan storage capacity for storing 7 days data with 20% cushion. It is also to note that Storage of the feed required 2 Megapixel, 25 FPS, H.264 Compression standards with 100% feed

4.2.3 Command and Control Station Architecture





The main servers and video management application will be placed at Main Control Room with a Core Switch connecting the main camera Network from sub-Control room to the Main server at Central Control Room. The Monitoring stations are connected to the network via switch and will be places at various stated viewing locations across the cities. The Viewing station will be directly/indirectly connected to the main server for retrieving the recording or viewing the live video.

There will be a NAS storage connected to the recording servers for recording storage, there will be one or multiple numbers of server through which the NAS device will be attached. All the devices will be connected to RAW power supply through a UPS placed at control stations.. All the cameras at field will be connected to the same network via switch placed at field level further connecting to sub control station and to the servers at main control station.

4.2.4 Network Connectivity (Dedicated Network for Police BUIDCo)

To enable hybrid connectivity, as per feasibility i.e. Fiber or Wireless based network will be preferred. This network should be zero interruption based communication for links among Control room and IP Cameras installed & spread over various locations in the city as mentioned in **Annexure-2**.

1. The successful bidder shall be responsible for end-to-end implementation of connectivity of all the locations under this RFP and shall quote and provide/ supply any item(s) of latest make and model not included in the bill of materials, but required for successful implementation and commissioning of the system as well as its management. For such item(s), which have not been quoted by the successful bidder in the bid, but are required for successful completion of the project, the Bidder shall not pay for the same.
2. The supply of all the installation material/accessories/ consumables necessary for the installation of the systems.
3. The required networking equipment for end to end connectivity from Control room to individual Surveillance Cameras shall also be provided by the bidder at each location.
4. The complete ownership of the network proposed on wireless/fibre will that be of Police BUIDCo Bihar.Therefore proposed Network has to be a private Network build for Bihar Govt. and not hired from a Telecom Service Provider/ Operator. However complete maintenance will be in the scope of the bidder including rectification of minor or major faults/breakages in the network equipment.
5. Carry out installation of active components, passive components and accessories supplied as per standards for successful integration and implementation of the systems at each locations connected under this RFP.
6. Configuring and fine-tuning of subsystems to achieve overall optimal network performance with high level physical & cyber security.

7. CPE (Customer Premise Equipment) shall have enough gain to provide strong signals for the video & audio communication.
8. Wireless Communication should be fully secure and shall support 128-bit encryption or better.
9. Minimum bit-rate of streaming shall be 2 Mbps.
10. All the locations are connected through wireless or wired medium (fibre) with Local Control Room.
11. Access Point shall be placed in such a way that it covers the entire locations which is under surveillance. Associated planning and diagrams of placement of Access Points shall be provided by bidder.
12. Product offer by bidder must fulfil functional requirement of entire project for successful implementation and commissioning of the project as well as its management. For meeting such functional requirement in case any components /items is not specified in this RFP, it must be quoted as a separate item along with its price.
13. Connectivity between Police Control Room and SSP office, other Senior Official, link to be provided for displaying dashboard for alert messages to BUIDCo all Senior officials by extending link from control room to nearest BSWAN PoPs at Sasaram City.

4.2.5 Pan tilt zoom (PTZ) cameras specification

Sr. No.	Features	Specifications
1.	Image sensor	1 / 3” CMOS (2 MP)
2.	Focal Length	4.45 to 89mm
3.	Zoom	20x Optical
4.	Electronic Shutter	1/30 to 1 / 30,000 s
5.	Min illumination/ light sensitivity (Color)	0.15 lux (50 IRE AGC ON)
6.	Min illumination/ light sensitivity (B/W)	0.01 lux (50 IRE, AGC ON)
7.	Wide Dynamic Range	80 dB
8.	Backlight Compensation	ON/OFF

Sr. No.	Features	Specifications
9.	IRIS Control	DC or Automatic
10.	Focus	Automatic / Manual
11.	Automatic Gain Control	Auto / Manual
12.	Color, Brightness, Contrast functionality	Required
13.	Frame Rate	25 FPS for 1920 x 1080
	Video	
14.	Day and Night functionality	Automatic, Color, Mono
15.	Video Resolution	2 MP (1920 x 1080)
16.	Video Streams	Individually configurable 02 video streams (H.264 High Profile, MJPEG) should support at least 12 different video profiles including Q1080P (960 x 544) profile.
17.	Intelligent Video	Motion detection
18.	Electronic Image Stabilization	Required
	PTZ Function	
19.	PAN TILT Range	360° continuous pan & 90° tilt range
20.	PAN TILT Speed	300°/sec manual
21.	Presets	256 Preset Points
22.	Tour & Pattern	Required
23.	Privacy Mask	04 Zones
	Compression	
24.	MJPEG	Required
25.	H.264	Required
	Audio	
26.	Audio support	Required
27.	Audio Compression	G.711 or better
28.	Two-way audio	Required
29.	Input / Output	02 IN & 01 OUT. Alarm linkage with SD card video recording / FTP Upload / Email /

Sr. No.	Features	Specifications
		Snapshot / Preset / Alarm output / CMS
	Network & Interface	
30.	Interface	RJ-45 for 10/100 base-T Ethernet
31.	Upgrade	Through web browser , online, firmware upgrade
32.	Network Protocols support	TCP/IP, HTTP, DHCP, UDP, DNS, SMTP, RTP, RTSP, SNMP protocols
33.	Alarm Event	Events / alerts send via FTP, HTTP, email, Pre-Post alarm video buffering.
34.	Alarm	Tamper Alarm
35.	Compliance	ONVIF Profile S or above
	Security	
36.	Password Protection	Required
37.	HTTPS encryption	Required
38.	IEEE 802.1X	Required
	General	
39.	Operational temperature °C	-10°C to 60 °C
40.	Humidity	0 to 90% RH non-condensing
41.	IP rating	IP66 Outdoor Housing, Vandal proof IK10
42.	Power	Upto 26W, AC/DC24V/ 100- 230VAC
43.	Certifications	CE, FCC
44.	SD card	Camera shall be able to support SD card up to 32 GB
45.	Auto detection and configuration	Camera shall be automatically discovered and configured when connected to video management.

4.2.6 Fixed lenses high resolution cameras specification

Sr. No.	Features	Specifications
1.	Image sensor	1/3” CMOS Progressive Scan (2 MP)
2.	Electronic Shutter	1/5 to 1 / 32,000 s
3.	Min illumination/ light sensitivity (Color)	0.02 lux (AGC ON@F 1.4)

4.	Min illumination/ light sensitivity (B/W)	0 lux with IR illuminator active (30 IRE, F 1.2)
5.	Wide Dynamic Range	80dB
6.	Backlight Compensation	ON/OFF
7.	IRIS Control	DC or Automatic
8.	Focus	Automatic / Manual
9.	Automatic Gain Control	Auto / Manual
10.	Color, Brightness, Contrast	functionality Required
11.	Frame Rate	25 FPS for 1920 x 1080
12.	Varifocal Lens	2.8 – 12mm varifocal lens
	Video	
13.	Day and Night functionality	Automatic, Color, Mono
14.	Video Resolution	2 MP (1920 x 1080)
15.	Video Streams	Individually configurable 02 video streams (H.264 High Profile, MJPEG), should support at least 12 different video profiles including Q1080P (960 x 544) profile.
16.	Intelligent Video	Motion detection
	Compression	
17.	MJPEG	Required
18.	H.264 (Recording & Viewing)	Required
	Audio	
19.	Audio support	Required, TWO-WAY
20.	Audio Compression	G.711 or better
21.	Two-way audio	Required
22.	Input / Output	02 IN & 01 OUT
	Network & Interface	
23.	Interface	RJ-45 for 10/100 base-T Ethernet
24.	Upgrade	Through web browser , online, firmware upgrade
25.	Network Protocols support	TCP/IP, HTTP, , DHCP, UDP, DNS, SMTP, RTP, RTSP, SNMP protocols, UNICAST (4 simultaneous users)

26.	Alarm Event	Events / alerts send via FTP, HTTP, email, Pre-Post alarm video buffering.. camera shall provide Camera Tamper Alarm and Motion detection as standard feature.
27.	Compliance	ONVIF 2.0 or above
	Security	
28.	Password Protection	Required
29.	HTTPS encryption	Required
30.	IEEE 802.1X	Required
	General	
31.	Operational temperature °C	-20 °C to 55 °C
32.	Humidity	0 to 90% RH non-condensing
33.	IP rating	IP66 Outdoor Housing
34.	Power	Up to 10 Watt, AC24V/ DC12V, 100-230VAC
35.	Certifications	CE, FCC
	Local Storage	
36.	SD card	Camera shall be able to support SD card up to 32 GB.
37.	Auto detection and configuration	Camera shall be automatically discovered and configured when connected to video management system.

4.3 Connectivity

4.3.1 Fiber Specifications

- Minimum 24 Core Amour Cable
- No any Media Converter required, Fiber will be terminated from Switch to Switch directly
- HDD (Horizontal Drilling) lying

4.3.2 Wireless Specifications

Bidder is free to build its network on fibre or wireless technology. But if bidder chooses to go on providing connectivity using wireless network then the specifications mentioned below should be followed.

- Bidder should propose a separate wireless secured communication technology that should prohibit any kind of intrusion in the Network, Bidder has to do survey for distance of links. Bidders need to be plan for this survey at their own Band width requirement

    a) On an average a typical CCTV PTZ requires 4 Mbps bandwidth.

    b) On an average a typical fixed camera requires 2 Mbps bandwidth.

    c) Megapixel Camera requires 4 Mbps

    d) City of Sasaram is approximately 20 meter height.

Wireless Radio with Antenna Mast & Other Related Accessories	
1	System shall operate in Unlicensed band frequency spectrum of ISM-III - 5 GHz band.
2	The Wireless system shall be fit for outdoor use with supported integrated antenna. The system shall be based on state of art QoSIEEE 802.11 standards.
3	The System shall support centralized bandwidth management and authentication system for high security and QoS. The management application should be client server based system and not browser based, to ensure security of the network.
4	The system shall support remote maintenance of radio units. System shall be remotely configured, maintained, reset, monitored without compromising the security of the wireless network.
5	The system shall have the capabilities of upgrading the Software without interrupting the normal system service
6	The system shall have built in targeted coverage capability in point to point system designed specifically for Video streaming application. The system shall have latest software for managing various clusters of cameras.
7	Power transmitted should be less than or equal to 4W EiRP for outdoor frequency range, less than 200mW indoor frequency range. All definitions as per WPC requirements.
8	The system shall be scalable in terms of deployment for future expansion.
9	Wireless system shall be capable of easy and rapid deployment to avoid lengthy way-leave, access and legal agreements and operate in preapproved license free bands authorised by WPC.
10	All Wireless equipment should be WPC - ETA approved. The approval should be annexed with technical documents. Any submission without this approval shall render the disqualified technically.
11	The system shall support extensive networking modes including switching,

	VLAN tagging and classifications etc.
12	The system shall support high level of security mechanisms. AES, WEP 64/128/152, WEP 2, WPA, TKIP, 128 Bit, Access Control, SSID, Suppress and BRAID authentication etc for end-to-end connectivity to avoid any breaches due to Interference or hacking.
13	The system both in point to point and point to Multipoint mode shall support high level of interference mitigation techniques
14	The system shall support remote maintenance of radio units.
16	The radios shall support 2 x N type (f) antennas
17	Ethernet Interface - 10/100 Base T
18	VLAN - IEEE std. 802.1Q
19	Auto Frequency Mode - System must check automatically and select alternative channels, if required, due to frequency interference
20	Frequency & Power Control should be DFS based.
21	All necessary cables shall be included in the cost of wireless set.
22	Modulation should be on OFDM and 802.11a,b,g
23	The system equipment shall support 802.1x with Radius Authentication
24	The equipment shall be operational in environments where frequency jammers are deployed
25	Power Supply - 110 VAC - 240VAC, 47Hz to 63 Hz
26	Min IP 65 or above weather proof protection should be provided
27	The equipment should be able to withstand salt spray test for 24hrs. Test Certificate for enclosure required.
28	Operating temperature - (-)20degC to (+)50deg C
29	Signaling rate should be 108 Mbps for 40 MHz spectrum
30	MIMO Standards
31	User Interface should be simple, intuitive and easy to use without onerous need for training. The software should facilitate ease of installation from Control Room. Network management tool should be capable of viewing the complete system and choose the nodes for further actions.

4.3.3 Core Switch

Port Density and Redundancy

Layer-3 Switch. 19" Rack Mountable with stackable. Min. 24 Nos. 10/100/1000BaseT ports and Min.12 Nos. free mini SFP/GBIC slot to accommodate 1000BaseSx/1000BaseLx Ports, upgradable to any combination of 24 ports of fibre or copper gigabit ports. Modular support for adding two 10G ports if required in future. All ports should be switched ports.
1+1 Redundant and hot swappable, load sharing Power supply
Two core switches will be connected in 100% redundancy, master/slave mode using industry standard VRRP protocol to avoid single point of failure in network
Both the core switch will connect to each other on a high speed stacking cable that should be supplied along with the switch.
Each VMS Server will have dual NIC cards to connect to both the Core switches, and incase of failure of one core switch other should take over, without loss of connection between VMS & cameras.
Performance
Min. 165Gbps switching fabric, Min. 110Mpps forwarding rate. Should be wire speed switching and routing capabilities and non blocking architecture, Supports 10KB Jumbo frame size
Support Up to 256K IPv4 routes, 16K MAC, 4K layer 3 interfaces , Up to 1K layer 3 IPv4 multicast groups and IPv6 routing option
VLAN support
Supports 4096 VLANs
Support Private VLANs, VLAN double tagging (Q-in-Q), IEEE 802.3ac VLAN tagging
IEEE 802.1Q Virtual LANs, IEEE 802.1v VLAN classification by protocol & port
Routing Protocol
IP routing and RIPv1 and RIPv2, OSPF, DVMRP, HSRP/VRRP(Optional), UDP, ICMP, TCP, ARP. Should support IPv6 for future upgrades.
Hitless upgrade of the IOS, capability to store multiple configuration files, Date, day, time based event sensitivity and dynamic auto re-configuration capability
Security
Access control list, TACACS, TACACS+, SSH, RADIUS, SSLv3, MAC-based authentication
Dynamic VLAN assignment, NAC, BPDU Protection, Guest VLAN support, Web-based Authentication
Transport Layer Security (TLS) Extensions, PPP Extensible Authentication Protocol and IEEE 802.1x Multi Supplicant authentication
IEEE 802.1x Authentication protocols (TLS, TTLS, PEAP & MD5), SSH Remote Login

Quality of Service
Policy based QoS features, 8 QoS queues per port, IEEE 802.1p Priority Tagging
Highly configurable traffic classification Mixed scheduling, to support complex traffic queuing requirements
TCP-IP bandwidth limiting performance and bandwidth resolution down to 1Kbps
RFC 2474 Diff Serve Precedence for 8 queues/port, RFC 2475 Diff Serve Architecture, RFC 2597 Diff Serve Assured Forwarding (AF) and RFC 3246 Diff Serve Expedited Forwarding (EF)
Redundancy features
Link Aggregation (802.3ad LACP), Dynamic Link Failover, STP Root Guard
Loop Protection - Loop Detection and Loop Protection - Thrash Limiting
IEEE 802.1D Spanning Tree Protocol (STP) - MAC Bridges, IEEE 802.1s Multiple Spanning Tree Protocol (MSTP)
IEEE 802.1t - 2001 802.1D maintenance and IEEE 802.1w - 2001 Rapid Spanning Tree Protocol (RSTP)
Multicast Supports
Bootstrap Router for PIM-SM, IGMP Proxy, IGMP Snooping, MLD Snooping (v1 and v2), RFC 1112 Host extensions for IP multicasting, RFC 3376 IGMPv3
RFC 2236 Internet Group Management Protocol v2 (IGMPv2), RFC 2715 Interoperability Rules for Multicast Routing Protocols, PIM-SM & PIM-DM
Management
SNMPV3, Web based, Telnet, RMON (4 groups) and command Line Interface.
Out of band 10/100/1000 Ethernet management port , Console management port
An SD memory card socket on the front panel, allowing switch firmware, configurations to be stored for backup and distribution to other switches
SSH and SNMPv3 for secure management, Support RFC 2741 Agent Extensibility (Agent X) Protocol
RFC 2575 View-based Access Control Model (VACM) for SNMP
RFC 2574 User-based Security Model (USM) for SNMPv3, RFC 1212 Concise MIB definitions
RFC 1212 Concise MIB definitions, RFC 3164 Syslog Protocol, Diagnostic Tools ,BIST (Built-In Self Test)
Electrical Approvals and Compliances
EMC: EN55022 class A, FCC class A, VCCI class A
Certification: UL, CUL, TUV

Safety :UL60950-1, CAN/CSA-C22.2 No. 60950-1-03,EN60950-1, EN60825-1, AS/NZS 60950.1
Ro HS Compliant
Power Consumption
110 Watts (375 BTU/hr)
Environmental Specifications
Operating Temperature Range: 0°C to 40°C
Storage Temperature Range: -30°C to 70°C

4.3.4 Distribution Switch

Port Density
Layer-2 Switch. 19" Rack Mountable. Min. 24-port stackable 10/100/1000TX Copper Port
Should Have 4 standby SFP bays
2 Nos. 1G Stack port on rear
Performance
Min. 88Gbps switching fabric, Min. 50Mpps forwarding rate. Support 8K MAC address
Wire speed switching on all Ethernet ports for all packet sizes including jumbo frames up to 10Kbytes
VLAN support
Supports up to 4094 VLAN IDs and 256 active VLANs
Support Port based , MAC Based and Tagged based VLANs, GARP
General Features
Support Storm Control : Broadcast, multicast ,IGMP snooping v3, Across Stack Link Aggregation, Stack VLAN configuration, Stack Port Mirroring, Trunking across stack, Single IP address Stack management, 20Gig Resilient Ring Stacking Architecture, Dual-stack IPv4/IPv6 protocol
Support Spanning-Tree Protocol , Rapid Spanning-Tree, Multiple Spanning Tree, 802.3ad LACP link aggregation ,Trunk can support up to eight members per group, LLDP-MED
RFC 2461 IPv6 neighbour discovery, RFC 2463 ICMPv6: Internet Control Message , Protocol version 6
RFC 1981 Path MTU discovery, IPv6 Tunnelling over IPv4
Support Dual software images, Port mirroring, DHCP, IGMPv3 & IGMP queries
Security

Guest VLAN, SSHv2 for Telnet management, SSLv3 for WEB management ,RFC 1492 TACACS+, RFC 2138 RADIUS Authentication, IEEE 802.1x Port-based and MAC network access control, Access Control Lists, MAC Acls, IPv4 as well IPv6 ACLs, service-ACL, SNTP, 1.10.13.1. Layer 2 and Layer 3 Access Control Lists (ACL), Broadcast Storm Control
Quality of Service
Support IEEE 802.1p QoS, Eight priority queues and Strict priority and weighted round robin, DSCP (Diffusers) for Layer 3 QoS, Traffic prioritization using 802.1p, ToS, DSCP Fields, 802.1p to DSCP remarking traffic
Management
SNMPV3, Secure encrypted Web based and Command Line Interface with SSH v2 and SSL, Telnet, RMON (4 groups) and TFTP , Two levels access privileges User EXEC mode, Privileged EXEC mode, Global Configuration mode, and Interface Configuration mod
IPv6 Network management, IPv6 Applications: WEB/SSL Telnet server/SSH, AAA/Radius, Management ACLs, SNTP, PING, TFTP/Copy, Syslog
Electrical Approvals and Compliances
Safety UL 1950 (UL/cUL), EN60950 (TUV), EMI FCC Class A, EN55022 Class A, VCCI Class A, C-Tick, EN61000-3-2, EN61000-3-3, Immunity EN55024 ,Ro HS compliant
Power Specifications
Voltage input 100- 240VAC, Max Power consumption 39.6W, Heat Dissipation 135.1 BTU/hour
Environmental Specifications
Operating Temp 0°C to 45°C (32F to 113F)
Storage Temp -25°C to 70°C (-13F to 158F)
Operating humidity 5% to 80% non-condensing

4.3.5 Technical specs Of the Broadband Radio

System should consist, outdoor and indoor equipment, antenna cable with associated accessories System Software and other hardware and software required for operation, monitoring and configuration of the links. It shall be used for point to Point and point to Multipoint. The system should be reliable and field proven design and suitable for harsh environmental conditions. The system shall support flexible quality of service and concurrent use of IP, VOIP for Voice and data applications.

Feature	Specification

Feature	Specification
Frequency Range	5.1-5.9Ghz (includes unlicensed band)
Channel Width	10/20/40mhz
Radio Technology	TDD, OFDM
RF media access protocol	TDMA with Polling
MIMO Options	2x2
Interference Resitant	Yes
Wireless Data Rate	54 Mbps, 108 Mbps 150Mbps,300 mbps
	OFDM
Option of multiple rate algorithm for different LOS schemes	Yes
Duplex Format	Time division Duplexing (TDD)
Certification	CE, ETSI, FCC
Range	75kms
Output Power	Up to 28dBm
Watch Dog Timer (for un-manned monitoring)	Software/Hardware/Temperature
QOS/COS/GOS (quality, class, grade of service)	Yes
Option of priority to Video or any specific type of server	
VLAN with Management VLAN	Yes
Static Routing	Yes
MPLS Support	Yes
TDMA Polling	Yes
Auto Channel Selection	Yes
Jumbo Frame	1700 bytes or more
Management Options	Preferably Telnet/ SNMP Based/ NMS
Packet Format	IEEE 802.3 and Ethernet II
Network Connection	10/100 RJ Female Ethernet Connection, Ruggedized Ethernet Connector
IGMP support	Yes

Feature	Specification
802.1x support	Yes
NTP	Yes
Bridge Functionality (fully transparent)	Yes
Network Topologies	Point to Multipoint, Any point-to Multipoint, Multipoint-to Multipoint
Repeater Mode	Built-in Mode
RF Collision Management	Combined TDD / OFDM and FEC
Security - Open VPN support (Server and client)	Yes
Security - Data Scrambling	256 bit Encryption , AES, WPA, WPA2
Security - Data Security Password	Network attachment is password protected
Remote Management	http web, SSH
Management Port	Ethernet, SSH
SNMP (read/write/ trap)	V2
Wireless NMS	Yes
Multicasting support	Yes
Management Port Functionality	Full configuration/management from any station through a command line
Software Management	File download over RF for firmware updates
Built in surge protection	3KVA or more
Power Adapter Requirement	110 VAC or 220 VAC
Power Consumption	max 25W (fully loaded)
Operational Temperature	(-)40C to (+)80C
Humidity	Humidity 0-95% non condensing
	Outdoor weatherproof endorser
Outdoor Unit	IP67

4.4 Central Control Room

Sr. No.	Features	Specifications
	Additional Equipment Monitoring and Testing Facilities	It shall be possible to insert and remove a computer demand for demand dependent stages by timetable, macro, or operator command, or by the use of the in-station test set
	Monitoring By Operator	The operational display facilities of terminal shall provide the following as a minimum requirement: - i) Monitor display ii) Plan compliance display iii) Log Outstation Modems to disk iv) Override control and reply data pattern it shall be possible to display a minimum of 4 different plan compliance displays on any active operator terminal using the GUI operating environment.
	Green Wave	The System shall provide a minimum of 100 Green Wave routes with a maximum of 25 junctions on each Green Wave route. The system shall be capable of running a minimum of 15 Green Wave routes simultaneously in different regions without impeding the operation, response time and speed of implementation of any Green Wave which may already in operation.
	Remote Requests	A Remote Request is a facility where it is possible to call a plan or other facility as described below from a remote location by an authorised source. It shall be possible to implement a minimum of 20 different Remote Requests either in combination or singly. There are four types of remote request demand, which are: i) Request for a fixed plan(s) ii) Call a diversion; iii) Call a Green Wave; iv) User configurable, or by the use of Macros
	System Log	The System shall be supplied with a hard disc of sufficient capacity to store all System log data output for a minimum of 2 years. The System shall create a

		disc file log in which the following shall be stored: - i) All messages output by the System; ii) All implemented operator commands; iii) All generated fault messages; iv) All operator comments; v) All operator recorded faults.
	System Graphics and Operator Terminal Screen Displays	The System shall be configured to operate within a GUI type of Operator terminal screen display environment. It shall be possible to display a minimum of 8 active displays on each Operator terminal and every display shall be capable of showing real time fully adaptive ATC facilities and events. The System shall have the facility to show System real-time information changes including `user defined text' within the graphical displays. As a minimum requirement, the graphical displays shall be capable of providing the following: i) Whole network area; ii) Sub-area; iii) Group; iv) Signal junction; v) Signalled pedestrian crossing; vi) Fixed Time region; vii) Fixed Time node; viii) Fully adaptive region; ix) Fully adaptive node.
	Traffic Signal Junction Graphics	It shall be possible to display the status of a signal junction by the use of symbols and colours. The parameters to be displayed shall include : - i) Outstation Modem fault; ii) Operator control; iii) Equipment fault; iv) Method of control (e.g. local, operator, Fixed Time, fully adaptive, green Wave);

		v) User defined text to enhance display; vi) Current plan, cycle time, stage with movements at green, and intergreen in progress.

4.4.1 Soundless Genset – 30 KVA with AMF Control Panel

- No. of Phases: Three
- Speed 1500 RPM
- Type of Engine: 4 Stroke Diesel Engine with Electronic / Mechanical Fuel Governor
- Cooling: Air or water
- Rated Voltage(in Volts): 415V
- Rated Capacity (in KVA): 30
- ALTERNATOR
- Foundation
- Earthing
- SNMP based controller

4.4.2 20.0 KVA Rack Mountable Online Ups Specificationin 1+1 Redundant mode

Technology	a. True on Line Rack Mountable DSP based UPS with double conversion technology. b. UPS should be capable of paralleling up to 4 units. c. UPS should have IGBT based rectifier and inverter d. Temperature compensated battery charging feature should be built-in for prolonged battery life
Input	a. VOLTAGE RANGE 228-478 V AC. 3 phase b. FREQUENCY 40-70Hz c. POWER FACTOR 0.99 (With p.f correction) d. CAPACITY 20KVA/18 KW
Output	a. VOLTAGE RANGE 3 phase 380V AC ,Single phase 220V AC +/-1% b. HARMONIC DISTORTION <2%(Linear Load); <5%(Non-Linear Load) c. FREQUENCY +/-0.25% free run d. POWER FACTOR 0.9 e. CREST FACTOR 3:1
Efficiency	AC – AC >93%
Battery	a. TYPE Sealed, lead acid, maintenance free (SMF) b. RATED VOLTAGE 360-432 V c. BACKUP TIME 47520vah 120 MIN d. TRANSFER TIME Zero

	e. AUDIBLE NOISE <55dB f. DISPLAYLED
Interface Slot	USB & Intelligent Slot (SNMP)
Management	SNMP Ready UPS from Day One
Protection Grade	IP 20
Credentials	a. Manufacturer Should be ISO 9001:2000 certified b. Manufacturer Should be ISO 14001certified c. UPS should meet ROHS R5 standards
Scope of Transient Voltage Surge Suppression (TVSS)	Critical and expensive electronic equipment should be protected from transient over-voltages by TVSS. The selection of surge protective devices typically depends on the location of the device. TVSS device for ITE equipment shall be as per following specifications. • Surge Current Capacity : 50kA • All Modes Protection : L-L, L-N, L-G, N-G • Connection Type : Parallel • Protection Level : < 1 kV • MCOV : Min. 320 Volts • Response Time : < 0.5 nanoseconds • EMI/RFI Attenuation : 40 dB typical • Status Indication : LED, Dry contacts • Monitoring : Monitoring of All Modes, including N-E • Fusing : Individual Fusing of MOV's including N-G • Certification : UL 1449-3 • Enclosure : NEMA Tested • Mounting : Wall Mounting • Warranty : 5 Years

4.4.3 PTZ Keyboard/ joystick

- Communication Distance : Maximum 1200m
- Baud Rate: 2400 – 19200Bps
- Working Voltage: DC or AC
- Communication Port: RJ45 or any other

4.4.4 55" LED Commercial LCD Display

- Screen Size: 55"
- Resolution: 1920x1080 or better

- Wall mounting kit
- Energy Star Complaint
- Connectivity with Workstation/Server for Surveillance Camera Display
- 15 meter VGA Data Cable
- 24x7 operation
- Operating Temperature: 0 degree C – 40 degree C
- Power supply: AC Voltage

4.4.5 Network Management Software (NMS)

1. General features
    a. Secure SNMP v3 support
    b. Scalable, distributed architecture, with management support for multiple distributed domains, each NMS should be able to import the map of one or more remote servers. With support for both local and remote access.
    c. Remote console component
    d. Remote console and JAVA access
    e. Email/Pager event notification
    f. Real-time MIB displays
    g. Multi-vendor graphical device views
    h. Web and printed trend reports
2. Monitoring and Alerts
    a. Should automatically discovers and polls
        - SNMP/ICMP
        - WEB
        - FTP
        - SMTP
        - TELNET services
    b. Along with real-time service status
    c. Should support Web-based availability reports.
3. Trend Reporting

a. Should be capable of automatically generating daily, weekly, and monthly statistical reports. Report formats include graph, bar chart, distribution, and summary.
b. Exported reports to a variety of destinations, including
   - Printers
   - Files
   - Web server
   - ODBC databases.
c. Customized reports.

4. Console Options
   a. Remote console:
      - Should enable local user access in the nms station via remote console
      - Run the remote console application from any Windows workstation using TCP/IP connection

5. SNMP Protocols
   a. v1, v2c, v3 with SHA/MD5 authenticationand DES encryption.

6. Device Discovery
   a. Automatically discovers and polls SNMP and ICMP(Ping) devices.

7. Service Discovery
   a. Performs service discovery on device, including
      - SNMP
      - ICMP
      - Telnet
      - FTP
      - HTTP
      - SMTP

8. Service Polling
   a. Up to 16 user-defined TCP ports per icon, each with configurable send/reply string.
   b. External polling with custom applications.

9. Topology Layout
    a. Multiple level hierarchies, segmented by polling agent.
    b. Tree, ring, or snaked bus networks.
10. Event Notification
    a. Ignore,
    b. Ignore duplicates
    c. forward e-mail
    d. page
    e. display alarm box
    f. execute application
11. Reporting
    a. Graph
    b. Bar chart
    c. Distribution
    d. Summary–with print
    e. Web export.
12. Backup
    a. Live/standby server support with automated failover.
13. External Interfaces
    a. ODBC
    b. Text export
    c. Event forwarding using SNMP Traps
14. Customization
    a. Private MIB import,
    b. Custom tables, expressions, and menus
    c. Execute application from map double-click, on event reception, and during custom polling.
15. Programming Interfaces

a. Proprietary object-oriented interface for C/C++ applications
b. SNMPc v4.0 DDE Interface
c. WinSNMP de-facto standard interface
d. Utilities for Scripting language support

4.4.6 Workstation

- Intel Core i5 or better
- 4 GB Dual Channel DDR3 SDRAM at 1333Mhz
- 1024 Mb dedicated graphics
- 1 or higher GB Graphic Accelerator Card
- 16X DVD-ROM
- 10/100/1000 Ethernet
- 2 x 250 GB HDD
- Genuine Windows 7 and Anti Virus
- USB: 8 external USB Ports (4 front, 4 back); 2 USB 3.0 via add-on cards
- Audio: Six back-panel connectors: microphone-in, line-in, and 4 line-out to support 7.1 audio jack; two front-panel connectors for headphone-output and microphone-in
- Other Features: HDMI, VGA port, S/PDIF connector, e-SATA, RJ-45 (10/100/1000 Ethernet)
- 22" LED TFT Monitor

4.4.7 Storage NAS

Sl. No.	Component / Performance / Utility	Minimum Specification
1	Interfaces	Min. a) 8 Gbps FC host port >=8 b) Device lanes >= 8
2	Controller	a) Dual Active controllers b) Supporting Hardware RAID - 1, 5, 6 & 10 c) 8 GB cache scalable to 16 GB cache within the same pair of controllers. d) Cache should be SDRAM based and usable read / write data cache. Minimum 90% of total cache should be usable for data
3	Max nos. of Disks	a) Min. 100 SAS disks scalable
4	Usable capacity required	As per Bidder's solutions proposed / calculation, using SAS/NL-SAS/SATA disk with minimum 7.2K RPM or more, with RAID-5 configuration.
5	Power, Cooling & Host Connectivity	Power supply & Fans : a) Dual redundant b) Hot-swap

		Host Connectivity a) Minimum 20 Server supported 5_
6	Mandatory features to be provided	a) Custom LUN b) No single point of failure architecture. c) Hot-spare disks support d) Clone copy / Incremental clone copy e) Point-in-time pointer based copy f) Thin provisioning to be offered for full capacity of the storage. g) Storage Management -should support configuration, error management, administration security and reporting of assists centrally
7	File Server Features	2 * Intel Xeon E5-2420 6C 1.9 GHz or higher, 15 MB L3 Cache per socket 32 GB ECC DDR3 1333MHz LP RDIMM memory, upgradable to 192 GB using RDIMM
		Minimum twelve hot swap disk bays,Integrated two gigabit Ethernet ports,Dual Port 8 Gbps FC HBA
		N+N redundant power supply

4.4.8 Video Management System (VMS)

1. The Video Management System (VMS) shall be open platform, a fully distributed solution, designed for multi-site and multiple server installations requiring 24/7 surveillance with support for devices from different OEM/ Vendors.
2. The VMS shall allow for up to 64 cameras or other devices to be connected to each Recording Server and for an unlimited number of Recording Servers to be connected to a single master Recording Server across multiple sites. The system shall support any combination of master and slave servers to provide flexibility and scalability in the overall system configuration.
3. The VMS shall support Microsoft Vista Business/Enterprise/Ultimate (32 bit or 64 bit running as a 32 bit application), Windows 2003 Server (32 bit or 64 bit running as a 32 bit application), Windows XP Professional (32 bit or 64 bit running as a 32 bit application), Windows 7 Professional/Enterprise/Ultimate (32 bit or 64 bit running as a 32 bit application) and Windows Server 2008 (32 bit or 64 bit running as a 32 bit application) with the latest patches and service packs installed. The system shall use Direct X and .Net.
4. The VMS shall consist of the following major components:

   Surveillance System Server, which further consists of the following add-on modules or services:

   - Recording Server (a service).

- Administration application.
- Image Server (a service).
- PDA / Smartphone Server.
- Video client viewer.
- Web client viewer.
- Viewer – For Exported Video Recordings.
- Matrix Monitor.
- Central Alarm Management Module.
- PDA / Smartphone Client.

5. The VMS shall incorporate fully integrated Matrix functionality for distributed viewing of any camera in the system from any computer with the Video Client Viewer or Matrix Monitor application installed.
6. The VMS shall include support for a graphical Central Alarm Management application module. The alarm management module shall allow for the continuous monitoring of the operational status and event-triggered alarms from system servers, cameras and other external devices. The alarm management module shall support graphical displays with interactive icons to display the status of cameras and other inputs.
7. The VMS shall provide connectivity with third-party systems and devices using the OPC (Object-Linking and Embedding Process Control) Data Access set of communication standards. The supported third-party systems shall include industrial automation and SCADA (Supervisory Control and Data Acquisition) systems. The VMS shall support the following commands and interfaces:

    - Get configuration.
    - Get server CPU load.
    - Get camera status and frame rate.
    - Get camera and global events.

- Set events.
- Set Matrix Monitor live view and play back.

8. The VMS shall include a stand-alone Viewer application to be included with video exported from the Video client viewer application. The Viewer application shall allow recipients of the video to browse and play back the exported video without installing separate software on their computers.
9. The VMS shall include support for Active Directory to allow users to be added to the system. Use of Active Directory shall require that a server running Active Directory, acting as a domain controller, be available on the network.
10. The VMS shall be designed to support each component on the same computer for efficiency in smaller systems or in a distributed architecture for large system deployments. VMS core components shall be installed on the same server.
11. Video Device Drivers - Video device drivers are installable program components used for controlling / communicating with the cameras / devices connected to a Recording Server. Video device drivers for supported devices are automatically loaded during the initial installation of the system. Newly released device drivers may be downloaded from the VMS manufacturer's website if the user is connecting a device for which the driver is not already loaded.

4.4.9 SURVEILLANCE SYSTEM SERVER

1. The Surveillance System Server shall support the assignment of any of the Image Servers (a service running on the Surveillance System Server) to function as a master, and any of the Image Servers to function as slaves, thus allowing the user to connect to all Image Servers in the system by connecting to only a master Image Server.
2. The Surveillance System Server shall support the use of separate networks, VLANs or switches for connecting the cameras to the Recording Servers to provide physical network separation from the clients and facilitate the use of static IP addresses for the devices.
3. The Surveillance System Server shall support H.264, MPEG-4 (both ASP and SP), and MJPEG compression formats for the video stream from all devices including analog cameras connected to encoders, DVRs, and IP cameras connected to the system.

4. The Surveillance System Server shall have the option to record the native frame rate and resolution (NTSC, PAL, HD or Megapixel) supplied by the camera or as configured from the administration application.
5. Multi-stream Support - The Surveillance System Server shall support H.264 / MPEG-4 / MJPEG bandwidth optimized multi-streaming. The system shall allow a single video stream from a device to be independently recorded at one specified frame rate by the Recording Server, and viewed by Video client viewers or Web client viewers using a different frame rate setting.
6. The VMS shall support interoperability with IP camera standards including, at a minimum, the Physical Security Interoperability Alliance (PSIA) and the Open Network Video Interface Forum (ONVIF).
7. The VMS recording servers shall support interface to cameras with universal serial bus (USB) communications.
8. The system shall support specific devices, where the specific supported model numbers shall be listed for each manufacturer on an up-to-date on-line web-site.
9. The Surveillance System Server shall support the PTZ protocols of the supported devices as listed in section 4.4.9, subsection 8 above. The Surveillance System Server shall support both Absolute positioning PTZ protocols to move the camera to a specific X, Y, and Z set of coordinates positions, as well as, Relative positioning PTZ protocols to move the camera a relative amount based on the camera's current position.
10. The Surveillance System Server shall support full two-way audio between the Video client viewers and remote cameras/devices. Two-way audio integration shall support the following features and functions:
    - Outgoing Audio - Microphone inputs to Video client viewers shall transmit audio streams to speakers attached to remote IP devices. Selectable options shall be one-to-one (send audio to a specific IP device), and one-to-all (broadcast to all IP devices).
    - Audio from remote IP devices equipped with microphones shall be transmitted to, and recorded by, the Recording Server. The audio shall be relayed to Video client viewers equipped with speakers.

- Each speaker and microphone shall be assigned to a specific camera/device. The speaker and microphone shall have the capability to be assigned to other devices as well.

4.4.10 VIDEO CLIENT VIEWER

1. The Video client viewer shall allow users to connect to the Image Server for initial authorization. Upon authorization the Video client viewer will allow connection to the Recording Server(s) for access to video recordings.
2. The Video client viewer shall provide users with a comprehensive suite of features including:
    - Viewing live video from cameras on the surveillance system.
    - Playing back recordings from cameras on the surveillance system, with a selection of advanced navigation tools, including an intuitive timeline browser.
    - Creating and switching between an unlimited number of views, each able to display video from up to 100 cameras from multiple servers at a time. The system shall allow views to be created which are only accessible to the user or to groups of users.
    - Creating special views for widescreen monitors.
    - Using multiple screens as well as floating windows for displaying multiple views simultaneously.
    - Quickly substituting one or more of a view's cameras with other cameras.
    - Viewing a "slideshow" of images from several cameras in sequence in a single camera position view. This view of several cameras in sequences in a single view is called a carousel.
    - Viewing video from selected cameras in greater magnification and/or higher quality in a designated hotspot.
    - Receiving video triggered through the Matrix Monitor application including live video upon event.
    - Include HTML pages and static images (e. g. maps or photos) in views.
    - Controlling PTZ cameras.
    - Using digital zoom on live video, as well as, recorded video.

- Activating manually triggered events.
- Activating external outputs (e. g. lights and sirens)
- Using sound notifications for attracting attention to detected motion or events.
- Getting quick overview of sequences with detected motion.
- Getting quick overviews of detected alerts or events.
- Quickly searching selected areas of video recording for motion (also known as Smart Search).
- Skipping gaps during playback of recordings.
- Configuring and using several different joysticks.
- Printing images, with optional comments.
- Copying images for subsequent pasting into word processors, email, etc.
- Exporting recording (e.g. for use as evidence) in AVI or MJPEG database formats.
- Using pre-configured as well as customizable keyboard shortcuts to speed up common actions.
- Selecting between a number of language versions, independent of language used on main surveillance system via the down load of language packages.
- Communicating with remote audio devices, including microphones and speakers via a local microphone and speaker.
- Wiping and washing of supported PTZ cameras using assigned keyboard shortcuts or joystick buttons.
- Navigating images from fisheye 360-degree panoramic cameras.

3. The Video client viewer shall have the ability to adjust the display parameters for the video images from the Recording Server to optimize bandwidth utilization.
4. The Video client viewer shall have the capability to serve as a host to third-party applications through the use of a plug-in component.
5. The Video client viewer shall be installed on remote user’s computers.

6. The Video client viewer shall provide a Graphical User Interface (GUI) and feature Live, Browse and Setup tabs for the convenient access of live and recorded video as well as camera properties and display quality.
7. The Video client viewer shall support a minimum of two languages Hindi and English.
8. The Video client viewer shall by default, support English with a fully localized help system in Arabic, Danish, Dutch, French, German, Italian, Japanese, Polish, Russian and Spanish.
9. The Video client viewer shall support the use of standard PTZ controllers or three-axis USB joysticks for the control of pan, tilt, zoom and auxiliary camera functions.
10. For the efficient review of recorded video, the Video client viewer shall support the use of multimedia control devices that are capable of emulating keystrokes.
11. The Video client viewer shall support the use of keyboard shortcuts for control of standard features.
12. The Video client viewer shall have the following two-way audio functions:
    - The Video client viewer shall allow an operator to play live audio from a camera's microphone and play back recorded audio.
    - The Video client viewer shall allow an operator to export incoming audio from a camera's microphone together with video in the native database format or as an AVI file.
    - The operator shall have a "press to talk" option which shall send the microphone input from the operator out to one IP device enabled speaker, or to all of them.
    - Each camera view item shall use the default assigned microphone and speaker, but the operator shall have the ability to select other audio devices or to let the same speaker follow the operator when choosing other views.
13. The operator shall have the ability to use digital zoom where the zooming is performed in the image only. This functionality shall be the default for fixed cameras.
14. The Video client viewer shall be equipped with a context-sensitive help system that covers the full Video client viewer functionality for operators to instantly get help on a certain topic.

15. The Live tab shall allow the user to trigger manual events, control outputs, select audio inputs, and control PTZ cameras.

16. The Video client viewer shall support the following multiple viewing options:

    - Floating Window – Allows the selected view to be duplicated as a new floating view which may be moved to other connected monitors by dragging the image.
    - Send view to a primary monitor (a full-screen view on a PC's main monitor), or secondary monitor (a full-screen view on another monitor).
    - Create views of up to 100 cameras
    - Carousel – The Carousel feature shall allow the sequencing display of cameras in a view window. Multiple carousels may be defined to allow all view windows to display sequences of cameras. The operator shall have the ability to select the default display time or to enter a custom display time for each camera in the carousel. From inside the camera view the operator shall have the option to manually switch to the next or previous camera in the carousel camera list as well as pausing at the current camera. When switching from one camera to the next the transition phase shall be completely smooth without any delay.
    - Static Image – The Static Image feature shall allow any position of a view to be used for displaying maps or other images of interest to the user.
    - Matrix Window – A window that is used to display cameras on demand or by an external event.
    - Dynamic Actions – The operator shall be able to assign outputs, PTZ presets, events, and views as actions to joystick buttons and as keyboard shortcuts. The actions shall be ordered in categories to optimize the ease of use.

17. HTML Page – The HTML Page feature shall allow for several navigation functions within the Video client viewer including.

    - Allow web pages to be opened in Video client viewer views.
    - Switching between views by clicking on a text description of the view in the HTML Page. For example; "Go to Shared Group 1 View 1"

- Switching between different views by clicking on an interactive map area. For example; a site or building floor plan with interactive colored zones inserted as a HTML page would allow the user to switch views to a camera displaying images of the specific part of the site or building.
- Allowing maps to be created from standard image files (MJPEG, GIF, TIF, etc.).
- Allowing HTML scripting for use in creating buttons for view navigation.

18. The Video client viewer shall allow the user to select events and manually trigger the selected event to occur. The event window shall list all events grouped by server and camera/device that the event is associated with.
19. The Video client viewer shall allow actions to be taken with a specific camera by right-clicking on the camera's live video window. The actions for a specific camera shall be:
    - Start/stop recording for a predefined period in minutes – This action shall force the system to record, or stop recording live video, regardless of settings. The predefined period to start/stop recording shall be configurable by the Administrator.
    - Copy – This action will copy a current live image from the camera to the PC clipboard.
    - Camera – This action will present a menu of available cameras and will allow the user to select a different camera for the given live view position in the live view user interface.
    - Sound Notification – This action will allow the toggling of <mute> and <unmute> of a sound notification upon an event or detected motion.
    - PTZ Presets – This action will allow the selection of a preset from a list of presets assigned to the specific camera.
    - Matrix – This action will force a manual trigger of the live video feed to a Matrix Monitor recipient.
    - Send Camera – This action will send the camera's video to a specific position within the live view user interface.
20. The Video client viewer shall feature an Output Control user interface to allow the user to manually activate an external output port on a device. The user interface shall list all selectable outputs grouped by server and camera/device that the output is attached to.

21. The Video client viewer shall allow the user to control a PTZ camera within each displayed view, provided that the user has been granted the proper privileges by the Administrator. Depending on camera capabilities / camera model the typical method for controlling the PTZ functions is as follows: when the mouse cursor is placed on the video image the cursor pointer shall automatically change to a crosshair indicating the camera has PTZ capabilities. Re-centering the camera's field-of-view shall be accomplished by left clicking the crosshair on the area of interest within the image. Controlling the zoom function shall be accomplished by holding down the left mouse button and selecting a percent zoom from a scale of 0% to 100% or by use of the mouse wheel.
22. Additional control feature for cameras (device dependent) includes the ability to draw a rectangle around the area of interest to zoom the camera in for closer examination. The size of the rectangle shall be proportionate to the level of zoom, i.e., the smaller the rectangle the greater the zoom level achieved.
23. The Video client viewer shall feature a PTZ controls rendered on the user interface that provides eight directional and home positions.
    - The PTZ controls shall provide a digital zoom feature for the user to digitally zoom in on the displayed image without affecting the recording or the display of the camera on other Video client viewer applications.
    - An overview image in the view shall display the normal field-of-view and the digital zoom area in a highlighted box to provide the user with spatial awareness.
    - The PTZ control window shall allow the user to select pre-defined presets for PTZ cameras and thus move the selected camera to the preset.
24. The system shall allow for live or playback video to switch to full quality for a selected camera when the camera's view is maximized unless "Keep when maximized" is selected and the stored camera settings are not set to full quality settings. If "Keep when maximized" is selected, the quality settings for the camera that are stored in the system will be used.
25. The Browse tab shall display motion activated sequences for the selected camera in a drop down menu. Each sequence shall be represented by a line with the date, start time and duration. A drop down preview screen shall allow the user to view the recorded sequence.
26. The Browse tab shall display Alerts defined as bookmarked events in the System Manager.

4.4.11 Central Alarm Management Module

1. The alarm management module shall allow for continuous monitoring of the operational status and event-triggered alarms from servers, cameras and other devices. The alarm management module shall provide a real-time overview of alarm status or technical problems while allowing for immediate visual verification and troubleshooting.
2. The alarm management module shall provide interface and navigational tools through the client including:
   - Graphical overview of the operational status and alarms from servers, network cameras and external devices including motion detectors and access control systems.
   - Intuitive navigation using a map-based, hierarchical structure with hyperlinks to other maps, servers and devices or through a tree-view format.

4.4.12 Specification of the Servers for Video Management

Item	Feature description
Processors	Each server shall have a minimum of two (2) Intel E5-2600 series CPUs and supports the Intel E5-2690 2.90 GHz 135 W CPU
Storage	The server should have up to 12 front-accessible, hot-swappable, SAS or SATA drives
	The Server RAID controller should support the following configurations RAID 0, 1, 5, 6
	Should support a write cache of 1 GB for the storage controller
	Support for a battery back write cache for the storage controller
Memory	Should have at least 24 DIMM slots for up to 768 GB of DDR3 memory using 32 GB DIMMs
	Support for advanced memory redundant technologies like Advanced error-correcting code (ECC) and memory mirroring
Network	Should have 4 * 1 GbE LAN on Motherboard (LOM) for network connectivity
Ports	Should have the following ports for server connectivity 1 serial port, 2 USB ports, 1 VGA video port
Others	Supports hot swappable redundant fans
	Supports hot swappable redundant power supplies
Environmental	Operating Temperature support from 41 to 104°F (5 to 40°C) and Non-operating Temperature from -40 to 149°F (-40 to 65°C)

Item	Feature description
	Operating Humidity from 10 to 90% noncondensing
	Operating Altitude from 0 to 10,000 ft (0 to 3000m) and Non-operating Altitude upto 40,000 ft (12,000m)

4.4.13 Firewall Specifications

Hardware Architecture
The appliance based security platform should be capable of providing firewall / IPS /Botnet and VPN (IPSec and SSL(IPSec and SSL (internally/externally)) functionality simultaneously from day one
The appliance should support atleast 6 Gigabit copper Interfaces & should support additional scalability of 6 Gigabit interfaces copper & Fibre
The appliance should support at least one 10/100/1000 dedicated management interfaces to configure/manage the firewall policies, perform image upgrades even in case of failure of the data interfaces. Data ports should not be used for management purpose
The appliance hardware should be a multicore CPU architecture with a hardened 64 bit operating system to support higher memory
Firewall should support adequate memory or more to support additional services
Firewall should support integrated IPS functionality for threat prevention
Proposed Firewall should not be proprietary ASIC based in nature & should be open architecture based on multi-core CPU's to protect & scale against dynamic latest security threats.
Performance & Scalability
Firewall should support at least 600 Mbps of Multi-protocol real-world throughput based on protocols like HTTP, SMTP, FTP, IMAP (Only UDP based performance nos. will not be considered)
Firewall should support at least 400 Mbps of combined Firewall & IPS throughput (IPS is not required from day 1)
Firewall should support at least 250 IPSec/SSL (internally/externally) concurrent VPN peers
Firewall should support at least 200,000 concurrent sessions
Firewall should support at least 15,000 new connections per second
Firewall should support processing at least 500,000 64 byte packets per second
Firewall should support at least 100 VLANs & have support for at least 5 virtual firewalls for network segmentation with scalability
Firewall should support Jumbo Frames up to 9216 bytes
Firewall Features
Firewall should support IPv4 & IPv6 dual stack functionality to be able to use IPv4 & IPv6 simultaneously
Firewall should support creating access-rules with IPv4 & IPv6 objects simultaneously eg: IPv4 source & IPv6 destination

Firewall should support operating in routed & transparent mode
In transparent mode firewall should support ARP-inspection to prevent spoofing at Layer-2
Failover function should ensure that the routes learned via dynamic routing protocols are maintained in the standby unit as well
Firewall should support failover of IPv4 & IPv6 sessions
Firewall should replicate NAT translations, TCP,UDP connection states, ARP table, HTTP connection states, ISAKMP &IPSec SA's, SIP signalling sessions
Firewall should provide application inspection for DNS, FTP, HTTP, SMTP,ESMTP, LDAP, MGCP, RTSP, SIP, SQLNET, TFTP, H.323, SNMP
Firewall should provide IPv6 application inspection for DNS, FTP, HTTP, SIP, SMTP & IPv6
Firewall should support DoS protection functionalities
Firewall should support setting connection limits based on max embryonic-connections, per-client embryonic connections, per-client max connections, setting embryonic connection timeouts & idle-timeouts. These settings should be applicable on web servers & clients.
Firewall should be able to create access policies based on the User/group info from the directory services either through clientless or agent based mechanism.
Firewall should support static NAT, PAT, dynamic NAT, PAT & destination based NAT
Firewall should support integration with RADIUS, TACACS+, RSA, LDAP v3 Directory servers, NT server & Local Database
High-Availability Features
Firewall should support state full failover of sessions in Active/Standby & Active/Active mode
Firewall should support port aggregation functionality for the failover control
Firewall should support the functionality for allowing Asymmetrically Routed Packets in active/active mode
Firewall should support redundant interfaces to provide interface level redundancy before device failover
Firewall should support 802.3ad port aggregation functionality to increase the bandwidth for a segment.
Firewall should support state full failover of NAT translations, TCP & UDP connections, ISAKMP &IPSec SA's & SIP Signalling sessions
VPN Features
Firewall should support IPSec& SSL Client (externally/internally) based VPN from day one.
Firewall should support Cryptography Suites/algorithms for enhanced VPN security.
Firewall should support latest IKEv2 standards for supporting SHA-2 256, 384 & 512 bit message integrity algorithms in hardware to ensure there is no performance bottleneck & higher security.
Should support pre-shared keys & Digital Certificates for VPN peer authentication
Should support perfect forward secrecy & dead peer detection functionality

Routing Features
Firewall should support IPv4 & IPv6 static routing, RIP, OSPF v2 & v3
Firewall should support PIM multicast routing
Should support state full failover for OSPFv3
Firewall should support SLA monitoring for static routes
Management Capabilities
Firewall should support management of firewall policies via CLI, Telnet, SSH & inbuilt GUI management interface.
Firewall should support syslog with the functionality of sending syslogs messages via email to different teams based on syslog severity
Firewall should support sending syslogs over TCP with the capability to block new connections in case the syslog server is down
Firewall should support the function of sending syslogs in a encrypted format using SSL/TLS
Firewall should support SNMP logging & specify which messages are to be sent to SNMP servers
Firewall should support rate-limiting of syslog messages to avoid DoS attacks on the firewall
Firewall should support Net flow /flow to provide detailed flow information about the connections
Firewall should support SNMP v1,2c & 3 simultaneously
Firewall should support the functionality of identifying issues quickly with continuous monitoring & providing notifications of potential problems in which a service request has been raised with all diagnostic data attached.
Firewall should support the functionality to automatically generate service request with the OEM support centre, route it to the appropriate support team which provides detailed diagnostic information to speed up problem resolution.
Firewall GUI management interface should support backing up & restoring configurations
Firewall GUI should support inbuilt function to simulate network traffic to check firewall rules & for troubleshooting network access issues
Firewall should support packet capturing functionality to send the packet capture to ethereal/wireshark for detailed packet analysis
Firewall should support the functionality of Auto-Update to check for latest software versions & download the same & replicate the image to the standby unit

5 Bill of Quantities

5.1 Adaptive Traffic Light System

Sl. No.	Description of Item (with brief specification)	Unit	Quantity	Rate
1	2	3	4	5
1	Supply of power supply box 600mm X 400mm X 300mm UPS (HXWXD), with canopy made in welded construction of M.S which also houses the UPS and base frame	Nos.	6	
2	Supply of Type 4 controller (13-16 phases) with controller cabinet. Provide red lamp monitoring, ATC (outstation modem) interface with optical fibre cables, Cable-less Linking facility etc.	Nos.	6	
3	Installation, testing and commissioning of all types of ATC controller	Nos.	6	
4	Sealing of controller with bitumen / foam for achieving IP 55 protection.	Nos.	6	
5	Supply of single120mm (OD)/100 mm (ID) double walled corrugated High Density Poly Ethylene (HDPE) Pipes conforming to the IS 14930 (Part-II) including supply of necessary sockets, couplings etc.	mtrs	2055	
6	Laying of single 120mm (OD)/ 100 mm (ID) double walled corrugated High Density Poly Ethylene (HDPE) Pipes including pull wire along with necessary sockets, couplings etc.	mtrs	2055	
7	Supply of single 50 mm (OD)/ 37 mm (ID) double walled corrugated High Density Poly Ethylene (HDPE) Pipes conforming to the IS 14930 (Part-II) including supply of necessary sockets, couplings etc.	mtrs	795	
8	Laying 50 mm (OD)/ 37mm (ID) double walled corrugated High Density Poly Ethylene (HDPE) Pipes including pull wire along with necessary sockets, couplings etc.	mtrs	795	

9	Supply and installation of fabricated Pre-cast concrete chamber of M20 cc grade, type 450mm inner by 600mm deep .	Nos	66	
10	Supply of FRP chamber cover with frame 510mm (L)X510mm (B) X 35mm thick as per EN 124 grade B to take load 12.5 MT	Nos.	66	
11	Supply and installation of M.S. chamber cover frame to accommodate the chamber cover of size 510mm (L)X 510mm (B) X 35mm thick	Nos.	66	
12	Supply of Polycarbonate LED Signal head housing 300 mm dia. along with brackets & accessories etc.	Nos.	468	
13	Supply of 300 mm dia – single source – LED retrofit - Red (Blow) EN-12368 as per Specification	Nos.	90	
14	Supply of 300 mm dia – single source – LED retrofit - Amber (Blow) EN-12368 as per Specification	Nos.	90	
15	Supply of 300 mm dia – single source – LED retrofit - Green (arrow/U- Turn) EN-12368 as per Specification	Nos.	192	
16	Supply of 300 mm dia – single source – LED retrofit - Red (ped. standing) EN-12368 as per Specification	Nos.	48	
17	Supply of 300 mm dia – single source – LED retrofit - Green (ped.walking) EN-12368 as per Specification	Nos.	48	
18	Installation of Polycarbonate LED Signal aspect of 300 mm dia. On standard traffic signal straight pole	Nos.	90	
19	Installation of Polycarbonate LED Signal aspect of 300 mm dia. On standard traffic signal cantilever pole	Nos.	45	
20	Supply of Galvanized Iron Class B Traffic Signal straight pole of 6 mtr height as per Specification	Nos.	45	
21	Supply of Galvanized Iron Class B Traffic Signal cantilever pole of as per Specification	Nos.	23	

22	Supply of following 650/1100 volt grade PVC insulated PVC sheathed ulticore copper conductor armored cables as per specification & IS 1554 part I in existing trenches, ducts, GI pipes - 1 Sq.mm. 8 core copper conductor	mtrs	1999.5	
23	Supply of following 650/1100 volt grade PVC insulated PVC sheathed ulticore copper conductor armored cables as per specification & IS 1554 part I in existing trenches, ducts, GI pipes - 1 Sq.mm. 16 core copper conductor	mtrs	4326	
24	Supply of following 650/1100 volt grade PVC insulated PVC sheathed multicore copper conductor armored CAT 6 cables	mtrs	2487	
25	Supply of following 650/1100 volt grade PVC insulated PVC sheathed ulticore copper conductor armoured cables as per specification & IS 1554 part I in existing trenches, ducts, GI pipes - 2.5 Sq.mm. 3 core copper conductor	mtrs	705	
26	Supply of 1 Sq mm 3 core Flexible wire for connecting LED aspects fixed on each pole to the connectors in that Pole	mtrs	300	
27	Supply of 1 Sq mm 6 core Flexible wire for connecting Multiple LED aspects fixed on each pole to the connectors in that Pole	mtrs	300	
28	Laying of signal cables (all types including communication cables with multipairs as described above) in trenches, existing ducts / G.I. Pipes including ferruling, testing etc. but excluding any cable joint, excavation etc.	mtrs	9517.5	
29	Supply of Brass Gland (20 MM S Gland) for attaching and securing the end of 4 Core & 8 core power cables to the controller	Nos	90	
30	Supply of Brass Gland (25 MM B Gland) for attaching and securing the end of 16 core power cables to the controller	Nos	90	
31	Camera for Vehicle detection system, Traficam Wide Angle Lens Camera for Vehicle detection system, Black & White	Nos.	20	

32	Interface card for detection camera 4TI - 16 outputs	Nos.	6	
33	Ethernet interface for detection camera	Nos.	6	
34	Power Supply Unit for detection camera system	Nos.	6	
35	Supply of cable jointing Kit and joining of 1.5 Sq.mm. 2 Pair copper conductor cable (IP68 Enclosure)	Nos.	19	
	TOTAL			

5.2 Cost for Civil Work for Adaptive Traffic System

Sl. No.	Description of Item (with brief specification)	Unit	Quantity	Rate
1	Construction of signal controller foundation upto 600mm height above ground level and 600 mm below ground level on C.C. M20 grade pedestal, having size (LXBXH) with fixing of SS304 nut bolts for controller cabinet & Power supply box cabinet	Nos.	6	
2	HDD Trenching by trenchless technology of 120mm for laying of DWC HDPE 120 MM pipe	mtrs	1125	
3	Excavation of trench for traffic signals and VMS boards cables and conduiting as per requirement of the signal junction up to the depth of 600mm below the ground surface and width 500mm in the footpath/soft soil including refilling of the trench in footpath and removal of debris	Cum	210	
4	Excavate and install pre-cast chamber of 450 mm dia ID by 600 mm deep to tie into proposed 100mm duct in footway. Including backfilling of material	Nos	66	

5	Excavate and install brick built sectional chamber type "3B". Chamber to be 650mm by 650mm by 600mm deep to tie into proposed 100mm ducts in footway (cariage way). Including backfilling of material with RCC cover and MS frame	Nos.	11	
6	Supply and installation of febricated Pre-cast concrete chamber of M20 cc grade, type 1000mm inner by 800mm deep .	Per Nos	6	
7	Erecting straight pole in pole foundation of concrete M20 grade circular in hape of depth 1.3m below and/or above ground level having dia. Of 300mm only, as per technical specification.	Nos.	45	
8	Erecting cantilever pole in pole foundation of concrete M20 grade circular in shape of depth 1.3m below and/or above ground level having dia. Of 450mm only, as per technical specification.	Nos.	23	
	TOTAL			

5.3 Cost components for CCTV

Sl. No.	Description of Item (with brief specification)	Unit	Quantity	Rate
1	Supply Installation, testing and commissioning of Outdoor, Colour Pan Tilt Zoom Integrated Dome Network Camera. Including master recorder software, camera review licence and per camera licence required including extension arm wherever required.	Nos.	6	
2	Supply Installation, testing and commissioning of Outdoor, Colour 3 MP camera including master recorder software, camera review licence and per camera licence required including extension arm wherever required	Nos.	20	
3	Junction box IP66 compliant with accessories	Nos.	6	
4	UPS 2 KVA & 4 hr battery Back	Nos.	6	

5	Supply of Armoured Single Mode Optical Fibre Cable – 4 core	mtrs	2175	
6	Distribution Switch for CCTV	Nos.	6	
7	Supply of following 650/1100 volt grade PVC insulated PVC sheathed ulticore copper conductor armoured cables as per specification & IS 1554 part I in existing trenches, ducts, GI pipes - 2.5 Sq.mm. 3 core copper conductor	mtrs	600	
8	Laying of signal cables (all types including communication cables with multipairs as described above) in trenches, existing ducts / G.I. Pipes including ferruling, testing etc. but excluding any cable joint, excavation etc.	mtrs	2775	
9	Supply of Camera support mounting bracket for fixed camera	Nos.	20	
10	Patch chord fiber	Nos.	45	
11	Media Converter to connect the Ethernet interface of the cameras to the OFC	Nos.	45	
12	Power supply box for cameras and other CCTV equipments	Nos.	23	
13	Splicing termination	Nos.	9	
	TOTAL			

5.4 Cost components for Control Room

Sl. No.	Description of Item (with brief specification)	Unit	Quantity	Rate
1	Supply, installation & commissioning of Server including the Operating system for Adaptive system as per the specification mention above	Nos.	1	
2	Supply, installation & commissioning of Server including the Operating system for CCTV as per the specification mention above	Nos.	1	
3	Supply, installation & commissioning of Storage NAS as per specification mention above	Nos.	1	

4	Supply, installation & commissioning of Video Management System for monitoring and recording with necessary hardware with adequate licences for recording & reviewing.	Sets	1	
5	Supply, installation of Workstations as per specification mentioned above Specification including PTZ Keyboard/ joystick	Nos.	6	
6	Supply, installation, testing and commissioning of 15 kVA (1+1) UPS along with batteries providing 2 hr Total back up including MS powder quoted battery rack	Nos.	1	
7	Soundless 20 KVA Genset as per the specification mention above	Nos.	1	
8	Supply of a Fully Adaptive Traffic Control System capable of running 500 nodes with proper interface with transmission equipment including modems sufficient to meet the requirement	Nos.	1	
9	Creation and Input of ATC System graphical displays	Nos	1	
10	FLUX , 1 server license of the Traficon Management Software	Nos.	1	
11	Other networking equipment for interconnections with the onsite equipments such as Rack 42U for mounting servers, Network caballing cat 6 (LAN) with IOs, Patch panel	Sets	1	
12	Core Network Switches as per specification mention in RFP	Nos	2	
13	Firewall as per specification mention above	Nos	1	
14	55” LED Commercial LED Display	Nos	6	
15	NMS software With Hardware for monitoring of 100 devices	Nos	100	
16	Installation & Commissioning Charges of Control Room	Lumpsum	1	
	TOTAL			

5.5 Point-to-Point connectivity between Traffic junction & Control room

Sl. No.	Description of Item (with brief specification)	Unit	Quantity	Rate
1	Supply of Single wall HDPE Pipe - OD 40mm & ID 33mm HDPE pipe of PE80 grade on IS 4984 & BS – 6437 with proper marking/printed of standard over pipe in single colour	mtrs	15000	
2	Laying of Single wall HDPE Pipe - OD 40mm & ID 33mm HDPE pipe of PE80 grade on IS 4984 & BS – 6437 with proper marking/printed of standard over pipe in single colour	mtrs	15000	
3	Supply of Armoured Single Mode Optical Fibre Cable – 12 Core – Outdoor Underground application	mtrs	15000	
4	Laying of Armoured Single Mode Optical Fibre Cable – 12 Core – Outdoor Underground application	mtrs	15000	
5	Supply of Pre-cast sectional chamber . Chamber to be 600mm by 650mm by 600mm deep with Iron Frame of 75mm thickness.	Nos	37	
6	Excavate and install pre-cast sectional chamber . Chamber to be 600mm by 650mm by 600mm deep with Iron Frame of 75mm thickness.	Nos	37	
7	Supply of RCC Frame Cover with Iron frame of 75mm thickness to be fixed on 600mm by 650mm Pre-cast Chamber	Nos	37	
8	Installation of RCC Frame Cover with Iron frame of 75mm thickness on 600mm by 650mm Pre-cast Chamber	Nos	37	
9	Excavate and install Brick Chamber 650 x 650 mm -and supply of Iron Chamber cover - 2 Inches and installation of the brick chamber cover	Nos	3	
10	Excavate and install Brick Chamber 650 x 650 mm -and supply of Iron Chamber cover - 4 Inches and installation of the brick chamber cover	Nos	3	

	TOTAL

5.6 AMC & Operation Cost

Sl. No.	Description of Item (with brief specification)	Unit	Quantity	Rate
1	AMC of Equipments of 1st Year	Lumpsum	1	
2	AMC of Equipments of 2nd year	Lumpsum	1	
3	AMC of Equipments of 3rd year	Lumpsum	1	
4	Project Manager 1 PM for 36 month	Per Man Month	36	
5	System Engineer • 1 SE in day shift for 36 months • 1 SE each in night for 36 months	Per Man Month	120	
	TOTAL			

5.7 Commercial Quote

Sl. No.	Description	Total Project Cost for Three Years (INR) (Inclusive of all taxes and expenditures)
1.	Adaptive Traffic Light System	
2.	Cost for Civil Work for Adaptive Traffic System	
3.	Cost components for CCTV	
4.	Cost components for Control Room	
5.	Point-to-Point connectivity between Traffic junction & Control room	
6.	AMC & Operational Cost	
	Total Amount (Rs.)	

Annexure – 1: Profile of the company

The Bidder should furnish the following details to be pre-qualified for the commercial bid opening.

Sr.No.	Details	Remarks
1	Name of the organization and year of incorporation.	
2	Nature of organization	
3	Address of the Registered office of Bidder with phone and Fax number.	
4	Sales Tax registration No. TIN / VAT CST	
5	Income Tax clearance certificate (Latest to be enclosed)	
6	Audited Balance sheet and Income statements of the just concluded year and the previous three years (Details relating to the sales made on similar system should be furnished separately)	
7	Project officer who will be handling the above project. (Name, qualification and experience and Contact phone number)	
8	Details of qualified Technical personnel available for Installation, commissioning and maintaining the project	

9	Name of the Government agencies and other organisations, to whom the supply installation and commissioning of similar systems were made in the preceding three years (enclose copy of purchase orders and other documents	
10	Details of service centre in Sasaram or nearest location (Full address with Phone and Fax No.)	

Note: All the details above with supporting documents must be provided by the Bidder.

I/We, hereby declare that the particulars furnished by us in this offer are true to the best of my/our knowledge and we understand and accept that, if at any stage the information furnished are found to be incorrect or false, we are liable for disqualification from this tender and also liable for any penal action that may arise due to the above.

Name:

Designation:

Signature:

Seal of the Bidder:

Date:

Place:

Annexure-2: The tentative list of locations at which traffic light system needs to be installed

S. No	Place Name	Galvanised Iron Class B Traffic Signal cantilever pole	Galvanised Iron Class B Traffic Signal straight pole of 6 mtr height
1	Dharmshala Chowk / Gandhi Chowk	23	45
2	Post Office Chauwk/Golambar		
3	Bauliya More/ Jagdeo Marg Chowk		
4	Kargahar More / Majar More		
5	Prabhakar Chowk		
6	Circuit House More		

Annexure- 3: Qualification of PMU team

Project Manager

Qualifications

- B.E./B.Tech./MCA from a premier institute with Project management qualification(PMP)
- More than 8 years of experience in Implementation of large scale IT/e-Governance projects; at least 1 in the role of a Project Manager

Experience Requirements

- Should have experience in monitoring large IT/e-Governance projects (to the tune of Min. Rs. 5 Crores)
- Should have experience of working on e-Government Projects, preferably in Bihar
- Should have relevant technical and managerial experience and relevant certifications in design and monitoring of large-scale IT/e-Governance projects
- Should have experience in program management involving extensive communication with stakeholders in a coordinated fashion for the implementation of a project/program.
- Should have relevant experience in Problem Identification, Cause Analysis, Reporting and Escalation
- Should have experience in Project Planning and Implementation, evaluation and assessment of Project plans including ability to anticipate and address the project risks
- Should have ability to lead, motivate and direct the team to achieve the business objectives.
- Should have excellent oral & written communication skills.

System Engineer

Qualifications

- B.E./B.Tech./MCA
- More than 2 years of experience in implementation of large scale IT/e- Governance projects
- Should have experience in monitoring large IT/e-Governance projects (To the tune of Rs. 1 Crores and above)
- Should have experience of working on Government Projects, preferably in Bihar Should have experience in programs involving extensive communication and coordination with stakeholders in a coordinated fashion for the implementation of a large- scale project/program.
- Should have experience in Project Planning and Implementation, evaluation and assessment of Project plans including ability to anticipate and address the project risks

- Should have excellent oral & written communication skills
- Should have excellent documentation skills.

Annexure –4: Provisioning of usage of existing tower infrastructure

To enhance security of citizens of Sasaram and protect vital assets of the city and also to reduce wait time for citizens for getting help during emergency, a project was envisaged by the BUIDCo which had ensure highly effective police operations with accurate flow of information and communication.

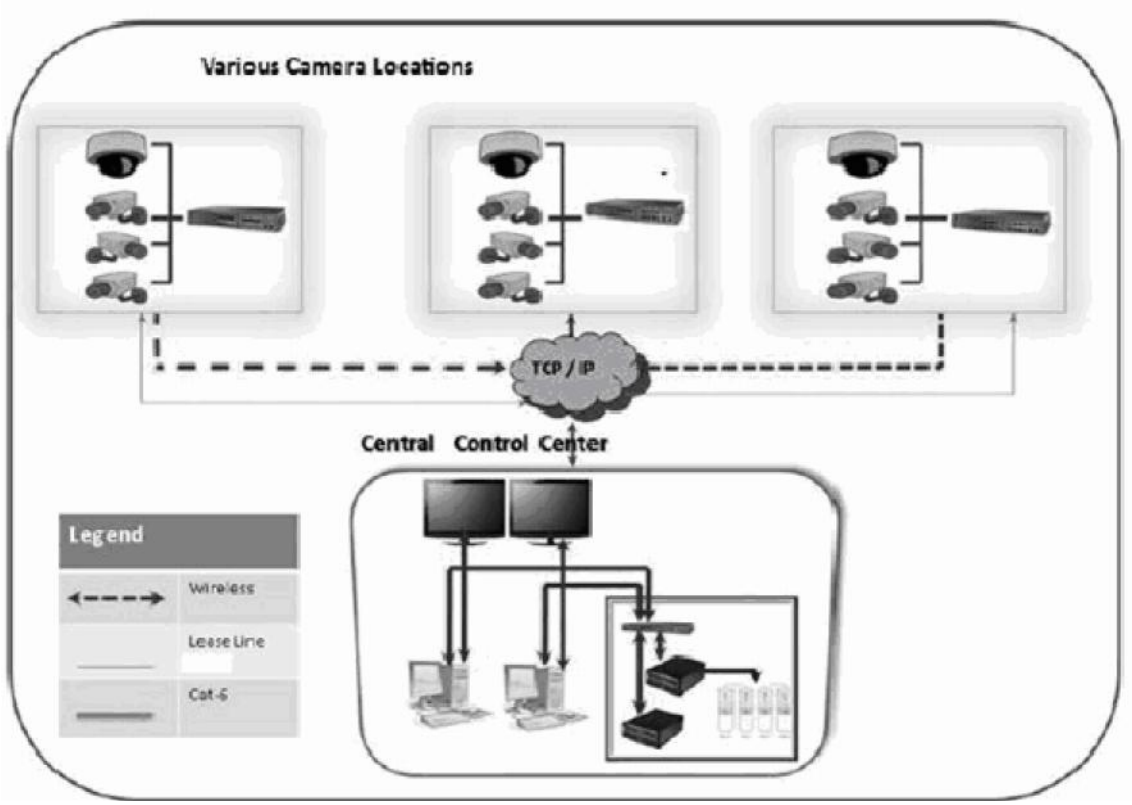
The project "IT based City Surveillance & Dial 100 for Vehicle Tracking for Emergency Response System" was conceived and implemented by BUIDCo with the help of Police BUIDCo. For the purpose, state-of-the art 30 sweater control room operations for Sasaram Police is being developed and made operational for smooth execution using wi-fi/ RF-radio technology.

Apart from that, survey was executed by the selected bidder in the guidance of Police BUIDCo and BUIDCo for identification of sites for installing of tower and creating clustering for surrounding locations. In this regard, locations across the city were identified for this purpose and are being used for mounting of CPE (Customer premises equipment). Further these CPE is connected to control room tower (Back haul). List of CPE locations is tabled below:

S No	Location
1	Central BTS--- SP Office, Sasaram
2	Police Wireless BTS: SP office, Sasaram

After the award of the bid, bidder had visited sites and finalized bill of material and quantities as per feasibility in order to provide the solution. The solution is design as such than there are central towers which cuts across the city and through these central towers various field towers are connected through RF Connectivity. In consequence to this, these central towers/sites are further integrated to Control room via, Leased line. The entire established tower infrastructure is the property of the BUIDCo and can be utlised for implementing this project "Traffic Light System".

Below is the Network Diagram for the same.



For the execution of the Traffic Light System project, the selected bidder is required to conduct the Site Survey along with RF Planning and Network design. Bidder will decised the capacity, configuration and quantity of the radio equipments which needs to be mounted at Back hole and CPE Towers to meet the requirement of project for the purpose of seamless integration across the city.

Annexure 5: Non – Disclosure Agreement (NDA):

WHEREAS

The BUIDCo here in after called the "Purchaser" has issued a public notice inviting various organizations to propose for hiring services of an organization for provision of services under the Traffic Lights & surveillance Project (hereinafter called the "Project") of the Purchaser; The Bidder, having represented to the "Purchaser" that it is interested to bid for the proposed Project, The Purchaser and the Bidder agree as follows:

1. In connection with the "Project", the Purchaser agrees to provide to the Bidder a Detailed Document on the Project vide the Request for Proposal. The Request for Proposal contains details and information of the Purchaser operations that are considered confidential.
2. The Bidder to whom this Information (Request for Proposal) is disclosed shall:

a. Hold such Information in confidence with the same degree of care with which the Bidder protects its own confidential and proprietary information;
b. Restrict disclosure of the Information solely to its employees, agents and contractors with a need to know such Information and advise those persons of their obligations hereunder with respect to such Information.
c. Use the Information only as needed for the purpose of bidding for the Project.
d. Except for the purpose of bidding for the Project, not copy or otherwise duplicate such Information or knowingly allow anyone else to copy or otherwise duplicate such Information.
e. Undertake to document the number of copies it makes.
f. On completion of the bidding process and in case unsuccessful, promptly return to the Purchaser, all Information in a tangible form or certify to the Purchaser that it has destroyed such Information.

3. The Bidder shall have no obligation to preserve the confidential or proprietary nature of any Information which:

a) Was previously known to the Bidder free of any obligation to keep it confidential at the time of its disclosure as evidenced by the Bidder's written records prepared prior to such disclosure;

or

b) Is or becomes publicly known through no wrongful act of the Bidder;

or

c) Is independently developed by an employee, agent, or contractor of the Bidder not associated with the Project and who did not have any direct or indirect access to the Information.

4. The Agreement shall apply to all Information relating to the Project disclosed by the Purchaser to the Bidder under this Agreement.

- 5. The Purchaser will have the right to obtain an immediate injunction enjoining any breach of this Agreement, as well as the right to pursue any and all other rights and remedies available at law or in equity for such a breach.

6. Nothing contained in this Agreement shall be construed as granting or conferring rights of license or otherwise, to the bidder, in any of the Information. Notwithstanding the disclosure of any Information by the Purchaser to the Bidder, the Purchaser shall retain title and all intellectual property and proprietary rights in the Information. No license under any trademark, patent or copyright, or application for same that are now or thereafter may be obtained by such party is either granted or implied by the conveying of Information. The Bidder shall not alter or obliterate any trademark, trademark notice, copyright notice, confidentiality notice or any notice of any other proprietary right of the Purchaser on any copy of the Information, and shall reproduce any such mark or notice on all copies of such Information.

7. This Agreement shall be effective from the date the last signature is affixed to this Agreement and shall continue in perpetuity.

8. Upon written demand of the Purchaser, the Bidder shall

a) cease using the Information,

b) return the Information and all copies, notes or extracts thereof to the Purchaser forthwith after receipt of notice, and

c) upon request of the Purchaser, certify in writing that the Bidder has complied with the obligations set forth in this paragraph.

9. This Agreement constitutes the entire agreement between the parties relating to the matters discussed herein and supersedes any and all prior oral discussions and/or written correspondence or agreements between the parties. This Agreement may be amended or modified only with the mutual written consent of the parties. Neither this Agreement nor any right granted hereunder shall be assignable or otherwise transferable.

10. Confidential Information is provided "As Is" with all faults. In no event shall the Purchaser be liable for the accuracy or completeness of the confidential information.

11. This Agreement shall benefit and be binding upon the Purchaser and the Bidder and their respective subsidiaries, affiliate, successors and assigns.

12. This Agreement shall be governed by and construed in accordance with the Indian laws. For and on behalf of the Bidder

Date_____

Signature_____

Name & Designation_____

Name and Address of Company_____

Seal / Stamp of Company_____

Annexure6: Performance Security Bank Guarantee format

To,

Managing Director,

BUIDCo

Patna (Bihar)

Place: _____

Bank Guarantee No.:_____

Amount of Bank Guarantee: Rs._____(Rs. in Words_____)

Bank Guarantee valid from:_____

Last Date for Lodgment of Claim: _____

This Deed of Guarantee executed by the _____(Bank) having Registered Office at_____ and local office at_____(hereinafter called " the Bank") in favour of The Managing Director, BUIDCo, Patna for BUIDCo can amount not exceeding Rs._____ (Rs. In words_____ only) at the request of M/s_____ having their Registered office at_____ (hereinafter called the SI) to whom work order no. _____dated_____ amounting to Rs._____(Rs. In words_____ only) is given by Managing Director, BUIDCoBUIDCo, in respect of which this Bank guarantee is being submitted as security to complete the work and provide the services within stipulated time.

The bank do hereby undertake to pay to the MD, BUIDCo an amount not exceeding Rs._____(Rs. In words_____ only) by reason of breach of Agreement, „Term and Conditions" as stated in Tender Document, and commitment under the scope of Work Order.

The Bank do hereby guarantee and undertake to pay to the MD, BUIDCo immediately on demand, without any reservation(s), protest, demur and without reference to any party the amount of Rs_____ (Rs. In words_____ only).

Any such demand made by the BUIDCo shall be conclusive and binding on the bank irrespective of any dispute(s) or difference(s) raised by any party.

The bank undertake to pay to MD, BUIDCo amount so demanded, notwithstanding any dispute or disputes raised by any party in any suit or proceeding pending before any Court or Tribunal relating thereto, Banks liability under this guarantee being absolute and unequivocal.

The payment so made by the bank under this bond shall be a valid discharge of liability for payment there under and the SI shall have no claim against the bank making such payment.

This Guarantee will not be discharged due to the change in the constitution of the Bank or SI. This guarantee shall be irrevocable and shall remain valid up to _____(date). The guarantee shall be extended further at the discretion of the Bank for such period as required under the instructions of the SI M/s_____, on whose behalf this guarantee is furnished.

The bank agree that the amount hereby guaranteed shall be due and payable to the BUIDCo on the bank being served a notice requiring the payment of the amount and such notice shall be deemed to have been served on the Bank by actual delivery. In order to give full effect to the provisions of this guarantee the bank hereby waives all rights inconsistent with the above provisions and which the bank might otherwise as a guarantor be entitled to claim and enforce.

We,_____(Bank) may renew the Bank Guarantee at our discretion provided the request for renewal is made by the SI before the expiry of the Bank Guarantee with the mutual consent of the Bank.

We,_____ (Bank) , lastly undertake not to revoke this guarantee during its currency except with the previous consent of the MD, BUIDCo in writing and the guarantee shall be continuous and irrevocable guarantee up to a sum of Rs._____(Rs. In words_____ only).

Not with standing anything stated hereinbefore:

1. Our liability under this guarantee is restricted to Rs._____ (Rs. In words _____only).

2. The guarantee shall remain in force till _____(date) and

3. The Bank is liable to pay the guarantee amount or any part thereof under this Bank Guarantee only if the MD, BUIDCo serves upon the Bank a written claim or demand on or before _____(date).

Please note that this Bank Guarantee automatically stand cancelled notwithstanding the fact that the original bank guarantee may not be returned to us by you after _____(date).

Witness:

1._____ Signature

Manager/ Authorized Signatory

2._____ Full Name (in Block Letters)

Designation & Signature I.D. No

Bank & Branch Address with Branch No.

Annexure 7: Undertaking on Patent Rights

(Company letterhead)

[Date]

To

Managing Director,

BUIDCo

Patna (Bihar)

Sub: Undertaking on Patent Rights

Sir,

1. I/We as Bidder / System Integrator (SI) do hereby undertake that none of the deliverables being provided by us is infringing on any patent or intellectual and industrial property rights as per the applicable laws of relevant jurisdictions having requisite competence.
2. I/We also confirm that there shall be no infringement of any patent or intellectual and industrial property rights as per the applicable laws of relevant jurisdictions having requisite competence, in respect of the equipments, systems or any part thereof to be supplied by us. We shall indemnify MD, BUIDCo against all cost/claims/legal claims/liabilities arising from third party claim in this regard at any time on account of the infringement or unauthorized use of patent or intellectual and industrial property rights of any such parties, whether such claims arise in respect of manufacture or use. Without prejudice to the aforesaid indemnity, the SI shall be responsible for the completion of the supplies including spares and uninterrupted use of the equipment and/or system or any part thereof to MD, BUIDCo and persons authorized by MD, BUIDCo, irrespective of the fact of claims of infringement of any or all the rights mentioned above.
3. If it is found that it does infringe on patent rights, I/We absolve MD, BUIDCo of any legal action.

Yours faithfully,

Date_____

Signature_____

Name & Designation_____

Name and Address of Company_____

Seal / Stamp of Company_____

Annexure 8: Non-Malicious Code Certificate

(Company letterhead)

[Date]

To

Managing Director,

BUIDCo

Patna (Bihar)

Sub: Non-Malicious Code Certificate

Sir,

1. I/We hereby certify that the software being offered / developed as part of the contract does not and will not contain any kind of malicious code that would activate procedures to:

a) Inhibit the desired and the designed function of the equipment / solution.

b) Cause damage to the user or his equipment / solution during the operational exploitation of the equipment / solution.

c) Tap information regarding network, network users and information stored on the network that is classified and / or relating to National Security, thereby contravening Official Secrets Act 1923.

1. There are / will be no Trojans, Viruses, Worms, Spy wares or any malicious software on the system and in the software offered or software that will be developed.

3. Without prejudice to any other rights and remedies available to BUIDCo, we are liable under Information Technology Act, 2000 and Indian Penal Code 1860 in case of physical damage, loss of information and those relating to copyright and Intellectual Property rights (IPRs), caused due to activation of any such malicious code in offered / developed software.

Yours faithfully,

Date_____

Signature_____

Name & Designation_____

Name and Address of Company_____

Seal / Stamp of Company_____

Annexure 9: On Pricing of Items of Technical Response

(Company letterhead)

[Date]

To

Managing Director,

BUIDCo

Patna (Bihar)

Sub: Undertaking on Clarifications sent to BUIDCo,

Sir,

I/We do hereby undertake that Commercial Proposal submitted by us is inclusive of all the items in the technical proposal and is inclusive of all the clarifications provided/may be provided by us on the technical proposal during the evaluation of the technical offer. We understand and agree that our Commercial Proposal is firm and final and that any clarifications sought by you and provided by us would not have any impact on the Commercial Proposal submitted by us.

Yours faithfully,

Date_____

Signature_____

Name & Designation_____

Name and Address of Company_____

Seal / Stamp of Company_____

Annexure 10: Undertaking on Provision for Required Storage Capacity

(Company letterhead)

[Date]

To

Managing Director,

BUIDCo

Patna (Bihar)

Sub: Undertaking on Provision for Required Storage Capacity

Sir,

1. I/We as Bidder / System Integrator do hereby undertake that the proposed storage at the Data Centre meets the minimum RFP requirements in terms of a minimum usable capacity of __TB (with __TB on FC / SAS / NLSAS/SATA or equivalent drives with storage array (FC) configured on Raid ___ configuration) on the day of commissioning the infrastructure. The same will be applicable to the Disaster Recovery Site also.
2. I/We as Bidder / System Integrator do hereby undertake that the proposed storage at the Data Centre and Disaster Recovery Site as per our sizing will be sufficient to meet the RFP requirements in terms of storing the information pertaining to total households with an average size ____ MB per household for given period as mentioned in RFP.
3. Any augmentation of the storage up to ___ TB to meet the above said requirements (Total households information for ____ EB with an average of ____ households per EB for given time as mentioned in RFP, with an average file size of ___ MB per household) will be carried out at no additional cost to BUIDCo.

Yours faithfully,

Date_____

Signature_____

Name & Designation_____

Name and Address of Company_____

Seal / Stamp of Company_____

Annexure 11: Undertaking on Compliance and Sizing of Infrastructure

(Company letterhead)

[Date]

To

Managing Director,

BUIDCo

Patna (Bihar)

Sub: Undertaking on Compliance and Sizing of Infrastructure

Sir,

1. I/We as Bidder / System Integrator do hereby undertake that we have proposed and sized the hardware and all software (including licenses) based on information provided by BUIDCo in its RFP document and in accordance with the Service Level requirements and minimum specifications provided for Software licenses, Servers, NAS Storage, Tape Library, NMS ,Enterprise Management System, Anti Virus, Backup Software and assure BUIDCo that the sizing is for all the functionality envisaged in the RFP document.
2. Any augmentation of the proposed solution or sizing of any of the proposed solutions (software, hardware,) in order to meet the minimum tender requirements and/or the requisite Service Level requirements given by BUIDCo will be carried out at no additional cost to BUIDCo.

Yours faithfully,

Date_____

Signature_____

Name & Designation_____

Name and Address of Company_____

Seal / Stamp of Company_____

Annexure 12: Undertaking on Provision of Support

(Company letterhead)

[Date]

To

Managing Director,

BUIDCo

Patna (Bihar)

Sub: Undertaking on Provision of Support for Software

Sir,

1. I/We as Bidder / System Integrator do hereby undertake the provision for ATS / Warranty support (Services as defined in the RFP) by OEM for all the primary components (Web Server, Application Server, Database and Operating System) of the Core Application Software for both State and Centre during the duration of the contract period.

2. We also undertake to provide the support needed for any 3rd party products proposed as part of Application Software during the duration of the contract period.

Yours Faithfully,

Date_____

Signature_____

Name & Designation_____

Name and Address of Company_____

Seal / Stamp of Company_____

Annexure 13: Undertaking on Service Level Compliance

(Company letterhead)

[Date]

To

Managing Director,

BUIDCo

Patna (Bihar)

Sub: Undertaking on Service Level Compliance

Sir,

1. I/We as System Integrator do hereby undertake that we shall monitor, maintain, and comply with the service levels stated in the Addendum to the RFP to provide quality service to BUIDCo.
2. However, if the proposed number of resources is found to be not sufficient in meeting the tender and/or the Service Level requirements given by BUIDCo, then we will augment the team without any additional cost to BUIDCo.

Yours faithfully,

Date_____

Signature_____

Name & Designation_____

Name and Address of Company_____

Seal / Stamp of Company_____

Annexure 14: Undertaking on Deliverables

(Company letterhead)

[Date]

To

Managing Director,

BUIDCo

Patna (Bihar)

Sub: Undertaking on Deliverables

Sir,

1. I/We as Bidder / System Integrator do hereby undertake the adherence of required Certification or above standards to the processes, deliverables/artifacts to be submitted to BUIDCo proposed as part of the **Traffic Light & Surveillance** Project.
2. We also recognize and undertake that the Deliverables/artifacts shall be presented and explained to BUIDCo and other key stakeholders (identified by BUIDCo), and also take the responsibility to provided clarifications as requested by BUIDCo.
3. We also understand that the acceptance, approval and sign-off of the deliverables by BUIDCo will be done on the advice of Core Group and/or the Technical Team and/or the consultant. We understand that while all efforts shall be made to accept and convey the acceptance of each deliverable in accordance with the project schedule, no deliverable will be considered accepted until a specific written communication to that effect is made by BUIDCo.

Yours faithfully,

Date_____

Signature_____

Name & Designation_____

Name and Address of Company_____

Seal / Stamp of Company_____

Annexure 15: Undertaking on Exit Management and Transition

(Company letterhead)

[Date]

To

Managing Director,

BUIDCo

Patna (Bihar)

Sub: Undertaking on Exit Management and Transition

Sir,

I/We hereby undertake that at the time of completion of the engagement, we shall successfully carry out the exit management and transition (to BUIDCo or to an agency identified by BUIDCo) to BUIDCo" s satisfaction.

1. I/We further undertake to complete the following as part of the Exit Management and Transition:

a. Capacity Building at Central Level in Patna

i. We undertake to design team/organization structure at BUIDCo to manage the system

ii. We undertake to carry out an analysis of the skill set requirement at BUIDCo to manage system and carry out the training & knowledge transfer required at BUIDCo to manage system

b. Transition of project artifacts and assets

i. We undertake to complete the updating of all project documents and other artifacts and handover the same to BUIDCo before transition

ii. We undertake to design Standard Operating Procedures to manage system (including application and IT systems), document the same and train BUIDCo Personnel on the same.

2. I/We also understand that the Exit Management and Transition will be considered complete on the basis of approval from BUIDCo.

Yours faithfully,

Date_____

Signature_____
Name & Designation_____

Name and Address of Company_____

Seal / Stamp of Company_____

Annexure 16: Undertaking on Changes to the Contract Clauses

(Company letterhead)

[Date]

To

Managing Director,

BUIDCo

Patna (Bihar)

Sub: Undertaking on Changes to Contract Clauses

Sir,

1. I/We as Bidder / System Integrator do hereby acknowledge that we understand that the request for changes to contract clauses and any other terms and conditions in the RFP, submitted in our proposal as per the RFP are just suggestions for change.

2. We understand that it is neither guaranteed that these requests for changes will be accepted in the final contract nor this process will be construed as any commitment from BUIDCo to consider those suggestions.

Yours faithfully,

Date_____

Signature_____

Name & Designation_____

Name and Address of Company_____

Seal / Stamp of Company_____

Annexure 17: Undertaking from OEM on Authorization of use of their OEM products

(OEM Letterhead)

[Date]

To

Managing Director,
BUIDCo,
Patna (Bihar)
Sub: Authorization to <Company name of SI> for providing our products and services.

Sir,

This is to certify that I/We am/are the Original Equipment Manufacturer in respect of the products listed below. I/We confirm that <name of SI> ("SI") have due authorization from us to bid and provide our products and services, to BUIDCo, that are listed below as per Request for Proposal (RFP) document. The -..... ("SI") is authorized for providing the Solution, Implementation, Training & Maintenance Services, Information Technology Infrastructure and System Integration Services to BUIDCo on our behalf. We further endorse the warranty, contracting and licensing terms provided by SI to BUIDCo as per RFP terms.

Sr. No.	Product Name	Remarks
1.		
2.		
3.		

We also certify that the equipment /system software provided by us are not end of life products and the maintenance support / updates / patches for the proposed products will be provided till the project period.

Yours faithfully,

Authorized Signatory_____

Name_____

Designation_____

OEM" s Company name_____
CC: System Integrator name_____

Annexure 18: Format for Self Declaration

(Company Letterhead – Submit separate declaration for consortium member, if any)

[Date]

To

Managing Director,

BUIDCo,

Patna (Bihar)

In response to the RFP No._____ dated _____ for quoting against the RFP as an authorized representative of M/s_____, I / We hereby declare that our Company / Firm _____is having unblemished past record and was not declared blacklisted or ineligible to participate for bidding during last two financial years by any State/Central Govt. or PSU due to unsatisfactory performance, breach of general or specific instructions, corrupt / fraudulent or any other unethical business practices.

Yours faithfully,

Authorized Signatory_____

Name_____

Designation_____

Company name_____

Annexure 19: Template for Pre-Bid Conference queries/Clarifications

RFP purchase no:

Date:

Name of the Bidder:

Address:

Telephone Nos:

Fax No:

Mobile No:

Email ID:

Sl No:	**Clause No:__ Section No:__**	**Corresponding page no in the RFP Document**	**Particulars of the query / clarification**	**Remarks**
1				
2				
3				
4				

Authorized Signatory

Designation

(If the queries / clarifications are submitted through e-mail, the bidder should send the queries / clarifications through official e-mail IDs only.)

Annexure 20: Bank Guarantee for Earnest Money Deposit

To,

The Managing Director,

BUIDCo Limited,

Patna 800 023

Whereas..... (herein after called "the Bidder") has submitted its Bid dated..... (Date of submission of Bid) for execution as Agency for the **Traffic Light & Surveillance project** in Bihar in terms of the Tender dated ..... issued by the Managing Director of Bihar State Electronics Development Corporation Limited, Patna, (hereinafter called "the Bid").

Whereas as per Security of the Bid, the Bidder is required to furnish a bank guarantee as Earnest Money Deposit from a scheduled commercial bank (Bank Guarantee)

In consideration of the fact that the Bidder is our valued customer and the fact that he has submitted the Bid, we, (name and address of the bank), (hereinafter called "the Guarantor Bank"), has agreed to bind ourselves, our successors, and assigns to irrevocably issue this Bank Guarantee and guarantee as under

NOW THIS GUARANTEE WITNESSETH: -

1. If the Bidder

(a) withdraws its Bid proposal during the period of Bid validity specified by the Bidder on the Technical Proposal Cover Letter; or

(b) having been notified of the acceptance of its Bid by the Managing Director, Bihar State Electronics Development Corporation Limited during the period of Bid Proposal validity:

(i) fails or refuses to enter into the Contract; or

(ii) fails or refuses to furnish the performance guarantee, in accordance with the Terms of Reference of the Tender document issued to the Bidders.The Guarantor Bank shall immediately on demand pay the Managing Director, Bihar State Electronics Development Corporation Limited without any demur and without the Managing Director, Bihar State

Electronics Development Corporation Limited having to substantiate such demand a sum of Rs _____(Rupees _____ only) (Guaranteed Amount).

2. The Guarantor Bank will make the payment of the Guaranteed Amount forthwith on the demand made by the Managing Director, Bihar State Electronics Development Corporation Limited, notwithstanding any objection or dispute that may exist or arise between the Managing Director, Bihar State Electronics Development Corporation Limited and the Bidder or any other person.

3. The demand of the Managing Director, Bihar State Electronics Development Corporation Limited on the Guarantor Bank for the payment of the Guaranteed Amount, shall be deemed as the final proof of fulfilment of the conditions stipulated in (1) above.

4. This Guarantee shall be irrevocable and shall not be discharged except by payment of the above amount by us to the Managing Director, Bihar State Electronics Development Corporation Limited and our liability under this Guarantee shall be restricted to the Guaranteed Amount being _____ (Rupees _____ only).

5. If it is necessary to extend this Guarantee on account of any reason whatsoever, we undertake to extend the period of this Guarantee on the request of the Bidder under intimation to the Managing Director, Bihar State Electronics Development Corporation Limited.

6. To give full effect to the Guarantee contained herein, the Managing Director, Bihar State Electronics Development Corporation Limited shall be entitled to act as if the Guarantor Bank is the principal debtor in respect of claims against the Bidder and the Guarantor Bank hereby expressly waives all its rights of surety-ship and other rights, if any, which are in any way inconsistent with any of the provisions of this Guarantee.

7. Any notice by way of demand or otherwise may be sent by special courier, telex, fax, registered post or other electronic media to our address as afore-said and if sent by post,shall be deemed to have been given to us after expiry of 48 hours when the same has been posted.

8. Our liability under this Guarantee will continue to exist until a demand is made by the Managing Director, Bihar State Electronics Development Corporation Limited in writing or up to and including One Hundred and Eighty (180) days after the period of the Bid Proposal validity, i.e. up to _____, and any demand in respect thereof should reach the Bank not later than the above date.

Dated ……. this …….. day ……..201_

Yours faithfully,

For and on behalf of the ……. Guarantor Bank,

(Signature)

Designation

(Address and Common Seal of the bank)