NATIONAL HIGHWAYS AUTHORITY OF INDIA
(Ministry of Road Transport and Highways)

Bidding Document for assigning System Integrator for implementation of Hybrid ETC System, Video Surveillance System (PTZ Camera), MSWIM and SWB (Static Weigh Bridge) at VallamToll Plaza @ Km 80/600, Enamkariyanandal @ Km 138/600 and Thennamadevi @ 198/600 on Vellore to Viluppuram section of NH 234 in the State of Tamilnadu

Part-I Notice InvitingTender
Part-II Definitions
Part-III Instructions to Bidders
Part-IV Conditions of Contract
Part-V Scope of Work
Part-VI Forms and Annexures
Part-VII Preparation and submission of Bids

Tender No. NHAI_RO CHN_HETC_NH-234_2021-22_34.

The Regional Officer,
Chennai Region,
National Highways Authority of India, Sri Tower, 3rd Floor,
DP, 34 Industrial Estate, Guindy, Chennai – 600 032
E-mail: nhaichennairo@gmail.com: rochennai@nhai.org
Ph.No.044 – 22252635

January, 2021

DISCLAIMER

The information contained in this Request for Bidding Document (the "RFP") or subsequently provided to prospective Bidder(s), whether verbally or in documentary or any other form by any of its employees or advisors, is provided to Bidder(s) on the terms and conditions set out in this RFP and such other terms and conditions subject to which such information isprovided.

The issue of this RFP does not imply that the Authority is bound to select or shortlist pre-qualified Bids for the Bid stage or to appoint the Selected Bidder or Contractor, as the case may be, for the Project and the Authority reserves the right to reject all or any of the Bidders or Bids without assigning any reason whatsoever.

The assumptions, assessments, statements and information contained in the RFP, may not be complete, accurate, adequate or correct. Each Bidder should, therefore, conduct its own investigations and analysis and should check the accuracy, adequacy, correctness, reliability and completeness of the assumptions, assessments, statements and information contained in this RFP and obtain independent advice from appropriatesources.

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

NHAI, make no representation or warranty and shall have no liability to any person, including any Bidder under any law whether written or otherwise , statute, rules or regulations or tort, principles of restitution or unjust enrichment or otherwise for any loss, damages, cost or expense which may arise from or be incurred or suffered on account of anything contained in this RFP or otherwise, including the accuracy, adequacy, correctness, completeness or reliability of the RFP and any assessment, assumption, statement or information contained therein or deemed to form part of this RFP or arising in any way for participation in thisRFP.

NHAI also accepts no liability of any nature whether resulting from negligence or otherwise howsoever caused arising from any Bidder upon the statements contained in this RFP. This office may in its absolute discretion, but without being under any obligation to do so, update, amend or supplement the information, assessment or assumptions/quantities contained in this RFP.

NATIONAL HIGHWAYS AUTHORITY OF INDIA
(MINISTRY OF ROAD TRANSPORT & HIGHWAYS)
NOTICE INVITING e-TENDER

Bid/ Package no.: NHAI_RO CHN_HETC_NH-234_2021-22_34 **Date: 04.01.2021**

1. The National Highways Authority of India (NHAI) hereinafter called ("the **Authority**") invites bids through e-tendering from eligible bidders and/or firms (excluding those firms who have been declared as non-performing by NHAI or the firms those are blacklisted/ debarred for specified period by NHAI and against whom such action is under process by NHAI) for the Work detailed in the Table below:

Name of Works	**Contract Package No.**	**Approximate value of works (Rs.)**	**Bid Security (Rs)**	**Completion Period**
(1)	*(2)*	*(3)*	*(4)*	*(5)*
System Integrator for implementation of Hybrid ETC System, Video Surveillance System (PTZ Camera), MSWIM and SWB (Static Weigh Bridge) at VallamToll Plaza @ Km 80/600, Enamkariyanandal @ Km 138/600 and Thennamadevi @ 198/600 on Vellore to Viluppuram section of NH 234 in the State of Tamilnadu	NHAI_RO CHN HETC_ NH-234_2021-22_34	**Rs. 6,26,84,100/- (including Maintenance for 2 years)**	**NIL (Bid Securing Declaration Form should be submitted)**	**75 days and 2 years O&M period**

Cost of Bid Documents (Non-refundable) : Rs.10,000 plus GST @ 12% (online payment to NHAI, RO Chennai).

Name of Beneficiary : National Highways Authority of India
Name of Bank : Syndicate Bank
Account No. **: 60341010004225**
IFSC Code : SYNB0006034

e-Tender Processing fee (non-Refundable) : NIL

2. The detailed tender document can be viewed from the website on www.nhai.org from **04.01.2021 to 01.02.2021 upto 11:00 hrs**.

3. The Complete Bid Document can be downloaded with effect from **04.01.2021 to 01.02.2021 upto 11:00 hrs** from the NHAI e-Tendering portal free of cost. To participate for bidding, bidders have to pay a non-refundable document fee through online to above said NHAI, RO Chennai Bank Account. The Amendments/clarifications to the bid document if any will be hosted on the above website only.

4. The bid should be submitted online in the prescribed format given in the website. No other mode of submission is acceptable.

5. The last date of online submission of the Bid is **01.02.2021 upto 11:30 hrs** (as mentioned on the e-Portal only) ("Bid Due Date"). The Bids would be opened on **02.02.2021 at 11:30 hrs** online at National Highway Authority of India, Regional office, Chennai. Representatives of the bidders (maximum of two) who choose to attend may attend the online opening of the bids at NHAI, RO, Chennai on the date & time as mentioned above. However, such representatives shall be allowed to attend the opening of the bids only if they produce letter of authority on the letterhead of the bidder, at the time of opening of bids as mentioned above.

6. All bids must be accompanied by scanned copy of Bid Securing Declaration Form as specified in RFP. .

7. **For any clarification, the following office may be contacted:**

Address for communication
Regional Officer
National Highways Authority of India
Sri Tower, 3rd Floor,
DP, 34 Industrial
Estate, Guindy,
Chennai – 600 032

Conditional bids would be rejected.

8. NHAI reserves the right to accept/reject any or all the bids without assigning any reasons thereof.

9. **Key Dates**:

Sl. No.	Event Description	Date
1.	Invitation of RFP (NIT)	04.01.2021
2.	Last date for receiving queries	11.01.2021 (At 11:00 Hrs IST)
3.	Pre-BID meeting	11.01.2021 (At 11:00 Hrs IST)
4.	Authority response to queries latest by	18.01.2021
5.	Last date of Request for BID Document	01.02.2021 Upto 11:00 Hrs IST
6.	The last date of online submission of the Bid	01.02.2021 upto 11:30 hrs IST
7.	Opening of Technical Bids	02.02.2021 Upto 11:30 Hrs IST

Regional Officer
National Highways Authority of India
Sri Towers, 3rd Floor,
DP-34, Industrial Estate
Guindy, Chennai 600 032
Telephone: 044-22252635
Email:

rochennai@nhai.org

PART II:DEFINITIONS

1. DEFINITIONS

In this document, the following terms shall have respective meanings as indicated:

"Applicable Law" means the laws, rules or regulations and any other instruments, having the force of law in Republic of India, as in force from time to time.

"Authorized Representative" means any person authorized by NHAI.

"Applicant/Bidder" means a 'firm' or 'Consortium' which participates in the subject RFP and submits its application/bid.

"Application/Bid" means the documents submitted by the Bidder in response to this RFP.

"Commencement date" Commencement Date shall be the date at which signature of the Contract Agreement by both Parties, and within 15 days from the Engineer/Employer's issuance of letter to commence the work

"Contract" shall mean & include RFP , Notice for Inviting Tender (NIT), the tender documents and letter of acceptance thereof and the formal agreement, to be executed between NHAI and the Service Provider together with the complete documents referred to therein including the conditions with appendices and any special conditions, the specifications, bill of quantities with rates and amounts. All these documents taken together shall be deemed to form one Contract and shall be complementary to eachother

"Law" or "Legislation" - shall mean any Act, notification, bye law, rules and regulations, directive, ordinance, order or instruction having the force of law enacted or issued by the Government of India or State Government or regulatory authority.

"Letter of Award (LOA)" means the issue of a signed letter by NHAI to Successful Bidder conveying its intention to accept the offer of Successful Bidder and awarding the work mentioning the total ContractValue.

"Local Currency" means the IndianRupees

"MoRTH" means Ministry of Road Transport and Highways

"NHAI" means National Highways Authority of India.

"Party" shall mean NHAI or Bidder individually and "Parties" shall mean NHAI and Bidder collectively.

"Personnel" means persons hired by the Service Provider as employees and assigned to the performance of the Services or any partthereof.

"RFP" shall mean this Request for Quotation, including the written clarifications & Corrigendum/Addendum issued by NHAI in respect of the RFP from time to time.

"Services" means requirements defined in this RFP including all additional services associated thereto to be delivered by the Successful Bidder.

"Service Provider/System Integrator" shall mean the successful bidder with whom agreement is executed.

PART-III : INSTRUCTIONS TO BIDDERS

Application Conditions

3.1 Eligibility to Apply:-

Bidders who fulfill the following eligibility criteria are eligible to apply-

(i) The bidder should be an entity operating in the field of Tolling Systems for Highways and should have successfully executed the supply, install, commission & maintenance of Tolling systems for at least 10 Electronic Toll Collection (ETC) Lanes with RFID transceiversacross one or more projects.
(A certificate from Authorized Signatory of the Bidder as proof for the above in the format specified in Section 6.5: Business Plan)

(ii) A bidder shall have positive net worth in each of the last three consecutive financial years, the last financial year being taken as financial year ended on 31st March-2020. For the purposes of this RFP, net worth (the "**Net Worth**") shall mean the aggregate value of the paid-up share capital and all reserves created out of the profits and securities premium account, after deducting the aggregate value of the accumulated loses, deferred expenditure and miscellaneous expenditure not written off, as per the audited balance sheet, but does not include reserves created out of revaluation of assets, write back of depreciation andamalgamation.
(A certificate from the Statutory Auditor as proof for the above in the format specified in Section 6.3: Bidder's Financial Capacity)

(iii) The bidder shall have average annual turnover of INR 20 Crores (Rupees Twenty Crore) for last three Financial Years the last financial year being taken as financial year ended on 31st March-2020.
(A certificate from the Statutory Auditor as proof for the above in the format specified in Section 6.3: Bidder's Financial Capacity)

(iv) The bidder should not have been sanctioned or blacklisted or debarred by any government department/agency/PSU for material non-performance or contractual non-compliance in the last 3years.
(Undertaking to be provided by the Authorized Signatory of the Bidder on its letterhead section 6.2)

(v) The Bidder maybe:

i. A Company incorporated and registered in India under the Companies Act,2013/1956.

OR

ii. A Wholly Owned Subsidiary (WOS) Company registered in India of a Foreign Company having requisite experience. For considering the experienceoftheForeignHoldingCompany("**ParentCompany**"),the

WOS registered in India should provide an undertaking from their Parent Company confirming thereby:

a. Perpetual and unconditional access to assets, intellectual property, expertise, personnel and facilities of the Parent Company to the WOS;

b. Sharing of risks and profits of the WOS by the Parent Company; and

c. That the Parent Company has sufficient representation and control of the management of WOS to control the activities of the subsidiary.

d. That the Parent Company is holding and shall continue to hold 51% (Fifty one percent) shareholding in Indian Company at all times during the Contract period and sufficient representation in the management of Indian Company to control the activities of such IndianCompany.

Subject to and fulfillment of the conditions as mentioned above, the experience and the details of the Parent Company will be considered, otherwise the details/ experience of WOS only, will be considered.

It is clarified that under this concept, there is no involvement of Parent Company; the WOS shall participate as a sole bidder.

OR

iii. A Joint Venture (JV)/ Consortium subject to fulfilling following conditions:

a. All Partners of the JV/Consortium shall be entities incorporated and registered in India under the Companies Act,2013/1956.

b. Maximum number of partners in the JV or Consortium shall be two, including the LeadPartner;

c. The Partners in a JV or Consortium shall be jointly and severally liable;

d. The Lead Partner in the JV or Consortium shall be single largest partner in terms of Capital contribution to the Capital of JV/Consortium.

e. The eligibility/ experience of JV or Consortium shall be considered cumulatively.

f. The eligibility/ experience of any partner of JV or Consortium shall be considered only if the partner is proposed to hold at least twenty-six percent (26%) of capital contribution in the JV/Consortium.

g. The parties in JV or Consortium cannot be part of any other JV / Consortium or bid individually for the same project. Effectively one party shall be bidding only once, either as a standalone company or as a part of Consortium / JV for thisproject.

The documentary proof in support of the experience(in the form of copy of work order and completion certificate from its clients indicating the names of projects undertaken, scope of work of each project, name of client, start date, date of completion, value of the project etc.) shall be submitted as part of the eligibility documents. The details of the said proofs of experience should be submitted in the prescribed format.

3.2 Technical Evaluation Criteria

The eligible bidders will be evaluated under the following Technical Evaluation Criteria:

S.No.	Criteria	S.No.	Sub-Criteria	Maximum Marks
A	Financial Strength	A1	Bidder's Average Annual Turnover over the last 3 financial years (FY 2017-18 , 2018-19 and 2019-20). • INR 20 Cr to 40 Cr : 5Marks • >INR 40 Cr. to 60 Cr : 10Marks • >INR 60 Cr. to 80 Cr : 20Marks • >INR 80 Cr. to 100 Cr : 30Marks • >INR 100 Cr: 40Marks	40
B	Technical Strength	B1	Experience in implementing &operationalising ETC Lanes using RFID transceivers	30
			• 10 to 50 Lanes : 10Marks • 51 to 100 Lanes : 15Marks • 101 to 150 Lanes: 20Marks • 151 to 200 Lanes: 25Marks • > 200 Lanes: 30Marks	
		B2	Experience in implementing &operationalisingToll Management System for Cash Lane	30
			• 0 to 50 lanes : 10Marks • 51 to 100 lanes: 15Marks • 101 to 150 Lanes: 20Marks • 151 to 200 Lanes: 25Marks • > 200 Lanes: 30Marks	
	Total			100

Only Bidders scoring at least total technical score of 75 shall be shortlisted. The Applicants/Bidders must provide all supporting documents specified above in support of each technical requirement as per format provided in Section 6.6 – Format for Technical Experience.

3.3 POWER OF ATTORNEY:-

The Applicant should submit a notarized Power of Attorney in the format provided at Section 6.4 authorizing the signatory of the Application to sign the Bid/Application and all related documents.

3.4 CONTENT OF RFP

3.4.1 The RFP should be read in conjunction with any addenda or clarifications issued subsequent to publication ofRFP.

3.4.2 The Bidders are advised to study the RFP carefully. Submission of the Bid will be deemed to have been done after careful study and examination of all instructions, eligibility norms, terms and requirement specifications in the RFP with full understanding of its implications. Bids not complying with all the stipulations and requirements as set forth in this RFP are liable to be rejected at the sole discretion of NHAI. Failure to furnish all information required in the RFP or submission of anbid not substantially responsive to the RFP in all respects will be at the Bidders risk and may result in the rejection of theApplication.

3.5 COST OF BIDDING:

The Bidder shall bear all costs associated with the preparation and submission of the Bid and NHAI will in no case, be responsible or liable for those costs, regardless of the conduct or outcome of the bidding process.

3.6 Clarification on bidding document

3.6.1 All Bidders are required to go through the RFP document and submit their queries/ clarifications to NHAI at nhaichennairo@gmail.com, or in writing within **06.01.2021, 11:00hrs** (shall be received by NHAI) from the date of publication of this RFP. NHAI will neither acknowledge nor respond to any queries received after thisdate.

The bidder or his official representative is invited to attend a pre-bid meeting which will take place at NHAI, RO, Chennai on **06.01.2021, 11:00hrs**

3.6.1 NHAI will publish the clarifications to the Bidders' queries on NHAI website only. No separate information or communication will be sent to any particular bidder in thisregard.

3.6.2 Save and except as provided in this RFP, NHAI shall not entertain any correspondence with any bidder in relation to acceptance or rejection of any bids.

3.6.3 Bids shall be deemed to be under consideration immediately after the bids are opened and until such time NHAI makes official intimation of qualification or disqualification to the bidders. While the bids are under consideration, bidders and/ or their representatives or other interested parties are advised to refrain, save and except as required under this RFP, from approaching or contacting through any means, NHAI and/ or their employees/ representatives on matters related to the bids under

consideration.

3.7 AMENDMENT OF RFP

3.7.1 At any time prior to the closure of time for submission of bids, NHAI, for any reason, whether at its own initiative or in response to the clarifications requested by prospective bidders may modify the RFP by issuing amendment(s) orCorrigendum.

3.7.2 Any Addendum thus issued shall be part of the bidding documents, and shall be available only on NHAI e-tendering portal. Bidders are advised to keep themselves update of all the addendums issued on e-tendering portal by daily checking the e-tendering portal and NHAI does not assume any responsibility in case bidder fails to do so and does not take any action, if required with respect to any relevant addendum of the bidding documents.

3.8 LANGUAGE OF Bid

The bids prepared by the bidder, as well as all correspondence and documents relating to the Bid exchanged by the bidder and NHAI shall be written in English language only.

3.9 Preparation and submission of Bid

3.9.1 **Content of Bidding Documents**

The set of bidding documents comprises the documents listed below and addenda/corrigendum (if any) issued in accordance with Clause3.7:

Volume – I:

Part-I Notice InvitingTender

Part-II	Definitions
Part-III	Instructions to Bidders
Part-IV	Conditions of Contract
Part-V	Scope ofWork
Part-VI	Forms andAnnexures
Part VII	Preparation and submission of Bids

Volume – II:

Bill of Quantities

Bidders will be required to quote for the individual items in the bill of quantities.

3.9.2 The bidder is expected to examine carefully all instructions, conditions of contract, forms, terms, specifications, bill of quantities, etc. in the Bid Document. Failure to comply with the requirements of Bid Documents shall be at the bidder's own risk. Pursuant to clause 3.20 hereof, bids, which are not substantially responsive to the requirements of the Bid Documents, shall be rejected.

3.9.3Documents Comprising theBid

The e-bid submitted by the bidder shall be in two separate parts.

- This shall be named Technical Bid and shall comprise of information submitted in Part-VI, Bid Securing Declaration, proof of online payment of Bid Document Fee, POA, documentary proof of experiennce and other information specified in RFP
- It shall be named Financial Bid and shall comprise of Priced bill of quantities

3.10 Bid VALIDITY

3.10.1 Bids shall remain valid for a period of **180 days** after the deadline date for bid submission specified in Clause 3.21. A bid valid for a shorter period shall be rejected by the Employer as non-responsive.

3.10.2 In exceptional circumstances, prior to expiry of the original time limit, the Employer may request that the bidders may extend the period of validity for a specified additional period. The request and the bidders' responses shall be made in writing or by email. A bidder may refuse the request without forfeiting his bid security. A bidder agreeing to the request will not be required or permitted to modify his bid, but will be required to extend the validity of his bid security for a period of the extension, and in compliance with Clause 3.27 in allrespects.

3.11 Cost of Bid Document

3.11.1 Document fee: Online payment of Rs. 10,000/- (Rupees Ten thousand only) (non-refundable) plus GST @ 12% to National Highways Authority of India, RO Chennai Bank Account shall be made towards cost of bid documents.

3.11.2 Any Bidnot accompanied with Document Fee shall be rejected by Authority-NHAIasnon-responsive.

3.12 ALTERNATIVE PROPOSALS BYBIDDERS

Bidders shall submit only one offer for each package that fully complies with the requirement of the RFP including conditions of Contract. Conditional offer or alternate offer will not be considered further in the process of tender evaluation.

3.13 FORMAT FOR SIGNING OF BIDS

The Bidder shall submit thebid comprising of the document as described in Clause 3.9.3of theRFP in e-tender portal only.

3.14 FORMAT FOR SUBMISSION OF BIDS

3.14.1The bidders shall upload scanned copies of the following

a) BidSecurity

b) Bid DocumentFee

c) Power of Attorney in favour of the authorized signatory of the Bidder in the prescribed format at Section 6.4; the Power of Attorney should be executed on a non-judicial stamp paper of appropriate denomination and should be registered or duly notarized by a notarypublic.

d) POA for Lead member if applicable

e) Joint Bidding agreement if applicable

f) Documents in support of justifying the eligibility criteria prescribed in thisdocument along with experience certificate

Bids submitted by fax, telex, telegram or e-mail shall not be entertained and shall be summarilyrejected.

3.14.2 The bidders shall submit originals of all documents listed in 3.14.1(a-e) after declaration of bid evaluation result by Authority

3.14.3 All the Bidders (including individual or any of its Joint Venture Members) failing to submit the original documents reuired as per para 3.14.1(a-e) above shall be unconditionally debarred from bidding in NHAI projects for a period of 5 years.

3.14.4 In case L-1 Bidder fails to submit the originals as per para 3.14.1(a-e), the bidding process shall be annulled and tender shall be re-invited

3.14.5 Technical & Financial evaluation of bid and declaration of result shall be done based on the documents received online after confirmation of Bid Security BG from the issuing Bank and payment for cost of tender in Authority's Account.

3.14.6 The following documents, which are not submitted with the bid, will be deemed to be part of thebid.

Section	Particulars
Part-I	Notice InvitingTender
Part-II	Definitions
Part-III	Instructions to bidders
Part-IV	Conditions of Contract
Part-V	Scope ofWork
Part-VI	Forms andAnnexures
Part VII	Preparation and Submission of Bids

3.15 **KEYDATES**

Sl. No.	Event Description	Date
1.	Invitation of RFP (NIT)	22.12.2020
2.	Last date for receiving queries	06.01.2021 (At 11:00 Hrs IST)
3.	Pre-BID meeting	06.01.2021 (At 11:00 Hrs IST)
4.	Authority response to queries latest by	13.01.2021
5.	Last date of Request for BID Document	27.01.2021 Upto 11:00 Hrs IST
6.	The last date of online submission of the Bid	27.01.2021 upto 11:30 hrs IST
7.	Opening of Technical Bids	28.01.2021 Upto 11:30 Hrs IST

3.16 DEADLINE FOR SUBMISSION OF BIDS:

3.16.1 Complete e-Bid to be uploaded on NHAI e-tender portal before due date & time.

3.16.2 The Employer may extend the deadline for submission of bids by issuing an amendment in accordance with Clause 3.7, in which case all rights and obligations of the Employer and the bidders previously subject to the original deadline will then be subject to the newdeadline.

3.17 DELETED

3.18 MODIFICATION AND WITHDRAWAL OFBIDS

3.18.1 Bidder may modify or withdraw their Application before thedeadline.
3.18.2 The modifications or withdrawal shall be submitted online

3.19 OPENING OF Technical Bid

3.19.1 The bid of those bidders who submit on- line shall only be opened
3.19.2 The Employer will open the "Technical Bid" through on-line process, in the presence of the bidders/bidders' representatives who choose to attend at 11:30 hrs on 28.01.2021 at places specified in the NIT. In the event of the specified date for the submission of bids being declared a holiday for the Employer, the Bids will be opened at the appointed time and location on the next working day
3.19.3 Technical & Financial evaluation of bid and declaration of result shall be done based on the documents received online after confirmation of Bid Security BG from the issuing Bank and payment for cost of tender in Authority's Account.
3.19.4 As soon as possible prior to evaluation of Bids, the Authority shall determine whether each Bid is responsive to the requirements of the Bidding Document, then the Evaluation Committee will finalize the list of responsive bidders whose financial bids are eligible for consideration. However, to assist in the examination, evaluation of technical bids, the Employer may at his discretion, ask any bidder for clarification of his bid.
3.19.5 The Employer/Authority shall inform the bidders, whose technical bids are found responsive, of the date, time and place of opening of the financial bids. The bidders so informed, or their representative, may attend the meeting of opening of financial bids. The 'Financial Bid' of non- responsive bidders shall not be opened.
3.19.6 Financial bids of those bidders whose technical bid was found responsive will only be opened. Any Bid price, which is not read out and recorded, will not be taken into account in Bid Evaluation.Bidder's authorized representative may attend the opening, and those who are present shall sign the Attendance Sheet evidencing their attendance.

3.20 EXAMINATION AND EVALUATION OFBIDS

3.20.1 Phase-1: Test of Responsiveness:

As part of the evaluation process, NHAI shall first determine whether each Bid is responsive to the requirements of this RFP. AnBid shall be considered responsive only if:

i. Technical details are received as per the format required under this RFP;
ii. Bid is accompanied by proof of the document fee as specified
iii. Bid is accompanied by scanned copy of the Bid Security asspecified
iv. Bid is accompanied by scanned copy the Power of Attorney in the format as required under this RFP;
v. All Annexures and form as mentioned in Part VI
vi. Bid contains all the information as required (complete in all respects);
vii. Bid does not contain any condition orqualification;
viii. Bid is accompanied by Power of Attorney for Lead Member of Consortium and the Joint Bidding Agreement as specified in RFP, if applicable;
ix. At any stage during the entire Bid evaluation process, if the Bid securityis found to be invalid, the respective Bidder's Bid shall be summarily rejected. If Physical Documents submitted by the Bidder has the Financial Bid details, the Bid shall be summarily rejected.
x. it is not non-responsive in termshereof

NHAI reserves the right to reject any Bid which is non-responsive and no request for alteration, modification, substitution or withdrawal shall be entertained by NHAI in respect thereof.Any time during the process of evaluation, NHAI may seek for clarifications from any or all bidder. Failure of any Bidder to provide the required clarificationswithinthestipulatedtimelinemayresultinrejectionofitsbid, at the sole discretion of NHAI.

3.20.2 Phase-2: Technical ProposalEvaluation:

The Technical Bids will be evaluated by an Evaluation Committee. The Bids that meet the Eligibility Criteria will subsequently be scrutinized under the Technical Evaluation criteria. Only the Bidders meeting threshold score of 75 marks will beshortlisted for financial opening.

Evaluation of Technical Proposals by NHAI shall not be questioned by anyof the Bidders. NHAI may ask Bidder(s) for additional information, visit to Bidder's site and/ or arrange discussions with their professional, technical faculties to verify claims made in Technical Bid documentation from the Bidder on the already submitted Technical Proposal at any point of time.

3.20.3 Phase III - OPENING OF FINANCIAL BIDS

(a) Tests of responsiveness

As part of Bid evaluation process, NHAI shall first determine whether each Bid is responsive to the requirements of this RFP. A bid shall be considered responsive onlyif:

i. Bid does not contain any condition orqualification;

ii. The total amount indicated in the Financial Proposal shall be without any condition attached or subject to any assumption, and shall be final and binding.

iii. If equipment name is mentioned but quantity is not mentioned, bidder has to provide cost for theequipments.

NHAI reserves the right to reject any bid which is not passing the test of responsiveness in (a) supra.

(b) **Financial Bid Evaluation:**

The Financial Bids of ONLY the Bidders who are declared as qualified in Technical Proposal Evaluation will be evaluated. The Financial Bid Evaluation will be based on the "Total Price" quoted by the bidder which would be the total payouts inclusive of all levies and taxes like Excise Duty, Custom Duty, packing, forwarding, freight and insurance, Octroi/Entry Tax, etc. or as applicable taxes, but exclusive of GST.

If there is a discrepancy between the unit price & the total price, the unit price shall prevail and NHAI shall correct the total price. If there is a discrepancy between words & figures, the amount in words shall prevail. If the bidder does not accept the correction of errors, its Bid shall be rejected and the EMDwill be forfeited.

The Evaluation Committee shall determine if the financial bid is complete and without computational errors. The Bid with the lowest price will be selected

3.20.4 The bidders shall submit originals of all documents listed in 3.14.1(a-e) after declaration of bid evaluation result by Authority

3.20.5 All the Bidders (including individual or any of its Joint Venture Members) failing to submit the original documents reuired as per para 3.14.1(a-e) above shall be unconditionally debarred from bidding in NHAI projects for a period of 5 years.

3.20.6 In case L-1 Bidder fails to submit the originals as per para 3.14.1(a-e), the bidding process shall be annulled and tendrs hall be re-invited

3.20.7 Technical & Financial evaluation of bid and declaration of result shall be done based on the documents received online after confirmation of Bid Security BG from the issuing Bank and payment for cost of tender in Authority's Account.

3.21 PROCESSCONFIDENTIALITY

Information relating to the examination, clarification, evaluation, and comparison of bids and recommendations for the award of a Contract shall not be disclosed to bidder or any other persons not officially concerned with such process until the award to the Successful bidder has been announced. Any attempt by anbidder to influence NHAI's processing of bids or award decisions may result in the rejection of hisbid.

3.22 DELETED

3.23 NHAI'S RIGHT TO REJECT ANY OR ALL BIDS

Notwithstanding anything contained herein, NHAI/Authority reserves the right to reject any Bid, and to annul the bidding process and reject all Bids at any time before signing of Contract Agreement, without thereby incurring any liability to the affected Bidder(s) or any obligation to inform the affected Bidder(s) of the grounds for such decision.

3.24 CONFIDENTIALITY

3.24.1 The Bidder shall keep confidential any information related to this RFP 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 reasonwhatsoever.

3.24.2 Information relating to the examination, clarification, evaluation and recommendation for the Bidders shall not be disclosed to any person. NHAI will treat all information, submitted as part of the Bid, in confidence and will require all those who have access to such material to treat the same in confidence. NHAI may not divulge any such information unless it is directed to do so by any statutory entity that has the power under law to require its disclosure or as may be required by law or in connection with any legal process or such information which would be available in public domain.

3.24.3 At all times during the performance of the Services, the Bidder shall abide by all applicable NHAI 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.

3.24.4 The Successful Bidder should not disclose to any other party and keep confidential the terms and conditions of this Contract, any amendment hereof, and any Attachment or Annexurehereof.
The obligations of confidentiality under this section shall survive termination ofthe Contract.

3.24.5 Bidders shall not be under a declaration of ineligibility or blacklisting for corrupt and fraudulent practices by the Central Government, the State Government or any public undertaking, autonomous body, authority by whatever name called under the Central or the StateGovernment.

3.25 CORRUPT OR FRAUDULENT PRACTICES

NHAI will reject a proposal for award and appropriate the Performance Security, if it determines that the Bidder recommended for award has engaged in corrupt or fraudulent practices in competing for the contract in question.

NHAI will declare the Bidder ineligible, either indefinitely or for a stated period of time, to be awarded a contract by NHAI if it at any time determines that the Bidder has engaged in corrupt or fraudulent practices in competing for the contract, or during execution.

"Corrupt practice" means the offering, giving, receiving, or soliciting of

anything of value to influence the action of a public official or employee of NHAI in the procurement process or in Contract execution.

"Fraudulent Practice" means a misrepresentation of facts in order to influence a procurement process or the execution of a contract to the detriment of NHAI and includes collusive practice among Bidders (prior to or after Bid submission) designed to establish bid process at artificial non-competitive levels and to deprive NHAI of the benefits of free and opencompetition.

3.26 MISCELLANEOUS

3.26.1 The Bid Process shall be governed by, and construed in accordance with, the laws of India and the Courts at Madurai shall have exclusive jurisdiction over all disputes arising under, pursuant to and/ or in connection with the BiddingProcess.

3.26.2 NHAI, in its sole discretion and without incurring any obligation or liability, reserves the right, at any time to;

3.26.2.2 suspend and/ or cancel the Bid Process and/ or amend and/ or supplement the Bidding Process or modify the dates or other terms and conditions relating thereto;

3.26.2.2 consult with any Bidder in order to receive clarification or further information;

3.26.2.3 retain any information and/ or evidence submitted to NHAI by, on behalf of, and/ or in relation to any Bidder; and/or

3.26.2.4 Independently verify, disqualify, reject and/ or accept any or all submissions or other information and/ or evidence submitted by or on behalf of any Bidder.

3.26.3 It shall be deemed that by submitting the Bid, the Bidder agrees and releasesNHAI,itsemployees,agentsandadvisers,irrevocably,unconditionally, fully and finally from any and all liability for claims, losses, damages, costs, expenses or liabilities in any way related to or arising from the exercise of any rights and/ or performance of any obligations hereunder, pursuant hereto and/ or in connection with the Bidding Process and waives, to the fullest extent permitted by applicable laws, any and all rights and/ or claims it may have in this respect, whether actual or contingent, whether present or in future.

3.26.4 If the Bidder has committed a transgression under this RFP such as to put its reliability or credibility into question, NHAI shall be entitled to blacklist and debar such Bidder for any future tenders/contract award process in its sole and absolutediscretion.

3.27 BID SECURITY

3.27.1 The Bidder shall furnish scanned copy of the BG as part of the Bid towards Bid Security. The Successful Bidder's EMD will be returned, without any interest, upon the Successful Bidder signing the

Contract and furnishing the Performance Security in accordance with the provisions thereof. NHAI may, at the Successful Bidder's option, adjust the amount of EMD in the amount of Performance Security to be provided by him in accordance with the provisions of theContract.

3.27.2 The Bid security shall be in the form of Bank Guarantee drawn in favour of "NHAI, Chennai ." Drawn on any Scheduled bank payable at Chennai.

3.27.3 Any bid not accompanied by an acceptable Bid security and Document Fee shall be rejected by NHAI/Authority asnon-responsive.

3.27.4 The Bid security of unsuccessful bidders will be returneduponwritten request from the unsuccessful bidder, after expiry of the period of Bid Validity prescribed by Authorityor Signing of Contract Agreement between Authorityand successful bidder.

3.27.5 The Earnest Money Deposit of the Successful Bidder will be discharged when the Successful Bidder has furnished the required Performance Security and signed the ContractAgreement.

3.27.6 The Bid Security will beforfeited:

a. if the Bidder withdraws the Bid during the period of Bidvalidity:
b. if the Bidder does not accept the correction of the bid price, pursuant to clause pertaining to imbalance bid;
c. in the case of a Successful Bidder, if the Bidder fails within the specified time limit to
d. sign the Contract;and/or
e. Furnish the required Performance Security;or
f. if the Bidder is found to be engaged in corrupt or fraudulentpractices.

3.27.7 In case of forfeiture of bid security, the bidder shall also be debarred from participation in NHAI works for a period as decided by Authority.

3.28 Imbalanced Bid

If the Bid of the Successful Bidder is seriously imbalanced in relation to NHAI's estimate of the cost of work to be performed under the Contract, NHAI may require the Bidder to produce detailed price analysis for any or all items of the Bill of Quantities, to demonstrate the internal consistency of the proposed System. After evaluation of the price analyses, NHAI may require that the amount of the Performance Security set forth in the RFPbe increased and an additional Performance Security may be obtained at the expense of the Successful Bidder to a level sufficient to protect NHAI against financial loss in the event of default of the Successful Bidder under the Contract. Additional Performance security shall be calculated as under:

(i) If the bid price offered by the contractor is lower than 10% but upto 20% of the estimated project cost, then the additional performance security shall be calculated at 20% of the difference in the(a) Estimated project cost(as mentioned in RFP) – 10% of the estimated project cost and (b) the bid price offered by the selected bidder.

(ii) If the bid price offered but the contractor is lower than 20% of the estimated project cost, then the additional performance security shall be calculated at 30%

of the difference in the (a) Estimated project cost (as mentioned in RFP) -10% of the estimayted project cost and (b) the bid price offered by the selected bidder.

3.29 AwardCriteria

Subject to Clause 3.32 and 3.20, the Employer will award the Contract to the Bidder whose Bid has beendetermined:

3.29.2 to be substantially responsive to the bidding documents and who has offered the lowest evaluated Bidprice.

3.29.3 Authorityreserves the right to order for increased or decreased quantity, as per requirement without any change in unitprice.

3.30 Notification Of Award Of Contract

i. Prior to the expiration of the Bid validity, Authoritywill notify the Successful Bidder that his Bid has been accepted. Authority will mention the contract value in the LOA.

ii. The Contract will incorporate agreements between Authority and the Successful Bidder. It will be signed by Authority and the Successful Bidder after the performance security is furnished by the Successful Bidder. Authoritywill issue notice to commence the work after signing ofContract.

iii. Upon furnishing of the Performance Security by the Successful Bidder, Authoritywill promptly notify the other Bidders that their Bids have been unsuccessful via www.nhai.org. bid security of unsuccessful Bidders will be returned back to them after signing of Contract with the Successful Bidder or after the expiry of the validity period of the Bids, whichever isearlier.

3.31 SIGNING OF CONTRACT

NHAI shall ask the Successful Bidder to furnish the Performance Guarantee and also to execute the Contract Agreement.

3.32 PERFORMANCE SECURITY

3.32.1 Within 15 (Fifteen) days of the receipt of the Letter of Award, the Successful Bidder shall submit an irrevocable and unconditional Bank guarantee issued in the name of NHAI for an amount equal to **3% of the Total Bid Price** (value of awarded work), issued by a Bank described under this RFP which shall be verified at any branch located in Chennai and through SFMS mode as performance security for the due performance of its obligations under the Contract.

3.32.2 The aforesaid Bank Guarantee shall be as per the format given in format provided in this RFP and will be valid for a period of 180 days after the expiry of Contract period and shall also have a minimum claim period of 1 year. The validity shall account for additional 3 months time to account BG verification, signing the contract and start date.

3.32.3 The Additional Performance Security shall be valid until 28 (twenty eight)

days after the issue of Completion Certificate under this Agreement.

3.32.4 The Additional Performance Security shall not be treated as part of the Performance Security and shall be released after issuing taking-over certificate as per ContractAgreement.

3.32.5 Failure of the successful bidder to comply with the reuirement of sub clause 3.32 constitute sufficient ground for cancellation of the award and forfeiture of the bid security and debarrement.

3.33 BANK GUARANTEE(BG)

3.33.1 The Bank Guarantee in the name of NHAI issued by the following banks would only beaccepted:-

I. Any NationalizedBank

II. Any Scheduled Commercial Bank approved by RBI having a net worth of not less than Rs. 500 crore as per the latest Audited Balance Sheet of the Bank. In the case of a Foreign Bank (issued by a branch in India), the net worth in respect of the Indian operations shall only be taken intoaccount

III. A Foreign Bank (issued by a branch outside India) with a counter guarantee from any Indian NationalizedBank.

IV. Export Import Bank ofIndia

3.33.2 The acceptance of the Bank Guarantees shall also be subject to the following conditions:-

I. The capital adequacy of the Bank shall not be less than the norms prescribed by RBI

II. The bank guarantee issued by a Cooperative Bank shall not be accepted.

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AMENDMENT (BID SECURITY)

All the provisions regarding bid security are stand modified as per the provisions contained in the MoRT&H Circular No. RW/NH/37010/4/2010/4/2010-EAP (Printing) Vol-IV dated 07.10.2019.

Bid Securing Declaration

I hereby submit a declaration that the bid submitted by the undersigned, on behalf of the bidder, [Name of the bidder], either sole or in JV, shall not be withdrawn or modified during the period of validity, i.e. not less than 180 (one hundred and eighty) days from the bid due date.

I, on behalf of the bidder, [name of the Bidder], also accept the fact that in case the bid is withdrawn or modified during the period of its validity or if we fail to sign the contract in case the work is awarded to us or we fail to submit a performance security before the deadline in Clause 3.32 of the Request for Proposal (RFP), then [Name of Bidder] will be suspended for participation in the tendering process for the works of MoRT&H/NHAI/NHIDCL and works under other Centrally Sponsored Schemes, for a period of one year from the bid due date of this work.

(Signature of the Authorized Signatory)
(Official – Seal)

PART IV- CONDITIONS OF CONTRACT

4.1 CONDITIONS OF CONTRACT

These Conditions shall supplement or amend the other parts of the Bidding Documents and whenever there is a conflict; provision herein shall prevail over those in the other parts of the Bidding Documents.

4.2 GOVERNING LANGUAGE

All correspondence and other documents to be exchanged by the parties shall be written in the English language. The version written in English language shall govern its interpretation.

4.3 APPLICABLE LAW

Appropriate laws as in force in Republic of India shall apply.

4.4 INTERPRETATION

In interpreting these Conditions of Contract, singular also means plural, male also means female or neuter, and the other way around. Headings have no significance. Words have their normal meaning under the language of the Contract unless specifically defined.

4.5 The Bidders are expected to examine all terms and instructions included in the RFP Document. During preparation of the technical proposal, the Bidders shall make their own assessment of staff to undertake theassignment.

4.6 RIGHT TO VARY QUANTITY

4.6.1 At the time of award of contract or during the Contract Period, the quantity of goods, works, scope or services originally specified in the bidding documents may be changed by NHAI by a written order to the Successful Bidder.It shall be without any change in the unit prices or other terms and conditions of the Bid and the bidding documents.

4.6.2 If NHAI does not procure any line item(s) as specified in the Bill of Materials for procurement or procures less than the quantity specified in the RFP Document due to change in circumstances, the Succesful Bidder shall not been titled for any claim or compensation except otherwise provided in the bidding document.

4.6.3 Repeat orders for extra items or additional quantities may be placed on the rates and conditions given in the contract. Delivery or completion period may also be proportionally increased on mutually agreed terms.

4.6.4 NHAI may choose to procure additional material for any of the line item specified in Bill of Materials of the quantities per line item during the Contract Period.The Successful Bidder shall hold the same prices quoted herewith.

4.6.5 Payment for additional quantities for line items shall be made on pro-rata basis as per unit rates mentioned in the bid. The unit rates quoted by bidder shall be valid for at least two years from the date of Contract signing. Thereafter, the unit rates may be escalated up to 10% on year on year basis on mutually agreedterms.

4.6.6 At the time of procurement, the Successful Bidder may propose product with same or higher specification. The right to choose the vendor for additional quantities at any point during the Implementation or O&M phase rests with NHAI.

4.7 RIGHT TO AMEND PROJECTSCOPE

4.7.1 NHAI retains the right to amend the Project Scope without assigning any reason at any time during the Contract Period. NHAI makes no commitments, express or implied, that the full scope of work as described in this RFP will be commissioned.

4.7.2 NHAI, may at any time, at its sole discretion defer the implementation of certain components of the project as per its requirements. Appropriate time extensions (but no cost extensions) shall be provided in case of delay owing to deferment byNHAI.

4.8 PAYMENT TERMS

4.8.1 Payments will be made in Indian Rupeesonly

4.8.2 The payment to be made to the Contractor for System Design, Engineering, Supply, installation, System Integration, Testing & Commissioning shall be made to the as per thefollowing:

Payment Milestones		
Sr. No.	**Milestone Description**	**Payment Percentage**
Milestone 1.	Upon delivery of equipment at site location	30% of Total price for the Toll Plazas
Milestone 2.	After successful installation and integration with Central Clearing House[1] (CCH)	30% of Total price for the Toll Plazas
Milestone 3.	On successful acceptance of Site Acceptance Test (SAT)	10% of Total price for the Toll Plazas
O&M Period	Payments during O&M period for 2 years.	30% of Total price for the Toll Plazas to be paid in equal quarterly installment

4.8.3 Payment may be claimed for any particular site, on achievement of above said milestones.

4.8.4 NHAI shall issue the instruction for the supply & installation of main component as per BOQ for each toll plaza, basis which service provider shall be responsible to deliver and install the equipments and accordingly payment shall be released.

4.8.5 In Milestone -1: -

(i) List of BOQ items supplied should be certified by concerned NHAI-PIU before submission of invoices to NHAI. Intimation to NHAI on delivery of BOQitems.

(ii) No payment shall be released on the basis of partial delivery of equipment as specified in Annexure-A.

4.8.6 In Milestone2:-

(i) Go-Live confirmation from NPCI/bank

4.8.7 In Milestone 3:-

(i) Site Acceptance Test has to be conducted and certified by concerned NHAI- PIU before submission of invoices toNHAI.

4.8.8 Operation & Maintenance (O&M) Period:-

(i) Defect Liability Period (DLP) shall be for a period of two years (24 month).

(ii) O&M period shall commence from the date of **"Go-Live"** (defined as receipt of confirmation from NPCI/Bank for all lanes) of the Toll Plaza. NHAI shall release the equal quarterly payment to the Successful Bidder.

4.8.9 The quantities of some items may increase or decrease depending upon individual plaza conditions. Payments would be made for actual quantities of items used at unit price indicated in the FinancialBid.

4.8.10 All payments shall be made subject to adjustment of applicablepenalties. All Payments will be processed within 60 days of submission of undisputed invoice.

4.9 PRICES

4.9.1 GST as applicable, which will be levied on the goods and services invoiced by the Service Provider to NHAI, will be reimbursed on actual basis.

4.9.2 Authority reserves the right to ask the Service Provider to submit proof of payment against any of the taxes, duties, levies indicated.

4.9.3 All payments shall be made subject to adjustment of applicable damages.

4.9.4 No amount or cost shall be payable for holding discussion, as considered necessary by NHAI, for any purpose with NHAI's Officials at NHAI's Head Office or else where, prior, during or after the conduct of an assignment.

4.9.5 Prices quoted by the bidder shall be inclusive of all other taxes and duties but exclusive of GSTand fixed for the entire Contract period.

[1] Refers to the NETC Clearing house/mapper maintained by National Payments Corporation of India (NPCI)

4.10 START OFASSIGNMENT

4.10.1 Service Provider shall conduct site assessment survey at the each of allocated toll plazas and submit the detailed report within 10 days from the date of signing of contract agreement or date of issuance of instruction for commencement notice issued by NHAI.

4.10.2 Service Provider shall submit schedule for work execution plan for each toll plaza within 10 days of submission of Site Survey Report.

4.10.3 Service Provider shall supply, installation and commission all the main component of BOQ within 30 days from the installation instruction given by NHAI. NHAI may issue main component wise supply & installation instruction to service provider.

4.10.4 The Service Provider shall have sufficient teams to complete the assignment and submit the deliverables as per Part V- Scope of Work for the toll plaza awarded to him. Non-fulfillment of this requirement or delay in submission of reports would attract penalties.

4.11 DAMAGES

4.11.1 Delay in supply, installation & commissioning: - If service provider fails to supply, installation & commission as per timelines, penalty of Rs. 1000/- per day upto maximum of Rs. 10,000/- shall beapplied.

4.11.2 In case NHAI is of the view that the delay is due to reasons beyond the control of the Service Provider, suitable extension of time may be granted to the Service Provider with or without imposing any Damages on such Service Provider in the absolute discretion of NHAI.

4.11.3 Damages shall be payable by the Service Provider within 5 days of imposition thereof by NHAI, failing which the same shall be deducted from the payments to be made to the Service Provider or from the Performance Security as deemed appropriate byNHAI.

4.11.4 The Damages payable, as set forth in this Contract, are mutually agreed genuine pre-estimated loss and damage likely to be suffered and incurred by the Party entitled to receive the same and are not by way of penalty (the“Damages”).

4.12 CONTRACT PERIOD

The initial period of engagement shall be 03 years from date of signing of Contract Agreement. The period of engagement may be further extendable by additional 1 year at the sole discretion of NHAI.

4.13 INSURANCE

The Service Provider shall effect and maintain at its own cost, during the Contract period, such insurances for such maximum sums as may be required under the Applicable Laws, and such insurances as may be necessary or prudent in accordance with Good Industry Practice to cover third party claims, theft, accidental damage, vandalism, fire, flood, and Force Majeure events.

4.14 FORCE MAJEURE

4.14.1 Neither party shall be responsible to the other for any delay or failure in performance of its obligations due to any occurrence of a Force Majeure event 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.

4.14.2 If a Force Majeure arises, the Service Provider shall promptly notify NHAI in writing of such condition and the cause thereof. Unless otherwise directed by

NHAI, the Service Provider 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 Parties shall be excused from performance of their respective obligations in whole or part as long as such Force Majeure event continues to prevent or delay such performance by the Parties. However, in case such Force Majeure event lasts for a continuous period of 60 days, either Party may terminate the Contract.

4.15 INDEMNIFICATION

4.15.1 The Service Provider shall indemnify, defend, save and hold harmless, NHAI and their officers, against any direct loss, damage, claims, cost and expense of whatever kind and nature (including without limitation, legal fees, claims and expenses incurred in connection with any suit, action or proceeding or any claim asserted, as such fees and expenses are incurred), joint or several, that arise out of or are based upon any order passed by any statutory authority including Courts, tribunals or other judicial/quasi judicial authorities, on account of breach of the Service Provider's obligations under this Contract or any other related agreement or otherwise, any fraud or negligence attributable to the Service Provider or its Agents under contract or tort or on any other ground whatsoever, all eventualities of theft, dacoity, robbery, etc., except to the extent that any such suits, proceedings, actions, demands and claims has arisen due to any breach or default of this Contract on the part of NHAI Indemnified Persons.

4.15.2 The Service Provider shall indemnify NHAI Indemnified Persons from all legal obligations in respect of professionals deployed by the Service Provider. NHAI Indemnified Persons also stand absolved of any liability on account of death or injury sustained by the Service Provider's staff during the performance of their work and also for any damages or compensation due to any dispute between the Service Provider and its staff.

4.15.3 In addition to the aforesaid, the Service Provider shall fully indemnify, hold harmless and defend NHAI Indemnified Persons from and against any and all directloss, damage, cost and expense of whatever kind and nature (including, without limitation, legal fees and other expenses incurred in connection with any suit, action or proceeding or any claim

asserted, as such fees and expenses are incurred), joint or several, that arise out of, or are based upon any demands, claims, suits or proceedings arising out of claims of infringement of any domestic or foreign patent rights, copyrights or other intellectual property, proprietary or confidentiality rights with respect to any materials, information, design or process used by the Service Provider or by the Agents in performing the Service Provider's obligations or in any way incorporated in or related to this Contract. If in any such suit, action, claim or proceedings, a temporary restraint order or preliminary injunction is granted, the Service Provider shall make every reasonable effort, by giving a bond (of the type and value as required) or otherwise, to secure the revocation or suspension of the injunction or restraint order and continue to perform its obligations hereunder. If the Service Provider is unable to secure such revocation within a reasonable time, it shall, at its own expense, and without impairing the Specifications and Standards, shall rectify such defaults and shall also be liable for damages to NHAI for the corresponding loss during the interim period on thisaccount.

4.15.4 The provisions of Clause 5.13 shall surviveTermination.

4.15.5 The remedies provided under Clause 5.13 are not exclusive and shall not limit any rights or remedies that may otherwise be available to NHAI Indemnified Persons at law or inequity.

4.16 TERMINATION

4.16.1 ON EXPIRY OF THE CONTRACT: Subject to the condition mentioned under Clause 5.10, the Agreement shall be deemed to have been automatically terminated on the expiry of the Contract Period unless NHAIhas exercised its option to further renew the Contract Period in accordance with the provisions, if any, of theContract.

4.16.2 ON ACCOUNT OF FORCE MAJEURE: Either party shall have the right to terminate the Contract on account of Force Majeure, as set forth in Clause5.12.

4.16.3 ON BREACH OF CONTRACT: NHAI may terminate the Contract if the Service Provider causes a fundamental breach of the Contract. Fundamental breach of Contract include, but shall not be limited to, thefollowing:

4.16.3.1 The Service Provider fails to carry out any obligation under the Contract.

4.16.3.2 The Service Provider without reasonable excuse fails to commence the work in accordance with relevantclauses.

4.16.3.3 Has failed to furnish the required securities or extension thereof in terms of theContract.

4.16.3.4 the Service Provider stops work and the stoppage has not been authorized byNHAI;

4.16.3.5 the Service Provider at any time during the term of the Contract becomes insolvent or makes a voluntary assignment of its assets for

the benefit of creditors or is adjudged bankrupt

4.16.3.6 If the Service Provider, in the judgment of the Employer, has engaged in the corrupt or fraudulent practice in competing for or in executing the Contract.

4.16.4 The Service Provider sub-contracts any assignment under this Agreement without approval ofNHAI.

4.16.5 Any other fundamental breaches as specified in theRFP.

4.16.6 Not with standing the above, NHAI may terminate the Contract in its sole discretion by giving 30 days prior notice without assigning any reason.

4.16.7 Upon Termination (except on account of expiry of Term of this Agreement, Force Majeure), NHAI shall be entitled at the sole discretion to:

a. appropriate the entire Performance Security or part thereof as Damages; and

b. Debar/Blacklist the Service Provider from participating in any other project/assignment/work of NHAI for a period as determined by NHAI in its sole discretion.

4.17 ARBITRATION/ RESOLUTION OF DISPUTES

4.17.1 Any dispute, difference or controversy of whatever nature howsoever arising under or out of or in relation to the Contract (including its interpretation) between the Parties, and so notified in writing by either Party to the other Party (the “Dispute”) shall, in the first instance, be attempted to be resolved amicably in accordance with the conciliation procedure set forth in Clause 5.15.4.

4.17.2 The Parties agree to use their best efforts for resolving all Disputes arising under or in respect of the Contract promptly, equitably and in good faith, and further agree to provide each other with reasonable access during normal business hours to all non-privileged records, information and data pertaining to any Dispute.

4.17.3 Mediation

In the event of any Dispute between the Parties, either Party may call upon the Chairman in case of NHAI or his nominee and the Managing Director/CEO/ Director, as the case may be, in case of the Service Provider to mediate in arriving at an amicable settlement thereof. If after expiry of 30 days of receipt of the documents in relation to the Dispute or such extended period as the Parties may agree in writing, the Dispute remains unresolved, the Parties shall attempt to resolve the dispute through conciliation and/or Arbitration under the Arbitration and Conciliation Act, 1996, in accordance with the procedure specified in Clause 5.15.4 and Clause 5.15.5.

4.17.4 Conciliation

The Parties shall attempt to select one of the experts from the list of empanelled arbitrators of the Society for Affordable Redressal of Disputes (“SAROD”) as the Conciliator to mediate and assist the Parties in arriving at an amicable

settlement thereof. If the Parties fail to agree on nominating a conciliator within 15 (fifteen) days or the Dispute is not resolved as evidenced by the signing of written terms of settlement within 60 (sixty) days of the notice in writing or such longer period as may be mutually agreed by the Parties, either Party may refer the Dispute to arbitration in accordance with the provisions of Clause 5.15.5.

4.17.5 Arbitration

Any Dispute which is not resolved amicably by conciliation, as provided in Clause 5.15.4, shall be finally settled by arbitration as set forth below:

i. The Dispute shall be referred to the SAROD. The dispute shall be dealt with in terms of Rules of SAROD. The detailed procedure for conducting Arbitration shall be governed by the Rules of SAROD and provisionsof Arbitration & Conciliation Act. 1996, as amended from time to time.
ii. The seat of Arbitration shall be New Delhi and the language for all documents and communications between the parties shall beEnglish.
iii. The expenses incurred by each party in connection with the preparation, presentation, etc., of arbitral proceedings shall be borne by each partyitself.

4.17.6 The arbitrators shall make a reasoned award (the“Award”).

4.17.7 The Service Provider and NHAI agree that an Award may be enforced against the Service Provider and/or NHAI, as the case may be, and their respective assets where eversituated.

4.17.8 This Agreement and the rights and obligations of the Parties shall remain in full force and effect, pending any proceedings hereunder. Further, the Parties unconditionally acknowledge and agree that notwithstanding any Dispute between them, each Party shall proceed with the performance of its respective obligations, pending resolution of Dispute in accordance with thisClause.

4.18 Appropriation of Performance Security

4.18.1 Upon failure of the Service Provider to commence the services, for any reason whatsoever, within the period set forth in this Contract or the extended period thereunder, NHAI shall, without prejudice to its other rights and remedies hereunder or in law, be entitled to levy Damages as per Clause 5.8 herein above.

4.18.2 NHAI shall, without prejudice to its other rights and remedies hereunder or in law, be entitled to encash and appropriate the relevant amounts from the Performance Security as Damages or any other amounts payable to NHAI under this Contract as and when such Damages or other amounts become due and payable. Upon such encashment and appropriation from the Performance Security, the Service Provider shall, within 10 days thereof, replenish, in case of partial appropriation, to its original level of the amount guaranteed under the Performance Security, and in case of appropriation of the entire Performance Security, provide a fresh Performance Security, as

the case may be failing which NHAI shall been titled to terminate this Agreement in accordance with clause5.14 hereof.

4.19 MISCELLANEOUS

4.19.1 Standard of Performance

The Service Provider shall undertake to perform the services with the highest standards of professional and ethical competence and integrity which are, amongst others, ESSENCE of this assignment. Keeping in view the sensitivity involved in such assignments, the personnel deployed should maintain confidentiality/integrity at all times and should work in a professional manner to protect the interest of NHAI. The firm shall promptly replace any personnel deployed under this contract that NHAI considered unsatisfactory.

4.19.2 Representations and Warranties of the Parties

The Parties represents and warrants to the each other that:

(a) it is duly organized and validly existing under the applicable laws, and has full power and authority to execute and perform its obligations under this Contract and to carry out the transactions contemplated hereby;

(b) it has taken all necessary corporate and other actions under applicable laws to authorize the execution and delivery of this Contract and to validly exercise its rights and perform its obligations under this Contract;

(c) this Contract constitutes its legal, valid and binding obligation, enforceable against it in accordance with the terms hereof, and its obligations under this Contract will be legally valid, binding and enforceable obligations against it in accordance with the termshereof;

(d) the information furnished in the Bid and as updated on or before the date of this Contract is true and accurate in all respects as on the date of this Contract;

(e) the execution, delivery and performance of this Contract will not conflict with, result in the breach of, constitute a default under, or accelerate performance required by any of the terms of its Memorandum and ArticlesofAssociation [or those of any member of the Consortium] or any Applicable Laws or any covenant, contract, agreement, arrangement, understanding, decree or order to which it is a party or by which it or any of its properties or assets is bound or affected;

(f) there are no actions, suits, proceedings, or investigations pending or, to its knowledge, threatened against it at law or in equity before any court or before

any other judicial, quasi-judicial or other authority, the outcome of which may result in the breach of this Contract or which individually or in the aggregate may result in any material impairment of its ability to perform any of its obligations under thisContract;

4.19.3 Waiver of immunity

Each Party unconditionally and irrevocably:

(a) agrees that the execution, delivery and performance by it of this Contract constitute commercial acts done and performed for commercial purpose;

(b) agrees that, should any proceedings be brought against it or its assets, property or revenues in any jurisdiction in relation to this Contract or any transaction contemplated by this Contract, no immunity (whether by reason of sovereignty or otherwise) from such proceedings shall be claimed by or on behalf of the Party with respect to its assets;)

(c) waives any right of immunity which it or its assets, property or revenues now has, may acquire in the future or which may be attributed to it in any jurisdiction; and

(d) consents generally in respect of the enforcement of any judgment or award against it in any such proceedings to the giving of any relief or the issue of any process in any jurisdiction in connection with such proceedings (including the making, enforcement or execution against it or in respect of any assets, property or revenues whatsoever irrespective of their use or intended use of any order or judgment that may be made or given in connection therewith).

4.19.4 Waiver

(a) Waiver, including partial or conditional waiver, by either Party of any default by the other Party in the observance and performance of any provision of or obligations under this Contract:

I. shall not operate or be construed as a waiver of any other or subsequent default hereof or of other provisions of or obligations under thisContract;

II. shall not be effective unless it is in writing and executed by a duly authorised representative of the Party;and

III. shall not affect the validity or enforceability of this Contract in any manner.

(b) Neither the failure by either Party to insist on any occasion upon the performance of the terms, conditions and provisions of this Contract or any obligation there under nor time or other indulgence granted by a Party to the other Party shall be treated or deemed as waiver of such breach or acceptance of any variation or the relinquishment of any such right hereunder.

4.19.5 Liability for review of Documents

Except to the extent expressly provided in this Contract:

(a) no review, comment or approval by NHAI, any document submitted by the

Service Provider nor any observation or inspection of the Services performed by the Contractor nor the failure to review, approve, comment, observe or inspect hereunder shall relieve or absolve the Contractor from its obligations, duties and liabilities under this Contract, the Applicable Laws and applicable permits; and

(b) NHAI shall not be liable to the Service Provider by reason of any review, comment, approval, observation or inspection referred to inSub-clause(a) above.

4.19.6 Exclusion of implied warranties etc.

This Contract expressly excludes any warranty, condition or other undertaking implied at law or by custom or otherwise arising out of any other agreement between the Parties or any representation by either Party not contained in a binding legal agreement executed by bothParties.

4.19.7 **Survival**

4.19.7.1. Temination shall:

a. not relieve the Contractor or NHAI, as the case may be, of any obligations hereunder which expressly or by implication survive Termination hereof;and
b. except as otherwise provided in any provision of this Contract expressly limiting the liability of either Party, not relieve either Party of any obligations or liabilities for loss or damage to the other Party arising out of or caused by acts or omissions of such Party prior to the effectiveness of such Termination or arising out of such Termination.

4.19.7.2. All obligations surviving Termination shall only survive for a period of 3 (three) years following the date of such Termination

4.19.8 Entire Agreement

This Contract, the RFP and the Sections hereto together constitute a complete and exclusive statement of the terms of the agreement between the Parties on the subject hereof and no amendment or modification hereto shall be valid and effective unless such modification or amendment is agreed to in writing by the Parties and duly executed by persons especially empowered in this behalf by the respective Parties. All prior written or oral understandings, offers or other communications of every kind pertaining to this Contract are abrogated and withdrawn. For the avoidance of doubt, the Parties hereto agree that any obligations of the Contractor arising from the Request for Proposals shall be deemed to form part of this Contract and treated as such.

4.19.9 Severability

If for any reason whatever any provision of this Contract is or becomes invalid, illegal or unenforceable or is declared by any court of competent jurisdiction or any other instrumentality to be invalid, illegal or unenforceable, the validity, legality or enforceability of the remaining provisions shall not be affected in any manner, and the Parties will negotiate in good faith with a view to agreeing to one or more provisions which may be substituted for such invalid,

unenforceableorillegalprovisions,asnearlyasispracticabletosuchinvalid, illegal or unenforceable provision. Failure to agree upon any such provisions shall not be subject to the Dispute Resolution Procedure set forth under this Contract or otherwise.

4.19.10 No partnership

This Contract shall not be interpreted or construed to create an association, joint venture or partnership between the Parties, or to impose any partnership obligation or liability upon either Party and neither Party shall have any right, power or authority to enter into any agreement or undertaking for, or act on behalf of, or to act as or be an agent or representative of, or to otherwise bind, the other Party.

4.19.11 Third parties

This Contract is intended solely for the benefit of the Parties and their respective successors and permitted assigns and nothing in this Contract shall be construed to create any duty to, standard of care with reference to, or any liability to, any person not a Party to this Contract.

4.19.12 Successors andassigns

This Contract shall be binding upon and inure to the benefit of the Parties and their respective successors and permitted assigns.

4.19.13 Notices

Any notice or other communication to be given by any Party to the other Party under or in connection with the matters contemplated by this Contract shall be in writing and shall:

(a) in the case of the Contractor, be given by facsimile or e-mail and by letter delivered by hand to the address given and marked for attention of the person set out below or to such other person as the Contractor may from time to time designate by notice to NHAI; provided that notices or other communications to be given to an address outside Delhi may, if they are subsequently confirmed by sending a copy thereof by registered acknowledgement due, air mail or by courier, be sent by facsimile or e-mail to the number as the Contractor may from time to time designate by notice to NHAI;

(b) in the case of NHAI, be given by facsimile or e-mail and by letterdelivered by hand and be addressed to the [•] of NHAI with a copy delivered to the Authority Representative or such other person as NHAI may from time to time designate by notice to the Contractor; provided that if the Contractor does not have an office in Delhi it may send such notice by facsimile or e-mail and by registered acknowledgement due, air mail or by courier; and

(c) any notice or communication by a Party to the other Party given in accordance herewith shall be deemed to have been delivered when in the normal course of post it ought to have been delivered and in all other cases, it shall be deemed to have been delivered on the actual date and time of

delivery; provided that in the case of facsimile or e-mail, it shall be deemed to have been delivered on the working day following the date of its delivery

4.19.14 Sub-Contracting

The Service Provider shall not sub-contract any assignment (excluding minimum civil work) to a third party. The Service Provider shall remain solely responsible for all works under this Agreement.

4.19.15 Confidentiality of the Assignment/Findings

The agency shall not, during the term of assignment and within two years after its expiration, disclose any propriety or confidential information relating to the services, this assignment or NHAI's business or operations without prior written consent of NHAI.

4.19.16 Modification

Modification of the terms and conditions of this Contract, including any modification of the scope of the Services, may only be made by written agreement between the Parties as the case may be, has been obtained.

4.19.17 Language

All notices required to be given by one Party to the other Party and all other communications, Documentation and proceedings which are in any way relevant to this Contract shall be in writing and in English language.

For & behalf of NHAI
By

Signature

Authorised Representative

Name

Address

For & behalf of

Witness

(Contractor)

1.Signature

Name

Address

By

Authorised Representative

2.Signature

Name

Address

---------- XXXX ----------

PART V - Scope of Work

5.1 Background:

In order to remove the bottlenecks associated with manual toll collection and ensure seamless movement of traffic and collection of toll as per the notified rates, the Government had decided to introduce Electronic Toll Collection (ETC) across National Highways in India.

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5.2 Objective:

To cater to the above requirement, NHAI intends to empanel Service Provider(s) to undertake the supply, installation, integration, testing, commissioning and configuration of all required hardware & software systems & sub-systems for Hybrid ETC and Toll Management Systems at the toll plazas in a time bound manner. Service provider is also expected to provide round the clock maintenance for the same during the entire period of contract such that the required services are available at the toll plazas as per service levelrequirements.

5.3 Detailed Scope ofWork:

The subsequent sections capture details regarding potential work that may be awarded to successful bidder by NHAI. NHAI reserves the right to reduce/add details to the scope to better satisfy theirrequirements.

5.3.1 Supply, Installation and Integration:

i. The service provider shall supply, install, integrate, test, commission and configure all required hardware & software systems & sub-systems for Hybrid ETC and Toll Management System at the designated Toll Plazas.

ii. Service provider shall ensure to supply items as per BOQ as per direction from NHAI and get them verified by respective PIU. Prior to site acceptance test, the responsibility of providing storage and security for supplied material shall be in the scope of service provider.

iii. Service Provider shall be fully responsible for the safety of equipment which shall be delivered or installed at site before commencing SAT by respective PIU. Prior to SAT, if any equipment/sub-equipment/consumable gets non-functional/damaged due to any reason whatsoever, excluding scenarios covered under force majeure, then service provider will be liable for replacing of damaged item without imposing any extra charges to NHAI.

iv. Service provider shall complete the Installation, Integration, Commissioning of Hybrid ETC system and sub systems as specified in Annexure-A on such specified sites within **50 days** of the receipt of notification. The service provider shall be responsible for system integration so that the Hybrid ETC and Toll Management System including the sub-system(s) work coherently and are able to exchange data/information electronically, among themselves (if applicable), as well as with the acquirer bank and central clearing house for ETC program without any financial implication to Toll Operating Agency andNHAI.

v. Service provider shall ensure to complete all pre-requisite minor civil works i.e. pole foundation/ sensor foundation/ cabling chamber/lane ducting, plaza to Lane connectivity, Median Extension etc. pertaining to hybrid ETC system and Toll Management System. Major civil works i.e. PQC work, toll plaza canopy, toll booth, etc. are not in the scope of serviceprovider.

vi. Service provide shall provide and install valid throughout the period of contract antivirus and operating System license at lanes as well as plaza level in the system highlighted in BOQ items of thisdocument.

vii. Service Provider shall provideequipments performance NHAI.

5.4 Defect Liability Period (DLP):

I. DLP will commence from a time of Take Over Certificate(TOC) /Site Acceptance Test (SAT) issuance and will run for a period of two years (24month).

II. Maintenance, repair and replacement of all hardware, software, peripherals and sub components of all BOQ items shall be the responsibility of Service Provider without any cost toNHAI/NHAI.

III. Service provider shall resolve all faults in a specified timeframe as per the priority of the equipment to minimize closure of thelanes.

IV. Service provider shall be fully responsible for the warranty of all items which shall be supplied by them. Service Provider shall ensure to resolve all faults of equipment/Sub-equipment/consumables which are linked to spare dependency within 24 hours from the time when the fault actual occurs and for this as indicated through equipment monitoring toll or intimated by NHAI/NHAI/Toll Operating Agency, adequate spare quantity to be maintained at site level for critical items specially Hybrid ETC equipment. If the time for rectification exceeds 24 hours, 1% penalty on daily basis shall be imposed on service provider from the amount which shall be reserved for completion of DLP. However, the penalty amount shall be capped at 10% (ten percent) of the amount which shall be reserved for completion of DLP.

V. Corrective of all defective materials and workmanship in the installation will be carried out as required within this period. All de-snagging will be expediently completed within thisperiod.

VI. The Service provider shall provide 24X7 on-site support. during the DLPperiod.

5.5 Service provider shall adhere to the maintenance of ETC & TMS Equipment, Periodic Preventive Maintenance of equipment, Timely Corrective Maintenance, Software Maintenance, Remote Software support for the Hybrid ETC & Toll System. **Operation and Maintenance:**

i. Maintenance, repair and replacement of all hardware, software, peripherals and sub components of all BOQ items throughout the contract period shall be the responsibility of Service Provider in adherence to the SLA without any further cost toNHAI.

ii. Service provider shall intimate PIU/Toll operating agency for any corrective action to be taken on ground to resolve any major issue which shall take more than 2 hours of lane closure.

iii. The Service provider shall provide 24X7 on-site support during the operation & maintenanceperiod.

iv. Service Provider shall take prior approval from respective PIU before updating any version of Lane / Plaza application, for which, a software modification request shall be submitted to PIU for seekingapproval.

v. NHAI holds the right to ask Service Provider to replace any staff if found and proved unsuitable/ indulged in unwantedactivities.

vi. Any damage cause due to mishandling of equipment by the service provider employees shall be borne by service provider.

5.6 Other activities:

i. Toll Management System should be able to support all kind of Fare structures & Payment methods including, but not limited to, Daily Pass, Return Pass, Monthly Pass, Discounted tariffs, Exemptions, Open / Closed fare schemes etc. and shall meet the Tolling System requirements of the respective Concession Agreement, including subsequent regulation/ notification thereon byNHAI.

ii. The BOQ (As defined under Annexure-A) by NHAI may increase/decrease according to the further requirement at sites.

iii. The Service Provider shall arrange for all insurances pertaining to the scope of work and it shall be deemed that any related costs are included in the price Bid.

iv. The scope of the service provider will also include civil, electrical, networking works required to complete installation/commissioning of Hybrid ETC andToll Management System and associated peripherals on the plaza.

5.7Service Level Requirements(SLA)

5.8.1 System Down time Calculations

i. The uptime availability of all systems and sub-system of Hybrid ETC and TMS is provided in Annexure-A. The permissible downtime for critical systems and sub-systems is 7 hours per lane permonth.

ii. The downtime for a toll lane shall be calculated at a cumulative level when any of the critical components as mentioned in Annexure-A is non-operational for that specific lanes/plaza.

iii. For all other components of Hybrid ETC System and TMS, the uptime availability shall be 99% per lane permonth.

iv. Scheduled downtime is defined as a period of time when system will remain unavailable for conducting necessary preventive maintenance, urgent repairs etc. The maximum scheduled downtime for any Site shall be 4 hours per lane per month.

v. The formula for calculation of Hybrid ETC System availability shall be asfollows:

System Uptime = [1 – {A/(B – C)}*100],where
A = Time for which system is down per month basis scenarios
B = Total time in a month
C = Scheduled downtime basis section 8.4.1(iv)

vi. The Service Provider shall maintain adequate inventory/spares to ensure the service levels prescribed in clause 8.4.1(i) areadhered.

vii. In case of non-adherence to service levels as defined, penalties of 5% of quarterly invoice amount shall bedetected.

viii. The Service Provider along with the Toll Operating Agency shall ensure that all transaction files of the Hybrid ETC systems are uploaded as per the service levels defined in the NETCprogram.

5.8 Routine Maintenance

Scheduled downtime / Routine maintenance is defined as a period of time when system will remain unavailable for conducting necessary preventive maintenance, urgent repairs etc. The maximum scheduled downtime for any site shall be 4 hours per lane per month. The objective of electronic equipment maintenance shall be to ensure reliability, to enhance its economic life and to improve its efficiency. Routine maintenance consists of a fixed set of checks, measurements, cleaningandcalibration. These activities shall be based on Equipment Service Provider's specifications and general maintenance practices that include but not limited to:

- Checking the condition of components, e.g. check connections for signs of deterioration.
- Check voltage levels: Power supply levels are crucial to the effective operation of electronic equipment. Borderline levels could lead to intermittent faults and damage tocomponents.
- Voltage level changes are caused by the deterioration of capacitors, transformers and semiconductorcomponents.
- Certain measurements can also be performed to check the status of elements of the system, i.e. impedance and isolationtests.
- Mechanical components need routine cleaning and lubrication to ensure their effective operation.

5.9 Data Retention, Back-up and Restore Operations:

Data Retention:

Data for each plaza shall be retained for entire Agreement period in the Toll Plaza Server. The backup devices and media as per current industry practice shall also be provided.

The Service provider shall ensure adequate security measure for safe guarding of Toll Transaction data, by providing, off site Disaster recovery or Data Storage mechanism.

The service provider shall also be responsible to extract and provide data /information based on requirement of law Enforcement Agencies of Govt. of India/ State based on specific approvals on case-to-case basis.

However, it will be limited to the data captured in Hybrid ETC and Toll Management Systems as per standard operations and the data being retained as per retention schedule.

Data Back-up & Restore:

Service provider shall also demonstrate the backup & restore procedure successfully. The Service Provider shall prepare and implement a proper Data Backup & Restore policy with NHAI's approval, to ensure data safety and avoid data loss, in case of any untowardincidents.

Such policy shall ensure Back-up & Restore of Toll Transaction data at least once in a week.

5.10 Statutory and Others:

NHAI shall reserve the right to get the security / compliance audit of the Hybrid ETC and Toll Management Systems done at any time through any agency appointed for the purpose and the service provider shall extend all support & cooperation for smooth conduct of said Audit.

The Service Provider shall abide by all statutory guidelines and comply with rules/ regulations/guidelines framed by NHAI from time to time; It shall be responsibility of the service provider to incorporate such changes within the stipulated time frame into the Toll Management System.

The Service Provider shall comply with the guidelines and/ or Specifications and Standards including the revisions thereof issued from time to time by Ministry of Road Transport & Highways Govt. of India / IRC. In absence of which, the system and equipment provided by the service provider shall meet relevant American or European/ British standards &specifications.

5.11 Technical Specifications &Standards

The minimum technical specifications & the standards to be adhered have been prescribed in RFP. The Service Provider shall ensure to provide the equipment meeting the prescribedrequirements.

5.12 Acceptance Test and Approvals

After installation of Hybrid ETC and Toll Management System at the toll plazas in the current scope of work, a Site Acceptance Test (SAT) shall be carried out at these plazas to test the system functionality and performance.

The SAT shall be carried out as per the Circular: NHAI/ETC/Operations/2017/Phase-III/361/CO-II/01 dated September 28, 2017 issued by the NHAI.

Commissioning: Once Site Acceptance Testing has been concluded and the Service Provider has attended to and remedied all reported defects, the system shall be ready to be commissioned and taken into operation.

Third Party Check: For Acceptance Testing, NHAI reserves the right to appoint a third party to carry out Acceptance Testing on behalf of NHAI. The service provider shall have no objection on the same & will cooperate with such appointed third party/ consultant.

Failure by the Service Provider to complete the Works and to have remedied all reported defects by the Prescribed Date for commissioning shall result in the application of the penalties for delays prescribed under liquidated damages in the Contract Agreement.

5.13 System Development Progress Reporting

The Service Provider shall note that they are obliged to provide hardware and software progress reports, if any, as the works proceeds. These reports shall be in the English language for project managementpurposes.

5.14 Other Works

a) Service Provider's Design Responsibility

The Service Provider shall be required to produce engineering design drawings of all Toll Management Systems components / system, electrical installation and computer & data transmission network systems. It shall be the Service Provider's responsibility to adhere to the designs submitted during the implementation of Hybrid ETC systems and Toll management systems at the plazas. In case of any changes in the systems the service provider shall modify and resubmit the designs.The design should be

submitted by the service provider within 7 days of receipt of notification of commencement of work.

b) ElectricityRequirements

The Service Provider shall be required to submit the design of the electricity load requirement for the Toll Management Systems / ETC Equipment, which shall include the cabling, distribution boards, and clean earthing system, in regard to its suitability for the Toll Management Systems and ETC components. Toll Management Systems equipment earthing shall be separated from the toll plaza utility power earthing. Earthing for all equipment shall be the responsibility of the Service Provider.

c) Cabling to UPSLoads

The Service Provider shall supply, install, terminate and connect all cabling from the power DB to the entire field and control room equipment. The cable shall be suitably sized and earth PVC insulated and steel wire armoured copper cables. Wire armouring may be omitted, if the cables are drawn through aconduit.

d) Cable tray

The Service Provider shall provide adequate perforated cable trays and/or cable support wherever required, for all cabling required in Toll Lanes / Booths & Plaza Building.

e) CableNumbering

All cables installed shall be numbered with ferules, in accordance with the universal cable numbering system, in such a way that any person shall be able to understand & identify cabling for specific equipment.

All cables shall be ISI marked, fire retardant type and shall be terminated with proper lugs & joints as per best industry practices.

Part VI – Annexures & Forms

6.1 BidFORM

(In Bidding entity's Letter head)

(Date) _____

From,

(Name & Address oftheBidder)

To,

Regional Officer

National Highways Authority of India
Sri Tower, 3rd Floor,
DP, 34 Industrial Estate, Guindy,
Chennai – 600 032
E-mail: nhaichennairo@gmail.com:
rochennai@nhai.org
Ph.No.044 – 22252635.

Subject:_____

Ref.: ApplicationNo _____

Dear Sir/Madam,

After examining / reviewing the Application Documents for_____etc.the Receipt of which is hereby duly acknowledged,we,the undersigned, are pleased to apply to execute the whole of the Job for the item in conformity with, the said RFP Documents, including Corrigendum /AddendaNos._____.

We confirm that this Application is valid for a period of 180 days from the date of opening of Bid, and it shall remain binding upon us and may be accepted by any time before the expiration of that period.

Until a final Contract is prepared and executed between us, the Application together with your written acceptance thereof in your notification of award shall constitute a binding Contract between us.

We undertake that, in competing for (and, if the award is made to us, in executing) the above Contract, we will strictly observe the laws against fraud and corruption in force in India namely "Prevention of Corruption Act 1988" and other applicable law. We understand you are not bound to accept any Proposal you receive.
Yours sincerely,

(Signature of the Authorized signatory):
Name and Designation of the Authorized signatory: Name and Address of Bidder:

Phone, Fax & E-Mail

6.2 UNDERTAKING

(In Bidding entity's Letter head)

1. I, the undersigned, do hereby certify that all the statements made in the required attachments are true andcorrect.
2. The undersigned also hereby certifies that neither ourCompany M/s_____ have abandoned any work of National Highways Authority of India nor any contract awarded to us for such works have been rescinded, during last three years prior to the date of this Application.
3. The undersigned hereby authorize(s) and request(s) any bank, person, firm or corporation to furnish pertinent information deemed necessary and requested by NHAI to verify this statement or regarding my (our) competence and generalreputation.
4. The undersigned understands and agrees that NHAI may ask for further qualifying information, and agrees to furnish any such information at the request ofNHAI.
5. We confirm that we have not been blacklisted /debarred by any central/state Government department/organization or Quasi Government agencies ofPSU.
6. We confirm that no criminal proceeding is pending against our company/firm or any of its Directors/ Partners in any court oflaw.
7. We also confirm that we have not been convicted by any court of law for any of the offenses under any Indianlaws

_____

(Signed by an Authorized Officer of the Bidder)

_____

Title of Officer

_____

Name of Bidder

_____

DATE

6.3 BIDDER'S FINANCIAL CAPACITY

(In Bidding entity's Letter head)

(Date)

From,

(Name & Address oftheBidder)

To,

Regional Officer
National Highways Authority of India
Sri Tower, 3rd Floor,
DP, 34 Industrial Estate, Guindy,
Chennai – 600 032
E-mail: nhaichennairo@gmail.com:
rochennai@nhai.org
Ph.No.044 – 22252635.

Subject: ----------

Tender Ref. No.:----------
Dear Sir/Madam,
We hereby certify that the financial capacityofM/s. _____
(Name of the Bidder) for the last three financial years (ending 31st March of the financial year) is as givenbelow:

Financial capacity for the last 3 Financial Years (FYs) in Indian Rupees (INR)				
	FY (2017-2018)	FY (2018-2019)	FY (2019-2020)	Average
Annual Turnover				
Net Worth				

Yours Sincerely,

(Signature of Statutory Auditor) Name of the Statutory Auditor: Name of the Statutory Auditor Firm:
Seal:

6.4 Power of Attorney

Know all men by these presents, we, M/s ..... (name of Firm/ Company and address of the registered office) do hereby constitute, nominate, appoint and authorize Mr/Ms. .....son/daughter/wife of…….. and presently residing at ..... , who is presently employed with us and holding the position of ..... as our true and lawful attorney (hereinafter referred to as the "Authorised Signatory or Attorney") to do in our name and on our behalf, all such acts, deeds and things as are necessary or required in connection with or incidental to submission of our quotation for the works of _____ including but not limited to signing and submission of all bids, proposals and other documents and writings, and providing information/ responses to NHAI, representing us in all matters before NHAI, signing and execution of all contracts and undertakings consequent to acceptance of our proposal and generally dealing with NHAI in all matters in connection with or relating to or arising out of our proposal for the said assignment and/or upon award thereof to us.

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

IN WITNESS WHEREOF WE, ...THE ABOVE NAMED PRINCIPAL HAVE EXECUTED THIS

POWER OF ATTORNEY ON THIS .....DAY OF ..... , 2021

For .....

(Signature, name, designation and address)

Witnesses: 1.

2. Notarised

Accepted

.....

(Signature, name, designation and address of the Attorney)

Notes:

The mode of execution of the Power of Attorney should be in accordance with the procedure, if any, laid down by the applicable law and the charter documents of the executants(s) and when it is so required the same should be under common seal affixed in accordance with the required procedure. The Power of Attorney should be executed on a non-judicial stamp paper of appropriate denomination and should be registered or duly notarised by a notarypublic.

Wherever required, the Bidder should submit for verification the extract of thecharter

documents and other documents such as a resolution/power of attorney in favour of the person executing this Power of Attorney for the delegation of power hereunder on behalf of the Bidder.

For a Power of Attorney executed and issued overseas, the document will also have to be legalised by the Indian Embassy and notarised in the jurisdiction where the Power of Attorney is being issued. However, Bidders from countries that have signed the Hague Legislation Convention 1961 need not get their Power of Attorney legalised by the Indian Embassy if it carries a conforming Apostlescertificate.

6.5 BUSINESS PLAN
(In Bidding entity's Letter head)

1 Name of the Bidder/Lead Member ofConsortium:

2 Information on ongoing/existing ETC Projects that satisfy the technical qualification criteria as specified in thisRFP:

Serial Number	Name of Project	Duration	Staff details

3 Information on ongoing/existing Cash Lanes that satisfy the technical qualification criteria as specified in thisRFP:

Serial Number	Name of Project	Duration	Staff details

4 Ability of the Bidder to supply the following equipment and time required forsame

i. Please confirm if the Bidder can supply the equipment(s) as specified in Annexure-A.
ii. Equipment that cannot be supplied byBidder
iii. Time required forsupply

For and on behalf of (Name of the Bidder - if Consortium, Name of LeadMember)
(Signature of AuthorizedRepresentative)

_____

(Name, Title, andDate)

6.6 Format for Technical Experience

(On Bidding entity's Letter head)

(To be submitted separately for each experience)

Format for Experience

Assignment Name	
Client's Name and Complete Address	
Number of ETC lanes and Cash Lanes	
Location of Toll plaza	
Start Date	
Completion Date	
Details of supply, install, commission & maintenance of Tolling system	

(Copies of Work orders/Agreement/Client certificate to be attached along with)

(Authorised Signatory)
Signature:
Name:
Designation:
Bidding entity's name
Address:

Dated: ….. /…../2021

6.7 FORM OF PERFORMANCE SECURITY (BANK GUARANTEE)

(In the Bidder's Letter Head)

To
Regional Officer
National Highways Authority of India
Sri Tower, 3rd Floor,
DP, 34 Industrial Estate, Guindy,
Chennai – 600 032
E-mail: nhaichennairo@gmail.com:
rochennai@nhai.org
Ph.No.044 – 22252635.

WHEREAS _____(Name and address of Contractor) (hereinafter called "the Contractor")* has undertaken, in pursuance of Contract No._____dated _____Toexecute_____(Name ofcontract and brief description of works) (hereinafter called the "the Contract").

AND WHEREAS it has been stipulated by you in the said Contract that the Contractor shall furnish you with a Bank Guarantee by a recognized bank for the sum specified therein as security for compliance with his obligations in accordance with theContract;

AND WHEREAS we have agreed to give the Contractor such a Bank Guarantee;

NOW THEREOF we hereby affirm that we are the Guarantor and responsible to you, on behalf of the Contractor up to a total of _____(amount of Guarantee)**_____(in words) , such Sumbeing payable in the types and proportions of currencies in which the Contract Price is payable, and we undertake to pay you, upon your first written demand and without cavil or argument, any sum or sums within the limits of _____(amount of Guarantee)as aforesaid without your needing to prove or to show grounds or reasons for your demand for the sum specified therein.

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

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

The liability of the Bank under this Guarantee shall not be affected by any change in the constitution of the contractor or of the Bank.

Notwithstanding anything contained herein before, our liability under this guaranteeis restricted to Rs._____(Rs_____) and the guarantee shall remain validtill_____.Unless a claim or a demand in writing is served on us onorbefore_____all our liability under this guarantee shallcease.

This guarantee shall be valid until 28 days after the date of issue of the Defects Liability Certificate.

This guarantee shall also be operatable at our…….. Branch at New Delhi, from whom, confirmation regarding the issue of this guarantee or extension / renewal thereof shall be made available on demand. In the contingency of this guarantee being invoked and payment thereunder claimed, the said branch shall accept such invocation letter and make payment of amounts so demanded under the said invocation.

The guarantor/ bank hereby confirms that it is on the SFMS (Structural Finance Messaging System), platform & shall invariably send an advice of this bank Guarantee to the designated bank of NHAI obtaining details thereof from NHAI.

The Bank Guarantee has been sent to Authority's Bank through SFMS as per the details below:

Sr No.	**Particulars**	**Details**
1.	Name of Beneficiary	National Highways Authority of India
2.	Name of Bank	Syndicate Bank
3.	Account No.	60341010004225
4.	IFSC Code	SYNB0006034

Signature and seal of th eGuarantor_____ In presence of

Name and Designation_____1._____

(Name, signature &Occupation)

Code no. of the officer(s) signing the

guarantee(s) Name of the Bank_____ Address__

2._____(Name, signature &Occupation)

Date_____

Controlling Office of the Bank:

ContactPerson: _____

Address : _____

Tel. No : _____

Note:

[1]Give names of all partners if the Contractor is a Joint Venture.

[2]An amount is to be inserted by the Guarantor, representing the percentage of the Contract Price specified in the Contract and denominated in Indian Rupees.

[3]Letter addressed to the Employer from the Bank issuing the guarantee must accompany this form as per Annexure I to this form

Annexure I

(Ref. Section VII, Form of Performance Guarantee, Footnote No. 3)

(ON THE LETTER HEAD OF THE BANK ISSUING THE GUARANTEE)

To:

Regional Officer
National Highways Authority of India
Sri Tower, 3rd Floor,
DP, 34 Industrial
Estate, Guindy,
Chennai – 600 032
E-mail: nhaichennairo@gmail.com:
rochennai@nhai.org
Ph.No.044 – 22252635.

Sir,

Please find enclosed our Letter of Guarantee No. ……. dated ……...

For amount of Rs. …… (in words ……..Only)

Valid till …….. with claim period till …… issued at the request of

…… (Name of the Contractor / Consultant)

by this office under the joint signature of our following officers :

Name of the Officer Designation

1…… ……

2…… ……It is suggested to you that you may get confirmation of issuance of this guarantee from our Controlling Office to whom a copy of this little is being endorsed.

Thanking you,

Yours faithfully,

Signature ……..…….

Name ……..…….

Designation …….…….

Bank's Stamp …….…….

CC: The Zonal Manager,

…….. (Name of the Bank)

…….. (Complete Address)

…….. (Phone No. & Fax No.)

Copy of above said guarantee being enclosed for your information and record.

Signature

Bid Securing Declaration

I hereby submit a declaration that the bid submitted by the undersigned, on behalf of the bidder, [Name of the bidder], either sole or in JV, shall not be withdrawn or modified during the period of validity, i.e. not less than 180 (one hundred and eighty) days from the bid due date.

I, on behalf of the bidder, [name of the Bidder], also accept the fact that in case the bid is withdrawn or modified during the period of its validity or if we fail to sign the contract in case the work is awarded to us or we fail to submit a performance security before the deadline in Clause 3.32 of the Request for Proposal (RFP), then [Name of Bidder] will be suspended for participation in the tendering process for the works of MoRT&H/NHAI/NHIDCL and works under other Centrally Sponsored Schemes, for a period of one year from the bid due date of this work.

(Signature of the Authorized Signatory)
(Official – Seal)

6.8 FORMAT FOR FINANCIAL BIDSUBMISSION

(To be submitted on in the excel format separately in financial bid as available on the e-procurement portal)

Appendix 1. Toll Plazas included within the scope of the project

The subsequent table captures the list of toll plazas within the scope of the project

S. No.	Toll Plaza Name	RO	PIU	Total Lanes
1	Vallam Toll Plaza @ Km 80/600 of NH-234	Chennai	Viluppuram	6
2	Enamkariyanandal @ Km 138/600 of NH-234	Chennai	Viluppuram	6
3	Thennamadevi @ 198/600 of NH-234	Chennai	Viluppuram	6

Annexure-A

1. ETCequipment

The following table captures the list of equipment required at plaza and lanes. The minimum standard expected of these equipment is captured in subsequent sections of this document, while the number of equipment expected to be provided as part of project is as follows[1]:

Implementation of Hybrid ETC System, Video Surveillance System (PTZ Camera), MSWIM and SWB (Static Weigh Bridge) at VallamToll Plaza @ Km 80/600, Enamkariyanandal @ Km 138/600 and Thennamadevi @ 198/600 on Vellore to Viluppuram section of NH 234 in the State of Tamilnadu			
No. of Toll Plaza		**3 Nos**	
No.of Lanes		**6 Lanes per plaza**	
Part-I - System supply, Installation, Integration and Commissioning			
		Unit	**Qty**
A-Lane Level Equipment			
1	ETC RFID transciever near pay axis mounted on canopy (1 per lane)	No	18
2	Electronic Enclosure (1 per lane)	No	18
3	Lane controller with indudtrial PC (only Controller) (1 per lane)	No	18
4	AVC including sencors, loop and detector (1 per lane)	No	18
5	User fare Display with mounting pole (1 per lane)	No	18
6	Automatic barrier gate (1 per lane)	No	18
7	Over head lane Status light (OHLS) (1 per lane)	No	18
8	Traffic light with mounting pole (1 per lane)	No	18
9	Loops with detector (2 per lane)	No	36
10	Incident capture camera with mounting pole (1 per lane)	No	18
11	License plate image capture camera with mounting pole (1 per lane)	No	18
12	TFT Monitor (1 per lane)	No	18
13	Customized industrial grade keyboard (1 per lane)	No	18
14	Thermal receipt printer (1 per lane)	No	18
15	Barcode reader with stand (1 per lane)	No	18
16	Violation light and Alarm and foot switch in booth (1 per lane)	No	18
17	Booth CCTV camera with voice recording (1 per lane)	No	18
18	Cabling/Networking/Installation/Commissioning of all equipment and systems (Lump sum)	LS	18
19	Software-Lane level (1 per lane)	No	18
20	Intercom slave unit in booth (1 per lane)	No	18

21	RFID HHT reader - Wifi enabled (2 per plaza)	No	6
22	Lane UPS with 1KVA (1 per lane)	No	18
23	MSWIM (6 per plaza)	No	18
B-Plaza Level Equipment			
24	Plaza Servers in hot stand by configuration (1 per plaza)	No	3
25	Workstation for MIS,Cash up, Audit & LSDU (Lane status display unit in control room)	No	12
26	Network printer (1 per plaza)	No	3
27	8 port networks switch (Layer 3) (2 per plaza)	No	6
28	24 port networks switch (Layer 3) (2 per plaza)	No	6
29	Software-Plaza level (1 per plaza)	Job	3
30	UPS system as required for complete Hybrid ETC Toll Plaza system (1 per plaza)	No	3
31	55" LED Display for CCTV monitoring (1 per plaza)	No	3
32	Network video recorder (NVR) for CCTV recording (1 per plaza)	No	3
33	CCTV camera for plaza building surveillance (4 per plaza)	No	12
34	Intercom master unit in control room -20 channer(for <8lanes) (1 per plaza)	No	3
35	Static weigh bridge (2 per plaza)	No	6
C - PTZ camera			
36	Video Surevillance System (PTZ camera) (2 per plaza)	No	6
D - Miscillaneous			
37	Broadband Internet connection with Minimum 10 Mpbs Link (1 per plaza)	Facility	3
38	E.B. service connection (Lumpsum)	Facility	3
39	Civil works (if any required)	Facility	3
40	Part-II Operation and Maintenance (2 Years)		
	O&M Charges for 2 years	1 year	3

[1] Please refer specification details of the equipment as captured in this Annexure.

2. SoftwareSpecifications

2.1. FunctionalRequirements

2.1.1. General Requirements

This functionality shall meet the lane operation described in the subsequent sections.

2.1.2. Transaction DataFormat:

The following shall be the minimum data that make up an ETC transaction

(i) TransactionID
(ii) Tag ID (TID, EPC, and UserMemory)
(iii) Plaza and Lane ID
(iv) Date and TimeStamp
(v) AVCClass
(vi) Image of vehicle(JPEG)

The above may be modified during project execution in order to optimize the performance.

2.1.3. Transaction Processing

The System shall:

(i) Have functionality to feed in transaction data through RFID ETC transceiver, Hand-held devices and manually entry of Registration no. ofvehicles.

(ii) Validate each transaction for completeness (e.g. possessing all the related information like Tag ID, Vehicle classetc.)

(iii) check for duplicate transactions (e.g. the same tag cannot be used in the same direction within a specified duration at the sameplaza)

(iv) support generation of a wide variety of reports as given below but not limitedto:

(a) Revenuereports
(b) Trafficreports
(c) Daily / Weekly / monthly reconciliationreports
(d) Violationreports
(e) Equipment availabilityreports

(v) Security

(a) Login feature for accessing theSystem
(b) Access the system based on roles definition
(c) Storage of Sensitive data like password in an encryptedformat
(d) Use of Complicated passwords: password should be more than 6 characters and should have at least one numericcharacter.

(e) Automatic logging of every sensitive action in thesystem.

(vi) Scalability

The System / Servers shall be scalable to support increase in Tag Users / ETC transactions in future. During the time of system commissioning each lane of the system shall be capable to support 5 million tag users and 30,000 (Thirty thousand) transactions per day and at the end of 5 years shall be capable enough to support 20 million tag users and 45,000 (Forty five thousand) transactions perday.

Automatic Lane closure

The ETC lane shall close automatically in case of detection of failure of critical equipment like Transceiver, Boom barrier, critical vehicle guidance signs (Traffic Lights), Incident Capture System etc. In such cases the OHLS shall display that ETC lane is closed and the ETC exit barrier shall remain closed. Thus any vehicle entering the ETC lane is automatically 'ejected' into the neighboring mixed / manuallane.

3. Toll Plaza Equipment and SoftwareSpecifications

The subsequent sections capture the specifications of various equipment that may be required as a part of this project. Please note that this is in exhaustive list of all ETC equipment and the entire set may not be required in the current phase. Bidders are requested to refer to the detailed BOQ captured in the preceding sections of this Annexure. Also, the specifications are a minimum standard, and the supplier may choose to include products with specifications that exceed the standards, post approval from NHAI.

3.1. RFID ETC Transceiver near pay axis (mounted oncanopy)

3.1.1. General

Sr.	Parameter	Minimum Specifications
1	Frequency	UHF 865 MHZ to 867 MHZ *
2	Communication	Ethernet/ Serial communication (EIA standard RS 232 C / RS 485)
3	RFPower maximum	1 W – transmitted & 4 W – EIRP (Equivalent Isotopically Radiated Power) *
4	Reading distance	With the Transceiver mounted typically at a height of 6 m above the road surface, the coverage of the antenna shall not exceed a diameter of 3.6m.
5	Antenna	Circularly Polarized
6	Protocol	EPC Gen 2, ISO 18000-6C and shall comply with the general conformance requirements of the standard
7	Visual diagnostics	The Transceiver shall have LED indicators for sense, transmit Fault and Power which shall be visible clearly to the operator on ground while the system is operational.

*** is in the wireless license free band for RFID use in India. Typical existing product(s) for 'RFID- based-ETC' operates in the 865 MHz – 868 MHzband.**

3.1.2. Environmental

Sr.	Parameter	Particular
1	Enclosure	Light weight enclosure for the RFID Transceiver and circularly polarized antenna
2	Environmental	IP 65 or better for outdoor units
3	Relative Humidity	95% Condensing
4	Operating Temperature	-20°C to 55°C
5	Storage Temperature	-40°C to 85°C

3.1.3. OperatingCharacteristics

Sr.	Parameter	Particulars
1	Air Interface & Adaptive Noise Features	The Transceiver technology employed should have the capability to optimize read rates for the vehicle identification application and adapt to instantaneous noise and interference level
2	Application capability	1. Should have read reliability exceeding 99.**5**% in the distancerange specified. 2. Diagnostic and ReportingTools
3.	Upgradeability	The firmware should be upgradable to support future protocols.
4	Transaction Capability	Reading of Tag & EPC memory for at least 2 Tags per second for a moving vehicle with a speed limit of 40 kilometers/ hour.
5.	Driver Software	The transceiver driver software shall be provided along with the transceiver that will interface to the ETC client through socket interface and handle the communication with ETC client. The packet structuresshall be as notified in the ETC client-transceiver interface. The driver software shall implement filtering using a range of EPC-codes provided by set of bit pattern masks.

3.2. Electronics Enclosure

3.2.1. The Interface Electronics and all related peripheral/controllers should be enclosed in an IP65compliantcabinet.

3.2.2. Locking System: Enclosure shall have a **unique** key allowing access to theelectronic.

3.2.3. Door monitoring: The cabinet door shall be monitored utilizing proximity switch. Door open / close events shall be recorded as incidents identified by time and Lane. The incidents are to be displayed on the plaza softwaresubsystem.

3.2.4. Cabling Layout: All external cables shall be protected against the effects of lightning and shall comply with all requirements for the control of interference from EMI. All data cables shall be screened and shall be properly separated and shielded from all power cables.

3.2.5. Ventilation and internal temperature: All equipment endorsed by the cabinet shall be kept at a temperature consistent with manufacturersrecommendations.

3.2.6. Finishing: The cabinet surfaces shall be protected from the environment in which it shall be used and the Equipment Contractor shall specify the surface treatments to be applied. Each cabinet shall be painted and numbered in a manner consistent with the toll lanes and consistent with all equipment related functions (e.g. reporting to the plaza softwaresubsystem).

3.2.7. Cable dressing: All cables (power & signal) shall be properly routed and dressed with suitable railings inside the enclosure and ties.

3.2.8. Cable numbering: The signal & power cable terminations shall be identified by proper numbering. In addition to the termination at the controller end, this numbering shall also be maintained at locations where the cables are exposed (like manholes, junctions) and at the peripheral end. Further, all the individual component boards shall be properly identified bylabeling.

3.2.9. Cable terminations: The signal & power cable (from the peripherals) terminations shall be kept separated inside the cabinet. The cable routing inside the enclosures shall be done in a proper manner, so that, aesthetics apart, the cable faults can be traced and faulty cables replaced, easily and less timeconsuming.

3.3. Lane Controller with Industrial PC

3.3.1. FunctionalRequirements

3.3.1.1. The Toll Lane Controller (TLC) is situated in the tunnel underneath the toll lane or in the booth and has the principal task of controlling the toll collection function and all the peripheral equipment, transmitting information and data on all lane activities to a local ETC Server and receiving other control information and data from the ETC server. It also has the function of controlling all the peripherals connected toit.

3.3.1.2. All hardware, software, TLC interface to peripherals and local ETC Server shall be supplied by the equipmentsupplier.

3.3.1.3. The TLC software shall be developed to operate as ETC toll lanes as is defined under earlier section of thisdocument.

3.3.1.4. All lane operating data shall be stored in the local hard disk drive in the lane. Adequate RAM shall be provided to prevent “Thrashing” of the hard disk drive. The hard disk shall have enough memory to load and maintain all necessary program tables (like ETC black list, white list, discount list etc.) and data in memory, to optimize the toll collection functionality. Each transaction data collected from the lane peripherals shall be stored in the local hard disk of the TLC in a separate encrypted file placed in a folder automatically created with the month’s name at the start of each month, before being transmitted to the master database in the local ETC server. This data shall remain in the local hard disk irrespective of transmission to the local ETC server until a period of 1 month. At the start of the

7th month, the 1st week's data shall be deleted from the hard disk on the basis of FIFOlogic.

3.3.1.5. Further, there should be a mechanism for auditing the real time data transmission (including incidents) over a predetermined time period (say 30 minutes) and automatic data retrieval from the lane in case of datamismatch.

3.3.1.6. The TLC must be capable of storing the following minimuminformation:

i. 1 month of Transaction data including image associated withincidents
ii. Tag Whitelist asmentioned
iii. Tag Blacklist asmentioned
iv. 5 Tariff Table (active andpending)

A transaction record shall contain all the necessary information to enable complete control and auditing of the system.

3.3.1.7. The minimum required fields are asfollows:

- ✓ Transaction SequenceNumber
- ✓ Date
- ✓ Time
- ✓ Plaza
- ✓ Lane
- ✓ Shift
- ✓ Tag Vehicle Class(TVC)
- ✓ Automatic Vehicle Class(AVC)
- ✓ Image ID (in case of a violationtransaction)

The transaction time shall be the time when a Tag is detected at **transaction** area.

3.3.1.8. The TLC shall be capable of interfacing with at least the following peripheralequipment:

- Toll CollectorDisplay
- User FareDisplay
- Vehicle guidance signals (TrafficLights)
- Overhead LaneSign
- Automatic ExitBarrier
- Exit BarrierLoop
- AVC system including AVCloop
- Barrier Arm Optical and other methods of Protection
- Electronic Toll CollectionEquipment
- Incident Recording (CCTV)System
- License Plate Image CaptureCamera

3.3.1.9. The TLC shall be capable of communicating with the local ETC server. Communication shall consist of data necessary to build a

complete database in the local ETC server, from which the required financial and operating reports and statistics can be generated. The local ETC server shall also receive and log any reportable incidents occurring in the lane, which shall be transmitted real-time to the Incidents Computer (IC) for action by the toll supervision staff. In terms of incidents, real-time shall mean the time from the occurrence of the incident to the storage of the incident and the subsequent display of the incident on the IC; shall not be greater than ***2seconds***.

3.3.1.10. As described above, all data entries shall be sequentially numbered and referenced to other related entities. The incidents that occur during a transaction shall refer to that transaction. Transactions and incidents shall refer to the applicable financial entity in which theyoccur.

3.3.1.11. An automatic / manual data validation process is required to check for data continuity and missing/duplicate data. An audit trail of manual corrections is required. The data validation process shall be linked to a “data not complete” message that will be indicated on reports if data is missing / pending validation /consolidation.

3.3.1.12. Further, the TLC (via the AVC) shall monitor the lane at all times for any traffic violation or incident; and for failure of any of the toll equipment. The level of incident reported to plaza via the peripherals in the toll lane, or reported to the LOCAL ETC SERVER shall be a parameter setting in the software available at a definablelevel.

3.3.1.13. The TLC shall also be capable of receiving messages from the local ETC Server. These messages will contain data on the Tariff tables, classification table, whitelist, tag blacklists,ETCaccount balance, etc. Should the link between the TLC and the LOCAL ETC SERVER fail, a system to download such information locally into either end (TLC &LOCAL ETC SERVER) is to be made available.

3.3.1.14. The CCH maintains a vehicle class description that is generic to all toll plazas. However as the vehicle class description at each toll plaza for the same vehicle may be different, the TLC shall maintain a mapping of the CCH Vehicle class to the Plaza Vehicle class. The TLC generated transaction shall always refer to the Plaza vehicleclass.

3.3.1.15. Extended operation of the TLC in the Local Mode must be possible. The system shall manage its data storage capacity to ensure adequate free space for the operating system, application and data.

The system shall provide warnings regarding free-space when the storage capacity reduces to predefined critical limits. If the data storage on the TLC reaches this critical limit, it shall immediately instruct the plaza to stop processing of transactions any further and inform the supervisory staff to initiate a data extraction procedure. The data extraction shall be carried out via a thumb drive or portable computer and restored in the LOCAL ETCSERVER.

3.3.1.16. The Equipment Supplier shall provide the details on the TLC data managementstrategy.

3.3.1.17. Time throughout the entire toll collection system shall be synchronized with reference to the LOCAL ETCSERVER.

3.3.2. TLC PCSpecification:

3.3.2.1. The following minimum configuration requirements shall bemet:

a) Grade : Cabinet IndustrialPC
b) Motherboard : IndustrialGrade
c) HDD : based on estimated storage requirement for 6 months TLC data (at least 160 GB in case estimated capacity islesser)
d) RAM : 2 GB orlatest
e) Processor : Intel I3 orequivalent
f) Processorspeed : l 2 Ghzmin
g) NIC : 1 Gbps X 2 NumbersOn-board
h) PCISlot : 2 Nos. Spare
i) USB Port(forauthorized): 4nos.
j) Frame grabber card (if used for Capturing images) : 1 no with 2 channel capable to capture frames at the same time on bothchannels

3.3.2.2. The TLC shall receive UPS power from the UPS distribution panel. Any special electrical protection / interface unit shall be provided by the Contractor, if required, based on the needs of the device. The power distribution to the lane peripherals from the TLC shall be adequately protected with the help of surge arresters, lightning protection,etc.

3.4. AVC including sensors, loop anddetector

3.4.1. AccuracyLevel

The AVC system shall be 100% auditable and accuracy of vehicle counting should be 99.5% and classification accuracy shall not be less than 98%.

3.4.2. Auditability

The AVC System shall comply with the following auditability criteria:

3.4.2.1. Each transaction recorded by the system shall be uniquely and sequentiallynumbered.

3.4.2.2. The AVC shall be able to provide information to a laptop or to a computer connected tothe same network as on AVC computer that shall be used for auditing the classification of the AVC as well as the classification of the laneoperator.

The audit function shall be done in the following manner:

The auditor shall

a) connect to the AVC computer through network or RS-232 port of the AVCcomputer.
b) Start audit application/data extractionapplication
c) Supply Plaza name, AVC number, User id andPassword
d) Enter the date and duration for the audit.
e) Press enter to start data extraction (any time the auditor shall be able to cancel current command to start with other specificduration).
f) Obtain output of the audit report in XLS format and it shall contain at least thefollowing:
   i. Transaction sequencenumber
   ii. Date & time of thetransaction
   iii. LaneID
   iv. ShiftID
   v. TLCclass
   vi. AVCclass
   vii. MOP
   viii. Incident type and details associated with the transaction, ifany

3.4.2.3. The Contractor shall provide a data extraction tool to the Authority, it shall be possible to extract the AVC/TLC data for a user defined period in XLS format using thattool.

3.4.2.4. For audit purposes, it shall be possible to enable all transactions as incidents in order to grab LPIC images and ICS image for Supervisor / Auditor review per lane / direction / alllanes.

3.4.3. Description andFunctions

3.4.3.1. The automatic vehicle classification equipment shall be located in the lane before the position of RFID Transceiver#2.

3.4.3.2. The purpose of the AVC is to sense the presence of a vehicle (differentiate it from non- vehicular crossing), to measure and interpret certain physical characteristics of the vehicle as it passes through theAVC.

3.4.3.3. The AVC shall be able to distinguish between classes as per the applicable notifications of MORTH

3.4.3.4. This class information shall be stored locally at AVC level and communicated to the TLC. Simultaneously a still image of the

vehicle shall be captured / grabbed by the Incident Capture System (ICS) Camera as the vehicle triggers the AVC sensors. The TLC shall then check whether this AVC class matches the vehicle class (the CCH Class mapped to the Toll Plaza class) as read from the tag. If there is a discrepancy between the two classifications, the licenseplateimage(capturedwhenthevehiclepassedthroughtheETCexit)andtheICScamera image shall be saved and stored with all transaction and incident information watermarked on them. The images and discrepancy information shall be communicated to the Local ETC server for further action and processing by the toll supervision staff.

3.4.3.5. The Equipment Contractor shall submit details of the performance of existing AVC systems duly validated by the existing operators of thesystems.

3.4.3.6. The AVC shall be capable of detecting and reporting the following vehicle movements and incidents in the lane to theTLC:

- The AVC system must be able to count and distinguish two wheelers, autos andfour- wheelers separately.
- Vehicle Standing – the vehicle presence sensing equipment stays active for longer than a preset time. The preset time shall be parametersettable.

3.4.3.7. All AVC elements (loops, light curtain, cameras, etc.) shall be fully weatherproof and installed in a location where vehicle damage by accident is not possible.

3.4.3.8. When the TLC is inoperative, or communication between the TLC and the AVC is severed, the AVC shall record the last transaction number transmitted and shall be able to independently count and record (store) vehicle classes passing through or over it. A sequential vehicle counter at AVC level shall be implemented to reconcile. The AVC shall have its own battery backup and data extraction facility on to a CD or to a laptopcomputer.

3.4.3.9. The AVC shall be able to generate violation if the ETC lane is not logged- in and a vehicle passes through it.

3.4.3.10. In following cases, the AVC shall generate an alarm on the plaza level and send record to incident control system for supervisory action apart from the incidentsdefined:

- Degraded classification (in case of any single Transmit / Receivefailure)
- Unable toclassify

3.4.3.11. The accuracy of the AVC shall not be affected by temperature or

any weather /environmental conditions and shall be independent of vehicle speed /weight.

3.4.4. AVC System Design andApproval

3.4.4.1. Functionalrequirements:

3.4.4.1.1. The AVC shall be able to automatically classify the classes of vehicles as indicated in the vehicle class table to an accuracy of 99.60% without manual intervention and class correction or validation. Unless, the above criteria is achieved, the AVC shall never classify a vehicle to any defined category in the Classification table; it shall be categorized as unable to classify so that it triggers an incident and there is no chance for revenue loss. This can be used to fine tune the AVC to improve the accuracylater.

3.4.4.1.2. The functional specification for the AVC shall include the hardware, software and operational requirements. The design requirements of the AVC are to be seen as a system in which all failures, events and other events are logged, stored and managed. The following design criteria shall be used in theAVC:

- AVC ClassificationTable
- AVCConfiguration
- Vehicle Detection andClassification
- AVCInterfaces
- AVC TechnicalRequirements
- Data Storage

3.4.4.1.3. All operating data shall be stored on the local hard disk drive of the AVC computer. “Thrashing” of the hard disk drive shall be prevented. The AVC shall have enough memory to load and maintain all necessary program tables and data in memory. All other transaction data shall be stored on the local hard drive of the AVC and a copy to be transmitted to the LOCAL ETCSERVER.

3.4.4.1.4. The following minimum information is to be stored at AVClevel:

i. Classificationtable
ii. AVCconfiguration
iii. Data of at least one year (transaction, event, AVC centric incidentetc.)

3.4.4.1.5. Two separate streams of data, carrying vehicle classification information from TLC and AVC shall be copied at LOCAL ETC SERVER level for comparison, evaluation and audit purposes. There shall be provisions for drawing separate

reports for TLC and AVC classifications at LOCAL ETC SERVER level. An AVC accuracy and reconciliation report shall be present in the tollsystem.

3.4.4.2. The performance of the AVC shall form the basis for the accuracy checks, functional tests, installation, commissioning and handover to achieve the required accuracy and performance. All design and installation approvals shall be obtained from NHAI before installation and commissioning. The Contractor shall submit a detailed list of vehicles with photographs and Indian RTO authorized classification category of all models of vehicles found in India as part of Technical specifications delivery. The configuration of AVC classification table into the system shall be done in the presence of the authorized representative ofNHAI.

3.4.4.3. The plaza lane area detailed AVC layout including the following items shall be provided at the time of technical specifications delivery by the Contractor so that the design process can be implemented at site. The Contractor shall ensure that the equipment layout is in conformance with the Lane Design Drawings as provided by theAuthority.

3.4.4.4. The system architecture shall provide the details of the equipment layouts and the physical location of each component of the system in the ETC toll lane.

3.4.4.5. The loop detector units/cards shall conform to the following minimumrequirements.

3.4.4.6. The unit shall be easily removable and shall be fitted with at least two (2) loops percard.

3.4.4.7. The unit shall have a minimum of 4 separate adjustable sensitivity and frequencylevels.

3.4.4.8. The unit shall have indicators for vehicle presence, loop on/off and failure.

3.4.4.9. The light curtain installed shall comply with the following specification and are mounted in a manner as to ensure that the following minimum specifications are adhered to at alltimes.

- Ensure that no vehicle can pass through the AVC and miss axle counting.

- Number of Axles per vehicle is accurately counted for every vehiclepassage.
- Sensor replacement time shall not exceed 30minutes.

3.4.4.10. It shall be noted that the equipment enclosures shall be mounted in the tunnel running under the plaza, sufficient ventilation shall be provided by the equipment Contractor for this enclosure and the enclosure shall have IP65protection.

3.4.4.11. The AVC enclosure shall be mounted in the tunnel. The AVC enclosure shall be secured using suitable corrosion resistant fixtures, and all fixtures shall be approved before the mounting of the AVC can takeplace.

3.4.4.12. The AVC enclosure shall be provided with a switch to detect that the AVC door is open or closed, and the status shall be updated at plaza level in realtime.

3.4.4.13. All mounting shall be done in a neat and professional manner and shall be approved by the Authority.

3.4.4.14. All AVC cables that enter the enclosure shall be protected between the enclosure and the sensors, using a suitable flexible steel re-enforced trunking / cable tray / ducting as approved by the Authority to reduce the risk of tampering. All the cable entries to the AVC enclosure shall be sealed properly with glands / sealant, asapproved.

3.4.4.15. The quality control procedure manual shall be provided with the proposal by the equipment Contractor, which shall include a minimumof:

- AVC Installation LogSheet
- Loop Resistance Testing and Loop Earth TestingProcedure
- Cross-talk VerificationProcess

3.4.4.16. Loop Chatter (Bobbing) VerificationProcess

3.4.4.17. Basis of classification logic ofAVC

3.4.5. AVC ControllerConfiguration

The following minimum configuration requirements shall be met:

a) Grade : IndustrialPC
b) HDD : based on estimated storage requirement for 6 months TLC data (at least 160 GB in case estimated capacity islesser)
c) RAM : 2 GB orlatest
d) Processor : latest IntelProcessor
e) Processorspeed : latest available in the market at the time ofdelivery
f) CD /DVDR/W : latest available in the market at the time ofdelivery
g) NIC : 1 Gbps X 2 NumbersOn-board

h) PCISlot : 2 Nos.Spare
i) USBPort : 4nos.

3.4.6. AVCEnclosure

The AVC and all related peripheral controllers should be enclosed in an IP65 compliant cabinet.

1. Locking System: Each cabinet shall have a **unique** key allowing access to theAVC.
2. Door monitoring: The cabinet door shall be monitored utilizing proximity / limit switch. Door open / close events shall be recorded as incidents identified by time and Lane identification. The incidents are to be displayed on the plazalevel.
3. Cabling Layout: All external cables shall be protected against the effects of lightning and shall comply with all requirements for the control of interference from EMI. All data cables shall be screened and shall be properly separated and shielded from all powercables.
4. Ventilation and internal temperature: All equipment endorsed by the cabinet shall be kept at a temperature consistent with manufacturersrecommendations.
5. Finishing: The cabinet surfaces shall be protected from the environment in which it shall be used and the Equipment Contractor shall specify the surface treatments to be applied. Each cabinet shall be painted and numbered in a manner consistent with the toll lanes and consistent with all equipment related functions (e.g. reporting to the plaza software subsystem).
6. Cable dressing: All cables (power & signal) shall be properly routed and dressed with suitable railings inside the enclosure andties.
7. Cable numbering: The signal & power cable terminations shall be identified by proper numbering. In addition to the termination at the controller end, this numbering shall also be maintained at locations where the cables are exposed (like manholes, junctions) and at the peripheral end. Further, all the individual component boards shall be properly identified by labeling.
8. Cable terminations: The signal & power cable (from the peripherals) terminations shall be kept separated inside the cabinet. The cable routing inside the enclosures shall be done in a proper manner, so that, aesthetics apart, the cable faults can be traced and faulty cables replaced, easily and less timeconsuming.

3.5. User Fare Display with mountingpole

3.5.1. Description andFunction

3.5.1.1. The User Fare Display (UFD) shall be located in the toll lane in a position where it is readily visible to and readable by Users from the pay point. The display has the primary purpose of informing the User of the vehicle. It shall convey ETC balance information & low balance warnings, public relations and seasonalmessages.

3.5.1.2. The UFD shall be of variable message type and shall have high intensity LED or similar Operator approved display of 10 characters per line in two lines with the option of scrolling for displaying seasonalmessages.

3.5.1.3. The UFD shall send status information to the TLC for interface with plazasubsystem.

3.5.2.Specifications

The following minimum specifications shall be met:

a) Size : 750 X 400mm
b) Display : RedLED
c) VisibilityRange : 10m
d) Enclosure :MS
e) MTBF : 50,000hours
f) MTTR : less than 30minutes

3.5.3.PowerSource

The UFD shall receive UPS power from the TLC. Any special electrical protection / interface unit shall be provided by the Contractor, if required based on the needs of the device.

3.5.4.Protection

The UFD shall be IP 65 rated orbetter.

3.6. Automatic BarrierGate

3.6.1. Description and Functions – AutomaticBarriers

3.6.1.1. The lane exit barrier shall be suitable for high- speed ETC transactions. One full open- close cycle shall not take more than 1.2 seconds. The barriers are being used in the ETC express lane, the barriers shall be capable of full lane open from a close state in less than 0.6seconds.

3.6.1.2. The housing and any mounting frame shall be fabricated from corrosion-resistant materials. They shall be IP 55 rated. The barrier shall be driven electrically. The motor shall not be damaged when the barrier is blocked in any position. Exit barriers shall have presence detectors independent to the AVC system to prevent barrier arms coming down on vehicles while passing. This shall be in the form of infrared units and dedicated embedded loops. Apart from the barrier arm, the mechanism may not have any moving protrusions that pose a risk to persons standing in close proximity to the barrier.

3.6.1.3. The barrier arm shall be fabricated from a light, corrosion resistant material readily and inexpensively available in India. The barrier arm shall further have a protective mechanism whereby controlled fracture of the barrier arm occurs without damage to the housing or motor in the event of frontal collision. Preference will be given to non- destructive break-away mechanisms. Further, there shall be a protection mechanism to detect the presence of vehicles to avoid accidental hitting on the vehicles, whenever the boom is triggered for

closing.

3.6.1.4. Suitable power supply scheme shall be implemented by the Contractor to feed the Exit barrier to protect the source from being damaged due to electrical surges / spikes injected by the dynamic (inductive) load. Further, the drive shall be so designed as to the damping factor is just sufficient for the drive to operate the booms without any jerks during open / close to avoid freak hitting by the exitingvehicles.

3.6.1.5. Barrier arms shall have retro-reflective red stripes in accordance with the local traffic signstandards.

3.6.2. Specifications

3.6.2.1. The following minimum specifications shall be met:

a) BoomLength : 3 m or 3.5m
b) BoomMaterial :Aluminium

3.6.3. PowerSource

The Automatic Barrier Gate shall receive power directly from dedicated online UPS. Suitable protection shall be provided by the Contractor at the load end to protect the Boom Barrier. The Contractor shall fulfill any specific earthing requirement.

3.6.4. Protection

The Automatic Barrier Gate shall be IP 55 rated.

3.7. Overhead Lane Status Sign(OHLS)

3.7.1. Description andFunctions

3.7.1.1. The Over Head Lane Sign (OHLS) is located above the center of the lane at the lane entrance. The purpose of the OHLS is to indicate to the User whether the toll lane is open for the processing of vehicle or closed. A red cross is used to signal that the lane is closed, whilst a green arrow is used to indicate that the lane is open totraffic.

3.7.1.2. Signs must be sufficiently bright and directed to indicate to a motorist, approaching the toll plaza, at a distance of *300 m* on a bright cloud free day that the lane is available for use. The OHLS status shall also be visible up to a peripheral view of 45 degrees from the travel axis.

3.7.1.3. At any situation, both RED and GREEN part shall not glow simultaneously. Under failure conditions, only Red Cross shall be displayed untilrectification.

3.7.2. Specifications

The following minimum specifications shall be met:

a) Size : 300 mm X 300 mm
b) Display(Cross) : RedLED
c) Display(Arrow) : GreenLED
d) LED : 5mm in diameter, 8000mCd
e) VisibilityRange : 150 m (under extreme weather conditions)
f) Enclosure : IP 65 or better grade

3.7.3. PowerSource

The OHLS shall receive UPS power from the TLC.

3.7.4. Protection

The OHLS shall be IP 65 rated or better.

3.8. Traffic lights with mountingpole

3.8.1. Description andFunctions

3.8.1.1. The Traffic Light (TL) shall be located in the toll lanes in a position where it is readily visible to users of the toll road, usually on the side of the lane beyond the toll booth. The traffic light shall consist of two traffic light heads mounted on a suitable pole. An amber signal with arrow is used to indicate that the user should take suggested path, whilst the green signal is used to indicate that the user shouldproceed.

3.8.1.2. At any situation, both AMBER and GREEN part shall not glow simultaneously. Under failure conditions, only Amber arrow shall be displayed untilrectification.

3.8.2. Specifications

The following minimum specifications shall be met:

a) Size : 200 mmΦ
b) Display(Stop) : AmberLED
c) Display(Start) : GreenLED
d) VisibilityRange : 20 m (under normal visibilityconditions)
e) Enclosure : SS (stainless steel) orPolycarbonate

3.8.3. PowerSource

The TL shall receive UPS power from the TLC. Any special electrical protection / interface unit shall be provided by the Contractor, if required based on the needs of the device.

3.8.4. Protection

The TL shall be IP 65 rated or better.

3.9. Loops withdetector

Dimension as suggested by the Service Provider/System Integrator and detector specification as per AVC specification chapter.

3.10. Incident Capture Camera with mountingPoles

3.10.1. The cameras shall be charge coupled device (CCD) color cameras equipped with fixed focal manual iris lenses and night vision capabilities. The cameras shall require a minimum of 1.8 lux for usable image/video. The CCTV systems shall have adequate surge and lightning protection.

3.10.2. The model selected shall have image compensation capability to ignore stray lighting / vehicle lighting so that ICS and LPIC shall render meaningful output forverification.

3.10.3. The camera should be able to capture snapshotsalso.

3.10.4. CameraLocation

The Equipment Contractor shall determine the best mounting positions for the cameras so that effects, such as, direct sunlight and stray lighting is negated. The cameras shall also be protected from or be resistant to high winds and moisture. Vibration shall be minimised such that the image quality is nevercompromised.

Each camera shall view and detect vehicle images for its lane. The cameras shall be located so that sidelong profile of the vehicle is obtained as it crosses the AVC, so that the number of axles of the vehicle crossing the AVC shall be clearly visible when the vehicle is exiting the lane. The camera shall have an automatic adjustment of brightness. The housing shall be an IP-65 rated Enclosure to withstand adverse weather conditions.

3.11. License Plate Image CaptureCameras

Each camera shall view and detect vehicle images for its lane. The cameras shall be located so that sidelong profile of the vehicle is obtained as it crosses the AVC, so that the number of axles of the vehicle crossing the AVC shall be clearly visible when the vehicle is exiting the lane. The camera shall have an automatic adjustment of brightness. The housing shall be an IP-65 rated Enclosure to withstand adverse weather conditions

3.12. TFTDisplay

The TFT display/Fee Collector Display (FCD) shall be located on the fee collectors desktop and shall be screwed or bolted through the counter top, the position of the FCT shall be finalized with the employers engineer at time of installation, suitable mounting brackets manufactured from stainless steel shall be provided to fix the screen to the desktop. All nuts and bolts are used to secure the FCT to the booth counter top shall be stainless steel. It shall be the system's interface to the fee collector, to display the status of transactions and status of the lane peripherals.

Minimum Technical specifications for the TFT display shall be as follows:

Description	**Remarks**
Display Type	TFT with Diagonal Size of 18.5” Minimum
Cables	Power Cable 1 x VGA Cable (15- pin HD D – Sub)
Cable routes	Power cable: 15 meters VGA Cable: 15 meters (terminated to the SVGA Port at the LC via booth ducting)
Color	Manufacturer’s Original Color
Voltage Requirement	AC 230 V (50 / 60 Hz)
Power Consumption	80 W
Operating Temperature	0 degree C to 50 degree C
Relative Humidity	20 % to 80 %
Design Criteria	- Min. Resolution: 1024 X 768 / 60Hz - Aspect Ratio :4:3 - Number of Colors: 16.2 M,(6bit+FRC) - Video bandwidth: 70MHz - Viewable size: 18.5”Minimum - MTBF: 30,000hrs - MTTR: 0.25hrs

3.13. CustomizedKeyboard

The keyboard on the Fee Collector terminal for Registration of toll operations shall be a programmable Industrial Grade keyboard. The industrial grade keyboard shall be fully programmable; this however must be approved by the Engineer before supply. These keys will be used to enter data of:

(1) Staff Idnumber
(2) Vehicle Classification
(3) Type ofTransaction
(4) Accept/CancelTransaction
(5) Method of paymentsSelection
(6) OperateOHLS
(7) Numeric Keypad with backspace button for numericcorrections
(8) ClassCancel
(9) Bleed-off button
(10) Violation Cancel/AcceptButton
(11) Simulation Button (Only for use during MaintenanceMode)
(12) Alpha Numeric Keys in QWERTYformat

Customized Programmable Keyboard Features and minimum Specification shall be as follows:

- Shall have Powerful programmingcapability
- Programming under DOS and Windows, multiple page, multiple level, whole range key content, time delay, position sense answer back code,etc.
- True spill-resistantdesign
- Optional blank key, double key for alternative key grouplayout
- Optional MSR
- 70 programming keys + 6 position controlkey
- Key top size: 18 mm x 22 mm for singlekey
- Interface: PS/2 orUSB

- Dimension (maximum): 340 mm (W) x 150 mm (D) x 58 mm (H) or vendor/OEMspecific
- Weight: upto 1.2kg
- Color: OEMSpecific

3.14. Barcode Reader with stand

Desktop mounted fixed Barcode reader shall be installed in the toll booth on the FC desktop in lanes.

The motorists upon reaching the pay-axis of the lane will produce the return/ daily pass ticket he had collected from the FC at the first entry lane. The FC will place the ticket on the barcode reader which will read the 2D barcode printed on the ticket. The LC will get the transit details from the barcode which are required to validate the validity of the ticket and authenticate based on the vehicle class (already selected by the FC while the vehicle was approaching) for processing of the transaction.

System Integrator shall note that handheld/handy barcode scanner/readers will not be allowed in any case, even if the same is provided with the stand. The scan rate of the handheld readers is very less which delays the transaction processing. The possibilities of damages in handheld barcode readers are very high. Hence only desktop mounted BCR shall be supplied.

BCR Features and minimum Specification shall be as follows:

- BCR shall be a High performance 2D omnidirectional laserscanner
- Shall have Programmable sleep mode; Reactivated by simple push of abutton
- BCR shall perform Full automatic scanningoperation
- Depth of Field: 300 mm (EAN 0.33 mm / 13 mil, PCS =90%)
- Scan Patten: 7 directions of scan field, 24 scanlines
- Scan Rate: 2400 scans/sec for omnidirectionalscanning
- Dimension (maximum): 152 mm (H) x 152 mm (W) x 91 mm (D); Weight: not more than 500g
- Interface: USB orSerial

3.15. Themal ReceiptPrinter

3.15.1. The thermal receipt printer (RPR) shall be used to print receipts in the lanes. The printer shall be provided with the automatic advance function of the paper after printing so that the space for the first line of printing is aligned under the print head thus reducing the time taken to produce a receipt.

3.15.2. For design purpose, it shall be assumed that receipts will be approximately 70mm in length. The Employer (NHAI) and project/plaza information will occupy space on the top. The area under this shall be used for particular printed data. The System Integrator shall take the approval from the Employer for the format of thereceipt.

3.15.3. Minimum Technical specifications for the RPR shall be asfollows:

Descriptions	Remarks
Dimension	Maximum up to 145mm (W) x 195mm (D) x 148 (H)
Weight	Shall be less than 2 kg

Installation and Fixing Details	Installed and fixed on the Fee Collector desk
Cables	- Powercable - Serial RS232C/ Parallel/USB
Cable routes	Power cable is terminated to the HLC Termination Block via booth ducting. Data cable is connected to the HLC
Color	Cool White/Dark Grey
Power Supply Requirement	24 VDC + 7%
Access for maintenance, modularity of construction	The cover can be opened for maintenance.Italso has paper sensors. Off-the-shelfproduct
Operating Temperature	5 C to 50 C
Relative Humidity	5 % to 90 %
Design Criteria	Print Speed: 47 LPS Print font: 9x17/12x24 Print column capacity: 56/42 columns
	Character size (mm): 0.99(W) x 2.4 (H) / 1.41 (W) x 3.4 (H) Paper dimension (mm): 79.5 ± 0.5 (W) x 83 (diameter) Paper thickness: 0.06-0.07 mm Auto cutter life: 1.5 million cuts Real-time printer status: Auto status back (ASB) messages MCBF: 52 million lines MTBF: 360,000 hours, Overall MTTR: 0.25 hrs

3.16. Intercom Slave Unit inside Booth

This specification lays down the general, functional and technical requirements of intercom slave communication unit to be used as a sub-system in the Booth at the Plaza.

ISCU shall be used for communication between the Toll Collector at the lane and the auditor/ supervisor at the Plaza building.
ISCU shall have the following functions:

- Voice communication installed in the booths shall provide hands free two-way verbal communication between the supervision staff in the control room and the Collectors. The Collector shall be able to attract the attention of the auditor in the control room by pressing a single button on the intercom slave unit in thebooth.
- The equipment shall also have the facility to allow the supervision staff to monitor communication in the booth between the Collector and the user or between any booth without alerting theCollector.
- The voice communication system shall operate independently of the Plaza Toll managementsystem.
- Voice communication shall also be implemented in various rooms of the plaza building and at building access points.

- Two-way communications shall be possible as soon as the auditor responds by selecting the appropriate lane button on the Master Communicationunit
- One-way communication shall be possible from the Control Room intercom to all lanes simultaneously(broadcast)

ISCU shall meet the following minimum technical specifications:

Descriptions	**Minimum Specifications**
Installation and Fixing Details	Fixed in the booth. (wall/desktop mount)
Speech Method	Hands-free
Wiring distance	120 meters with 0.202 mm diameter (33 AWG) cable, 300 meters with 1.024 mm diameter (18AWG) cable
Speaker	20 ohms
Power Consumption	6 W (max.)
Power Supply Requirement	Power supply from Master System
Wiring	2 wires, non-twisted
Environmental Considerations	Operating Temperature of 10^{O}C to 50^{O}C
Reliability	30,000 hrs

The System Integartor may also propose/ provide an IP based intercom system.

3.17. Master Communication Unit(MCU)

This specification lays down the general, functional and technical requirements of master communication unit to be used as a sub-system in the Plaza.
The master communication unit MCU is a master communication system to control communication between the Collector at the lane and the auditor at the Plaza building. The unit will be located in the Control room and controlled by auditor/supervisor.

Technical Specifications:

Descriptions	Remarks
Power Source	24V DC
Current Consumption	Max. 1A, 80mA in standby
Communication	Push-to-talk at master station hands free at sub
Calling	LED and intermittent ringing tone at master until answered
Frequency Response	770 – 6800Hz
Total Harmonic Distortion	3% @ 1000Hz at 20 ohms
Mounting	Wall or desk mount

Wiring	2 conductor per sub station
MTBF	30,000 hrs

3.18. Closed Circuit TV (CCTV) (General)

3.18.1. General

This part of the RFP covers the equipment and services to be supplied under CCTV equipment to be installed at the Plazas. The CCTV equipment shall be categorized as two types, CCTV for lanes and CCTV for Plazasurveillance.

The CCTV for lanes shall be:

(1) Booth CCTVcameras

The CCTV for Plaza surveillance are:

(2) Network Video Recorder(NVR)
(3) Video Management Software(VMS)
(4) Plaza Building Security CCTVcameras

All the cameras shall be IP based and shall be connected to the Plaza Network video recorder (NVR). The video management software (VMS) installed on NVR shall provide the facility to control the cameras at the Supervision Control room at the Plaza Buildings. The video recording of each camera shall be stored at for a period of minimum 30 days.

The functionality of the CCTV cameras provided by the Bidder shall be described as follows:

Booth CCTV cameras – These cameras shall be installed inside of the booth to capture the activities of the Collector all the time and especially when doing the transactions along with the view of the paying vehicle. The position of the booth camera shall be decided accordingly. These cameras shall have inbuilt voice recording and SD memory card of minimum 32GB for local storage of videos and voice recordings.

Plaza Building Security CCTV cameras – These cameras shall be intended for monitoring of security areas such as the plaza compound, general parking area, Toll

Control Room, cash room, plaza building lobby, Collector walkway, server room, UPS room, tunnel, parking, staircase, cash van loading area,etc.

The design of the CCTV system for the plaza shall consider the following: -

(1) Provide effective supervision andcontrol
(2) Easy touse
(3) Self-containedsystem
(4) Increase span ofmanagement
(5) Reduce unnecessarytravel
(6) View / evaluate situationsquickly
(7) Motion detection
(8) Savings on time andmanpower
(9) Easy access to video information and quickplayback
(10) Minimize the use of securityguards
(11) Eliminate unnecessary responses to falsealarms
(12) Provision for futurescalability

3.19. Booth Level CCTV

The booth CCTV camera shall be an IP based fixed dome type color cameras installed inside the booth to capture the activities of the Fee Collector while performing his operations. The camera also shall capture the view of the paying vehicle while capturing the transaction video.

These cameras shall have inbuilt voice recording and SD memory card of minimum 32GB for local storage of videos and voice recordings.

These cameras shall be connected to the NVR installed at the control/server room at each Plaza building.

The camera and NVMS shall be capable of triggering alarms in case of Video motion detection, manual trigger, digital input, periodical trigger, system boot, recording notification, camera tampering detection and audio detection. The triggering alerts can be controlled by the control roomoperator.

Technical Specifications of the Booth Cameras shall be asfollows:

The technical specifications mentioned hereunder are minimum guidelines. The Bidder shall not deviate materially from the specifications specifiedherein.

Parameters	**Minimum Specifications**
Image Sensor	1/2.8” Progressive CMOS
Maximum Resolution	1920x1080 (2MP)
Lens Type	Fixed Focal
Focal Length	f = 2.8
Aperture	F1.8
Field of View	110° (Horizontal), 64° (Vertical), 135° (Diagonal)
Shutter Time	1/5 sec. to 1/30,000 sec.
Day/Night	Removable IR-cut filter for day & night function
Minimum Illumination	0.08 Lux @ F1.8(Color) 0.001 Lux @ F1.8(B/W)
IR Illuminators	Built-in IR illuminators, effective up to 25 meters or better IR LED*8
On-board Storage	SD/SDHC/SDXC card slot
Compression	H.265 & MJPEG
Maximum Frame Rate	30 fps @ 1920x1080 In both compression modes
Maximum Streams	4 simultaneous streams
S/N Ratio	Above 55dB

Parameters	Minimum Specifications
Dynamic Range	97dB or better
Video Streaming	Adjustable resolution, quality and bitrate
Image Settings	Adjustable image size, quality and bit rate, Time stamp, text overlay, flip & mirror, Configurable brightness, contrast, saturation, sharpness, white balance, exposure control, gain, backlight compensation, privacy masks, Scheduled profile settings,Seamless recording, smart stream, 3D Noise Reduction, VideoRotation
Audio Capability	Audio input /output (full duplex)
Compression	G.711, G.726
Interface	External microphone input Audio output
Protocols	IPv4, IPv6, TCP/IP, HTTP, HTTPS, UPnP, RTSP/RTP/RTCP, IGMP, SMTP, FTP, DHCP, NTP, DNS, DDNS, PPPoE, CoS, QoS, SNMP, 802.1X, UDP, ICMP
Interface	10 Base-T/100 BaseTX Ethernet (RJ-45)
ONVIF	Supported
Alarm Triggers	Video motion detection, manual trigger, digital input, periodical trigger, system boot, recording notification, camera tampering detection, audio detection
Alarm Events	Event notification using digital output, HTTP, SMTP, FTP and NAS server, SD Card File upload via HTTP, SMTP, FTP, NAS server and SD card
Connectors	RJ-45 for Network/PoE connection Audio output DC 12V power input Digital input : 1, Digital output :1
LED Indicator	System power and status indicator
Power Input	Max. 9 W (PoE)
Safety Certifications	CE, LVD, FCC Class B, VCCI, C-Tick
Operating Temperature	Temperature: -10°C to 50°C

3.20. Network Video Recorder (NVR)

H.265 Linux-based embedded standalone NVR shall be provided. Shall support 16-Channel /24- Channel / 32-Channel network cameras. The NVR shall be ONVIF compliant and scalable configuration with features to help users to set up and manage advanced IP surveillance systems with ease. The NVR shall also support remote and mobile access, via web based application, and app for both iOS and Android devices.

The NVR shall have minimum following technical features:

a) H.265 CompressionTechnology

b) Plug & Play One Button AutoSetup

c) Intuitive, Intelligent and InteractiveUI
d) Live viewing, recording and Playback features
e) Embedded Linux OS or OEMSpecific
f) Support RAID 0/1/5Storage
g) Up to 12MP Camera Liveview &Playback
h) Dual Lan Network Ports with FailoverFunction
i) ONVIF OpenPlatform

3.21. CCTV cameras for Plaza Building surveillance (Server room, Contorl room, Cash room, admin)

The system shall be connected to the NVR. The VMS installed on NVR shall provide the facility to control the cameras at the Supervision Control room at the Plaza Buildings.

The cameras shall be for monitoring of security areas such as plaza compound, security garage, Control Room, Change of Shift Room and Cash Counting Room, Lobby, Hallway, Tunnel, Fee Collector Walkway, parking, staircase, DG room, electrical room, server room, UPS room, Loading Bay, etc.

These cameras shall be

a) **Fixed lens Bullet CCTV night vision colourcameras**.

The bullet cameras installed outdoor shall be installed in the weather proof enclosure.

Technical Specifications of the Plaza Surveillance Cameras shall be as stated hereunder. The technical specifications mentioned hereunder are minimum guidelines. The Bidder shall not deviate materially from the specification specified while preparing the Technical Proposal of the Tender.

Fixed lens Bullet CCTV night vision color cameras

Parameters	Minimum Specifications
Image Sensor	1/2.8" Progressive CMOS
Maximum Resolution	1920x1080 (2MP)
Lens Type	Fixed-focal
Focal Length	f = 3.6 mm
Aperture	F2.1
Field of View	83° (Horizontal), 53° (Vertical), 91° (Diagonal)
Shutter Time	1/5 sec. to 1/30,000 sec. or better
Day/Night	Removable IR-cut filter for day & night function
Minimum Illumination	0.06 Lux @ F2.1 (Color)
	0.001 Lux @ F2.1 (B/W)
IR Illuminators	Built-in IR illuminators, effective up to 30 meters
On-board Storage	Slot type: SD/SDHC/SDXC card slot
	Seamless Recording
Compression	H.265 & MJPEG
Maximum Frame Rate	30 fps @ 1920x1080
	In both compression modes
Maximum Streams	4 simultaneous streams
S/N Ratio	50 dB or better
Dynamic Range	95 dB or better
Video Streaming	Adjustable resolution, quality and bitrate, Stream

Image Settings	Adjustable image size, quality and bit rate, Time stamp, text overlay, flip & mirror, Configurable brightness, contrast, saturation, sharpness, white balance, exposure control, gain, backlight compensation, privacy masks, Scheduled profile settings, 3D Noise Reduction, Video Rotation, Defog
Audio Capability	Two-way audio (full duplex)
Compression	G.711, G.726
Interface	External microphone input

Parameters	**Minimum Specifications**
	Audio output
Users	Live viewing for up to 10 clients
Protocols	IPv4, IPv6, TCP/IP, HTTP, HTTPS, UPnP, RTSP/RTP/RTCP, IGMP, SMTP, FTP, DHCP, NTP, DNS, DDNS, PPPoE, CoS, QoS, SNMP, 802.1X, UDP, ICMP, ARP, SSL, TLS
Interface	10 Base-T/100 BaseTX Ethernet (RJ-45)
ONVIF	Supported
VCA	Line crossing detection, field detection, loitering detection
Alarm Triggers	Video motion detection, manual trigger, digital input, periodical trigger, system boot, recording notification, camera tampering detection, audio detection
Alarm Events	Event notification using digital output, HTTP, SMTP, FTP and NAS server, SD Card
	File upload via HTTP, SMTP, FTP, NAS server and SD card
Smart Focus System	Fixed Focus
Connectors	RJ-45 cable connector for Network/PoE connection
	Audio input
	Audio output
	DC 12V power input
	Digital input: 1, Digital output:1
LED Indicator	System power and status indicator
Power Input	DC 12V
	IEEE 802.3af/at PoE Class 0
Power Consumption	Max. 9 W
Casing	Weather-proof IP66-rated housing
	Vandal-proof IK10-rated metal housing (Casing Only)
Safety Certifications	CE, LVD, FCC Class A, VCCI, C-Tick
Operating Temperature	10°C to 50°C

3.22. 24 port Network Switches (Layer3)

3.22.1. General

The System Integrator shall supply and install network equipment at each Plaza and each toll gate to connect Plaza building system with toll lane systems. At the Plaza, the System Integrator shall supply and install all equipment, cables, connectors, terminals and other miscellaneous materials necessary to establish a working local area network connecting these twosystems.

The network configuration shall be determined by the System Integrator. The cost of the network devices and materials that is not explicitly listed in the BOQ of this Contract but necessary for the system shall be deemed as included in the cost of appropriate items and the Contract Price, and no separate payment shall bemade.

8-Port PoE industrial grade rugged managed switch with 2 fibre port shall be provided in each lane to connect all lane peripherals. No unmanaged switch shall be provided in the HES lane. This 8-Port switch shall be installed inside the Electronic Enclosure of the Hybrid Lane Controller. Managed switch will ensure that the data transmission between the lanes and PMS is smooth and faster. This will also prevent data broadcasting from lanes which may result in chocking of the entire network and slows the data transfer and efficiency of the lane equipment.

3.22.2. 24 Port Layer 3 Switch with 4 FiberPort

Switch should support port security, DHCP snooping, Dynamic ARP inspection, IP Source guard, BPDU Guard, spanning tree root guard.

Switch should be IPv6 Certified/IPv6 logo ready and Switch / Switch's Operating System should be tested and certified or in process of certification for EAL 2/NDPP or above under Common Criteria Certification.

Switch should have 1:1 redundant internal power supply. Power supply modules, fan modules and transceivers modules should be hot swappable.

Should support IEEE Standards of Ethernet: IEEE 802.1D, 802.1s, 802.1w, 802.1x, 802.3ad, 802.3x, 802.1p, 802.1Q, 802.3, 802.3u, 802.3ab, 802.3z, 802.3az.

Switch shall have minimum 24 nos. 10/100/1000 Base-T ports and additional 4 nos. SFP uplink ports loaded with MMF modules with dedicated stacking ports

Switch shall have wire rate performance and 48 Gbps of dedicated stacking bandwidth.

3.23. ETC Server (PlazaServer)

3.23.1. The local ETC server is responsible for the control, data storage, processing and administration of the toll operation. It shall be the responsibility of toll management server to synchronize all activities of toll collection process, data and time of allworkstations.

3.23.2. There shall be a separate partition for Operating System. All Data files shall be stored in a separate partition. Image files shall have a separate 3rd partition. This scheme is applicable not only for the LOCAL ETC SERVER but in all levels of TollSystem.

3.23.3. Storage sizing at each level shall be backed up with corresponding file size per transaction / record as part of technical specifications delivery. If required, the HDD finalized as part of BOQ shall be revised to handle the data storage capacity requirement as per the requirement without any additional cost to thePurchaser.

3.23.4. General Requirements

3.23.4.1. The manufacturer of the server and workstations shall:

- Be a well-known and established company worldwide in the field of InformationTechnology.
- Have an established and appointed representative or authorized agency in projectlocation.

3.23.4.2. The Contractor of the server and workstationsshall:

- Be a well-known and established IT hardware supply company in projectlocation.
- Be a registered representative of the original equipment manufacturer in projectlocation.
- Be capable of supplying adequate after-sales service and support on 24X7basis.

3.23.5. Platform

3.23.5.1. The server shall make use of minimum 64-bitplatform.

3.23.5.2. Configuration

- Processor board: shall have the capacity to accept up to 4, 64-bit central processorunits.
- Central Processor Unit/s: shall be 64-bit, Xenon 3 GHz or superior latest available speed at the time of delivery to thesite.
- Number of Processors:2
- RAM: 8 GB (Upgrade up to16GB)
- RAID (Redundant Array of Inexpensive Disks): shall use RAID5 with hardware RAID controller.
- SCSI Controller: shall have a minimum of twochannels
- HDD: hot swap disks of latest available speed; capacity shall be based on data retention of all data for a period of 5years
- DVD R/W: latest availablespeed
- Network Devices: 3X10G (Gigabit) LAN NIC (Network InterfaceCard)
- Power Supply: shall have a dual hot swap power supply to provideredundancy
- Connectivity: Two (2) standard communications ports (D sub 9 pin), Four USB (Universal Serial Bus) ports (High Speed USB 2.0), SVGA Screenport
- Light path diagnostic with external visiblepanel
- LCD display for server operational log(events)
- Integrated system management processor onboard
- Redundant hot swapfans
- Optical scrollMouse
- 17” TFTmonitor

3.23.5.3. The server including all accessories listed above shall be installed inrack.

3.23.6. SoftwareCompatibility

The server shall be capable of supporting the following software platforms:

Operating System:
Window
s UNIX
LINUX (64bit platform) or compatible

Database:
Industry standard

3.23.7. BackupDevice

Backup device shall be connected with the server through a SCSI controller card and shall be DLT drive 80/160 GB.

3.24. Archive StorageDevice

3.24.1. This device shall be connected with the server through a USB port and shall be of any reputed make with service and support availability in India and of RAIDconfiguration.

3.24.2. This device shall contain all the archived data on a monthly basis after the 5 year retention period. It shall be possible to restore a COPY of the archived data for selected months to the live database as and when required and can be removed immediately after it serves its purpose. Since, this data is to be utilized only for reporting purposes, all the transaction and related data shall be retained in the Archive until the end of contractperiod.

3.24.3. However, the LPIC, ICS images grabs, AVC profile against each transaction can be archived separately on DVD / Tape after the 5 year retention period and will not be stored in the Server Hard disk and USB based Archive storagedevice.

3.25. System Image StorageDevice

3.25.1. A separate secure external HDD shall be supplied for storing the ghost images of all fresh installation of lane / AVC controller and other modules, local ETC Server, etc. After restoring this ghost image, it shall be possible to import / configure the lane / equipment specific characteristics before normal operation of the equipment. Any data required shall be restored from the back-up device. In case of local ETC Server restoration, the current day data after backup to external storage device can be retrieved from thelanes.

3.25.2. SystemSoftware

3.25.2.1. The system shall be in Domain environment and all workstations must connect to that domain.

3.25.2.2. An additional secondary server shall be provided, which shall take over

immediate charge of Primary server in case of its failure. In other words, this shall be a hot standby to the primary server in allaspects.

3.25.2.3. The specification, make, model of all the accessories of the secondary domain controller shall be same as that of the primary domaincontroller.

3.26. Licensing

License for each server, workstation operating system, Database management system software, database maintenance software (like TOAD, etc.) or any other software (MS-OFFICE package, Adobe, GHOST etc.) used in toll system, which requires a license, shall be provided by the Contractor in the name of the Authority without any additional cost to the Authority.

3.27. Database Management System

3.27.1. Database shall be a relational database managementsystem.

3.27.2. Lane system shall not have any direct database access. Data from the lane going to the database shall be through dedicated software that runs on databaseserver.

3.28. Data Network

3.28.1. The data network shall be Ethernet format. The network shall use TCP/IP protocol and the cabling shall be STP / MM OFC and it shall be compatible with all network system and equipment.

3.28.2. Care shall be taken to ensure that the cable and the network switches used between two equipment shall be able to cater to the speed of the higherNIC.

3.29. Remote Access

Remote access shall be through a safety system as a remote connection server or firewall system. The Toll system network shall be compliant with the majority remote access equipment and remote access system and it shall be configured with any remote system available at site.

3.30. Hardware and Software Control System

3.30.1. Hardware and Software fault logging system. This shall include all information regarding faults, downtime and repair time, imported from the ETCServer.

3.30.2. Help Menu

An intuitive and interactive help system that can be activated from anywhere in the TMS system.

3.30.3. Security System

3.30.3.1. A facility to allow the Authority to manage users and their accesslevels.

3.30.3.2. The plaza ETC system shall at its highest level determine access to the separate modules by any employee. It shall have the facility to define the employee according to an associated level or duty, and provide a mechanism, whereby access isrestricted.

3.30.3.3. All FDD and CD R/RW of workstation shall be disabled and except Administrator no one shall have any right assigned to add, remove or modify any program on any of the workstations.

3.30.3.4. Nothing other than toll collection and operations function shall be accessible to any level of toll operation function. If need arises, then the user shall logout, exit the application using administratorrights.
After this Logoff from the system the user shall login into Windows with Administrator rights and perform any required action. This is applicable for all levels of the Toll System.

3.31. Workstations Management

At any time, if the purchaser wants to add additional workstations and its peripheral hardware from the system, shall be able to do so without any additional cost to thepurchaser.

3.32. Interfaces

The system shall be designed using Open interface architecture at all levels of hardware used. In future, it shall be possible for the Authority to change any make / model of any hardware without dependency on the Contractor.

3.33. Data Management and Integrity

3.33.1. Data Integrity

The basic need for data integrity is the account closing at the administrative level. The closing process assumes that all data from the lanes has been introduced into thedatabase.

This can be resumed to:

- Guarantee the data in database iscomplete
- Guarantee the data in database iscorrect

This is accomplishedwith:

- Checksum: let detect errors in data
- Data type sequencing: let detect missingsequence
- Communication sequence: this is a periodic messaging to allow detection of communication failure

Since, the whole Toll Collection system is designed to detect and subsequently prevent misuse in any manner and collect all collectible revenues, any transaction / operation performed in any level of the Plaza ETC system shall be recorded in the system on detecting a definitive positive / negative confirmation only. Usage of any other irrelevant keys under such conditions shall display a warning message to use the correct keys.

3.33.2. Data Sequence

Each message / transaction shall have its own sequential number.

3.33.3. Missing Data Detection and Resolution

3.33.3.1. The conditions to be sure all data is in the database in a given momentare:

a) All message sequences received were correct (no checksumerrors)
b) There were no jumps in message sequential number
c) There were no jumps in message type sequentialnumber
d) The Communication sequence is being received with no gaps and small permissible delays.
e) The message sequence type counters into Communication sequence are in accordance with the counters received in actualmessages.

3.33.3.2. The program used to insert lane messages into the database keeps making the above checks. If any problem is detected, it is signaled to plazalevel.

3.33.3.3. If any of the conditions above fail, the system signals a problem with the data on a connected workstation in graphical form i.e. for each lane by hour. The resolution of the problems:

a) If there is a data error (message received with bad checksum or bad data fields) the system automatically tries to read the TLC / AVC messageagain.
b) If data is missing, the normal way to solve this will be to make an export from TLC and import in Administrative System using lane data import function. If the problem persists,

The specific situation will have to be analyzed by going in details like which kind of data sequence is missing - revenue or non-revenue, the missing sequence details shall be made available just by clicking on the failure block of the lane data as represented by the lane data failure graphics.

3.33.4. Data Import / ExportSystem

3.33.4.1. Reports Information

To a Microsoft Excel, comma separated and MS Access compatible database file.

3.33.4.2. Data Backup & Restore System

Data shall be backed up onto a removable medium on a regular basis for removal from the premises. *Contractor shall submit a backup process and plan with the proposal, Authority's agreement and approval is required before its implementation.*

3.33.4.3. Data archiving /restore

3.33.4.3.1. Data archived on removable media on a regular basis shall be as specified under clause6.21.5.2

3.33.4.3.2. All data shall be transferred / appended to removable electronic media / USB based Archive Storage device at monthly intervals and stored after the expiration of the prescribed period for retention of the data on various system levels, the data may be removed from the system. The plaza ETC system shall provide the facility to perform thesefunctions.

3.33.5. Data Redundancy

3.33.5.1. All transaction and incident data shall be retained duplicated and stored within the various levels of the toll collection system such that should any level or component of that level suffer a partial or total failure, the data is not irretrievably lost to the system. In addition, it shall be possible to reconstruct and restore the data for the failed level form the stored data into its originalformat.

3.33.5.2. Data retention times within the various levels shall be atleast:

a) Vehicle Processing at Lane Level:1month

b) Plazalevel:

- DetailedData: 36months
- Archived Data on USBArchiveStorage: 10years

3.33.6. Data Transfer

No workstation / controller can be used as a router to send data to the server database; all data shall be reported directly to the server.

3.34. Incident Management Workstation

3.34.1. This module facilitates the supervisor to acknowledge incidents and to correct class discrepancies generated at lane level. Incident capture camera and License plate capture camera image/s and sensor outputs shall help supervisor in deciding the correct class of the vehicle and other validationactions.

3.34.2. Incident Management

3.34.2.1. The GUI shall be so designed that it shall be possible for the Supervisor to view at least the following information corresponding to eachincident:

- Plaza ID
- Lane ID
- User ID (of the user who was logged in lane at the time of incidentgeneration)

- User Name (corresponding to above UserID)
- TransactionNumber
- Transaction Date &time
- TLCClass
- TLC / TAGVRN
- TLCMOP
- AVCClass
- AxleCount
- Processed by (User ID of the Supervisor who processed theincident)
- Supervisor Name (corresponding to Processed by UserID)
- CorrectedClass
- Corrected VRN
- SupervisorAction
- TAG Media ID
- ICS image (with watermarked Date / Time stamp, transaction number, incident type,etc.)
- LPIC image (with watermarked Date / Time stamp, transaction number, lane VRN, etc.)
- Event details (events / anomalies associated with this transaction – each transaction starts when Valid TAG Media is detected – for media based transactions / AVC Loop is triggered – for violations and ends when the vehicle liberates the AVCloop)

3.34.2.2. For processing of incidents / review of processed incidents, the Supervisor can filter the list of incidents based on thefollowing:

- Plaza ID (Default – All) Drop down menuform
- Lane ID (Default – All) Drop down menuform
- User ID (Default – All) Drop down menuform
- Transaction Date &time duration – From &To (Default – Current Date) Userconfigurable
- TLC Class (Default – All) Drop down menuform
- TLC MOP (Default – All) Drop down menuform
- AVC Class (Default – All) Drop down menuform
- Axle Count (Default – All) Drop down menuform
- Processed by (Default – All) Drop down menu form including blank which shall be the case until incident is processed.
- Corrected Class (Default – All) Drop down menu form including blank which shall be the case until incident isprocessed.
- Supervisor Action (Default – All) Drop down menu form including blank which shall be the case until incident isprocessed.
- Event details (Default – All) Drop down menu form
- Processed Incidents / Not ProcessedIncidents

3.34.2.3. In addition to the above, it shall be possible for the Supervisor to search for a particular record based on any / combination of the following searchcriteria:

- UserID
- TransactionNumber
- TLCClass

- TLC / MediaVRN
- TLCMOP
- Processedby
- CorrectedClass
- Corrected VRN
- SupervisorAction
- TAG Media ID

3.34.2.4. Based on the MOPs defined in the system and the Incident configuration, it shall be possible for the Supervisor to correct the class of the vehicle, Vehicle Registration Number (VRN) and Confirm / Reject the LaneMOP.

3.34.2.5. The incidents can normally be processed by Supervisor by performing selections / feeding information on one and / or all of the belowfields:

- CorrectedClass
- Corrected VRN
- Comments(optional)

3.34.2.6. It shall be possible for the Supervisor to perform these actions only by double clicking on a particular incident to view all information in detailed view before processing the incident.

3.34.2.7. It shall be possible at Plaza ETC system level to configure following on selection menu basis in order to activate and deactivate by administrator levelfunction:

1. Capture of ICS image none, for selected type of incident, for all types of incident, for alltransaction.
2. Capture of LPIC image none, for selected type of incident, for all types of incident, for alltransaction.
3. Record and report incident transaction at incident management system, none, for selected type of transaction, for alltransaction.

3.35. Other functions

3.35.1. In addition to the above primary function of the Supervisor, the following functions shall be performed by theSupervisor:

a) DataCompleteness
b) ShiftConsolidation
c) DayConsolidation
d) MonthClosure
e) Lists TransfeStatus

The above functionalities are explained in detail below.

3.35.2. Data Completeness

3.35.2.1. The Supervisor can verify the status of data transfer between the lanes and workstations on an hourly basis. Wherever, the data transfer status is not OK, a separate process shall be available through which the Supervisor can re-request data transfer to correct thestatus.

3.35.2.2. The Data completeness procedure shall check at least the following minimumitems:

- Transaction sequencejump
- Transaction sequencereset
- Gap in time (if regular data packets are not updated),etc.

3.35.2.3. The Data completeness procedure needs to be defined and a separate document shall be provided by the TCE Supplier on how this feature is to be accomplished in the system.

3.35.3. Day Closure

3.35.3.1. The Day Closure option is used by the Supervisor to close each Operational day. When the Supervisor selects this option, the system shall display the current status of Operation in terms of dataexchange.

3.35.3.2. When, the supervisor closes the day, the following conditions shall be verified by the system before generation of Day ClosureReport:

a) Datacompleteness
b) Data transfer to CCHcompleteness

3.35.3.3. If any of the above checks fail, the system shall display an alert (POP-UP) to the Supervisor to perform these pending operations before dayclosure.

3.35.3.4. This procedure shall ensure that no data generated is left unattended for review / reconciliation.

3.35.4. Month Closure

3.35.4.1. Month closure is performed on a monthly basis on a complete calendar month. Once, this option is selected any day pending closure shall be brought to the notice of the Supervisor. For ensuring that all data and all corrections are complete and no deconsolidation whatsoever shall be required any further, the month closure for a particular month shall be performed on the 2nd day of the subsequent month (configurable).

3.35.4.2. Once, this operation is performed, no changes whatsoever can be made through the application to the transaction data of the corresponding month whatsoever. Deconsolidation option shall not be available and all manual overrides with respect to these transactions shall not bepossible.

3.35.4.3. Whenever, this operation is confirmed, system shall ensure that this operation

is performed after debt recovery. A warning message to this effect shall still appear for the Supervisor to ensure and confirm that the debt recovery process for the month for which month closure is being performed is alreadycomplete.

3.35.5. Lists Transfer Status

3.35.5.1. In addition to the transaction data, there can be various lists related to users, media, classification, fare, configuration, parameters etc. which shall be transferred between server and workstations / lanes.

3.35.5.2. The status of all such lists shall be displayed on selection of this option. The status shall include thefollowing:

a) Name of thelist
b) Version of currenttransfer
c) Version of previoustransfer
d) Date & time
e) Frequency of transfer (in HH:MMformat)
f) TransferStatus

3.35.5.3. It shall be possible for the supervisor to re-request / re-transfer any failed listtransfers.

3.35.5.4. Also, all lists shall be retained in the system along with date of activation and date of expiry in addition to the versiondetails.

3.35.5.5. All the above listed functionalities are the core responsibilities of the Supervisor and only he / she can perform the above functions. Any user of a higher user-group though can view the actions performed by the Supervisor / current status but cannot modify anything unless explicitly somentioned.

3.35.6. Fare table management

3.35.6.1. The following functions shall be performed by the TollManager:

a) Fare table management (updation / revision subject to Project Manager authorization in the system through hislogin)
b) Whenever a new version of fare table is generated, the old fares and contracts shall be picked up by default. It shall be possible for the user to further modify these fares and set the date / time ofactivation.

3.35.7. Other Toll Manager Functions

3.35.7.1. Incident Management

The Plaza manager can view and access all features / options of this function. However, he / she cannot perform any modifications / corrections.

3.35.7.2. Data Completeness

On certain conditions when the Data completeness status cannot be corrected due to false triggers, non-revenue data missing, revenue data missing, etc., an option shall be available for the Plaza manager to manually override such statuses in order to restore the operationalflow.

3.35.8. Users Management

The following are the various user groups that shall be available in the system:

Operations	Finance	System
Project Manager	Finance Manager	Administrator
Toll Manager	Cashier	Maintenance
Supervisor		

3.35.8.1. When the user is created for the first time, all the information below ismandatory.

a) Name
b) Address
c) Date OfBirth
d) Contact Person
e) Contact Number
f) Email ID(optional)
g) UserID
h) Activation date
i) Valid upto

3.35.8.2. The status of account and Date of creation shall be displayed against all the existing users in the system. User account can never be deleted from the system once created, as there can be operations / transactions performed by the user that exists in the database and is required for reportingpurposes.

3.35.9. Administrator Functions

In addition to the normal functions listed above, administrator can perform the following operation.

3.35.9.1. Lists Transfer Management

The administrator can manually copy the latest version of lists from the local ETC Server and restore the same in all the lanes.

3.35.10. Incident reporting levels

3.35.10.1. The system will allow the assignment of a level of importance to each incident and also define if the incident should be acknowledged by thesupervisor.

3.35.10.2. The system has different levels of importance that can be assigned to different

types of incidents. They shall be colour coded to facilitate easy visualization by the supervisor.

3.35.11. Incident Recording

ICS image capturing start from loop occupation to loop liberation and an additional configurable time limit after loop liberation of that transaction. Image capturing shall timeout after 30 seconds (configurable) after loop occupation irrespective of the abovecondition.

3.35.12. System Configuration for Incident management

One number of Incident management workstation with following configuration and peripherals shall be supplied by the Contractor.

The following minimum configuration requirements shall be met:

a)	Make	:	Reputed Branded
b)	Grade	:	Workstation
c)	HDD	:	based on estimated storage requirement for 6 months data (at least 160 GB in case estimated capacity is lesser) of latestRPM
d)	RAM	:	4 GB orlatest
e)	Processor	:	latest Intel Processor
f)	Processorspeed	:	latest available in the market at the time of delivery to thesite
g)	CDROM	:	latestavailable
h)	PCISlot	:	2 Nos. Spare
i)	USBPort	:	4 nos.(highspeed)
j)	NIC	:	1 GbpsOn-board
k)	RS232port	:	2
l)	LPT port	:	1
m)	PS2 port(mouse)	:	1
n)	PS2 port(keybrd)	:	1
o)	Monitor	:	Colour 17”TFT
p)	Mouse	:	Optical
q)	Keyboard	:	Standard

3.36. UPS

3.36.1. Online UPS with 4 hours of backup and sizing based on power requirement calculation, shall be provided by the Bidder. The UPS design shall take the following into account:

a) The system shall be capable of maintaining an uninterrupted power supply to the UPS loads for a sustained period of at least 4 hours under full load conditions from a fully chargedbattery.
b) It shall also be capable of continuously supplying power to the system

under an intermittent interruptioncycle.

c) The UPS shall be capable of operating at input voltages of 210/380Volts ±10% and 50 Hz ±2.5Hz.

3.36.2. Lane LevelUPS:

Parameter	Minimum Specification
UPS with Battery	Online
Rating	As per power requirement (125% of connected load)
Backup	2 Hours
Input Voltage	155-305 VAC
Input Frequency	50H z
Output Voltage	230 VAC
Output Waveform	Sine Wave

3.37. Software – Lane level

As described under various sections of this document.

3.38. Software – Plaza level

As described under various section of this document.

4. Video Surevillance System (PTZ Camera- clause 816.15 of MoRTH 5th Revision).

4.1 General

The system shall be provided to monitor the movement of vehicles on the highway. System configuration shall comprise video camera, video camera housing, pan and tilt heads, optical transmission units for video and data (if required) and mounting poles at camera locations. The Control centre configuration shall comprise monitors for individual cameras, matrix switcher, multiplexer and digital video recordor with suitable interface for the integrated highway packages and optical interface units to the backbone communication system wherever required (where the video and data cannot be transported from camera location to the sub-centre on co-axial cable). The video camera locaton shall be easily identifiable. The video camera shall be of dome type to avoid pilferage, be resistant to vandalism and weather – proof. The mounting and equipment housing shall be able to withstand adverse weather conditions and the video camera shall be capable of working satisfactorily under worst weather conditions. The video camera and associated units shall be water ingress and dust proof. The video camera mounting shall have easy accessibility for maintenance purposes.

4.2 Technical Requirements

4.2.1 The video camera shall meet the following minimum technical as requirements:

a)	Image sensor	¼" CCD with 22x optical zoom
b)	Active Pixels	752 (H)x582(V)
c)	Horizontal Resolution	Minimum 470 lines
d)	Sensitivity	0.02 lux @ 1/1.5 secopnd shutter speed
e)	Focus	Automatic (with manual override/preset facility)
f)	Signal to Noise	> 50 dB
g)	AGC	Automatic with manual override
h)	White Balance	Automatic with manual override
i)	Auto shutter	Yes
j)	Signal Format	NTSC/PAL

4.2.2 The video camera shall have angular travel as below:

Horizontal : 360 degree continuous pan
Vertical : +2 to -92 degree

The video camera shall have speed as below:

Manual Speed

Pan : 1/10 degree to 80 degree/ second (Variable)
Tilt : 1/10 degree to 40 degree/ second (Variable)

Preset Speed

Pan : 250 degree/second
Tilt : 200 degree/second

4.2.3 The dome drive shall have 40 presets with labels and shall have an accuracy of +/-0.52 degree preset accuracy. It shall have built-in protection against power Line Surge and Lighting and provision for Onscreen-compass and Tilt display, integral, auto sensing multiprotocol receiver/dirve and provision for auto-filp dome rotation. There shall be programmable limit stops for Auto/random/frame scan modes. The Video Camera shall be connected to the control centre/sub-centre through co-axial cabel and data cable/optical fibre cable as per the site requirement and shall have remotely selectable operating modes and shall be operated from the Control Centre. The video images from camera shall be transmitted in real time. The video image shall be made available at the control centre without any distortion or loss of information. The video camera system shall have the facility for zone blanking, auto identification of zones when the pan movement of camera is active and infra-red compatibility for night operation.

5. Medium Speed Weigh in Motion (MSWIM)

5.1 Functional Requirements

a. The MSWIM system shall be able to capture number of axles, axle spacing, number of wheels, gross weight of vehicle and height of each passing vehicle and provide data of each vehicle to the lane controller for further auditing and analysis.

b. The Gross vehicle weight of vehicles approaching the toll booth shall be automatically detected for speed range prescribed in the specifications.

c. This detected weight shall not be displayed on the computer terminal of toll collector until the collector classifies the vehicles.

d. If the vehicle is found to be overloaded based on toll collector classification, the weight information shall be displayed as “Overweight Warning” and appropriate toll receipts with 10 times the fare, shall be generated automatically.

e. The excess fee charged against such overloaded vehicles shall also be separately printed on toll fee receipts of such vehicles.

f. MIS reports shall be available for IHMCL, on numbers of overloaded vehicles crossing any toll plaza as per mutually decided format.

5.2 Technical specifications

Capacity of the platform	30 Ton/Axle
Stationary Accuracy	± 0.1 % FSR
In Motion Accuracy	±7% FSR upto speed 50Km/h; and
Overload capacity of the platform	150% of rated capacity
Vehicle separator	IR Based curtain housed in weather proof, IP 65 Rated pillars with proper sealing
Controller Housing	Water/Weather proof with anti-rust coating; IP 65 rated
Approval/Certification	Weights & Measures approved Model, Duly stamped & sealed by W&M Department on Installation.
Re-calibration/stamping & Verification	Every 12 (Twelve) months
Downtime allowed for periodic maintenance	Maximum 24 (Twenty Four) hour/ Quarter

5.3 Installation & Operation

a. Slow speed weigh in Motion (SSWIM), if already installed and functional on a lane of a toll plazas shall NOT be removed.
b. Installation of MSWIM shall be carried out only on those lanes where there is no existing WIM equipment installed.
c. MSWIM platform should be installed on the road surface, 22.5 meter from pay axis (as per IRC SP 84 -2014) and the median is to be extended beyond the WIM with the bull nose.
d. Water drainage arrangement should be provided for WIM systems to prevent water logging inside the WIM Pit Frame wherever necessary.
e. All cables should run inside their respective condults and should not be exposed to the open.
f. Mechanical Checks should be carried out before fitting and mounting MSWIM hardwar.
g. After installation of MSWIM system, final levelling procedure has to be carried out before calibration.

h. Onsite calibration test is to be conducted for the MSWIM system before starting regular operations.
i. Proper earthing/grounding and UPS power shall be provided to MSWIM system.
j. The MSWIM system should be integrated with TMS system of toll plaza.
k. MSWIM system should provide 99% uptime excluding maintenance related downtime.
l. The approval/ certification for calibration of MSWIM shall be conducted by Department of weights and measures at least once in a year.

5.4 Maintenance

a. MSWIM system maintenance should take place on monthly/quarterly basis depending on the site conditions.
b. Basic cleaning and maintenance should be carried out by an authorized respective.
c. Glass of vehicle separator or sensors should be cleaned on a daily basis.

6. Static Weigh Bridge (SWB)

6.1 Functional Requirements

a. SWB Shall be installed in each direction of traffic, after the toll plaza, in a separate area having facility of parking of overloaded vehicles.
b. The SWB system shall be able to capture Toll Transaction Number with Date and Time, Vehicle Registration Number, Category of Vehicle, permissible Weight, and gross Vehicle weight along with date/time of weighing, and the receipt printed by the SWB System shall contain these information. This system shall also be integrated with the toll system and generate a closure report.
c. As soon as a vehicle passes through the weigh-in-motion system in the toll lane and is detected to be overloaded, the vehicle shall be directed to move towards the designated area having a Static Weigh Bridge (SWB). The Vehicle is weighed again on the SWB to confirm the overloading for the specified vehicle class.
d. If over loaded confirmed after weighing at SWB, the overloaded vehicle shall be parked in the designated area and allowed to unload to bring its weight within the permitted level for the identified vehicle class. Once, the driver/vehicle owner confirms that the extra load on the vehicle has been removed. The vehicle shall be weighed again on the SWB to check that its weight is within permissible limit before releasing it to move further on the National Highways.
e. IN case the vehicle weight is found to be under permissible limits, the SWB system shall be able to remove overweight comment from the Toll Transaction and the Transaction shall be closed without excess overweight fee/refund the overweight fee if charged. In such cases, the SWB charges shall not be payable by the vehicle owner/operator for weight measurement.
f. SWB station shall have a CCTV camera for capturing image of vehicle while weighing.
g. Monthly MIS reports shall be available for IHMCL and CO Division, NHAI such as Actual over load vehicles, Total Overweight Vehicles (WIM) vs Actual Overweight Vehicles (SWB) etc.,

6.2. Technical Specifications

Type	Site specific (Pit/Pit less/ Mobile)
Body/ platform	Steel
Size	18 meter x 3 meter
Capacity	120 Tonnes
Structure	1-Beam complying BIS 2062. Top plate – 10 mm or more – Steel as per BIS 2062
Structure	Duly certified for Structural Analysis And Design (ST AAD) – III
Number of Load cells	8
Type of Load Cells	Compression Type/Double Ended Shear Beam – Stainless Steel 17-5 ph
Protection Class for the Load Cells	IP 68 or better , Operational Temp: -10 to 65 Degrees
Protection Class for the Weighing Indicator	IP 65 or better, Operational Temp: -10 to 65 Degrees
Overload Capacity	150% of rated capacity
Accuracy Class	OIML – C- IV
Accuracy Tollerance	Up to 0.02 %
Painting	Anti-rust & anti-corrosion painting
BIS Specification	IS – 9281 (Part – III)
Complaint	Legal Metrology Act 2009 (1 of 2010) & Rules framed thereunder from time to time – Duly sealed by the Weights & Measures Dept.
Approval/Certification	Weights & Measures Approved Model

6.3. Installation & Operation

a. SWB shall be installed in each direction of traffic (LHS & RHS), after the toll plaza, in a separate area having facility of parking of overloaded vehicles. SWB shall be installed in toll plaza premises at distance atleast 100 meter from lane pay axis so that normal lane traffic shall not be affected.

b. The layout plan has to be marked on the surface where SWB is to be installed, as per dimensions. Based on the same soil for pit foundation has to be excavated and the raft shall be laid for civil foundation i.e. base – work.

c. Top surface levels of foundation should be kept in same level, to avoid camber or cross slope.

d. The pit should be deep enough to allow easy accessibility for routine maintenance. A sump pit should be provided to prevent water logging in the pit.

e. After the successful casting of foundation, SWB platform shall be Installed.

f. Mechanical checks should be carried out before fitting and mounting SWB hardware.

g. Proper earthing/grounding shall be provided to SWB as well as controller.

h. UPS power to be supplied to SWB Controller and other peripheral equipments installed.

I. The approval/certification for SWB calibration shall be conducted by Department of Weights and Measures at least once in a year.

j. SWB system should give 99% uptime excluding maintenance related downtime.

6.4. Maintenance

a. SWB system maintenance should take place on monthly/quarterly basis depending on the site conditions.

b. Basic cleaning and maintenance should be carried out by an authorised representative

c. Earthing needs to be checked on monthly basis.

PART–VII: PREPARATION AND SUBMISSION OF BID

7.1 Bid must be submitted online only at http://etenders.gov.induring the validity of registration with the e-Tendering Portal being managed by National Informatics Centre (NIC), i.e. http://etenders.gov.in.To participate in e-tendering, the intending participants shall register themselves in the website of URL.

7.2 Bidders/Applicants are advised to go through the FAQs, guidelines, instructions, manuals, policies, system setting procedures etc. as provided in the e-Procurementportal.

7.3 Tender form and relevant documents will not be sold /issued manually from offices.

7.4 Bidders are required to upload scanned copies of Bid Security, proof of online payment of cost Bidding Documents, Power of Attorney and other relevant document on the e-procurement portal.

7.5 The date and time for online submission as mentioned in the section RFP document shall be strictly followed in all cases. The bidder/Applicants should ensure that their tender is submitted online before the expiry of the scheduled date and time. No delay on account of any cause will be entertained. Tender(s) not submitted online will not been entertained.

7.6 If for any reason, any interested bidder fails to complete any online stages during the complete tender cycle, NHAI shall not be responsible for that and any grievance regarding that shall not been entertained.