Exhibits

Exhibit A – Project Implementation Schedule

Exhibit B – Payment Schedule

Exhibit C – Price Proposal Instructions

Exhibit D - Forms

Exhibit A
Project Implementation Schedule

Exhibit A - Project Implementation Schedule		
Major Milestone Description	**Projected Start**	**Projected End**
Implementation Phase Notice to Proceed	Sept 2021	--
Project Kickoff Meeting	Sept 2021	--
Project Planning Documentation (Project Schedule, Program Management Plan, Interface Test Plan, Master Test Plan)	Sept 2021	Oct 2021
System Design		
Requirements Review / Business Rules Workshops	Sept 2021	Sept 2021
Reports Design Workshops	Sept 2021	Oct 2021
System Detailed Design Review	Sept 2021	Nov 2021
Bill of Materials	Sept 2021	Nov 2021
Third Party Hardware and Software Documentation Submitted	Sept 2021	Nov 2021
Draft System Detailed Design Document (SDDD) Approved	Mar 2022	Jun 2022
Final System Detailed Design Document (SDDD) Submitted	May 2022	Jun 2022
RTCS Installation Design and Documentation Package Submitted	May 2022	Jun 2022
RTCS, Installation, and Test		
Software Modifications from Baseline RSS and TRH	--	May 2022
Factory Acceptance Test (FAT)	Jun 2022	Jul 2022
NCTA CBO Interface Test	Jun 2022	Jul 2022
Onsite Installation Test (OIT) includes installation of Tolling Location 1 to be used for OIT.	Sept 2022	Dec 2022
Maintenance Plan and Training Plan	Sept 2022	Dec 2022
Installation and System Acceptance Phase Notice to Proceed		
Final Installation Plan Approved		30 Calendar Days after NTP
RTCS Installation Design and Documentation Package Submitted		30 Calendar Days after NTP
Installation and Commissioning Approved Ready for Go Live - Tolling Location 1		30 Calendar Days after NTP
Toll Zone commissioning for revenue service during Site Installation Test - Installation and Site Installation Test of I-485 Express Lanes and RSS associated ITS Equipment. Installation and Commissioning Approved Ready for Go Live - Tolling Location 2, 3, 4, 5, 6, 7, 8, 9 and 10.		120 Calendar Days after NTP
Training Complete		30 Calendar Days prior to Go-Live
I-485 Express Lanes Go-Live Complete		210 Calendar Days after NTP

Exhibit A - Project Implementation Schedule		
Major Milestone Description	**Projected Start**	**Projected End**
Final Testing and Phase Closeout		
Formal Operational and Acceptance Testing and Start of Maintenance		60 Calendar Days after Go-Live Complete
As-Built System Detailed Design Document (SDDD) Approved		60 Calendar Days after Go-Live Complete
As-Built Drawing Package Approved		60 Calendar Days after Go-Live Complete
Operations Acceptance Test		60 Calendar Days after Go-Live Complete
System Acceptance Test		30 Calendar Days after Approval of Operations Acceptance Test

Exhibit B
Payment Schedule

Exhibit B - Payment Schedule

A. Payments for Implementation Roadside Toll Collection System Design and Development (Implementation Phase Notice to Proceed)					$ -
Payment Number	**Payment Milestone**	**Pay Items**	**% Paid**	**Cum. % Paid**	
A-1	Notice to Proceed	Implementation Phase Notice to Proceed	5.00%	5.00%	$ -
A-2	Roadside Toll System Development and Administration	Project Management Documents Approved (PMP, Project Schedule and Quality Management Plan)	3.00%	8.00%	$ -
A-3	Roadside Toll System Design	Business Rules and Design Documents Approved (SDDD)	15.00%	23.00%	$ -
A-4	Roadside Toll System Factory Acceptance Testing (FAT)	MTP and Factory Acceptance Testing Approved	15.00%	38.00%	$ -
A-5	Roadside Toll System Onsite Installation Testing (OIT)	Installation Plan Approved, Test Documentation and Onsite Installation Testing Approved - First Site	10.00%	48.00%	$ -
A-6	Roadside Toll System Manuals and Training	Manuals Approved and Training Approved	2.00%	50.00%	$ -
A-7	Roadside Toll System Commissioning	Installation and Commissioning Approved Ready for Go Live			
A-7a	Roadside Toll System Commissioning	Installation and Commissioning Approved Ready for Go Live - Tolling Location 1	3.00%	53.00%	$ -
A-7b	Roadside Toll System Commissioning	Installation and Commissioning Approved Ready for Go Live - Tolling Location 2	3.00%	56.00%	$ -
A-7c	Roadside Toll System Commissioning	Installation and Commissioning Approved Ready for Go Live - Tolling Location 3	3.00%	59.00%	$ -
A-7d	Roadside Toll System Commissioning	Installation and Commissioning Approved Ready for Go Live - Tolling Location 4	3.00%	62.00%	$ -
A-7e	Roadside Toll System Commissioning	Installation and Commissioning Approved Ready for Go Live - Tolling Location 5	3.00%	65.00%	$ -
A-7f	Roadside Toll System Commissioning	Installation and Commissioning Approved Ready for Go Live - Tolling Location 6	3.00%	68.00%	$ -

A-7g	Roadside Toll System Commissioning	Installation and Commissioning Approved Ready for Go Live - Tolling Location 7	3.00%	71.00%	$ -
A-7h	Roadside Toll System Commissioning	Installation and Commissioning Approved Ready for Go Live - Tolling Location 8	3.00%	74.00%	$ -
A-7i	Roadside Toll System Commissioning	Installation and Commissioning Approved Ready for Go Live - Tolling Location 9	3.00%	77.00%	$ -
A-7j	Roadside Toll System Commissioning	Installation and Commissioning Approved Ready for Go Live - Tolling Location 10	3.00%	80.00%	$ -
A-9	Roadside Toll System Acceptance	Operational and System Acceptance Test Approved, As-builts Approved and Implementation Phase Closed Out	20.00%	100.00%	$ -

B. Payments Related to Hardware, Equipment and Installation (Installation Notice to Proceed)				
Payment Number	**Payment Milestone**	**% Paid**	**Cum.% Paid**	
	I-485 Express Lanes			**$ -**
B-1	Ordering Verified I-485 Express Lanes (after Installation Notice to proceed is issued)	20.00%	20.00%	$ -
B-2	Purchased, Received and Verified I-485 Express Lanes	20.00%	40.00%	$ -
B-3	Installation Approved			
B-3a	Installation Approved - Tolling Location 1	6.00%	46.00%	$ -
B-3b	Installation Approved I-485 Express Lanes - Tolling Location 2	6.00%	52.00%	$ -
B-3c	Installation Approved I-485 Express Lanes - Tolling Location 3	6.00%	58.00%	$ -
B-3d	Installation Approved I-485 Express Lanes - Tolling Location 4	6.00%	64.00%	$ -
B-3e	Installation Approved I-485 Express Lanes - Tolling Location 5	6.00%	70.00%	$ -
B-3f	Installation Approved I-485 Express Lanes - Tolling Location 6	6.00%	76.00%	$ -
B-3g	Installation Approved I-485 Express Lanes - Tolling Location 7	6.00%	82.00%	$ -
B-3g	Installation Approved I-485 Express Lanes - Tolling Location 8	6.00%	88.00%	$ -
B-3g	Installation Approved I-485 Express Lanes - Tolling Location 9	6.00%	94.00%	$ -
B-3g	Installation Approved I-485 Express Lanes - Tolling Location 10	6.00%	100.00%	$ -

Exhibit C
Price Proposal Instructions

Table of Contents

1 GENERAL INSTRUCTIONS

Proposers shall complete their Price Proposals in accordance with the following instructions:

1. The Price Proposal Forms are provided in Excel format worksheets for ease of completion and checking. The Excel version of the Price Proposal shall be downloaded from the NCTA's Website at: https://connect.ncdot.gov/business/Turnpike/Pages/default.aspx.
2. Proposers shall submit their Price Proposals on the Price Proposal Forms included in RFP, Exhibit D - Forms. Price Proposals shall be sealed and submitted separate from the Technical Proposal as further instructed in the RFP. Price Proposals shall be submitted in the quantities and manner identified in the RFP.
3. The Price Proposal Forms shall constitute the full and complete Price Proposal for compensation for performance of the Contractor's obligations and Work under the I-485 Express Lanes Roadside Toll Collection System project.
4. Proposers must complete the Price Proposal Forms in their entirety. The Price Proposal Forms for the Project are as outlined in Table 1.
5. Proposers should not fill in any grayed-out cells on the Price Proposal Forms, nor shall Proposers make any other entry on or alteration to the Price Proposal Forms other than in accordance with these Price Proposal Instructions.
6. NCTA may waive or correct any error appearing in a Proposer's completed Price Proposal Forms if the correct amount can be clearly ascertained from the information provided; however, NCTA is under no obligation to do so. In the event of an inconsistency between the amount stated in numbers and the amount stated in written words, the amount stated in written words will control. In the event of a mathematical miscalculation, the correct sum will control.
7. An officer of the Proposer or an individual otherwise authorized in writing by an officer of the Proposer must sign and date Sheet 1 in the appropriate place as identified.
8. All elements of the Price Proposal must be completed. If zero quantities are included for a line item in the Proposal, a zero must be entered into the corresponding cell. In addition, all items identified by NCTA in the Price Proposal Forms will be assumed to be included in the Price Proposal.
9. NCTA reserves the right to reject Price Proposals that are not completed in accordance with the instructions set forth herein.
10. Instructions for completion of each of the Price Proposal Forms are provided in Sections 2 through 12 below.
11. No price escalation will be allowed above the costs provided on the Price Proposal Sheets to complete this Work except as set forth in Section 12.
12. The Price Proposal shall be inclusive of all costs, fees and applicable taxes needed to meet the requirements of the RFP, included in **Part III, Scope of Work and Requirements**. Implementation and "Future Zone Type" pricing should be entered in 2021 dollar values. Maintenance labor costs should be entered in 2021 dollar values. No price escalation will be allowed above the costs provided on the Price Proposal Forms to complete the Work, with the exception of the CPI as specifically identified herein.
13. For Image Verification Services, Proposers shall only provide pricing for Years 1-5. The Extension Years are intentionally excluded from the Price Proposal.

2 INSTRUCTIONS ON COMPLETING THE PRICE PROPOSAL FORMS

1. The Price Proposal Forms, as detailed above, include pricing summary sheets (Sheets 1, 2, 3, 4, and 5) and associated Backup information on Backup sheets for each pricing sheet. Backup sheets for each summary sheet are labeled to identify the corresponding summary pricing sheet; for example, Sheet 2-1 and Sheet 2-1a are Backup sheets to pricing Sheet 2. Backup sheets are located following summary sheets 1 through 5. The additional Services Rates sheet 10-1 is a standalone sheet and does not require a summary sheet.
2. Table 1 below summarizes the Price Proposal forms that shall be completed by all Proposers. Each form is located on a unique sheet in an Excel workbook. The table provides the following information for each form:
    a. The sheet number (e.g. 2, 2-1, etc.)
    b. The sheet title listed at the top of each sheet

Table 1 – Price Proposal Form Summary

Sheet Number	Sheet Title
1	NCTA I-485 Express Lanes RTCS Project Summary
2	RSS and ITS Cost Summary
2-1	Backup: AET 1: RSS and ITS Cost Schedule
2-1a	Backup: RSS + TRH + ITS - Staff and Position Classifications with Rates
3	RTCS (including RSS, TRH, and ITS) Cost
3-1	Backup: RTCS (including RSS + TRH and ITS) Cost Schedule
3-1a	Backup: RTCS (including RSS, TRH, and ITS) - Back Office Staff and Position Classifications with Rates
3-2	Backup: RTCS (including RSS, TRH and ITS) Initial Spare Parts and Equipment Cost
4	Base Contract and Optional Extensions – RTCS (including RSS, TRH and ITS) Hardware Maintenance and Software Support Services Cost
4-1	Base Contract and Optional Extensions – RTCS (including RSS, TRH and ITS) Maintenance Services Schedule by Year
4-2	Backup: Base Contract and Optional Extensions - RTCS (including RSS, TRH and ITS) Maintenance and Software Support Services - Fixed Cost Items by Month
5	Base Contract and Optional Extensions - Image Verification Services Operations Cost
5-1	Backup: Base Contract and Optional Extensions -Image Verification Services Only Costs (Optional) - Including all Labor and Other Direct Cost Items per Image Transaction
10-1	Additional Services Rates (2021 Values)
Exhibit B	Payment Schedule (in Separate file)

3. The Price Proposal Forms are password protected and shall not be unlocked by Proposers. Only in the unlocked cells may the Proposers enter data.
4. Blue colored tabs represent summary sheets that do *not* require Proposer input. Green tabs represent worksheets that require Proposer input.
5. On most sheets there are formulas that are automatically calculated based on data entered from elsewhere in the sheet or workbook. Font and background colors are used to indicate different types of cells as follows:
    - Black font – Indicates the cell cannot be altered by Proposer.
    - Red font – Indicates the Proposer should enter data.
    - Light red background – Indicates input required. All such cells should be completed accordingly.
    - Light yellow background – Indicates optional input, if Proposers need to provide additional detail.
    - Light green background – Indicates that data has been entered into the cell. Light red and light-yellow background will change to light green when any non-zero data is entered. The background for any cells where the Proposer enters zero (0) will not change colors in this manner.
6. While NCTA has made every effort to ensure the Price Proposal Forms contain accurate formulas and calculation, Proposers are required to independently verify that formulas and calculations are being performed correctly.

3 TOTAL PROJECT COSTS

The Proposer's proposed total price shall be the aggregate of all costs included in Sheet 1. Sheet 1 will automatically roll-up and present the totals from Sheets 2 through Sheet 5. These costs will be totaled and presented in the Grand Total Cost column in the line entitled Total Implementation, Operations and Maintenance Cost including Optional Extension Phases.

4 COMPLETION OF THE RSS and ITS COST SUMMARY - SHEETS 2, 2-1, 2-1a

The Proposer's total price for the RSS and ITS Systems portion of the Implementation Phase shall be the aggregate of all costs included in Sheet 2 which covers all costs associated with the RSS and ITS System portion of the Work for the I-485 Express Lanes.

The costs for Sheet 2 shall include (without limitation) all Equipment, supplies, Software, parts and materials, overhead, burden, profit, taxes, duties, fees, Contractor-acquired permits, licenses, warranties, and other items necessary to meet the Contractor contractual requirements associated with the RSS and ITS portion of the System.

The prices on Sheet 2 and related Backup sheets shall not include charges and costs associated with the RSS and ITS or the Operations and Maintenance Phase. These costs shall be provided on separate Price Proposal Sheets as described below.

To complete Sheets 2, 2-1, and 2-1a Proposers should do the following:

1. **Sheets 2-1**. In the columns provided under each cost component (Items 1- 10), enter a

description for each price element for each component in as much detail as space allows. Moving to the right in the 2nd column (B) enter the quantity for each item and in the 3rd column (C) enter the unit costs. If the item is provided as a lump sum, the quantity should be shown as 1. Total item costs will be calculated automatically. Moving to the right, in the 5th column (E), enter the labor costs associated with each of the price elements. The costs for each price element will then automatically be calculated and the summary will be shown in the appropriate line item on Sheet 2.

2. **Sheet 2**. This sheet will be automatically populated from Sheet 2-1. No Proposer input is required.
3. **Sheets 2-1a. -** Enter specific names for the Key Team positions (Items 1-6) for RSS and ITS labor costs related to the Implementation Phase. Enter their specific loaded labor rate in the rate column and their number of hours. Moving down the sheet, enter additional labor categories for all labor to be used to complete this Work, including rates and hours. The staff names are not required for these additional positions (i.e. the staff name cell that are not highlighted in a light red). The total labor dollars will be calculated for each staff person and labor category and a grand total will be calculated**.** The labor dollar grand total must match the Total on the corresponding zone type sheet (Sheet 2-1) A labor check cell is provided to assist Proposers with verifying that the two (2) labor totals are equal.

5 COMPLETION OF ROADSIDE TOLL COLLECTIONSYSTEM COST - SHEETS 3, 3-1, and 3-1a, 3-2

The Proposer's proposed total price for the RTCS (including RSS, TRH and ITS) portion of the Implementation Phase shall be the aggregate of all costs included in Sheet 3. This sheet covers all costs associated with the RTCS (RSS and ITS) for the I-485 Express Lanes to complete the implementation, such as project management, engineering and Design, Software and Testing.

The RTCS (including RSS, TRH and ITS) cost shall include all costs for items identified in line items 1 through 18 of Sheet 3 associated with the Operational Back office cost component including AVI and Image transaction processing. The total price shall include (without limitation) all overhead, burden, profit, taxes, duties, fees, warranties, and other items necessary for the Contractor to complete the Work. The costs shall also include (without limitation) all Equipment, supplies, Software, parts and materials, Contractor-acquired permits, licenses, warranties, and other items necessary to meet the Contractor contractual requirements associated with the RTCS (including RSS, TRH and ITS) Cost.

The prices on Sheet 3 and related Backup shall not include charges and costs associated with the RTCS (including RSS, TRH and ITS) or the Operations and Maintenance Phase. These costs shall be set forth on separate Price Proposal Forms as described in Section 2 above.

Proposers shall complete Sheets 3, 3-1, 3-1a, 3-2 as follows:

1. **Sheet 3-2.** This sheet includes Initial Spare Parts and Equipment items for the RTCS (including RSS, TRH and ITS) System include at a minimum spares equivalent to one (1) tolling location of equipment for I-485 Express Lanes for up to one lanes of traffic and (1) tolling location of equipment.

   In the columns provided under each cost component (Items 1-8 for the RSS and ITS and Items 1-5 for ITS Equipment, enter the total quantity in the 2nd column (B) for each listed element required for the I-485 Express Lanes RSS and ITS Initial Spare Parts and Equipment. If the item is provided as a lump sum, the quantity should be shown as 1. Moving to the right in the 3rd

column (C), enter the unit cost for each item. If additional items are required to be included under each component provided by the Proposer, enter each element name using the additional spaces provided under the appropriate component section. For all additional items entered, the Proposer must also enter the total quantity and unit cost as described above. Total item costs will be calculated automatically for each item.

2. The costs for each price element will then automatically be calculated and the summary will be shown in the appropriate line item on Sheet 3.
3. **Sheet 3.** This sheet is automatically populated from Sheets 3-1 and 3-2. No Proposer input is required.
4. **Sheets 3-1a -** Enter specific names for the Key Team positions (Items 1-6) for the RTCS (including RSS, TRH and ITS) Staff and Position Classifications with Rates Cost Schedule labor costs related to the Implementation Phase. Enter the specific loaded labor rate in the Rate column and their number of hours. Moving down the sheet, enter additional labor categories for all labor to be used to complete this Work, including rates and hours. The staff names are not required for these additional positions (i.e. the staff name cells that are not highlighted in a light red). The total labor dollars will be calculated for each staff person and labor category and a grand total will be calculated**.** The labor dollar grand total must match the Total labor dollars on the corresponding sheet (Sheet 3-1). A labor check cell is provided on the bottom of each sheet to assist Proposers with the verifying that the two (2) labor totals are equal.

6 COMPLETION OF RTCS HARDWARE MAINTENANCE AND SOFTWARE SUPPORT SERVICES COST (BASE AND OPTIONAL EXTENSIONS) SHEETS 4, 4-1, and 4-2

The Proposer's proposed total price for the RSS, TRH and ITS Hardware Maintenance and Software Support Services Cost shall be the aggregate of all costs included in Sheet 4. This sheet covers all costs associated with the Maintenance of the RSS, TRH and ITS for the I-485 Express Lanes.

The costs shall include (without limitation) all Contractor management, administrative and support labor costs, as well as all direct costs associated with maintaining the RSS, TRH and ITS Hardware Maintenance and Software Support Services Cost system. The total price shall include (without limitation) all overhead, burden, profit, taxes, duties, fees, warranties, Equipment, supplies, Software, parts and materials, Contractor-acquired permits, licenses, warranties, and all other items necessary to meet the Contractor contractual requirements associated with the RSS, TRH and ITS Hardware Maintenance and Software Support Services Cost Maintenance. All labor rates shall be entered in 2021-dollar values and are to include overhead, burden and profit ("2021 Loaded Labor Rate"). No price escalation will be allowed above the costs provided on the Price Proposal Sheets to complete the Work.

Proposers shall complete Sheets 4, 4-1, and 4-2 as follows:

1. **Sheet 4-2**. For the Base Contract for Maintenance (Years 1–5), as well as for the Optional Extension 1 (Years 1-3) and the Optional Extension 2 (Years 1-3) for I-485 Express Lanes, each year is identified with a corresponding set of Work elements. Starting in column (B), enter the monthly per-zone cost associated with each price element. The Total Monthly costs for each year will then automatically be calculated and the summary will be shown in the appropriate line item on Sheet 4-1.
2. **Sheet 4-1.** This sheet is automatically populated from Sheet 4-2; it requires no input from

the Proposer.

3. **Sheet 4**. This sheet is automatically populated from Sheet 4-2; it requires no input from the Proposer.

7 COMPLETION IMAGE VERIFICATION SERVICES OPERATIONS COST (BASE AND OPTIONAL EXTENSIONS) SHEETS 5, 5-1

The Proposer's proposed total price for the Image Verification Services (optional) shall be the aggregate of all costs included in Sheet 5. Sheet 5 Base Contract and Optional Extensions Image Verification Services Operations Cost, shall include, without limitation, all charges and costs associated with the provision of all Image Verification as set forth in **Part III, Scope of Work and Requirements**. The costs shall also include without limitation, all labor, supplies, normal operating parts and materials, overhead, burden, profit, taxes, duties, rent, utilities, service cost, third-party fees, postage, Contractor-acquired permits, licenses, warranties and other items necessary to meet the Contract requirements.

This Operations section of the Price Proposal requires the proposal of per-item costs for Image Verification Processing for the I-485 Express Lanes. Per Item is defined as a transaction per vehicle which may include up to 4 images. While procuring services for the Image verification services Proposers should carefully consider pricing each of the cost categories in a manner that is reflective of the Proposer's actual costs related to that cost category. Each cost category is expected to stand on its own in terms of pricing, with the per-item costs at the levels provided being reflective of the Proposer's actual costs related to the Services being provided. To the extent there are certain costs which cannot be attributed directly to a cost category. Proposers should include an equitable allocation of such costs to each of the two cost categories.

The Price Proposal for each cost category should reflect the cost of managing each category, with no one category bearing a disproportionate burden of shared or other costs.

The Base Contract for Operations (Years 1–5) for Image Verification Services for I-485 Express Lanes is found on Sheet 5-1. Image Verification Services is optional service and NCTA may select a separate Contractor to perform some of all of the Image Verification Services.

To complete Sheets 5, 5-1 Proposers must do the following:

1. **Sheets 5-1.** Each year has image verifications services costs explained above. The sample monthly units for evaluation purposes for each level have already been populated and should not be altered or deleted. Starting with column (C), enter the proposed unit cost for Image Verification Services for each year. Each entered amount should include total per item costs, including labor and other direct, non-labor costs. The Total Monthly Cost and the Total Annual Cost for each level evaluated will then automatically calculate and the summary will be shown in the appropriate line item on Sheet 5
2. **Sheet 5**. This sheet is automatically populated from Sheet 5-1; it requires no input from the Proposer.

8. COMPLETION OF ADDITIONAL SERVICES RATES SHEET 10-1

On Sheet 10-1, the Proposer shall provide a listing of staff positions and loaded hourly labor rates for the purpose of providing pricing for future Work not currently included in **Part III, Scope of Work and Requirements**. All changes to the Contract involving labor shall use the hourly labor rates in this table. All hourly labor rates shall be stated for the year 2021 and shall be inclusive of burden/overhead and profit. Hourly labor rates shall be adjusted based on changes to the CPI for the previous year as described below.

The Proposer shall also provide the current associated Overhead including burden and Profit rates in the cells identified.

9. COMPLETION OF ROV LOOKUP

On Sheet 11-1, the Proposer shall provide a listing of states and the cost to perform a lookup of a license plate number. The cost of the lookup shall include all Contractor costs to setup, provide and return results. License plate numbers and states without results shall not be compensated to the Contractor by NCTA. The Proposer shall provide all states in column A and the fully burdened cost for each successful lookup in Column B.

10. COMPLETION OF PAYMENT SCHEDULE – EXHIBIT B (separate file)

The Payment Schedule sheet applies the Implementation RTCS Toll Collection System Design and Development Costs and Hardware, Equipment and Off-the Shelf Software to payment milestones and associated percentages shown in RFP Exhibit B - Payment Schedule. The sheet takes the Proposer's Implementation price shown on Sheets 2 and 3 and multiplies it by the percentage associated with each payment milestone. The result is a dollar amount to be paid for each milestone. No Proposer input is required.

11. COST ESCALATION

Pricing that is noted above as subject to adjustment shall be adjusted up or down from the Proposal pricing using the following Bureau of Labor Statistics' (BLS) Employment Cost (CPI) indices as applicable:

CPI: CUUR0400SA0 Consumer Price Index - All Urban Consumers; West Urban All Items

NOTE: The above index names and numbers were obtained from the Bureau of Labor Statistics (BLS) and were current as of the date this RFP was written. In the event that the BLS updates an index name or number, NCTA shall consult the BLS web site to determine the new name and number of the index. More information about the index can be found on the U.S. Bureau of Labor's website (see http://www.bls.gov/cpi/).

For the purposes of the price proposal calculations, an assumed rate has been included. Adjustments shall be made to future prices based on actual CPI (Labor) for each applicable year. The basis for calculating the actual CPI to be applied shall be as follows:

1. Annual adjustment to prices shall be made using the anniversary date of the start of the Maintenance Phase at which each new Maintenance year begins.
2. In the first applicable year for adjustments (Year 2 of the Maintenance Phase) the reference for the adjustment calculation shall be the 2021 Loaded Labor Rate provided by Proposers.

The assumed CPI index for evaluation purposes has been applied to the following Cost Worksheets

ONLY:

1. Sheet 4 (including Backup sheets 4-1, 4-2) and
2. Sheet 5 (including Backup sheet 5-1)

Adjustments shall be made to future prices in the above sheets based on actual CPI (Labor) for each applicable year. The basis for calculating the actual CPI to be applied shall be as follows:

1. Annual adjustment to prices shall be made using the anniversary date of start of the Maintenance Phase at which each new Maintenance year begins.
2. In the first applicable year for adjustments (Year 2 of Maintenance) the reference period for the adjustment calculation shall be the 2021 Loaded Labor Rate.
3. For the subsequent applicable years of Maintenance, as well as for Optional Extension 1 (Extension Years 1-3) and for Optional Extension 2 (Extension Years 1-3), the CPI adjustments shall be applied against the previous reference year. For example, Maintenance and Software Support Services pricing shall be adjusted using the index change from Maintenance Year 2 as a reference point for adjusting each of the pricing elements identified in the above table).
4. The annual adjustment shall be equal to the cumulative change in the applicable index for the latest previous 12-month period available at the time of the anniversary date.
5. The applicable index shall be applied as follows:
    a. CPI shall be applied when the entire component of the cost is direct Contractor labor.

Exhibit D
Forms

Form D-1 Proposal Cover Sheet
Form D-2 List of Subcontractors and RS-2 Form
Form D-3 Recent Client List
Form D-4 Reference Forms Part 1
Form D-5 Reference Forms Part 2
Form D-6 Requirements Conformance Matrix
Form D-7 Price Proposal
Form D-8 Proposer Questions Form
Form D-9 Non-Collusion Forms
Form D-10 Surety Commitment Letter
Form D-11 Acknowledgement of Receipt of Addenda
Form D-12 Bid Bond Forms

Exhibit D-1

Proposal Cover Sheet

(A Word version of the Proposal Cover Sheet is "paper clipped" to this NCTA RTCS Exhibits file for ease of completion.)

NORTH CAROLINA TURNPIKE AUTHORITY
ROADSIDE TOLL COLLECTION SYSTEM
REQUEST FOR PROPOSALS
I-485 Express Lanes

EXECUTION: In compliance with this Request for Proposal, and subject to all the conditions herein, the undersigned offers and agrees to furnish any or all Services or goods upon which prices are offered, at the price(s) offered herein, within the time specified herein. By executing this offer, I certify that this offer is submitted competitively and without collusion.

Failure to execute/sign offer prior to submittal shall render Proposal invalid. Late offers are not acceptable.

<table>
<tr><td colspan="3">BIDDER:</td></tr>
<tr><td colspan="2">STREET ADDRESS:</td><td>P.O. BOX:
ZIP:</td></tr>
<tr><td colspan="2">CITY & STATE & ZIP:</td><td>TELEPHONE NUMBER:
TOLL FREE TEL. NO:</td></tr>
<tr><td colspan="2">PRINT NAME & TITLE OF PERSON SIGNING:</td><td>FAX NUMBER:</td></tr>
<tr><td>AUTHORIZED SIGNATURE:</td><td>DATE:</td><td>E-MAIL:</td></tr>
</table>

Offer valid for two hundred and forty days (240) days from Proposal Due Date.

Form D-2

List of Subcontractors and RS-2 Form

(PDFs of all forms are presented below. A fillable PDF of the RS-2 form is "paper clipped" to the RFP file for ease of completion.)

Please duplicate this page as necessary to provide the requested information.

	SUBCONTRACTOR	SUBCONTRACTOR	SUBCONTRACTOR
Legal Name of Company			
Company's FEID Number			
Company Contact Name			
Company Address			
City, State, Zip Code			
Company Telephone No.			
Company Fax Number			
Company E-mail address			
Legal Name of Principal(s)			
Address of Principal(s)			
City, State, Zip Code			
Telephone No. of Principal(s)			
Fax Number of Principal(s)			
E-mail address of Principal(s)			
Corporate Number (if applicable)			
License Number (if applicable)			
Status of License (if applicable)			
Work to be Performed			
Expected Percentage of Total Work			

By: _____ Signature: (1) _____
President or Vice President

Attest: _____ Signature: (2) _____
Secretary (or Assistant Secretary)

(Affix Corporate Seal)

****

NORTH CAROLINA DEPARTMENT OF TRANSPORTATION
SUBCONSULTANT
TO BE USED WITH PROFESSIONAL SERVICES CONTRACT ONLY
RACE AND GENDER NEUTRAL

_____
TIP No. and/or Type of Work (Limited Services)

_____
(Consultant/Firm Name and Federal Tax Id)

_____
(Subconsultant/Firm Name and Federal Tax Id)

SERVICE / ITEM DESCRIPTION		***Anticipated Utilization***
	TOTAL UTILIZATION:	
SUBMITTED BY: SUBCONSULTANT:	**RECOMMENDED BY:** CONSULTANT:	
*BY:	*BY:	
TITLE:	TITLE:	
SPSF Status: Yes ☐ No ☐		

"SUBCONCONSULTANT" (FORM RS-2)
RACE AND GENDER NEUTRAL

Instructions for completing the Form RS-2:

1. Complete a Subconsultant Form RS-2 for each Subconsultant firm to be utilized by your firm.
2. Insert TIP Number and /or Type of Work (Limited Services)
3. Complete the Consultant/Firm name and Federal Tax ID Number for the primary firm information.
4. Complete the Subconsultant/Sub Firm name and Federal Tax ID Number for the sub firm information.
5. Enter Service/Item Description – describe work to be performed by the Sub Firm
6. Enter Anticipated Utilization – Insert dollar value or percent of work to the Subconsultant/Sub Firm
7. *Signatures of both Subconsultant and Prime Consultant **are required** on each RS-2 Form to be submitted with the Letter of Interest (LOI) to be considered for selection
8. Complete "SPSF Status" section - Subconsultant shall check the appropriate box regarding SPSF Status, check Yes if SPSF or No if not SPSF

In the event the firm has **no** subconsultant, **it is required that this be indicated on the Subconsultant Form RS-2 form by entering the word "None" or the number "ZERO" and signing the form.**

Form D-3

Recent Client List

(A Word version of the Recent Client List is "paper clipped" to this NCTA RTCS Exhibits file for ease of completion.)

#	Name of Client including Address and Telephone #	Project Name	Project Description	Start Date	End Date	Contract Amount
001						
002						

Form D-4

Reference Forms Part I

(A Word version of the Reference Forms Part I is "paper clipped" to this NCTA RTCS Exhibits file for ease of completion.)

a) Proposer Minimum Experience for AET/ORT

Proposer shall use this form to clearly demonstrate how it meets the minimum qualification requirements for Proposals with regard to AET or ORT Proposer project experience. Each reference provided may be contacted by NCTA. Copy this form as needed to comply with the requirements outlined in the RFP for each of the Implementation and Operations and Maintenance Phase minimum requirements.

Proposer's Name: _____

Please check off which qualifications requirement this reference is intended to address (you may check more than one box to cover both Implementation and Maintenance requirements as long as the explanation below is sufficiently detailed to cover both).

☐ Implementation ☐ Operations and Maintenance

Reference Company/Agency Name:		
Address:		
City:	State:	Zip Code:
Phone Number:	Fax Number:	
Project Manager Reference:		
E-mail:		

Alternate Reference*:		
Phone Number:	Fax Number:	
E-mail:		
Alternate Reference Role on Reference Project:		
***Must be completed in addition to the Project Manager reference**		

Proposer's role on project and years of participation (mm/dd/yy to mm/dd/yy):

Project location, scope, cost, start / end dates:
Operational functionality, facility types (AET, ORT, Express Lanes) number of lanes / plazas, revenue collected, etc.:
Relevant equipment and systems used:
Comparison to NCTA requirements:
Installed System and Operations and Maintenance documented performance, as applicable:
Key Personnel involved and role who are also proposed on NCTA project:

b) Proposer Minimum Experience for Dynamically Priced Project with ITS Elements

Proposer shall use this from to clearly demonstrate how it meets the minimum qualification requirements for Proposals with regard to dynamically priced projects with ITS elements. Each reference provided may be contacted by NCTA. Copy this form as needed to comply with the requirements outlined in the RFP for each of the Implementation and Operations and Maintenance Phase minimum requirements.

Proposer's Name: _____

Please check off which qualifications requirement this reference is intended to address (you may check more than one box to cover both Implementation and Maintenance requirements as long as the explanation below is sufficiently detailed to cover both).

☐ Implementation ☐ Operations and Maintenance

Reference Company/Agency Name:		
Address:		
City:	State:	Zip Code:
Phone Number:	Fax Number:	
Agency Project Manager Reference:		
E-mail:		

Alternate Reference*:		
Phone Number:	Fax Number:	
E-mail:		
Alternate Reference Role on Reference Project:		
***Must be completed in addition to the Project Manager reference**		

Proposer's role on project and years of participation (mm/dd/yy to mm/dd/yy):

Project location, scope, cost, start / end dates:
Operational functionality (e.g., type of express lanes, pricing basis (per mile, per segment or other):
Identify ITS Systems used (identify which systems were provided by Proposer and maintained by Proposer):
Describe pricing functionality provided and maintained by Contractor:
Comparison to NCTA requirements:

Installed System and Operations and Maintenance documented performance, as applicable:
Key Personnel involved and role who are also proposed on NCTA project:

Form D-5

Reference Forms Part 2

(A Word version of the Reference Forms Part 2 is "paper clipped" to this NCTA RTCS Exhibits file for ease of completion.)

Proposer shall use this form for Key Personnel Team member references. Each reference provided may be contacted. Copy this form as needed to comply with the requirements of the RFP and the number of references cited.

Key Team Member _____

Proposed Position _____

Reference Company Name:		
Address:		
City:	State:	Zip Code:
Phone Number:	Fax Number:	
Project Manager:		
E-mail:		
Number of total years' experience of Key Personnel team member in similar role to one proposed for NCTA:		
Reference Project:		
Key Personnel team member role on reference project, including dates of participation and job description:		
Description of reference project location, scope, cost, start / end dates, etc.:		
Operational functionality, number of lanes, plazas, revenue collected, TRH, ORT, AET or Express Lane, etc.:		
Relevant systems used (such as TRH, Architecture design, dynamic pricing, OCR, ITS elements):		
Key Personnel team member's major contributions and highlights:		

Form D-6

Requirements Conformance Matrix

(An Excel version is "paper clipped" to this NCTA RTCS Exhibits file for ease of completion.)

Exhibit D-6: Instructions for Completing Requirements Conformance Matrix

1) The Proposer must complete and submit the Excel version of the Requirements Conformance Matrix which is provided in PDF form in Exhibit D-6: Requirements Conformance Matrix. The Excel version of the Workbook shall be downloaded from Doing Business with NCTA's Website at https://connect.ncdot.gov/business/Turnpike/Pages/default.aspx

2) The Matrix covers each of the requirements set forth in Part III, Scope of Work and Requirements.

3) Proposers shall not alter the requirements listed in the Requirements Conformance Matrix in any way and must use the workbooks provided. The Proposer shall submit a PDF version of the completed Matrix in Technical Proposal Section 6, in addition to submitting the Excel version of the Matrix on USB, as directed in Section 4.1 Submission of Technical Proposal.

4) The following are instructions for completion of Part III of the Requirements Matrix worksheet:

a) There are four (4) columns in the Part III Requirements listed in the Requirements Conformance Matrix worksheet as follows:

i. No. (Column A): A sequential number that matches the requirement number in the Requirements.

ii. Requirements (Column B): A description of each requirement.

iii. Status (Column C): Proposer must select one of the four (4) response codes for each Requirement and enter it in this column as further detailed in item "b)" below.

iii. Source (Column D): Indicate who will be providing the functionality; Proposer (P), Subcontractor (S), Third Party (T) and Not Applicable (NA).

iv. Subcontractor Name and/or 3rd Party Product/Vendor, If Applicable (Column E): If the functionality is provided by a Subcontractor or third party then please enter the name of the party/product.

v. Comments (Column F): This field must be completed if the Status code is entered as "E = not provided" for the particular requirement in order to explain why the Proposer is not complying with this Requirement.

b) Proposers must complete the Status (Column C) in the following manner:

i. Base Product = B: Enter an "B" in this column if the requirement described is already incorporated into the Proposer's baseline system and is provided in the proposed Roadside Toll Collection System.

ii. Base Modified = M: Enter an "M" in this column if the functionality exists and is provided in the proposed Roadside Toll Collection System but needs to be modified to meet the requirement.

iii. New Development = D: Enter a "D" if the Proposer's baseline system does not currently have the required functionality but the functionality will be provided in the proposed Roadside Toll Collection System and will be developed to meet the requirement.

iv. Exception = E: Enter an "E" if the Proposer will not provide the functionality and will not meet the requirement as part of its Proposal. If any row in the Status column is completed as "E" then Proposer must provide an explanation in the Comments (column D) in the corresponding row. The comment field may reference information that is included elsewhere in the Proposal. **All Exceptions require an explanation.**

No.		Required Inputs			
		Status	Source	If Applicable	Comments
	Requirements	B-Base Product M-Base Modified D-New Development E-Exception	P-Proposer S-Sub T-Third Party NA-Not Applicable	Subcontractor Name and/or 3rd Party Product/Vendor	Comment required if "Exception", optional otherwise.
1	The Program Management Plan shall, at a minimum, include the following elements:				
	a) Project scope and key Deliverables;				
	b) a description of the management and organization of the program, an organization chart, identification of key team personnel and their responsibilities, percentage commitment to the Project, task leads for each functional area and location and identification of the resources and key personnel during the Contract to be used in fulfilling the Requirements of the Contract;				
	c) Project team (Contractor, Subcontractors, NCTA, NCTA representatives, NCDOT) contact information;				
	d) a succession plan for key personnel(All successors should be familiar with the Project and be able to engage in the Project if necessary, should key personnel no longer be on the project);				
	e) a description of the Project planning, documentation and reporting methods to be utilized, both for use within the Contractor's staff and externally to NCTA and other entities;				
	f) a description of the process for communication, escalation, and resolution of project issues with NCTA;				
	g) meeting schedules with NCTA and other entities including the form of the meeting;				
	h) inclusion of the approved Project Schedule;				
	i) a description of the process for reporting, updating and tracking the Project Schedule and Project performance;				
	j) a description of the coordination process with NCTA, and NCDOT during the tolling facility infrastructure Implementation Phase;				
	k) a description of the coordination process with NCTA, and NCDOT during the installation drawing review process;				
	l) approach to change management, consistent with Contract Requirements, including a description of the process for documenting and submitting change requests, the approval process and how the change management approach shall be integrated into daily Project management;				
	m) approach to document control, including Software NCTA will use to access the documents;				
	n) approach to risk management;				
	o) approach to QA and QC;				
	p) documenting the invoice submission, invoice backup information, verification, and approval process;				
	q) a section with all approved Project forms including but not limited to, meeting agenda, meeting notes, action items tracking log, monthly progress report, and invoices; and;				
	r) an emergency contact list and succession plan.				
2	The Contractor shall identify the tools and products used to manage the Project, including the Software development lifecycle and the internal controls instituted by the Contractor to guarantee successful delivery of the Project.				
	The Contractor shall develop and submit the communication procedures to NCTA for review and approval that address the following, including but not limited to:				
	a) Correspondence - correspondence shall be identified as to originator and designated receiver and include the form of transmission;				
	b) Document control - tracking of document versions and changes including naming conventions;				

No.		Required Inputs			
		Status	Source	If Applicable	Comments
	Requirements	B-Base Product M-Base Modified D-New Development E-Exception	P-Proposer S-Sub T-Third Party NA-Not Applicable	Subcontractor Name and/or 3rd Party Product/Vendor	Comment required if "Exception", optional otherwise.
3	c) Invoices - all invoices shall be submitted with accompanying backup information as required by the Contract and consistent with NCTA processes and invoicing and auditing policies. The Contractor shall work with NCTA to develop the appropriate invoice and back-up materials as a part of the PMP development;				
	d) Submittals - all submittals shall be delivered as an enclosure to the Contractor's submittal letter. Each submittal letter shall be limited to a single subject or item. The Contractor's letter shall identify the contract number, contract name, and subject of the submittal;				
	e) Contract Number and Contract Name - all items of correspondence, invoices, submittals and documentation shall contain the contract number and the designated contract name, and;				
	f) Comments Log - process for validating that all comments provided by NCTA on Contractor Deliverables are successfully addressed.				
4	The Contractor is responsible for maintaining and assigning a competent and qualified professional who speaks fluent English to meet the Requirements of the Contract.				
5	The Contractor shall ensure key personnel are readily accessible to NCTA or their authorized representatives during the Contractor's performance of this Contract.				
6	The Contractor is required to provide sufficient staff at all times to meet the Project Requirements and Contract. The following are designated as key personnel for this Project and are subject to the approval, replacement, and removal requirements of NCTA for key personnel.				
	a) Project Principal – responsible for the overall conduct and performance of the Project; oversight of the Project; the performance of the Contractor Project Manager and a point of contact for any escalated project issues that cannot be resolved by the Contractor Project Manager. The Project Principal shall have experience in Express Lanes projects in the last five (5) calendar years.				
	b) Contractor Project Manager – responsible for all daily work, the overall execution and delivery of the Project and the Contractor contact person on the Project. The Contractor Project Manager shall be based in Raleigh and shall travel to the Project area as needed. During the Implementation Phase of the Contract, the Contractor Project Manager shall be one hundred percent (100%) dedicated to the Project. Throughout the duration of the Implementation Phase, the Contractor Project Manager shall not work on any other projects unrelated to the I-485 Express Lanes project. The Contractor Project Manager shall have worked as Project Manager for a minimum of three (3) similar All-Electronic Roadside Toll Collection projects, including an Express Lane project, in the past five (5) calendar years.				
	c) Technical Manager - responsible for the management of all the design, development and implementation of the technology solution and resources related to the RTCS, including the ITS, RSS, and interfaces to a NCTA provided CBOS/OBO. The Technical Manager shall serve as the overall RTCS solution architect, including management of Software development, backlog, on-going Hardware/Software maintenance, Equipment and systems and information security as required to satisfy the requirements of the Contract. The Technical Manager shall be one hundred percent (100%) dedicated to the Project during the design, development, and commissioning of the Project. The Technical Manager shall have worked in an equivalent position for on a minimum of two (2) similar transaction processing projects that include cloud or virtual machine deployments in the last two (2) calendar years.				

No.		Required Inputs			
		Status	Source	If Applicable	Comments
	Requirements	B-Base Product M-Base Modified D-New Development E-Exception	P-Proposer S-Sub T-Third Party NA-Not Applicable	Subcontractor Name and/or 3rd Party Product/Vendor	Comment required if "Exception", optional otherwise.
	d) Installation/Maintenance Manager – responsible for the installation, commissioning, and subsequent Maintenance Services of the RTCS, including ITS, RSS, and interfaces to a NCTA provided CBOS/OBO. The Installation/Maintenance Manager shall work primarily in the Charlotte area but shall need to attend regular meetings at the NCTA Raleigh offices and be available in Raleigh or project vicinity Monday through Friday from 8 a.m. eastern to 5 p.m. eastern or additional days or times as required to complete the work. During the installation and maintenance of the Project, the Installation/Maintenance Manager shall be one hundred percent (100%) dedicated to the Project. The Installation/Maintenance Manager shall have worked in an equivalent position on a minimum of two (2) similar transaction processing projects that include cloud or virtual machine deployments in the last two (2) calendar years.				
	e) Quality Assurance Manager – responsible for consistent quality throughout the design, development, testing, and implementation of the Project through good QA and QC practices, similar all-electronic roadside toll collection projects, and transaction processing projects in the past five (5) calendar years.				
	f) Test Manager – responsible for the overall planning and implementation of the Project's testing program. The Test Manager shall be one hundred percent (100%) dedicated to the Project during the development of testing plans and procedures and during the testing of the Project. The Test Manager shall have worked in an equivalent position on a minimum of two (2) similar all-electronic roadside toll collection, and transaction processing projects in the past five (5) calendar years.				
7	The Contractor shall cooperate to the fullest extent with NCTA and NCDOT to ensure the Project Implementation and Maintenance Services do not conflict with or cause any interruption in capability, service or safety issues to the traveling public or customers.				
8	The Contractor shall cooperate with the Constructor, NCTA, NCDOT, existing contractors, and external parties, as directed by NCTA, to support any activity related to the RSS Implementation, including but not limited to:				
	a) NCTA employees;				
	b) NCTA Designated Representatives;				
	c) other third parties, as directed by NCTA;				
	d) law enforcement;				
	e) inspectors;				
	f) auditors, and;				
	g) all contractors.				
9	The Contractor shall cooperate with and immediately notify NCTA of any customer complaints and RTCS defects identified in the toll lanes or facilities that come to the Contractor's attention during implementation, testing, or maintenance.				
10	The Contractor shall provide and maintain a current emergency contact list for NCTA's use at all times for handling emergencies and escalations. The emergency contact list shall name primary and secondary (multiple secondary contacts as applicable) points of contact for each anticipated emergency type. The emergency contact list shall name the Contractor's preferred points of contact, in order of precedence and shall include, at a minimum, the Contractor's project manager, installation manager, technical manager, and other support staff. The purpose of the emergency contact list is to ensure the Contractor can be reached outside normal working hours to address urgent matters.				
11	The Contractor shall provide and maintain a schedule for monthly progress meetings at a location designated by NCTA. The meeting shall be scheduled no later than the 20th day of the following month and shall cover progress up to the 15th of the current month.				

No.		Required Inputs			
		Status	Source	If Applicable	Comments
	Requirements	B-Base Product M-Base Modified D-New Development E-Exception	P-Proposer S-Sub T-Third Party NA-Not Applicable	Subcontractor Name and/or 3rd Party Product/Vendor	Comment required if "Exception", optional otherwise.
12	No less than five (5) Business Days prior to the meeting, the Contractor shall submit a draft monthly progress report to NCTA for the period covering the previous reporting period. NCTA will review and comment on the progress report prior to or during the meeting.				
13	The Contractor shall obtain Updated installation status prior to the monthly meeting and include such Updates in the Project Implementation Schedule which shall be submitted with the monthly progress report				
14	The format of the monthly progress report shall be agreed upon as one of the initial project tasks upon NTP and shall be incorporated by the Contractor into the Program Management Plan.				
15	The monthly progress report shall include but not be limited to the following items				
	a) a summary outlining progress and status, and percentage of work performed for each task as compared to planned activities in the Project Schedule. Comments shall be included where appropriate. The summary shall also identify key milestones met and missed in the period.				
	b) an analysis of all critical path tasks, potential risks associated with the tasks, and proposed contingency/workaround plan to circumvent or mitigate delays to the Project.				
	c) identification of any approved changes to approved milestone dates and approved Project Schedule, clearly noting the details and identifying the Contract Amendment.				
	d) a discussion of schedule compliance and an updated Project Schedule showing current status against the baseline approved Project Schedule. Past due tasks shall be updated, and actual dates shall be recorded for completed tasks.				
	e) construction/installation coordination status;				
	f) an updated action items list that tracks the status of all outstanding action items, activities and issues that need decision/resolution;				
	g) an updated Deliverables list showing submission dates, current version, current review status, responsible party, and due date;				
	h) a payment request, if applicable. Payment requests must identify the payment milestone, number, and dollar amount. Payment requests shall be made for completed and approved milestone payments only;				
	i) a list of change requests (Contractor and NCTA initiated) and their status;				
	j) the previous monthly final meeting minutes; and				
	k) a six (6) week look-ahead schedule.				
16	No more than five (5) Business Days after the meeting, the Contractor shall submit the final monthly progress report and draft meeting minutes for NCTA's review and approval.				
17	In addition to the monthly progress meeting, weekly or bi-weekly project status meetings, as applicable and approved by NCTA, and other regularly scheduled installation and ad-hoc project meetings shall be required during the course of the Project to address specific Deliverables, work items, maintenance procedures, and issues as they arise.				
18	The Contractor shall perform the following tasks related to all meetings, including but not limited to:				
	a) develop and coordinate the Project meeting schedule;				
	b) distribute notices of project meetings in accordance with document control requirements;				
	c) prepare the agenda in coordination with NCTA;				
	d) attend the meeting with all required staff in attendance;				
	e) prepare minutes of the meeting and forward them to NCTA within five (5) Business Days after the meeting date; and				

No.		Required Inputs			
		Status	Source	If Applicable	Comments
	Requirements	B-Base Product M-Base Modified D-New Development E-Exception	P-Proposer S-Sub T-Third Party NA-Not Applicable	Subcontractor Name and/or 3rd Party Product/Vendor	Comment required if "Exception", optional otherwise.
	f) maintain an action item list for each type of meeting, identifying issues that need to be resolved at the project level.				
19	The Contractor shall provide and maintain a detailed Project Schedule for the Project in Microsoft Project format (Project 2019 or above) that lists all project activities and tasks in the Contract, including but not limited to:				
	a) requirements;				
	b) design;				
	c) development;				
	d) testing;				
	e) installation;				
	f) transition; and				
	g) deployment and acceptance of the RTCS at the various RSS locations.				
20	The Project Schedule shall include coordination with Constructor, NCDOT, existing contractors, and NCTA and shall clearly document all interfacing tasks.				
21	The Project Schedule shall identify all milestones and tasks, starting with the NTP through the date of acceptance for the entire duration of the contract.				
22	The Project Schedule shall be resource loaded, shall include all draft submissions and review cycles, and shall include all tasks required of NCTA, NCDOT and other contractors with critical tasks.				
23	The Project Schedule shall identify all critical path tasks and shall be used to manage the Project.				
24	The baseline for the Project Schedule shall be submitted to NCTA for approval ten (10) Business Days after NTP. Once approved, the baseline Project Schedule shall only be modified by Contract Amendment.				
25	The Contractor shall maintain status and update the Project Schedule at least once a month, as identified in the requirements for the monthly progress report.				
26	The Contractor shall obtain approval from NCTA for any and all changes to the approved Baseline Project Schedule and associated milestones. In accordance with the Contract process for changes and amendments, schedule changes are not considered approved unless an Amendment is executed.				
27	The Contractor shall establish and maintain an effective Software design and development program along with a documented Software development life cycle to ensure compliance with the Requirements of the Contract.				
28	Prior to conducting any workshops, requirements reviews, focus group meetings, and design reviews, the Contractor shall develop the necessary documentation for NCTA review and submit such documentation ten (10) Business Days prior to such meetings.				
29	The NCTA Business Policies for NC Quick Pass and Roadside and the RTM shall be used to develop the SDDD. NCTA will provide the NCTA Business Policies for NC Quick Pass and Roadside within ten (10) Business Days after NTP.				
30	The Contractor shall schedule design meetings with NCTA to understand the design requirements fully.				
31	The Contractor shall demonstrate pre-production working products (such as beta versions) during the design review process, and stakeholders shall be walked through the workflow, utilizing screens and data flow diagrams.				
32	The Contractor shall trace how the RTCS design meets the SDDD, the NCTA Business Policies Document, and the Contract Requirements using the RTM.				
33	The RTM shall map all requirements to Contractor documentation and/or testing as applicable.				

No.		Required Inputs			
		Status	Source	If Applicable	Comments
	Requirements	B-Base Product M-Base Modified D-New Development E-Exception	P-Proposer S-Sub T-Third Party NA-Not Applicable	Subcontractor Name and/or 3rd Party Product/Vendor	Comment required if "Exception", optional otherwise.
34	The reports design process shall be iterative. The Contractor shall conduct multiple workshops with NCTA's stakeholders, and shall bring subject matter experts to the meeting to validate and test reports.				
35	Subject matter experts must provide a means for explaining each report, its intended purpose, columns, fields, and components and its connection with other reconciling and validating reports.				
36	Report templates from existing operational systems shall be submitted, and changes to meet the Requirements shall be noted. Sample analytics shall have correct and accurate data and shall reconcile across other reports that are provide by NCTA in **Attachment 8: NCTA Reports and Analytics Templates.** The Contractor shall provide initial reports and analytics and any Updates to the reports at least ten (10) Business Days prior to any scheduled reviewed meetings with NCTA**. Note: NCTA desires to move from static reports to analytics that include static views, dashboards and dynamically available data using modern analytics tools.**				
37	Upon receiving feedback from the stakeholder, the Contractor shall develop/modify the reports and resubmit the Updated reports for review.				
38	The modified and new reports shall be demonstrated to NCTA using accurate and reconciled test data. Reports that are expected to reconcile with one another shall be demonstrated together.				
39	The Contractor shall use an NCTA-provided online, electronic document management system (such as SharePoint) that is accessible to both NCTA and the Contractor by username and password, to control all project-related documents, submissions, and drawings.				
40	The Contractor shall maintain a Deliverable tracking list that accurately tracks all Contractor submissions, NCTA's review comments, resubmissions, and final approval.				
41	Each document shall be properly titled, date updated, numbered by revision and version, and shall incorporate signature blocks for authorship and approvals. The Contractor shall provide a logical indexing system making use of documents metadata for ease of access for NCTA to locate documents in the electronic document management system.				
42	Updated submissions of the document shall also include the red-lined version showing all revisions to the document since the last submission.				
43	The Contractor shall submit a minimum of a preliminary draft, a final draft, and a 100% final to NCTA for review and approval. NCTA will provide new comments in two iterations, provided that the Contractor provides the Deliverables in accordance with the Project Schedule. Additional iterations may be necessary to resolve comments. All final documents shall incorporate all NCTA's review comments to NCTA's satisfaction. Each subsequent submission of a Deliverable shall also include NCTA's comments review log with the resolution of each comment updated by the Contractor.				
44	NCTA will review and approve all documents submitted under the Contract. For documents containing less than one hundred (100) pages, NCTA will review and provide comments on preliminary draft documents within ten (10) Business Days. For documents containing more than one hundred (100) pages, NCTA will review and provide comments on preliminary draft documents within fifteen (15) Business Days. NCTA will review and provide comments on all final drafts and final documents within ten (10) Business Days. When multiple documents are submitted to NCTA simultaneously, or within one week of each other, the number of Business Days required for review shall be adjusted to reflect the overlapping submissions.				

No.		Required Inputs			
		Status	Source	If Applicable	Comments
	Requirements	B-Base Product M-Base Modified D-New Development E-Exception	P-Proposer S-Sub T-Third Party NA-Not Applicable	Subcontractor Name and/or 3rd Party Product/Vendor	Comment required if "Exception", optional otherwise.
45	The Contractor shall submit an electronic version of all Contractor-developed documentation for NCTA review and approval unless directed by NCTA to provide hard copies. Acceptable electronic formats are Microsoft Office 2019 Suite (or most current version), unsecured PDF and professional CAD applications for Contractor-prepared documentation.				
46	The Contractor is required to update documentation as changes occur through the Implementation and Maintenance Phase and shall maintain a document submittals list on the electronic document management site identifying all versions of documents, the date submitted, the nature of changes and provide relevant updates to NCTA as they are published.				
47	The documentation package for all submittals as applicable shall include all required electronic media to install, operate, and maintain the RTCS/Deliverable/document being supplied.				
48	The RTM shall include, but not limited to:				
	a) listing and categorization of all functional Requirements;				
	b) listing and categorization of all Software-related technical Requirements;				
	c) identification of the source of all Requirements;				
	d) identification of the design section of the SDDD that addresses the Requirement; and				
	e) identification of the test procedure that addresses the Requirement.				
49	The Contractor shall develop and submit a System Detailed Design Document (SDDD) that describes the design specifications of all Hardware and Software provided as part of the RTCS to meet the approved Contract Requirements. The SDDD shall demonstrate that the Contractor understands the functional, technical, and Performance Requirements of the RTCS and has the processes, Hardware and Software design in place to provide a high-quality and reliable product that meets the Requirements of the Contract.				
50	The Contractor shall provide detailed drawings of Equipment rack space layout for NCTA review/approval (verification) for consistency with the toll Equipment pad design.				
51	The SDDD shall include the use of diagrams, figures, tables, and examples, and it shall apply to all environments, including production, Quality Assurance, training, and testing environments.				
	The SDDD shall include but not be limited to:				
	a) System architecture, including overall system design concept;				
	b) lane layout electrical and logic diagrams;				
	c) image-processing details and image review screens;				
	d) dashboard layouts and design;				
	e) the requirements for all peripheral device Interfaces and control;				
	f) roadside server design, including sizing and processing calculations;				
	g) storage system design, including sizing and processing calculations;				
	h) data backup systems design, including sizing and processing calculations;				
	i) network sizing and design details including IP scheme;				
	j) Uninterruptable Power Supply (UPS) sizing information detailing all Equipment on the UPS(s) and their total power requirements;				
	k) high availability design, including servers, storage, network, database, and application;				
	l) Disaster Recovery (DR) design, including servers, storage, network, database, data resiliency, and application.				
	m) business continuity design, including cameras, AVI Equipment, and other associated Equipment near a tolling point in the case of catastrophic damage to the gantry at a damaged Toll Zone;				

No.		Required Inputs			
		Status	Source	If Applicable	Comments
	Requirements	B-Base Product M-Base Modified D-New Development E-Exception	P-Proposer S-Sub T-Third Party NA-Not Applicable	Subcontractor Name and/or 3rd Party Product/Vendor	Comment required if "Exception", optional otherwise.
52	n) Hardware dependencies and inter-dependencies;				
	o) detailed infrastructure Software design,				
	p) detailed operating systems design;				
	q) detailed peripherals configurations, including requirements for all peripheral device Interfaces and control;				
	r) all internal RTCS Interfaces;				
	s) all custom-developed Software;				
	t) all Software provided by the Contractor or a third party;				
	u) Software dependencies and inter-dependencies;				
	v) detailed database design, schema and data modeling, including sizing and processing calculations;				
	w) Entity Relationship Diagram (ERD);				
	x) data flow diagrams, state diagrams and data queues;				
	y) module level descriptions and interaction among various modules;				
	z) detailed description to the module and/or process level for all the functions according to the functional requirements of the RTCS;				
	aa) lane logic and vehicle framing design and rules with illustrations;				
	bb) degraded mode of operations and impacts of failures on system operations;				
	cc) transaction audit and pre-processing;				
	dd) transaction processing design, including sizing and processing calculations;				
	ee) detailed interface specifications between all Software components;				
	ff) design RTCS system interfaces including electronic interface to the NCTA provided CBOS/OBO;				
	gg) detailed data management design and processes, including summarization, archiving and purging;				
	hh) all user interfaces (including reports and screen formats);				
	ii) system data dictionaries;				
	jj) application performance monitoring design;				
	kk) access/identity security methodology;				
	ll) ACSMS layout and interconnections;				
	mm) environmental specifications;				
	nn) specification sheets for all Equipment;				
	oo) a logical division and an index of all contents within the SDDD, and;				
	pp) upon the completion of the Software development, and prior to the start of the RTCS formal testing, the Contractor shall submit the final updated SDDD that includes all changes/clarifications made during the Software development and validation activities.				
53	The Contractor shall submit an updated SDDD on an annual basis throughout the Contract Term that includes all changes/clarifications made during the just-completed year. The Contractor shall use the approval of System Acceptance as the anniversary date to deliver an SDDD as described above.				
54	The Contractor shall include the Bill of Materials (BOM) for all Equipment and Hardware supplied for the RTCS. The second manufacturer source, if available, for all Equipment and Hardware shall be included with any exceptions noted and explained.				
55	Prior to purchase of any Equipment and as part of its design, the Contractor shall submit the final BOM to NCTA for Approval. No Equipment shall be purchased by the Contractor prior to approval of the BOM and the design, unless otherwise authorized in writing by NCTA authorized representative.				

No.		Required Inputs			
		Status	Source	If Applicable	Comments
	Requirements	B-Base Product M-Base Modified D-New Development E-Exception	P-Proposer S-Sub T-Third Party NA-Not Applicable	Subcontractor Name and/or 3rd Party Product/Vendor	Comment required if "Exception", optional otherwise.
56	The Contractor shall provide an initial BOM and Updates to the BOM whenever Equipment and Hardware changes occur and at a minimum on a semi-annual basis over the Contract Term. All Equipment and Hardware changes shall be subject to the approval of NCTA.				
57	The Contractor shall provide a Master Test Plan (MTP) no later than sixty (60) Calendar Days after NTP. The Master Test Plan shall also describe how The Contractor shall execute each of the test activities as outlined in these requirements. The MTP shall describe testing planned by the Contractor in each test, entry and exit test criteria, test tools, test roles and responsibilities. The MTP shall include test cases based on the NCTA provider use cases. The test cases shall then be made up of test procedures with step by step instructions to verify the use cases. The Contractor shall provide FAT test cases and test procedures with the MTP for NCTA review and approval. The Contractor shall provide test procedures for OIT, SIT, OAT, and SAT at least ninety (90) Calendar Days prior to the start of each respective test.				
58	The Master Test Plan shall detail the Contractor's plan to perform each of the tests in order to satisfy NCTA use cases as described in **Attachment 7: Use Cases.**				
	a) Factory Acceptance Test (FAT);				
	b) Onsite Installation Test (OIT);				
	c) Site Installation Test (SIT);				
	d) Operations Acceptance Test (OAT); and				
	e) System Acceptance Test (SAT).				
59	During each testing in the MTP, the Contractor shall use testing data encompassing at least 24 hours of image-based transactions to demonstrate it can meet the Performance Requirements set forth in this Contract. It is desired that the Contractor captures images from an existing NCTA roadway and use a statistically significant sample size, representative of production, from the data collected for testing purposes in FAT, OIT, SIT. This Requirement shall also be verified by test during the entire duration of each of the OAT and SAT as defined in the MTP. The statistically significant sample shall be proposed to the NCTA for its review and approval in the MTP.				
60	The Contractor shall demonstrate its image review process during each test described in the Master Test Plan (using technology and manual image verification) to demonstrate how it shall meet the accuracy and timeliness Requirements during the Maintenance Phase.				
61	The Contractor shall demonstrate during the test program the image review process and uses, license plate data, QA and QC processes such as double-blind verification if necessary and demonstrate its efficiencies to confirm it can meet the Performance Requirements set forth in this SOW and Requirements.				
62	The Contractor shall plan and execute a baseline test known as Factory Acceptance Test (FAT). The FAT is intended confirm that the use cases as described in **Attachment 7: Use Cases**, as well as additional use cases and workflows needed to operate the system, are validated using the Contractor baseline system. **The definition of the testing required for FAT can be found in Attachment 7: Use Cases.** The Contractor shall propose additional use cases in its response to the Proposal to validate that the system can meet all use cases as a **baseline functional and working Express Lanes system.** The FAT shall be conducted at the Contractor's test facilities in the continental US.				

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	Requirements	B-Base Product M-Base Modified D-New Development E-Exception	P-Proposer S-Sub T-Third Party NA-Not Applicable	Subcontractor Name and/or 3rd Party Product/Vendor	Comment required if "Exception", optional otherwise.
63	The Contractor shall demonstrate performance of the system with a combination of vehicles and test transactions and simulated data provided by the Contractor. The Contractor shall provide a list of all simulators planned to be used in its Master Test Plan (MTP). The Contractor shall provide access to all test simulators and schedule a workshop at least thirty (30) Calendar Days prior to the start of FAT to demonstrate how the simulator works and validate the inputs, processes and outputs of such simulator prior to its use on the system.				
64	For OIT and SIT, NCTA will provide interfaces that to allow both OIT and SIT to be conducted as end-to-end tests with all interfaces tested. NCTA participation in the OIT and SIT end-to-end testing requires all elements of information from the FAT to be available in accordance with the Project Schedule. Any such deviation of this schedule or in complete data may impact NCTA readiness of its interfaces during the OIT or SIT.				
65	The Contractor shall plan and execute a baseline test known as Onsite Installation Test. (OIT). The purpose of the OIT is intended to validate that the system meets all use cases as outlined in **Attachment 7: Use Cases** and proposed by the Contractor in its proposal in a single NCTA-provided facility. **The definition of the testing required for OIT can be found in Attachment 7: Use Cases.** NCTA and the Contractor may choose to conduct the OIT on additional facilities as mutually agreed and if it benefits both parties. The OIT shall also configure the system to verify that the RTCS can meet all NCTA Business Policies. The Contractor shall propose any exceptions that must be simulated in the MTP.				
66	The Contractor shall develop and implement an operations Site Installation Test (SIT). The purpose of the SIT is intended to validate that the system meets all use cases as outlined in **Attachment 7: Use Cases** and proposed by the Contractor in its proposal in a NCTA provided toll location with the purpose of validating the RTCS in accordance with the Requirements during the transition from the installation to the Operations Phase, as well as demonstrate that the system can perform and meet all Performance Requirements. **The definition of the testing required for SIT can be found in Attachment 7: Use Cases.**				
	The Contractor shall provide additional testing resources that support the transition from the period of 2 weeks prior to Go-Live through a period of 3 weeks after Go-Live of the last commissioned Toll Zone. If there are Priority 1 issues, the SIT shall continue until NCTA agrees that the Priority 1 issue is resolved. The SIT commissioning test requires transactions created from the RTCS and post to the CBOS accounts and meets all Performance Requirements. The Contractor shall meet all Performance Requirements whether interfacing to the OBO or CBOS.				
67	The Contractor shall plan and execute a baseline test known as Operations Acceptance Test (OAT) immediately following the Go-Live. The purpose of the OAT is intended to validate that the system meets all use cases as outlined in **Attachment 7: Use Cases** and proposed by the Contractor in its proposal in a NCTA provided facility. **The definition of the testing required for OAT can be found in Attachment 7: Use Cases.** The OAT shall be conducted on all Express Lanes' configurations using controlled vehicles and live traffic and meet all requirements as outlined in Section 6.4 of **Part III, Scope of Work and Requirements** for a period of sixty (60) continuous Calendar Days.				

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68	The Contractor shall plan and execute a baseline test known as System Acceptance Test (SAT) immediately following NCTA approval of the OAT. The purpose of the SAT is intended to resolve any remaining punch list items, review and fully transition the system to a target operating model and to confirm that the system meets all requirements in accordance with Section 6.4 of **Part III, Scope of Work and Requirements** for a period of thirty (30) continuous Calendar Days. **The definition of the testing required for SAT can be found in Attachment 7: Use Cases.**				
69	The Contractor shall provide an Interface Test Plan (ITP) no later than thirty (30) Calendar Days after NTP for all external interfaces that shall connect to the NCTA systems. The Interface Test Plan shall describe all testing required to transfer data to NCTA to meet the Requirements set forth in this Contract.				
70	The Contractor shall demonstrate data from its RTCS to all external interfaces during FAT. The results from FAT shall be provided in the form of test cases, test procedures and actual test data from its interfaces that NCTA can use for its internal testing. The test cases shall be provided in the ITP and approved by NCTA and should cover, at a minimum:				
	a) success testing for normal transaction posting that test NCTA Business Policies;				
	b) failure testing when data fails to be sent or be received from the Contractor system, and;				
	c) exception scenarios that include system behaviors in the NCTA CBOS/OBO ICD that demonstrate error or failure reporting.				
71	The Contractor shall develop and submit a Training Plan for NCTA approval in accordance with the approved Project Schedule that describes the approach to training supervisors, auditors, administrators, end-users, maintenance, and support personnel.				
72	The Training Plan shall describe the plan for training new personnel and shall outline the required operational/maintenance and system knowledge for each position to be gained from the training.				
73	For each position/user type, the plan shall include a training instructor guide, training manual, and other materials to be used in training. The Training Plan also shall include a schedule for follow-up training and continuing education for staff.				
74	The Training Plan shall provide a plan for cross-training staff from other areas of operations or management for the peak period, emergency, or temporary assignments to provide for staff redundancy. The Training Plan also shall include the training schedule for regular staff training and continuing education/training.				
75	The Training Plan shall address the following areas including but not limited to:				
	a) overall description of the training program;				
	b) training techniques;				
	c) training delivery schedule;				
	d) names and descriptions of each training class;				
	e) purpose of each training class;				
	f) who should attend the class;				
	g) qualification requirements for the trainer;				
	h) minimum qualifications for personnel attending the class;				
	i) duration of the class;				
	j) training materials, including syllabus, schedule, training goals, manuals, guides, other support materials and techniques to be used;				
	k) data preparation, such as users and test transactions;				

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	l) trainee assessment and scoring methods;				
	m) trainee surveys and feedback;				
	n) required Equipment; and				
	o) facility requirements.				
76	Courses shall be limited to a maximum of eight (8) hours per Business Day for NCTA staff trained.				
77	The Contractor shall be responsible for maintaining a training database baseline and supporting data files that can be restored at the beginning of each training session.				
78	The Contractor shall provide up to 5 separate training modules to address the training needs of NCTA program to support the project. Multiple sessions of some or all modules may be required, based on demand and class size limitations. The Contractor and NCTA will determine specific training modules during the system design.				
	Examples of training modules might be: NCTA Auditor Training, System Overview Training, and TMC Operator Training.				
79	The Contractor shall be solely responsible for supplying all items necessary, including but not limited to training documentation, Software, Hardware, and any other Equipment required to complete the delivery of the training program.				
80	The Contractor's program shall include but not be limited to instruction, models/devices, manual, diagrams and component manuals and catalogs as required.				
81	The Contractor's training shall be hands on and use actual Hardware and Software in the training environment.				
82	The Contractor shall agree that NCTA staff, or their representatives, may attend any training sessions and may make recordings and/or copies of all training program materials for their use in training new employees.				
83	The Contractor shall submit the Project manuals to NCTA for review and approval in accordance with the approved Project Schedule.				
84	Each manual shall include, but not be limited to a title sheet; revision history; table of contents; list of illustrations (if applicable); and list of reference drawings and exhibits (if applicable).				
85	All manuals shall have a consistent look and feel and shall be professionally written and presented in clear and organized fashion.				
86	All manuals prepared for NCTA under this Contract shall be produced, or editable, using Microsoft Office 2019 Suite (our most current version). In addition, electronic copies of manuals shall be provided in native file format and unsecured PDF, if requested by NCTA.				
87	Any special Software required to produce scalable typefaces or other graphs shall be provided by the Contractor as part of the documentation for the manuals.				
88	The Contractor shall submit electronic copies of all manuals listed in ***Table 1: List of Manuals*** below.				
89	All manuals shall be maintained in electronic format in the NCTA-provided document management system.				
90	The Contractor shall submit the RTCS Maintenance Manual prepared for properly trained technical personnel assigned to the maintenance of the Hardware and Software installed as part of this Project.				
	The RTCS Maintenance Manual shall document information required to support roadside maintenance and repair activities, including but not limited to:				
	a) RSS Equipment layout for each tolling location type;				
	b) ITS Equipment layout throughout the project;				

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	c) schematics and layouts of the Hardware in the cabinets, Equipment racks, and the interconnection diagrams;				
	d) parts lists required to service each piece of Hardware installed under this Project;				
91	e) a general and detailed description and concepts of RSS, ITS, and TRH operations and functions;				
	f) detailed RTCS monitoring activities, specialty tools, and schedule;				
	g) detailed Software monitoring activities and troubleshooting procedures;				
	h) maintenance instructions to repair and replace parts and modules;				
	i) mechanical functions and installation of all Hardware;				
	j) listing of all event and error logs;				
	k) testing and basic troubleshooting procedures; and				
	l) preventative, pervasive, and corrective maintenance procedures.				
	The RTCS Maintenance Manual shall document information required to support including but not limited to:				
	a) all dashboards, monitoring screens, notifications and data that needs to be checked;				
	b) listing of all jobs/process, their dependencies, and their schedule;				
	c) listing of all folders and directories that need to be checked;				
92	d) details related to the activity that needs to be checked;				
	e) frequency of the validations;				
	f) actions to take when results are not as expected;				
	g) notification and escalation process;				
	h) basic troubleshooting procedures; and				
	i) creation of work orders in ITSM system.				
93	The RTCS Maintenance Manual shall provide a description of the tools and Software for personnel to record the monitoring activity and instructions to use the tools/Software.				
	The RTCS Maintenance Manual shall document information required to maintain and repair activities including but not limited to:				
	a) detailed Hardware maintenance activities and schedule;				
	b) detailed database maintenance activities and schedule;				
	c) detailed Software monitoring activities and schedule;				
	d) detailed monitoring procedures for file transfers and exception handling;				
	e) detailed procedures and processes for all maintenance activities;				
	f) detailed procedures for backup, archiving and purging of data;				
94	g) detailed procedures for testing Disaster Recovery systems;				
	h) detailed schedule for desktop and peripheral preventive maintenance activities;				
	i) the detailed schedule for all preventative maintenance activities;				
	j) technical contact lists for all external interfaces and NCTA system integrators;				
	k) Large-size logic diagrams and mechanical assembly diagrams do not have to be reduced or incorporated into the manuals if these drawings are provided with the manuals and presented in a useable and durable form;				
	l) technical contact lists for Hardware and Software providers; and				
	m) details and copies of all third-party system support agreements.				

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95	Standard service manuals for commercial products used for the Equipment shall be acceptable if they contain sufficient information to service and maintain the Equipment properly. This information shall be included in the RTCS Maintenance Manual.				
96	Photographic documentation of Equipment with appropriate labels and callouts are satisfactory if they contain sufficient information to identify components, parts, and features properly.				
97	Standard Operating Procedures (SOPs) shall provide a description of NCTA policies and detailed, step-by-step procedures for every task that the image review personnel must perform in the operation of the RTCS. Screenshots shall be included in the detailed description of the task.				
98	Standard Operating Procedures shall integrate the TRH application with the associated manual procedures required to complete each task, including but not limited to:				
	a) image review clerk activities;				
	b) image review supervisor activities;				
	c) image review QA management;				
	d) audit and reconciliation; and				
	e) operations monitoring.				
99	The Reconciliation and Audit Manual shall detail all procedures used to reconcile the data within RTCS and audit the toll operations.				
100	The reconciliation of transactions and revenue within the RTCS and reconciliation of transactions to the NCTA CBOS shall be fully described.				
101	Investigation of variances, discrepancies, unusual occurrences, and system exceptions processing shall be described.				
102	A detailed description of the screens, reports, and functions shall be provided and shall allow a qualified auditor to access, understand, and work with all financial aspects of the RTCS.				
103	A complete description of all audit procedures and a non-technical description of the screens, reports, and functions shall be provided.				
104	The manual shall contain illustrations and pictorial diagrams to demonstrate the step-by-step operations required for performing the audit and reconciliation functions.				
105	The manual shall contain QC and audit procedures to ensure that the Performance Requirements are met.				
106	Samples of all reports and analytics shall be included in an attachment to the Reconciliation and Audit Manual with any specific instructions that may be applicable to a given report and analytics. Reports and analytics included in the submittal shall have correct and accurate data, and this manual shall be used to train the auditors to validate the RTCS.				
107	The Contractor shall provide an RTCS User Manual to be used by NCTA staff to operate the RTCS as well as for training purposes.				
108	The Contractor shall develop a separate manual for each job category that details all the processes, procedures, and policies developed by the Contractor and approved by NCTA required to fulfill the requirements of each specific job description.				
109	The manual shall include screen images detailing the step-by-step activities that need to be completed in order to fulfill a specific functionality.				
110	The manual shall not include any information that could jeopardize the integrity of toll operations or the toll collection system.				
	Each user manual shall include but not be limited to:				

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111	a) step-by-step actions to take to complete an operation;				
	b) screen images detailing the step-by-step activities needed to fulfill a specific functionality;				
	c) flowcharts to provide NCTA staff with a clear understanding of the workflow;				
	d) all screens, reports, and data fields, clearly explained using sample formats applicable to the RTCS; and				
	e) samples of all reports and analytics, included in the manual or as an attachment to the RTCS User Manual, with any specific instructions that may apply to a given report or analytics.				
112	The Contractor shall develop and submit a Disaster Recovery Plan and subsequent Disaster Recovery (DR) procedures that describe the approach, as well as activities and procedures that take place in the event of a disaster for each element of the RTCS.				
113	The Disaster Recovery Plan shall document the Contractor's approach to recovering from a disaster, including but not limited to:				
	a) events that constitute a disaster and party responsible for the declaration of a disaster;				
	b) assessment of disaster risks;				
	c) mitigation of disaster risks;				
	d) preparations in the event of a disaster;				
	e) disaster declaration and DR process to invoke;				
	f) organization chart illustrating DR team members, roles and responsibilities;				
	g) notification contact list, including contact information;				
	h) notification protocol;				
	i) sites and Equipment for DR, presented in a diagram format;				
	j) DR process initiation and completion checklist;				
	k) Software and data replication processes;				
	l) detailed logistical processes for activation of DR site and systems;				
	m) detailed technical processes for activation of DR site and systems;				
	n) detailed procedures for failover and failback of the host including a checklist for ensuring that it failed over and failed back properly;				
	o) detailed operational functions for activation of DR site; and				
	p) detailed technical processes for reactivation of primary site (or moving to a new primary site if the original primary site is destroyed), operations and systems.				
114	The Disaster Recovery Plan shall be tested no less than annually with NCTA participation. The Contractor shall schedule the test no less than twenty (20) Calendar Days prior to the start of the Disaster Recovery Plan test.				
115	The Disaster Recovery Plan shall include an emergency response management plan, and the Contractor shall follow the procedures set forth in this plan when an emergency situation is invoked.				
116	The Contractor shall respond to any emergency and repair the RTCS, as notified by NCTA or otherwise, that may arise that has already or could potentially damage the RTCS. The Contractor shall be prepared to put forth all necessary resources to divert or correct an emergency condition.				
117	Such emergency conditions shall be handled in accordance with the policies and procedures established by NCTA. The following are a few examples of emergency conditions:				
	a) weather-related;				
	b) vehicle accident;				
	c) conditions that invoke the Disaster Recovery Plan;				
	d) third-party (power outage or communication failure);				

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	e) vandalism that causes parts of the RTCS to be inoperable; and				
	f) detection of security breaches, discovered vulnerabilities and activities that pose a security threat to the toll collection system.				
118	The Maintenance Plan defines the approach to services, staffing, and resources to fulfill the maintenance requirements. The Maintenance Plan shall include:				
	a) organizational structure, organizational chart, and job descriptions and responsibilities;				
	b) detailed matrix of responsibilities (NCTA and Contractor);				
	c) staffing plan;				
	d) approach to staffing and training;				
	e) detailed system monitoring requirements;				
	f) coverage and personnel locations;				
	g) third-party system support agreements overview;				
	h) schedule of all system maintenance activities;				
	i) all system maintenance related communication methods;				
	j) maintenance procedures, communication protocols, and approval processes for system and Software Upgrades, scheduled maintenance activities, Software releases, change management and scheduled downtime;				
	k) maintenance procedures and communications protocols for unscheduled downtime;				
	l) communication protocol for coordination with NCTA operations and third-party entities;				
	m) communication protocol for coordination with NCTA's existing system integrators;				
	n) trouble reporting processes;				
	o) escalation processes;				
	p) spare parts levels and reorder thresholds, Equipment and Software warranty tracking and return material processes;				
	q) monitoring the ITSM dashboards;				
	r) monitoring maintenance performance for compliance to Performance Requirements;				
	s) sample maintenance reports;				
	t) Equipment obsolescence/replacement/refresh schedule;				
	u) Upgrades to third-party Software and tools;				
	v) process in place to meet maintenance Performance Requirements; and				
	w) pervasive methodology and activities.				
119	The Maintenance Plan shall detail the Contractor's Software maintenance and warranty program including the approach to services, staffing, and resources to fulfill the Software maintenance requirements including but not limited to:				
	a) all Software maintenance related communication methods;				
	b) approach to receiving and prioritizing Software defects (bugs);				
	c) reporting, categorization, prioritization, remediation and disposition of Software defects;				
	d) maintenance procedures, communication protocols, and approval processes for Software Upgrades, Software releases, testing, scheduled maintenance activities, change management and scheduled downtime;				
	e) Software Updates and testing to comply with interoperability specification changes, and third-party interface changes;				
	f) Software and security Updates, remediation and testing to be compliant to NCTA Audit Requirements; and				

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120	The Maintenance Plan shall detail the Contractor preventative maintenance program in accordance with this SOW and Requirements.				
121	The Contractor shall provide a preventive maintenance schedule as part of the Maintenance Plan. The schedule shall detail the preventive maintenance to be performed on each Equipment item and system. The schedule shall provide a description of the work to be performed, expected duration, and the frequency.				
122	The Contractor shall catalog all third-party documentation and include the catalog with the third-party document submissions.				
123	The Contractor shall provide and maintain the standard, commercially available, Updated documentation for third-party provided Hardware, Software, services, and materials provided under this Contract. This set of third-party documentation shall be retained at the NCTA offices for the duration of this Contract and upon the termination of the Contract.				
124	All Updated documents shall show the revisions and include a version of the clean document.				
125	An electronic copy of all third-party COTS Hardware and Software installation and user manuals, with Updates, shall be provided to NCTA. Acceptable electronic formats are Microsoft Office 2019 Suite (or most current version), unsecured PDF and professional CAD applications.				
126	Documentation shall include sufficient detail to describe the configuration of the Software as it was installed by the Contractor for the RTCS. These should include any customization or modifications made to the Software or configurations specific to the NCTA environments.				
127	Within ten (10) Business Days after the approval of the Operational and Acceptance Test (OAT) and prior to NCTA acceptance of the RTCS, the Contractor shall submit the As-Built SDDD that includes all Software and Hardware changes made during the RTCS development, implementation, and testing.				
128	Upon NCTA's written notice, the Contractor shall furnish transition services prior to the end of the Contract Term. The Contractor shall develop with the successor contractor or NCTA staff, a Contract Transition Plan describing the nature and extent of transition services required.				
129	The Contract Transition Plan and dates for transferring responsibilities for each division of work shall be submitted within thirty (30) Calendar Days of such notice. Upon completion of NCTA review, both parties shall meet and resolve any additional requirements/differences.				
130	The Contractor shall provide sufficient experienced RTCS technical and Software support personnel in each division of work during the entire transition period to ensure that the quality of services is maintained at the levels required by this Contract.				
131	The Contractor shall provide sufficient staff to help the successor maintain the continuity and consistency of the Services required by the Contract. The Contractor shall allow the successor to conduct onsite interviews with the employees.				
132	The Contractor shall provide the necessary Software and systems support services to assist the successor contractor in setting up the systems, transfer of appropriate licenses and third-party Software, and transition of all data required to sustain uninterrupted service as directed by NCTA.				
133	The Contractor shall make all necessary provisions for transferring any leases or sub-leases held by the Contractor to NCTA, including without limitation, all keys, security codes, and other codes and other facility access information or devices.				
134	The Contractor shall make all other records, documents, data, and Software which are licensed to NCTA and pertaining to the Services rendered for this Agreement available within thirty (30) Calendar Days upon written notice or as otherwise provided in the executed license Agreement.				

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135	The Contractor shall make all operational records, documents, data, systems, specialty tools and Equipment, and facilities required to support and maintain daily services being rendered under this Agreement available before the date of such termination, suspension, or expiration.				
136	The Contractor shall work with NCTA and provide input into the civil design and/or construction schedule, and requirements for all civil construction work to be performed by others on the project, including toll gantry, toll Equipment pads, roadway/pavement, and conduit relative to the aspects that integrate with the design and installation of the RTCS.				
137	The Contractor shall cooperate and provide support as needed to the civil design and construction efforts. During civil design, Contractor support is anticipated to include responses to information requests for clarification on proposed designs as well as actively reviewing the civil plans and drawings.				
138	During construction, the Contractor shall provide review and comment on shop drawings or similar within the context of the RTCS functional and Performance Requirements.				
139	During installation, the Contractor shall provide verification and comment on RTCS related elements that the Constructor is responsible for installing.				
140	Upon approval of shop drawings or similar design elements by the Contractor, within the context of system function and performance, the Contractor shall assume responsibility for those elements to the extent that if the civil work is installed as designed and does not meet the Performance Requirements of this SOW and Requirements, the Contractor shall be responsible for the costs of redesign, civil rework, and additional Equipment costs as further set forth in the Contract.				
141	The Contractor shall review and comment on the Constructor infrastructure installation and confirm it is in compliance with the approved civil drawings. A site acceptance checklist, based on the approved civil drawings, shall be generated by NCTA. The site acceptance checklist shall be reviewed and approved by the Contractor, and signed by the Contractor and NCTA, prior to site acceptance.				
142	The Contractor shall be responsible for ensuring that the locations, positions, installation, connections and other elements of the Contractor inputs identified on the design and installation drawings provided by the Constructor, for all Contractor and NCTA-provided Equipment, whether in-roadway, structure/toll gantry mounted, or in or around the toll Equipment pads, or otherwise located, are accurate and correct.				
143	The Contractor shall also ensure that the installed roadway, infrastructure, structures/toll gantries, and toll Equipment pads meet the design requirements provided by the Contractor and shall certify this in writing.				
144	The Constructor will provide these components in accordance with the design plans. Any changes to the configuration by the Contractor shall be adjusted or moved by the Contractor at no additional cost to NCTA.				
145	The Contractor shall coordinate in-lane Equipment design, installation specifications, structural requirements and drawings for mounting the Equipment to the overhead toll gantry at each RTCS location as it relates to the Contractor's Equipment requirements to the Constructor, including but not limited to: Equipment mounting locations and installation instructions for mounting structure and mounting brackets, conduit, junction box, electrical requirements, wind load, Equipment load and power calculations, deflection and vibration limits for the various tolling Equipment, as well as Contractor Requirements related to special electrical grounding and isolated circuit integrity by Equipment.				

No.		Required Inputs			
		Status	Source	If Applicable	Comments
	Requirements	B-Base Product M-Base Modified D-New Development E-Exception	P-Proposer S-Sub T-Third Party NA-Not Applicable	Subcontractor Name and/or 3rd Party Product/Vendor	Comment required if "Exception", optional otherwise.
146	The Contractor shall also review and provide comments on all aspects of toll gantry design drawings submitted by the Constructor that is related to the RTCS Equipment required to meet the Requirements of this SOW and Requirements, when applicable.				
147	The Contractor shall be responsible for all necessary installation and mounting Hardware required to install the toll Equipment on each gantry at each lane as specified in this **Part III, Scope of Work and Requirements**.				
148	The toll Equipment pads shall house the RSS Equipment cabinets, racks, enclosures, and UPS provided by the Contractor. All RSS electronics, devices, servers, and associated communications Equipment shall be installed in the Equipment racks and enclosures.				
149	The Contractor shall review and comment on all aspects of toll Equipment pad design drawings, power specifications, electrical and cabling design, circuit breaker and switches, and grounding design submitted by the Constructor that are related to the RSS Equipment, when applicable.				
150	The Contractor shall coordinate with the Constructor for the installation of the toll Equipment pads and shall ensure consistency with the detailed drawings of Equipment rack space layout provided by the Contractor.				
151	The Constructor will procure, furnish, and install the conduits between the toll Equipment pad and the demarcation point on the toll gantry. The Contractor shall procure, furnish, and install any additional conduit required in addition to the Constructor installed conduit on the gantry to the Equipment and between the various components on the toll gantry.				
152	The Constructor will provide, terminate, and test the fiber connections from Toll Zone to Toll Zone. The Contractor is responsible for all network Equipment/switching at the Toll Zone and is responsible for all elements of the Local Area Network (LAN). The Contractor is responsible for Wide Area Network (WAN) connections to the NCTA CBOS. Please refer to **Attachment 5: I-485 ITS Equipment List.**				
153	The Contractor is responsible for the RTCS WAN communications. RTCS WAN design must be approved by NCTA and shall conform to **Section 5.3.3 and Attachment 4: State of North Carolina, Statewide Information Security Manual** included in **Part III, Scope of Work and Requirements.** All networking Equipment at the toll sites and other locations necessary to provide full communication capabilities to meet the Requirements in this SOW, such as the host and DR, shall be provided by the Contractor.				
154	The Contractor shall allocate a range of IPv4 class C addresses, and all networking addressing shall be coordinated with NCTA. The Contractor provided LAN Equipment shall be capable of supporting IPv6 addresses.				
155	Network monitoring Software shall be procured, furnished, and installed on the host servers to monitor the RTCS network status and communications, including the connection to the NCTA CBOS. All network alarms shall be reported to the ITSM. The Software tool shall utilize the Simple Network Management Protocol (SNMP) to poll devices real-time for status where possible.				
156	If communications to any element of the RTCS are down, an alarm shall be generated and reported to ITSM system.				
157	The Contractor shall provide network security at all RTCS locations and shall comply with the security policy as described in **Section 5.3.3 and Attachment 4: State of North Carolina, Statewide Information Security Manual** included in **Part III, Scope of Work and Requirements.**				

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158	The LAN within a toll site shall be connected by CAT6 (or higher) cabling. The LAN connections from the gantry to the roadside Equipment may either be CAT6 or multi-mode fiber-optic (MMFO) cable, according to the Contractor's design. The physical connectivity between the toll sites within the I-485 Express Lanes corridor, and to the MRTMC, shall be provided by the Constructor or NCDOT. The Contractor shall be responsible for providing and obtaining the WAN connectivity from any primary or secondary host locations to the NCTA CBOS.				
159	The RSS at the Toll Zones shall be connected and communicate to the NCTA provided CBOS/OBO.				
160	The Contractor shall coordinate with NCTA, NCDOT IT, and the Constructor regarding demarcation points between the onsite fiber network and Internet Service Providers (ISPs). The Contractor shall coordinate with NCTA and the Constructor regarding overall network design and splicing for the physical network between the Toll Zones. Once network design is finalized, the Contractor shall certify in writing that network design meets all RTCS needs.				
161	The Contractor may install the secondary host at a Contractor location within the contiguous United States as approved by NCTA. The Contractor is responsible for securing the connectivity from such a secondary location to the NCTA CBOS.				
162	The Contractor shall work with NCTA in designing the network communication interfaces between the RSS, ITS and TRH systems that compromise the RTCS.				
163	The Contractor shall make final acceptance of the physical network that shall be designed and installed by the Constructor. The site final acceptance shall be based on the completion of all items on an NCTA developed and approved installation checklist.				
164	The Contractor shall assist NCTA in reviewing all aspects of the ITS design revisions, construction submittals, catalog cuts, etc.				
165	The Contractor shall design, furnish, install, and commission additional ITS devices if deemed necessary to meet the Performance Requirements. The Contractor shall be responsible for any additional costs.				
166	The Contractor shall also coordinate and be available onsite as needed during the acceptance test of the ITS performed by the Constructor and shall be responsible for signing off that the ITS is performing in accordance with the Contractor's Requirements.				
167	The Contractor shall complete the commissioning and integration of the ITS to the RTCS.				
168	The Contractor shall be responsible for the integration of ITS to existing tools used by the Statewide Traffic Operations Center (STOC) and the Metrolina Regional Transportation Management Center (MRTMC).				
169	The Contractor shall coordinate and be available onsite as needed during the acceptance test of the unique WWVD system performed by the Constructor and shall be responsible for signing off that the system is performing in accordance with the Contractor's Requirements.				
170	The Contractor shall be responsible for integrating the WWVD system to the RTCS and meeting all WWVD Performance Requirements.				
171	The RTCS shall trigger an output from a Master Input/Output Mirror Device to an identical Remote Input/Output Mirror Device (by the Constructor) located in the NCTA ITS cabinet at the Westinghouse Direct Connect. This output will then be relayed via low-voltage wire, by the Constructor, to the loop input rack in the traffic signal cabinet, activating the blank-out signs and phase omits.				
172	The RTCS shall calculate average speed and travel time information for the Express Lanes and general purpose lanes along the entire I-485 corridor.				
173	The RTCS shall display the average speed and travel time on the two speed/travel time signs.				

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174	The Constructor will provide 60A 120/240V single-phase utility power to the Contractor at the Equipment pad locations at the toll zones. The Contractor shall propose a power continuity approach and provide portable generators to meet all Performance Requirements in the Contract.				
175	The Contractor shall supply a manual transfer switch (MTS) to enable the transfer of power from utility raw power to the Contractor-supplied portable generator. The Contractor shall mount the MTS to the Constructor-provided Unistrut frame on the toll equipment pad. The Contractor shall supply all necessary wiring between the MTS & disconnect/panel board and the toll equipment cabinets. See **Attachment 10: Additional Toll Site System Details** for more details.				
176	The Contractor is responsible for the design, procurement, installation, cabling, configuration, check-off, and testing of all Hardware, Equipment, communications, and Software and fixtures provided by the Contractor as part of the RTCS at each of the tolling locations.				
177	The Contractor shall install any RSS servers and Hardware in the cabinets provided by the Constructor and approved by NCTA.				
178	The Contractor shall work with NCTA to test the WAN and the connections to the NCTA CBOS/OBO. Testing shall include expected traffic loads and all types of production operation data.				
179	The Contractor shall develop an Installation Plan that documents all installation-related activities for the project. The Installation Plan shall be the master document from which the elements of the RTCS shall be installed.				
180	The Installation Plan shall include and define, at a minimum, the following items:				
	a) The installation schedule detailing all activities, shifts, and resources for the installation of the RTCS including third-party and Constructor activities. Once the baseline schedule is approved by NCTA, the Constructor shall provide Updates during the installation periods identifying all schedule changes and work progress in the form of percentage completions shall be submitted to NCTA for approval.				
	b) The minimum resource allocation requirement for any installation and segment including sequencing of Toll Zone and ITS installation, testing and Go-Live.				
	c) How the Contractor manages delivery and staging of the RTCS Equipment to be installed, including any staging, installation, and testing performed by the Contractor or third-party facilities and their subsequent delivery and installation at the production sites.				
	d) The coordination between other contractors, including the Constructor, and service providers.				
	e) Coordination of any travel lane or shoulder lane closures with NCTA and NCDOT Division 10 for the duration of the Project.				
	f) Coordination activities as applicable to other third-party entities for the various interfaces.				
	g) Testing of the Contractor-provided LAN and WAN communications for connection to the NCTA provided CBOS/OBO.				
	h) QC, QA inspection, and testing processes including validation of Contractor installation to the Requirements of the Contract installation drawings.				
	i) The order in which Equipment items are to be installed with estimated durations.				
	j) Special or unique installation requirements.				
	k) A detailed component list and a description of how each item version number and serial number shall be recorded for each installation and configuration into the ITSM system.				

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	l) A record keeping method such as the daily work reports identifying, at a minimum, the date, location, weather conditions, staff on site and classification, tasks completed, visitors, MOT, issues and resolution, and communications to other parties. These daily reports shall be delivered at the end of each work week to NCTA for review during the upcoming week installation meeting.				
	m) Contractor Organization Chart defining key team personnel, roles and responsibilities, and contact information. All Subcontractors shall be identified.				
	n) Contingency Plan: A detailed contingency plan shall be prepared for reopening closures to public traffic. A general contingency plan shall be included in the Installation Plan; however, a site-specific contingency plan shall be submitted to NCTA before work at the job site begins.				
181	The Contractor shall schedule, manage, and attend weekly installation meetings during the active design and installation of the Project and report on the progress of the installation. The Contractor shall identify and communicate any issues regarding system construction and installation immediately upon discovery to the Constructor, NCDOT and NCTA.				
182	The Contractor shall ensure that the appropriate personnel is present at these meetings who can represent the Contractor's interest and provide the information necessary in a meaningful manner.				
183	Prior to the meeting, the Contractor shall Update the installation schedule based on the construction schedule, and all changes shall be identified.				
184	The Contractor shall prepare and distribute a meeting agenda at least forty-eight (48) hours prior to the scheduled meeting. The meeting agenda shall consist of those items pertaining to the installation and schedule for the previous and current week's installation efforts and for an agreed to "look ahead" period. The meeting agenda should include any potential risk items identified and corresponding mitigation efforts.				
185	It is the Contractor's responsibility to make sure all issues that arose during the installation activity for the week are addressed and resolved or are scheduled for resolution.				
186	At these meetings, the Contractor shall also be prepared to address any issues or questions raised by the Constructor, other contractors, and NCTA or its representatives.				
187	The Contractor shall document the meeting discussions and distribute the meeting minutes within one (1) Business Day to everyone from the team invited to the meeting. It shall be up to the recipients of the meeting minutes to distribute to other interested parties. The Contractor shall also record and maintain an action items list that tracks all installation-related issues.				
188	The Contractor shall install racks, enclosures, and UPS within the cabinets in accordance with applicable North Carolina State building codes and **Attachment 3: I-5507 Constructor Plans & Requirements.**				
189	The Contractor shall adhere to the latest version of the **NCDOT Standard Specifications for Roads and Structures**, **NCDOT Roadway Standard Drawings** and **Attachment 3: I-5507 Constructor Plans & Requirements.** In case of conflict, **Attachment 3: I-5507 Constructor Plans & Requirements** shall take precedence.				
190	The Contractor shall coordinate all installation activities with NCTA, NCDOT, and the Constructor where applicable.				
191	Prior to the start of any installation activities the Contractor, including any Subcontractors, shall complete the safety orientation provided by the Constructor.				
	The Contractor shall participate in the design and installation of the infrastructure on the Roadway, including but not limited to:				
	a) review and reach consensus on all toll and ITS Equipment submittals;				

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192	b) review and reach a consensus of the ITS network design provided by the Constructor;				
	c) support and supply all information requested by the Constructor and civil designer in the form of a Request for Information (RFI);				
	d) review and reach consensus on all Constructor-provided drawings with respect to the RSS; and				
	e) of such drawings related to the RSS.				
193	The Contractor shall meet all electrical codes, traffic control, seismic considerations, calibration, configuration, and environmental requirements of and including but not limited to:				
	a) Equipment manufacturer's;				
	b) National Electrical Code (NEC);				
	c) UL standards;				
	d) NCTA;				
	e) NCDOT;				
	f) FHWA;				
	g) MUTCD;				
	h) IEEE (Institute of Electrical and Electronics Engineers);				
	i) COVID-19 safety requirements; please reference **Attachment 1: COVID-19 Workforce Safety Plan**;				
	j) OSHA requirements; and				
	k) any local authorities having jurisdiction.				
194	The Contractor shall adhere to the latest **NCDOT Roadway Standard Drawings**, the latest **NCDOT Standard Specifications**, and **Attachment 3: I-5507 Constructor Plans & Requirements** unless the Contractor receives written approval by NCTA.				
	The **NCDOT Standard Specifications for Roads and Structures** and the **NCDOT Roadway Standard Drawings** are located at:				
	https://connect.ncdot.gov/resources/Specifications/Pages/default.aspx				
195	The Contractor shall be responsible for all costs associated with any permits, plan reviews, and inspections related to RTCS work.				
196	It shall also be the Contractor's responsibility to procure all documentation required to install and adhere to the proper installation standards, law, ordinance, or codes.				
197	The Contractor shall procure services of Subcontractors qualified to work in this industry. If a Contractor's component requires a Contractor-approved installer, the Contractor shall use an approved component installer, including qualified Contractor staff.				
	The Contractor's installation responsibilities for the RSS shall include but not be limited to:				
	a) Furnish and install clean, uninterruptable power to all RSS Equipment on the overhead structures/toll gantries and in the toll Equipment cabinets.				
	b) Furnish and install separate ground wires for the RSS, Surge Protection Devices (SPD), junction boxes, pull boxes, conduits, and other such items as required by the installation standards and requirements.				
	c) Furnish and install all connecting conduit from wire ways and conduits provided and installed by others and/or stubbed out conduits to the Equipment on the toll gantries. The Constructor shall install the conduits from the toll Equipment pads to the foundation of overhead structures/toll gantries.				

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198	d) Furnish and install all wiring for all in-lane Equipment and connections to the Equipment racks in roadside cabinets. This includes the proper termination of all power, communication, and RF cables and/or wiring (copper or fiber-optic) required to connect the individual components into a fully operational system as specified by the manufacturer.				
	e) Furnish, and install the cables necessary for terminating and connecting the RSS Equipment on the toll gantry to the electronics in the Equipment cabinets. Cable lengths shall include sufficient service loops to facilitate maintenance.				
	f) Furnish and install all Equipment racks required for the in-lane electronics and toll network communications in the toll Equipment cabinets.				
	g) Furnish and install all electronics and other devices in their respective Equipment racks as required to provide a fully operational system.				
	h) Furnish and install all Zone Controller computers and other servers (Hardware and Software) into the Equipment racks and test the connection between the Zone Controller, and the NCTA provided CBOS/OBO.				
	i) Furnish and install all Equipment mounting brackets to support structures for the installation of all RSS Equipment on the overhead structures/toll gantries.				
	j) Furnish and install the AVDC system Equipment, overhead mounted Equipment and controllers as specified by the manufacturer. Includes all NCTA approved materials, Equipment and supplies required to complete the system.				
	k) Calibrate and test the AVDC system in full accordance with the manufacturer's guidelines.				
	l) Install all NCTA-provided AVI readers on the gantries, in the toll Equipment pads, or at approved NCTA locations.				
	m) Install the AVI system Equipment, including antennas, readers, related Equipment, cables, and any support brackets required. All AVI mounting Hardware, junction boxes, and cables shall be procured and supplied by the Contractor.				
	n) Time synchronize the new RSS with the AVI system, including the provision of required cables as needed.				
	o) Validate all cable and wire terminations via a test process to ensure that the cable is connected to the correct location on each end and that the cable/wire is properly terminated.				
	p) Power up and provide a field check out/installation acceptance test of all systems, to be witnessed and approved by NCTA or its Designated Representative. Provide the completed installation checklist as described in this SOW and Requirements.				
	q) Furnish and install the ICPS Equipment, including cameras, ICPS illumination, and any video controller Equipment, sensors, Software, controllers/servers, or specialty Equipment associated with the ICPS. Configure and tune the cameras to meet the Performance Requirements of the SOW and Requirements.				
	r) Calibrate and test the ICPS in full accordance with the manufacturer's guidelines and to meet the image processing requirements specified in the SOW and Requirements.				
	s) Furnish, install, calibrate, and test the DVAS cameras and Equipment.				
	t) Integrate, calibrate, and test the toll related ITS elements that are provided by the Contractor to the ITSM system.				
	u) Transaction Status Indicator (TSI) HOV indicator beacons for Express Lane facilities.				
	v) All other items, materials, and Equipment to complete installation in accordance with the Contract.				

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199	The Contractor shall integrate to a NCTA provided OBO with toll transaction data, DVAS, ITSM, and all images and image services.				
200	The Contractor shall transmit all data directly from the RSS and ITS Equipment to the OBO or the Contractor shall provide a on-premises or cloud-based transaction store for its systems to serve as an aggregator prior to sending to the NCTA OBO. The Contractor shall describe its architecture in its Technical Proposal.				
201	The Contractor shall provide an interface to all elements of the OBO. The Proposer shall include in its Technical Proposal ICD's and other related information on how the Contractor will integrate with the OBO.				
202	The Contractor shall develop an installation checklist that tracks the progress and completion of all RTCS installation activities for the RSS and ITS systems.				
203	The checklist shall be the document detailing those items required for the installation crew and technical team to complete the installation process for all Equipment and components, including terminations, connections, and configurations.				
204	A copy of the checklist signed and approved by the Contractor, attesting to the completeness of the installation, shall be provided to NCTA after the completion of the installation activities for each lane at each Tolling Location.				
205	The Contractor shall conduct a final inspection of all installations and certify the installation work.				
206	NCTA reserves the right to obtain the services of a certified engineer to witness the Contractor inspection and conduct an independent inspection. The Contractor shall coordinate and support such inspections at each tolling location.				
207	The checklist shall identify all non-conformances, discrepancies, and exceptions, and the Contractor shall be responsible for all corrections.				
208	The checklist shall document all changes identified during the installation process, and all such changes shall be approved by NCTA or its designated representative.				
209	Electrical work to be performed under this Contract shall include, but not be limited to the following general items of work:				
	a) Provide and install Surge Protection Devices (SPD) as required to protect all toll collection Equipment and electronics.				
	b) Install junction boxes and terminate new cable and conduit attachment devices, where applicable.				
	c) Bond all conduits, manhole frames, and other conductive items to the grounding system in conformance with the NEC.				
210	All electrical work shall be performed in accordance with the applicable regulations and approved by NCTA and NCDOT. Appropriate NEC compliance shall be adhered to with all electrical articles for installation pertaining to wiring, enclosures, and other electrical Equipment in hazardous locations. UL labels shall be provided for all electrical panel boards, enclosures, and accessories.				
211	All electrical Equipment must be inspected prior to installation for defects that could damage the Equipment or harm personnel. Any Equipment found to have defects shall not be installed but shall instead be replaced with a fully functioning replacement.				
212	All electrical Equipment shall be properly grounded for safety. Equipment shall be furnished with grounding pads or grounding lugs. All ground connections shall be cleaned immediately prior to connection.				

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213	The Contractor shall provide all grounding material required for installation of the Contractor Equipment and all installations shall be in compliance with the applicable standards.				
214	The Contractor shall cooperate with NCTA, NCDOT Division 10 and the Constructor to minimize the required number of lane closures and to maximize the use of other scheduled lane closures. The Contractor shall transmit all lane closure requests to NCTA for approval.				
215	The Contractor shall work with NCTA and agree to a reasonable plan for scheduling and approving lane closures, including a procedure for advance notice of cancellations of lane closures and allowable conditions for such cancellations as described in this SOW and Requirements.				
216	The Constructor will have the Express Lanes closed until the completion of the construction work. However, the Contractor shall be responsible for administering all lane closures and traffic controls that go beyond what is provided by the Constructor during the installation and for all the testing through acceptance. The Contractor shall be responsible for any lane closures on the general-purpose lanes to conduct its work and any lane closures that are required after the Constructor completes its work.				
217	RSS and ITS commissioning shall be scheduled to minimize traffic delays during the installation process. The Contractor shall make every effort to schedule work around peak traffic movement times. Note: Lane Closure Restrictions can be found in: **Attachment 3: I-5507 Constructor Plans & Requirements.**				
218	For all lane closures, the Contractor shall conform to the latest versions of the NCDOT Standard Specifications for Roads and Structures and the NCDOT Roadway Standard Drawings for regulations for MOT activities during the maintenance period.				
	The NCDOT Standard Specifications for Roads and Structures and the NCDOT Roadway Standard Drawings are located at:				
	https://connect.ncdot.gov/resources/Specifications/Pages/default.aspx				
219	By 12:00 p.m. Tuesday, the Contractor shall submit to NCTA and NCDOT Division 10 a written closure schedule that details the schedule of planned closures for the following week period, defined as Sunday 12:00 p.m. through the following Sunday 12:00 p.m.				
220	If required by the Contractor, closures involving work (temporary barrier placement and paving operations) that shall reduce horizontal clearances, traveled way inclusive of shoulders to two (2) lanes or less shall be submitted no less than twenty-five (25) Calendar Days and no more than one hundred and twenty-five (125) Calendar Days before the anticipated start of operations.				
221	Closures involving work (pavement overlay, overhead sign installation, falsework, and girder erection) that shall reduce the vertical clearances available to the public, shall be submitted no less than twenty-five (25) Calendar Days and no more than one hundred and twenty-five (125) Calendar Days before the anticipated start of the operation.				
222	The closure schedule request shall show the locations and times of the proposed closures. The closure schedule shall be submitted in the format requested by NCTA and NCDOT Division 10 and must be made in accordance with NCDOT lane closure requirements and in observation of the lane closure restriction for designated legal holidays. Closure charts for freeway/Express Lane and multilane requirements and the lane closure restriction for designated legal holidays may be obtained upon request from NCTA.				

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223	Closure schedules requests submitted to NCTA with incomplete or inaccurate information shall be rejected and returned for correction and resubmittal. The Contractor shall be notified by NCTA and/or NCDOT Division 10 of disapproved closures or closures that require coordination with other parties as a condition of approval.				
224	Closure schedule request amendments, including adding additional closures, shall be submitted by 12:00 p.m. to NCTA and NCDOT Division 10, in writing, at least three (3) Business Days in advance of a planned closure. Approval of closure schedule amendments shall be at the discretion of NCTA. NCTA will be notified of canceled closures two (2) Business Days before the date of the closure. Closures that are canceled due to unsuitable weather may be rescheduled at the discretion of NCTA.				
225	Any work involving removal/relocation of Equipment (both existing Equipment and the Contractor's Equipment), loosening or removal of nuts/screws, cables, connectors, etc., shall be done with appropriate lane closures during a nighttime period or off-peak hours and in accordance with NCTA approved lane closures.				
226	If extended lane closures (lane closure exceeding 2 hours) are required, the lane closures shall be completed between the hours of 11:00 P.M. EST and 6:00 A.M. EST, excluding holiday periods as set forth in the lane closure requirements.				
227	Lane closures scheduled for less than 2 hours shall be approved by NCTA and NCDOT Division 10 in accordance with the documentation provided on the website, and shall not occur during peak traffic times, and shall be solely at NCTA's and NCDOT Division 10's discretion.				
228	The Contractor shall secure the services of a fully qualified engineering design firm(s) for the purpose of performing any necessary infrastructure-related engineering design (civil, structural, electrical, mechanical, and architectural) and the preparation of related plans and documentation under the Contract for any design that impacts life safety. The Contractor shall submit the name of the engineering design firms in its proposal for NCTA approval. Any changes to the engineering firm shall be required by the Contractor.				
229	All design work shall be performed under the direct supervision of a licensed engineer of the appropriate discipline in the State of North Carolina. All design professionals shall be licensed and authorized to practice in the State of North Carolina.				
230	The Contractor's design submittals shall not be required to be signed / sealed by a licensed engineer. However, should the Contractor provide custom manufactured infrastructure that is structural in nature or other structure(s) or appurtenances (e.g., Equipment mounting brackets, Equipment arms, etc.) that have the potential to impact life safety, the Contractor shall secure the services of a fully-qualified engineering design firm(s) licensed in North Carolina for the purpose of performing engineering design and the preparation of related plans and documentation under the Contract.				
231	In addition, any electrical work performed in an occupied building shall require the seal of a licensed engineer of the appropriate discipline in the State of North Carolina.				
232	The Contractor shall provide the installation requirements including acceptable tolerances for the system Equipment, including all related plans and documents. The Contractor shall be fully responsible for the accuracy of its installation requirements.				
233	The Contractor shall prepare and submit the RTCS Installation Design Requirements package to NCTA for review in accordance with the approved Project Schedule.				
234	The installation requirements provided by the Contractor shall be consistent with those provided in the Contractor's proposal and shall accommodate the design provided to support the lane configurations listed in **Attachment 3: I-5507 Constructor Plans & Requirements.**				

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	Requirements	B-Base Product M-Base Modified D-New Development E-Exception	P-Proposer S-Sub T-Third Party NA-Not Applicable	Subcontractor Name and/or 3rd Party Product/Vendor	Comment required if "Exception", optional otherwise.
235	The Contractor shall develop a half-size (11" by 17") set of drawings providing sufficient and accurate detail to install the system components.				
236	In addition, the drawing shall contain notes and other detail defining specific processes that cannot be graphically depicted. The notes shall also be used to delineate specifications, tolerances, special conditions, or any other factor required to install and integrate a fully functional system.				
237	The Contractor shall indemnify all related parties as more fully described in the **Part IV: Terms and Conditions** for any damages that result from reliance on the installation requirements provided by the Contractor.				
238	The Contractor shall submit shop drawings detailing the installation design that shall be used onsite for installation work. Detailed drawings shall be provided for each site where Equipment procured and supplied under the Contract shall be installed.				
239	The drawings shall include but not be limited to the following:				
	a) lane Equipment layout for each tolling location type;				
	b) placement of the Equipment on the toll gantry;				
	c) lane geometry and dimensions of actual size and placement of all roadside Equipment;				
	d) Equipment brackets mounting detail to the mounting arm;				
	e) a detailed drawing showing the Equipment mounting brackets and details of their installation to the gantry;				
	f) specifications and tolerances;				
	g) detailed installation drawing for each piece of Equipment;				
	h) details related to the range of Equipment adjustments;				
	i) conduit and cable schedule showing all conduits, cables, and wires used for each RTCS location;				
	j) detailed conduit layout for power and communications;				
	k) all junction boxes and panels;				
	l) any specific infrastructure limitations (i.e., the proximity of rebar);				
	m) placement of overhead sensors;				
	n) details describing the termination process for each termination;				
	o) lightning and surge suppression system;				
	p) a graphical diagram of the network connectivity and data flow;				
	q) detailed interconnection diagrams for all systems;				
	r) detailed electrical schematics;				
	s) detailed communications layout;				
	t) Equipment rack layout, including power panels and connection to the UPS;				
	u) detailed cabinet/vault/Equipment rack layout and interconnections;				
	v) detailed cabinet/vault Equipment rack space requirements;				
	w) a detailed diagram of the network connectivity, including IP scheme;				
	x) server set-up and configuration;				
	y) other Hardware installation and connections; and				
	z) floor loading calculations.				
240	The Contractor shall use only the latest approved drawing version for installation.				
241	The Contractor shall provide the installation requirements for the Equipment, including all related plans and documents. The Contractor shall certify the installation requirements provided as accurate and appropriate for its intended purpose, to the satisfaction and approval of NCTA.				

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242	During installation, the Contractor shall maintain a redline version of the drawing package that is submitted to NCTA upon the completion of the installation.				
243	Documentation shall include memos denoting changes or modifications to Requirements.				
244	The Contractor shall submit detailed component level network drawings showing all WAN, LAN and VLAN connections, including connection to the RSS, the TRH, NC Quick Pass Operations Center, MRTMC, NCTA OBO/CBOS and the STOC.				
245	The Contractor shall utilize a predefined range of IP addresses provided by NCTA. An IP schematic shall be submitted that shows all the IP addresses for all Contractor supplied Equipment on the network.				
246	The Contractor shall submit detailed bill of materials for the TRH including configuration instructions, including storage device mirroring, virtual private clouds, back-up devices and configuration, and network configuration, security provisions, and testing.				
247	The Contractor shall submit detailed instructions on the installation and configuration of the operating system, database, third-party Software, and application Software on the servers as customized for NCTA operations.				
248	The Contractor shall submit detailed network drawings showing all WAN, LAN and VLAN connections, including all interface connections and IP addresses for all Equipment on the network.				
249	All testing required to verify successful installation and operation shall also be documented.				
250	The Contractor shall Update the latest drawings with red lines as changes are incorporated during the installation and check-out process. At the completion of the installation of the RTCS, the Contractor shall gather all red line drawings into a single package.				
251	The red-line drawings shall be verified and then incorporated into a final As-Built Drawing package. This final As-Built Drawing package shall include installation drawings, shop drawings and sketches, and other drawing types that may have been used to install the RTCS.				
252	All other documentation used regarding the installation shall also be finalized and submitted as part of the As-Built Drawing submittal.				
253	The NCTA Business Policies for NC Quick Pass and Roadside includes operations concepts, business policies, business rules and concept of operations for this Project and the NCTA systems roadside and customer service center and can be found in **Attachment 2: NCTA Business Policies for NC Quick Pass and Roadside.** All specific requirements that differ or expand upon these documents are included in this **Part III, Scope of Work and Requirements.**				
	NCTA currently has two volumes of Business Policies as described below:				
	a) Program Policies for Tolling System Operations lasted dated August 2020, Version 2.1, that describes the statewide business policies and business rules for the Roadside and TRH.				
	b) NC Quick Pass Business Policies that describes the statewide NC Quick Pass Business Policies and Business Rules.				
254	All Hardware and Equipment supplied under this Contract shall be new, Commercial Off-the-Shelf (COTS). Materials and products that have been previously used for development work or the Contractor's internal Formal testing, or items that have been salvaged or rebuilt shall not be used in connection with this Contract.				
255	The Contractor shall install all Equipment and systems needed for Express Lanes operations.				
256	The Contractor shall provide images and video stream with playback capability of toll rate sign.				
257	All RTCS Software developed, furnished, and installed under this Contract shall be warranted, by the Contractor, against Software defects, security vulnerabilities, and deficiencies for the life of the Project.				

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258	RTCS elements and subsystems shall be designed and installed in a manner that minimizes the need to close toll lanes for routine maintenance and minimizes the duration of any lane closures for maintenance.				
259	The Contractor shall provide, manage, and maintain all RTCS network Equipment within the RSS and TRH network including servers, switches, routers, and firewalls, and all network cabling.				
260	The RTCS shall include a minimum of two (2) network time servers each synchronized to a minimum of three (3) independent stratum 1-time servers.				
261	The RTCS shall synchronize all components of the RTCS to within 1/1000 of a second.				
262	The RTCS shall monitor and collect data on system and Equipment statuses continually 24 hours a day, 7 days a week.				
263	The Zone Controller shall interface with the DVAS to transmit event data for display on the DVAS. The event data shall be based on the facility type and shall include Transponder reads, ICPS data, and AVDC messages received as the vehicle travels through the lane.				
264	The RTCS shall record color video of every toll lane and Toll Zone that allows for the visual identification of vehicle size and number of inferred axles and length at all times of the day and under all environmental conditions. The frame rate shall be sufficient to clearly identify vehicle characteristics to support an audit.				
265	All toll lanes and Toll Zones shall be capable of operating without any communications to the RTCS TRH for up to 90 Calendar Days while storing all lane transactions to be processed when communications are restored.				
266	All Toll Zones shall be capable of processing and creating lane transactions for a minimum 3,000 vehicles per hour with no loss of data and with all vehicles with rear license plates and an AVI Transponder. Simulation Software shall be accepted as a method of compliance with this requirement to ensure the system is properly sized, coded and configured to achieve the highest level of system efficiency for processing all types of transactions that shall be processed on the NCTA toll roads.				
267	The RTCS shall provide supplemental illumination (if needed) for image based (Bill by Mail) tolling that does not interfere with vehicle travel or distract drivers and shall not cause light pollution to areas adjacent to the roadway.				
268	The RTCS shall provide time-of-day and Dynamic Toll Rate (DTR) scheduling configurable in five (5) minute time intervals.				
269	The RTCS shall provide fare override functions so that the Contractor and NCTA can override the toll roads to discount the toll rate from 0% to 100% to be CLOSED or to a pre-determined rate manually or automatically based on certain conditions.				
270	The RTCS shall use grace periods to account for the time between when a customer sees a Toll Rate Sign (TRS) and the time they pass under a toll point. TRS data shall be made available to the CBOS and to CSR's, available for review for at least one hundred eighty (180) Calendar Days. The history shall be viewed using a browser-based access that does not require any applications loaded on the CSR workstations.				
271	The RTCS TRS shall store the rates using local power for a minimum of two (2) hours if externally sourced power is lost.				
272	The Contractor shall calculate the average speed of travel and travel time within each toll segment (i.e. between Toll Zones).				
273	The Contractor shall calculate the average speed of travel and travel time between Toll Rate Sign (TRS) locations and the next toll gantry.				

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274	The Contractor shall provide Fully Formed Transactions (FFT) and associated data for toll transactions captured from the RTCS and sent to the NCTA CBOS/OBO. The Contractor shall provide an FFT that is compliant with CBOS/OBO to RTCS ICD as outlined in **Attachment 9: NCTA CBOS to RSS ICD.** During the design, NCTA will work with contractor to convert the current data exchange method from file transfer to web services between RSS and CBOS/OBO. Refer to the current Interface control document as a reference for number of Web services and minimum data exchange elements. The Contractor shall describe its existing interface in its Technical Proposal.				
275	The Contractor shall receive, and process Transponder and license plate data files as required to meet all Requirements. This data is required to complete the FFT and send to the CBOS/OBO in accordance with the Requirements and NCTA Business Policies for NC Quick Pass and Roadside.				
	The license plate and Transponder interface consist of Full Transponder Status List (FTSL), Incremental Transponder Status List (ITSL), Full Plate Status List (FPSL) as outlined in CBOS/OBO to RTCS ICD in **Attachment 9: NCTA CBOS to RSS ICD.**				
276	The RTCS shall conform to the CBOS/OBO ICDs for the transfer of FFT and all other necessary data from the RTCS hosts to the NCTA CBOS/OBO.				
277	The RTCS shall capture at least one rear unique color image of the vehicle and its license plates for every vehicle that passes through a toll lane or Toll Zone.				
278	The RTCS shall not delete any information included in the lane transaction. Data in the lane transaction can only be created and amended.				
279	All transactions shall be uniquely identified and validated at the RSS to ensure there are no missing or duplicate transactions prior to sending to the NCTA CBOS/OBO.				
280	When multiple Transponders are detected within a vehicle the system shall default to a single Transponder as determined by NCTA business rules (to be finalized during detailed design). NCTA Transponders shall be first priority followed by away agency Transponders. Away agency Transponder priorities shall start at the lowest agency number and work to the higher number.				
281	The lane transaction shall indicate which Transponder is assumed to be the valid Transponder for processing by the CBOS but shall also include the other Transponders in the Roadway Transaction Files or web services that is sent to the NCTA CBOS/OBO.				
282	The RTCS shall account for every lane transaction that is the result of a buffered Transponder read for tracking and disposition which shall be reported to and auditable by NCTA.				
283	Transponder reads buffered during lane degradation where no other information or images are captured shall be sent to the NCTA CBOS for processing as a transaction at the lowest toll class.				
284	The RTCS shall process image based (Bill by Mail) toll lane transactions on a first-in, first-out (FIFO) basis.				
285	The RTCS shall create a Region of Interest (ROI) from the image used to determine the license plate data, showing an enlarged view of the license plate with the license plate data clearly readable to the unaided eye. The ROI shall meet the CBOS/OBO ICD specifications.				
	The RTCS shall provide Automatic License Plate Recognition (ALPR) and identify license plate information, including license plate type, alphanumeric characters, stacked characters, vanity plates and jurisdiction of origin, to be included in the lane transaction message.				
	NCTA desires to select a sample of image transactions that have been reviewed and sent to the CBOS/OBO. The transactions should include:				
	• The raw images captured at the lane, including the toll rate sign image, and the images selected to be sent to CBOS/OBO after image review.				

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286	• All transaction details (transaction ID, classification, OCR, plate number, jurisdiction, plate type, transaction flags, lane mode, toll rate).				
	• A video clip 15 seconds before and after the toll transaction of interest shall be captured and be included, with the system log summary.				
	The Vendor shall provide functionality that selects a sample of image transactions that have been reviewed and rejected. These transactions shall include:				
	• Transaction details				
	• Raw image captured at the lane				
	• Video clip 15 seconds before and after the toll transaction. 15 seconds shall be configurable to XXX seconds before and after the toll transactions as determined by NCTA.				
	NCTA describes to select samples based on date/time range, class, image review results (accepted or rejected), reject reason, system flag, system mode, jurisdiction, plate type, toll rate, toll zone, and lane number.				
287	The RTCS shall provide image sets for image-based toll transactions which conform to the most recent CBOS/OBO ICD. This shall include the inset or modified version of any image or Region of Interest (ROI) used to create a human readable image that goes on the Bill by Mail invoice.				
288	NCTA understands that the Contractor shall implement ALPR for image-based transaction reviews using Optical Character Recognition (OCR) engines, machine learning and other methods to accurately identify the license plate numbers, jurisdiction and plate type (if required). The Contractor shall describe its image verification process (technology and manual verification) including filtering capabilities in its Proposal.				
289	The Contractor shall verify during all required tests the image review application workflow and uses, license plate data, Quality Assurance processes (e.g. double-blind verification if necessary) and demonstrate its efficiencies to confirm it can meet the Performance Requirements.				
290	The RTCS shall provide function to review the transaction accuracy, including the FFTs sent to the CBOS as well as transactions that were retained in the CBOS/OBO for the purpose of:				
	a) Audits conducted by the Contractor or NCTA and its agents.				
	b) Provide an application or filtering capabilities that allows the Contractor or NCTA and its agents to select problem plates to be added to queue that requires manual image verification. The plates shall be added by the image verification Software or manually by an authorized user in the system.				
	c) Support existing NCTA review and auditing processes to measure the system against the Performance Requirements.				
	d) The Contractor shall be able to filter AVI and images-based transactions including, but not limited to:				
	1. ALPR confidence levels				
	2. ALPR results based on location and Jurisdiction				
	3. Manual image review results based on location and jurisdiction				
	4. Contractor rejected images				
	5. Image-based transactions by vehicle class as defined in the NCTA Business Policies for NC Quick Pass and Roadside				
	6. Filtered criteria based random sampling for QA/QC (every XX transactions)				
	7. System exceptions as defined in this SOW and Requirements				
	8. Unusual occurrences as defined in this SOW and Requirements				
	The RTCS shall map transactions that are not subjected to audit for accuracy, defined as System Exceptions, including but not limited to:				

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291	a) auto flushes (tags read at the lane that did not correlate to a vehicle or lacks AVC data);				
	b) images that were not correlated to a transaction (video auto flush);				
	c) lane unavailable (transactions captured during a period of time when the system (lane or host) is deemed "unavailable"); and				
	d) transactions captured when in lane mode: maintenance.				
292	The RTCS shall map transactions to be used as indicators for potential lane issues, defined as Unusual Occurrences, including but not limited to:				
	a) AVI unrecognized or unknown from the CBOS FTSL file;				
	b) class mismatch of Transponder versus lane AVC (only applicable to transaction with programmed Transponders [6C and TDM]);				
	c) transaction without images;				
	d) transaction with unusual number of axles (7+);				
	e) Wrong Way Vehicle (WWV);				
	f) speed over 100 mph; and				
	g) speed of 0 mph (not including auto flush transactions).				
293	The RTCS shall allow toll lanes operational modes to be changed by authorized users from the operations center.				
294	The RTCS shall support manual audit and amendments to lane transactions.				
295	Interfaces shall allow authorized users to quickly search by various query criteria, including:				
	a) lane transaction number;				
	b) specific time and time range;				
	c) location (facility);				
	d) lane/Toll Zone;				
	e) class mismatch; and				
	f) any combination of these parameters.				
296	The RTCS shall support the remote monitoring of Toll Zones by authorized users. Remote monitoring shall at a minimum include:				
	a) observing lane transactions as they are created;				
	b) being able to look at the last 100 lane transactions;				
	c) reviewing ICPS images;				
	d) security and environment conditions;				
	e) monitoring of dynamic pricing, and travel time;				
	f) observing Equipment status; and				
	g) observing system status.				
297	The RTCS shall automatically generate and track work orders for preventative maintenance, corrective maintenance, and emergency maintenance.				
298	The RTCS shall automatically alert maintenance staff once a work order has been generated.				
299	The RTCS shall support the assignment of maintenance priority levels based on the system configurable combination of severity level, facility, day and time.				
300	Work orders are to be completed and closed out by the Contractor.				
301	Data from the alerts, logs, Hardware and Software status, work orders, tickets and any items in the IT Service Management (ITSM) system shall not be deleted or modified for the duration of the Contract.				
302	The RTCS shall support the generation of ad-hoc work orders by authorized users.				

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303	The RTCS shall track spares and inventory levels including serial numbers and associated warranty information for installed Equipment and inventoried Equipment.				
304	The AVDC system shall be able to detect and report vehicles traveling in the wrong direction. The RTCS shall generate an alarm and send notification to STOC and MRTMC when a wrong way vehicle is detected.				
305	The RTCS shall alert TMC personnel via email and SMS text message within ten (10) seconds (configurable) of the vehicle passing through the Toll Zone if the AVDC system detects the vehicle traveling in the wrong direction. The RTCS shall transmit to the MRTMC and STOC a five (5) second looping DVAS video file of the vehicle, and the message shall be prominently displayed on operators' video wall or monitors. An audio alarm shall be received with the video message.				
306	The Contractor shall store data in accordance with the data retention requirements described below:				
	a) 180 Calendar Days of CCTV road overview cameras, access control and video and transaction logs for audit purposes.				
	b) All RSS shall keep data for up to 30 days.				
	c) The TRH shall be configurable as determined by NCTA to manage data types and NCTA may change this policy at any time.				
	d) The Contractor shall provide in the SDDD a list of data types including tables and fields that map to the above policy for NCTA review and approval with the SDDD. This may be a separate appendix to the SDDD but all appendices are required prior to the approval of the SDDD.				
307	Proof of purchase in the form of purchase orders, dated invoices, and shipping bills shall be retained by the Contractor and furnished to NCTA under the Requirements of this SOW and Requirements and the Contract for the purposes of payments.				
308	Applicable industry standards and best practices for all electrical Work shall be met.				
309	Applicable industry standards and best practices for network and data communications shall be met.				
310	Error logs shall be transmitted to the ITSM system and available to authorized user in viewable form. Search and filter capability shall be provided to display and review up to one-hundred eighty (180) Calendar Days of data since the event.				
311	All work and diagnostics performed by Contractor staff on the RTCS shall be recorded and automatically reported to the ITSM system, including the technician identification, the time the maintenance was performed, and all status and recovery messages.				
312	The Contractor shall supply all diagnostic Software and specialty tools required for support of maintenance activities, and NCTA will have full rights and access as further defined in the Contract to such diagnostic Software and specialty tools.				
313	All in-lane Equipment controllers and RTCS electronics, devices, servers, and associated communications Equipment shall be installed inside environmentally controlled Equipment cabinets at the roadside. The Contractor shall purchase and install the cabinets per the Requirements of this Contract.				
314	All cabinets and enclosures that shall be installed outdoors shall be designed to withstand typical Charlotte, North Carolina area environmental conditions and shall not suffer any visible or functional degradation over the term of the Contract.				
315	The cabinets shall have monitoring sensors (including humidity and temperature), and if environmental conditions inside the cabinets exceed the configurable threshold, alarms shall be generated and reported to the ITSM system. There shall be no loss of data in such conditions, and the integrity of the RTCS shall be maintained.				

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316	All cabinets and enclosures shall be configured to "fail secure" in the event of power outages. The Contractor shall maintain a set of all keys to be used in the event of a "fail secure" incident and access to Equipment is necessary.				
317	Access to all Equipment cabinets shall be recorded automatically and reported to the ITSM system. The data reported shall include, but not be limited to cabinet status, date, time of door open, time of door close, and any applicable alarm conditions.				
318	The Contractor shall include the BOM as defined in this SOW and Requirements in **Section 2.3.4 Bill of Materials (BOM)**.				
319	This Contractor shall provide recommended quantities of spare parts required for the operation of the tolling locations during the Contract Term. Costs for the replacement of spare parts during the Contract Term shall be the responsibility of the Contractor.				
320	At the end of the maintenance term, all spare parts inventory shall be turned over to NCTA. The Contractor shall identify (via the ITSM system) the warranty status for each piece of Hardware and warranty period remaining, if applicable.				
321	The RTCS shall support AET Facilities as described in **Part III, Scope of Work and Requirements.**				
322	The RTCS shall support the lane configurations in **Attachment 3: I-5507 Constructor Plans & Requirements.**				
323	Shoulder widths shall vary by location and Toll Zone and are detailed in **Attachment 3: I-5507 Constructor Plans & Requirements.** Travel lanes shall be equipped with the required toll collection subsystems to accommodate the variation in widths and road curvature and super elevation. During the detailed design period, the Contractor shall make the required adjustments to the RTCS design to accommodate for variations in the actual lane widths and curvature.				
324	The Contractor's services shall be designed, developed, implemented and maintained in a manner consistent with security requirements, defined as the requirements levied on Information Environments that are derived from laws, Executive Orders, directives, policies, standards, instructions, regulations, procedures, or organizational mission/business case needs to ensure that security and privacy protections are implemented in the collection, use, sharing, storage, transmittal, and disposal of information. Security requirements shall be supported in a manner that makes verification possible via analysis, observation, test, inspection, measurement, or other defined and achievable means. The Contractor shall meet the following requirements (where applicable):				
	• 18 U.S. Code § 2721 — Driver's Privacy Protection Act				
	• N.C.G.S § 143B-1375 — Security				
	• N.C.G.S § 143B-1376. Statewide security standards				
	• N.C.G.S. §143B-1331 — Business Continuity Planning				
	• Functional Schedule for North Carolina State Agencies				
	• North Carolina Statewide Information Security Manual				
	• NCDOT Policies, Standards, Guidelines and Procedures				
	• NCDIT-T Policies, Standards, Guidelines and Procedures				
	• NCTA Policies, Standards, Guidelines and Procedures				
	NC Statewide Information Security Manual can be currently viewed at:				
	https://it.nc.gov/statewide-information-security-policies.				
	The policy regarding data classification and handling can be currently viewed at:				

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	https://it.nc.gov/documents/statewide-data-classification-and-handling-policy.				
	The Functional Schedule for North Carolina State Agencies can be currently viewed at:				
	https://archives.ncdcr.gov/documents/functional-schedule-state-agencies.				
	The definitions in the Statewide Glossary of Information Technology Terms apply to all statewide information technology policies and standards and can be currently viewed at:				
	https://it.nc.gov/documents/statewide-glossary-information-technology-terms.				
	The NIST Glossary of Information Technology Terms can be used to supplement the Statewide Glossary of Information Technology Terms and can be currently viewed at:				
	https://csrc.nist.gov/glossary.				
	The Contractor shall also adhere to the standards listed in **Attachment 4: State of North Carolina, Statewide Information Security Manual.**				
	Any exceptions to the standards described in this Requirement above and in **Attachment 4: State of North Carolina, Statewide Information Security Manual** shall be described in its proposal by adding Attachment 4 compliance in the Proposer's Technical Proposal. The Contractor shall describe any exception to the security policy and why they are exempt. The Contractors shall identify only of those exceptions within the policy with an explanation. Categorical exception to the policy shall be considered non-compliance.				
325	Remote access to all RTCS shall be VPN based and controlled through a central repository, with each user having a unique log-in.				
326	All remote access to the RTCS shall require two-factor authentication.				
327	User sign-on, access, and access failures, both local and remote, to any element of the RTCS shall be recorded and tracked for security audit proposes and reported to the ITSM system. The RTCS shall continuously and automatically monitor for unauthorized access; access violations shall be reported to the ITSM system as Priority 1 alert. These reports shall be provided to NCTA within one (1) hour of discovery.				
328	The Contractor shall develop the access levels, user roles, and privileges matrix during RTCS design with NCTA input and approval. The RTCS shall allow for additional changes to the access levels, user roles, and the addition of personnel in a secure manner.				
329	A system-level account shall be provided for NCTA security systems to perform "credentialed" scans. Additionally, NCDOT IT security can request the Contractor to perform vulnerability, anti-malware and intrusion detection scans and provide reports through the term of the Contract.				
330	The Contractor shall not circumvent NCTA approved RTCS security. All access to the RTCS and approved changes made shall be recorded, monitored, and available for review and audit. Specific requirements for this shall be developed by the Contractor during RTCS design.				
331	The Contractor is responsible for all Updates, patches and hotfixes for all Software developed, furnished and/or installed under this Contract which are needed to maintain functionality and system security. Critical Updates shall be tested and installed within thirty (30) Calendar Days of release. All applicable Updates shall be reviewed to determine if they are necessary and, if so, shall be tested and installed within ninety (90) Calendar Days of release.				

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332	The Contractor shall perform monthly vulnerability tests that are scheduled in the ITSM system, as well as every time a new Software release is deployed or new network Equipment, is added or replaced to evaluate the security risk to the RTCS and identify potential vulnerabilities. NCDOT IT security shall be a party to these security tests and shall be notified in advance of any scheduled tests.				
333	The Contractor is responsible for correcting all RTCS security deficiencies at the Contractor's cost and ensuring that all security risks are mitigated to a level that is acceptable to NCTA and meets state guidelines.				
334	The Contractor shall provide at their cost an annual information security risk assessment to be performed by a third-party approved by NCTA and in consultation with NCDOT IT security. The Contractor shall provide the assessment results to NCTA.				
	The Contractor, and third parties supporting the RTCS Information Environment, shall provide at their own cost applicable third-party risk assessment reports to NCTA that demonstrate the Contractor's compliance to industry accepted guidelines (e.g., SOC 2 Type II, ISO 27001, FedRAMP, PCI DSS, etc.) before the Contractor is permitted to handle Restricted and Highly Restricted NCTA data, and annually thereafter. The Contractor shall adhere to the Statewide Information Security Manual Risk Assessment Policy, Section RA-2:				
	https://files.nc.gov/ncdit/documents/Statewide_Policies/SCIO_Risk_Assessment.pdf https://it.nc.gov/documents/statewide-data-classification-and-handling-policy				
335	The Express Lanes toll facility shall use dynamic pricing with full matrix TRS modules/signs, provided by the Constructor, integrated with the RTCS by and controlled by the Contractor. These are required to inform motorists of the price in effect on the tolled Express Lanes so that motorists can choose their travel option. The TRS signs are provided by the Constructor. The Contractor shall provide all equipment necessary to integrate and make the TSR operational to meet all Requirements.				
336	If the TRS is upstream of the first tolling location where vehicle is detected, the RTCS shall				
	consider the travel time between the TRS location and the first tolling location to				
	determine and assign the toll that was displayed to the customer at the entrance to the facility.				
	The travel time shall be calculated based on either:				
	a) an evaluation of travel times indicated by ITS at the TRS points and the subsequent tolling point (if available), or				
	b) an analysis of speed data gathered by roadside traffic sensors.				
337	The Contractor shall provide a sign control system which, in normal operations, communicates with the pricing system and controls the TRS display.				
338	Authorized personnel shall have access to the TRS through a secure and authorized user				
	network interface to directly control the TRS manually and override system messages. When operating in manual override mode an alarm message shall be generated and sent to ITSM system at configurable intervals. The Contractor shall leverage native functionality (where possible) in the variable TRS boards.				
339	The status of the TRS and the data on the TRS shall be displayed on the TRH				
	dashboard/operations monitoring screen in real-time. The Contractor shall also provide a feed to the CBOS/OBO to display this dashboard or other data as NCTA choses.				
340	Loss of communications or failure of any component of the TRS, including the TRS camera				
	shall be detected and reported to ITSM system and be displayed on the operations monitoring screen as a Priority 1 event.				
341	These TRS cameras shall be integrated into the RTCS by the Contractor to record				
	the data displayed on the TRS upon every change in message and at configurable intervals.				

No.		Required Inputs			
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	Requirements	B-Base Product M-Base Modified D-New Development E-Exception	P-Proposer S-Sub T-Third Party NA-Not Applicable	Subcontractor Name and/or 3rd Party Product/Vendor	Comment required if "Exception", optional otherwise.
	The recorded frames shall be displayed on the operations monitoring screen and available for review.				
342	The TRS and the TRS cameras shall be synchronized to the same time source as the Toll Zone Controllers. The Constructor will provide a minimum of thirty (30) minutes of battery backup for the cabinet.				
343	The TRS camera shall have fixed view presets and also be able to pan/tilt/zoom to accommodate when the TRS is not functioning and temporary roadside signing is used to communicate temporary toll rates.				
344	The AVI system used on the Project shall include Kapsch MPR II readers and antennas. NCTA will provide the AVI system through the AVI vendor based upon the quantities determined by the Contractor in consultation with and approval by NCTA.				
345	The Contractor shall take delivery of the AVI system Equipment, and the Contractor shall be responsible for the AVI system Equipment installation, integration, and maintenance upon delivery.				
346	The Contractor shall integrate the RTCS with the NCTA-provided AVI system at the tolling locations specified in this SOW and Requirements. These integration requirements shall include all the following anticipated protocols to be supported by the RTCS in no specific order of precedence:				
	a) PS111 (TDM/IAG E-ZPass Group);				
	b) ISOB_80K (SeGo); and				
	c) ISOC (ISO 18000-63/6C).				
347	The Contractor shall furnish and install all other Hardware, cabling (including RF, communication, and power cables), connectors, and associated mounting fixtures to form a fully functioning AVI system that meets the Requirements of this SOW.				
348	The Contractor shall be responsible for the physical tuning of the certified AVI Equipment, and for integrating the AVI system into the Contractor in-lane design. All AVI installation, configuration, and tuning shall be in compliance with the AVI vendor requirements.				
349	The RTCS integrated with the AVI system shall process Transponders mounted on vehicles traveling in stop and go and bumper-to-bumper traffic and vehicles traveling at speeds of up to 100 mph. This requirement may be testing at a closed facility but not on any NCTA roadways due to safety reasons unless otherwise permitted in writing by NCTA.				
350	The Contractor shall analyze the site conditions and design, procure, furnish and install the required sensors and Hardware on all lanes at the specified tolling locations as part of the AVDC system that performs in accordance with Performance Requirements set forth in this **Part III, Scope of Work and Requirements** under all weather conditions. **Note: No sensors or loops may be installed in the pavement.**				
351	The AVDC system shall infer the vehicle axle count as well as determine vehicle length, height and width and classify vehicles in accordance with the NCTA vehicle classification structure for all travel lanes and shall include the logic to handle the exceptions identified. Classification of vehicles traveling on the shoulder lanes is not required; however, the RTCS shall detect vehicles that travel on the shoulder and trigger the Image Capture & Processing System (ICPS).				
	The NCTA vehicle classification structure for the Express Lanes is defined as:				
	a) **Low Occupancy Vehicle (LOV)** defined as two-axle motor vehicles other than motorcycles, without trailers, not larger than L:22' W:8.5' H:12", with less than 3 occupants				
	b) **Registered High Occupancy Vehicle (HOV)** defined as two-axle motor vehicles, without trailers, not larger than L:22' W:8.5' H:12", pre-registered as HOV, with three or more occupants for future occupancy and rideshare discount programs				

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352	c) **Motorcycles** defined as motor vehicles with two or three wheels, not larger than a LOV				
	d) **Transit Vehicles** defined as recognized non-profit transit agency buses, rubber wheeled trolleys, and vans used for mass transportation under applicable laws				
	e) **First Responder Vehicles** defined as law enforcement vehicles, emergency fire and rescue vehicles and emergency medical service vehicles				
	f) **Extended Vehicles** defined as two-axle motor vehicles exceeding the length of a LOV or two-axle motor vehicles traveling with a one-axle trailer				
353	The Contractor shall design, procure, furnish and install a secondary sensor and Equipment that are part of the AVDC system as a back-up to support image capture and vehicle framing in the event any element of the primary system fails or is degraded. The RTCS shall determine the conditions (configurable) that invoke the use of the secondary sensors and Equipment.				
354	In the event there is a class mismatch between the AVDC system and the Transponder class. The RTCS shall default to the AVDC class and flag the transaction as an unusual occurrence as defined in this SOW and Requirements.				
355	The DPS shall calculates toll rates, based on configured pricing plans through time of day(calendar) pricing or traffic volume(density) data in the system.				
356	The DPS shall provide functionality to support directional tolling, zone based tolling, and tolling segments. Tolling segments is a rate determined between two Toll Zone and toll rates are expected to be charged based on vehicle travel at the Toll Zone. The DPS shall support future trip building. At Go-Live, NCTA anticipates that all toll rates will be calculated for each toll segment. No zone or trip building is expected on the I-485 Express Lanes project. The Contractor shall support changes to the toll scheme including the adoption of zone or trip building pricing.				
357	The DPS shall update rates during each pricing interval. A pricing interval shall be from five (5) minutes to one hour, in five (5) minute increments.				
358	The DPS shall provide toll rates to the CBOS/OBO via GUI and system for historical purposes. The toll rate schedule shall meet all data retention requirements as specified in **Part III, Scope of Work and Requirements.**				
359	The DPS shall determine average rates for the pricing intervals defined in this Section for each day of the week, based on the most recent 90 days. This may be used for NCTA future toll rate determination. The DPS shall use this as default toll rates if directed by NCTA.				
360	The DPS shall either provide the time of day (preconfigured) toll rates to the Toll Rate Sign or the pre-computed toll rates based on traffic volumes and density.				
361	The DPS shall include or exclude toll rates for Toll Zones which are not operational or suspended in toll collection.				
362	The DPS shall adjust rates as specified by pricing plans from NCTA for different lane modes and events such as toll suspension as directed by NCTA.				
363	The DPS shall support at least twenty (20) different pricing plans. The DPS shall load different pricing plans and schedule or make pricing plans active as required.				
364	The DPS shall have Software algorithms that can use or filter density information from the ITS devices in order to calculate estimated travel times and toll rates.				
365	The RTCS shall support the maintenance and Update of a Violation Enforcement List (VEL) that contains Transponder and/or license plate numbers that NCTA requires notification.				

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366	The VEL shall be provided to the RTCS at frequent configurable increments and when changes to the list take place.				
367	The RTCS shall include a GUI that allows for manual entry of a violation enforcement subject. These entries shall not be overwritten by an upload of a VEL but shall be merged with the new VEL. This GUI should allow for the viewing and editing of the VEL.				
368	The RTCS shall alert authorized personnel if the RTCS detects a Transponder passing through the tolling location that is identified for enforcement notification. The criteria for notification shall include the status of the Transponder and the presence of the Transponder on the VEL.				
369	The RTCS shall alert personnel within ten (10) seconds (configurable) of the vehicle passing through the tolling location if a vehicle on the VEL is identified. The Transponder ID and status (if any), and a picture shall be included in the alert.				
370	Notification methods shall include text message and email to the applicable NCTA personnel. The vehicle shall be included in the transactions that are sent to the NCTA CBOS in the Roadway Transaction Files.				
371	If an enforcement notification was successfully transmitted to applicable personnel, the transaction shall have a flag denoting the transmission of the enforcement notification. This enforcement transmission status shall be transmitted to the existing NCTA CBOS.				
372	The RTCS shall transmit images (configurable) to the applicable personnel and shall include the image of the vehicle and/or the ROI.				
373	Storage shall be sized to hold a minimum of ninety (90) days of one hundred percent (100%) of transactions, images and event data for each lane at the tolling location supported by the Zone Controller.				
374	In the event of a power interruption, the Zone Controller shall open in the operational mode it was in before it was powered down.				
375	Authorized users shall locally connect to the Equipment and remotely connected by authorized Software configure the next operating mode and to gracefully shutdown the Zone Controller. Each time a mode change is requested, an alert message shall be sent to the ITSM system.				
376	When a lane is operating in a mode other than normal open mode (to be finalized during design), an alert shall be generated and sent to ITSM system at regular (configurable) intervals.				
377	The RTCS shall support various modes of operation that are managed and initiated by authorized users through the host.				
378	Transactions shall be processed according to different NCTA Business Policies either at the RSS level or the host level based on the mode of operation and the facility type. The Contractor shall be responsible for ensuring that the AVI and image-based transactions are processed according to NCTA Business Policies for NC Quick Pass and Roadside and transmitted correctly to the existing NCTA CBOS.				
379	The RTCS shall provide functionality to operate in the following modes of operations:				
	a) Open mode: All transactions shall be processed normally in an open mode;				
	b) Maintenance mode: Transactions created in maintenance mode are processed as normal transactions but are identified as maintenance mode transactions and transmitted to the host. Transactions that occur during maintenance mode are not reported as traffic or revenue transactions; and				
	c) Emergency mode: Transactions created during emergency mode shall be identified as emergency mode transactions and processed in accordance with NCTA Business Policies for NC Quick Pass and Roadside to be determined during the design.				

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380	The RTCS shall capture the raw Transponder class obtained from the Transponder data and map that to the NCTA mapped class for each of the toll facilities in accordance with the CBOS/OBO ICD. **Attachment 9: NCTA CBOS to RSS ICD** for reference only**.**				
381	The RTCS shall retain the raw Transponder class and include that in the transaction data along with the mapped class for each RTCS facility in accordance with NCTA Business Policies Document.				
382	If a Transponder has a raw Transponder class that is not mapped to the NCTA class, then the RTCS shall apply the class as defined by the business rules.				
383	The assignment of the revenue vehicle class in normal operations and in the degraded mode of operations shall be in accordance with the NCTA Business Policies for NC Quick Pass and Roadside. If no classification data is obtained, a configurable default revenue class shall be assigned to the transaction, and the transaction shall be flagged.				
384	The revenue vehicle class shall be one of the factors used to determine the fare for a transaction as defined by the NCTA Business Policies for NC Quick Pass and Roadside. Flags in the transaction shall identify which class was used as the revenue vehicle class.				
385	The RTCS shall cap the maximum and minimum (configurable) inferred axles and class and to charge a set toll rate per classification.				
386	Transactions shall include the AVDC class, raw NCTA interoperable partner Transponder class (if applicable), mapped interoperable partner Transponder class (if applicable), and revenue vehicle class. The revenue vehicle class assigned in accordance with NCTA business rules shall be used to determine the toll amount transmitted to the NCTA CBOS interface.				
387	The RTCS shall provide determination of the fare class at the tolling location or other supplemental systems prior to posting to the CBOS/OBO based on the vehicle class.				
388	The fare class shall be determined in accordance with NCTA business rules and may vary by payment method and lane status including lane open, maintenance or closed statuses				
389	The RTCS shall have a configurable default fare class to be used in the event classification data is not available.				
390	Tolls shall be assessed using the toll rates and schedules established for each tolling point. The RTCS shall support the toll rate and the NCTA vehicle classification structure based on the Toll Zone and facility. The initial toll rates shall be defined during RTCS design and shall be configurable to support periodic rate adjustments as approved by NCTA.				
391	The RTCS shall provide toll rates by payment type, for example, AVI, image-based, and non-revenue, vehicle class, lane health, agency code, and location-based on NCTA business rules.				
392	Home (NCTA-issued) non-revenue Transponders shall be charged $0.00 (configurable) fare, but away non-revenue Transponders shall be charged the normal fare based on vehicle class and location.				
393	Images shall be captured and saved for all transactions, regardless of operating mode in accordance with the NCTA data retention policy.				
394	Images saved during ICPS loss of communication event shall be flagged and subsequently matched with the correct transaction data when communications resume with the Zone Controller. This matching can occur at the host but shall take place in a manner that does not interfere with or degrade real-time Zone Controller operations.				

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395	In the event that the system captures vehicle images without any other supporting system data such as AVDC, these images shall be saved such that all non-valid Transponder transactions that occur during the AVDC malfunction can be subsequently pursued for collection. Sufficient data, such as image capture time stamps, shall be provided in the transactions to allow the TRH and CBOS/OBO to process such transactions so that customers are not charged in error when lane operation is degraded.				
396	All parameters and settings required to run the Zone Controller application shall be maintained in configuration files. Access to configuration files required to support the Zone Controller operations shall be controlled, and access to these files shall be limited to authorized personnel.				
397	The configuration files shall be maintained at the host for configuration and version control. All Zone Controllers shall have default configuration files that shall allow the lane to start-up automatically.				
398	Authorized personnel shall be able to make changes to parameters and settings that are defined as configurable in this SOW and Requirements and in the approved design documents. Authorized personnel shall be able to make changes to the configuration files in the field. Changes to configuration files shall be recorded in the ITSM. All changes made to the configuration files in the field shall be synchronized to the master configuration file that is maintained at the host.				
399	Each Zone Controller shall automatically back up its critical configuration files to a back-up server to be used to rebuild the master drive in the event of hard disk failures.				
400	The RTCS shall support exception handling in accordance with the NCTA business rules. Alarms shall be generated and reported to the ITSM system for all exceptions/errors.				
401	All messages generated at the Zone Controllers shall be transmitted to the host in real-time using a transport mechanism that performs error detection and correction to guarantee data transmission. All messages shall be uniquely identified and validated at the host to ensure there are no missing or duplicate messages.				
	Failure of transmission of data to the host shall result in the generation and transmission of an alarm message to the ITSM system.				
402	All messages shall be confirmed as received by the CBOS/OBO before they are flagged for write-over. In the event of communication failures, the messages shall be stored on the Zone Controller until the successful transmission is complete and verified.				
403	The Zone Controller shall transmit to the CBOS/OBO all data, including but not limited to those identified below:				
	a) all transaction messages generated in the lanes;				
	b) all alarm and status messages generated in the lanes;				
	c) all lane operational, communication status and self-health messages;				
	d) all events generated in the lanes that are displayed on the roadway operations monitoring screen or are required at the host; and				
	e) all events required by the DVAS for real-time review or playback.				
404	The RTCS shall rate the AVI transactions based on Transponder Status List (TSL) and any other interoperable agency lists and shall support every interoperable agency and its assigned Transponder number range as described in the national interoperability specifications.				
405	The RTCS shall accept comprehensive and incremental (changes Updated on a configurable interval, but not more frequently than every ten minutes) TSL in accordance with the established business rules and shall activate the lists upon receipt after validation of the files.				

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406	All RTCS Software shall be downloaded to the Zone Controllers from the host, and versions on each Zone Controller shall be maintained, tracked, and recorded.				
407	The RSS shall institute checks whereby it detects issues with the data it receives from the host, including but not limited to:				
	a) incorrect versions of the data received;				
	b) corrupted data received; and				
	c) missing files when a file was expected.				
408	The RTCS shall support exception handling in accordance with the NCTA Business Rules approved during the design. Alarms shall be generated and reported to the ITSM system for all exceptions/errors.				
409	Each Zone Controller shall self-monitor the system health of internal components and all associated in-lane Equipment devices for status. All RTCS components, including AVI system, AVDC system, and ICPS, shall be continuously polled for status. The health of some digital devices shall be inferred from events.				
410	The RTCS shall generate a recovery message and restore its operational status if a device recovers after reporting a failure. Recovery messages shall be recorded against the original failure work order, shall be reported through the ITSM system, and shall be available to authorized staff. Recovery messages shall not close the associated failure/work order but shall serve as supporting evidence of an Equipment recovery.				
411	All alarm, health, and recovery messages shall be transmitted and reported to the ITSM system.				
412	If communications from the Zone Controller to any host is unavailable, an alarm message shall be generated and reported to the ITSM system.				
413	If the lane is operating in any mode other than the normal open mode, an alert message shall be generated at configurable intervals and reported to the ITSM system.				
414	The Zone Controller shall operate in a stand-alone mode for a minimum of ninety (90) Calendar Days if communications to the host is down. When operating in stand-alone mode, the last files downloaded from the host shall be used for processing vehicles.				
415	The Zone Controller shall have an available data port to permit onsite manual uploading of Software, TSL, or other pertinent data required for continued operation until communications with the host is re-established. Devices utilized to download the TSL to the lanes shall have the capability of synchronizing the current versions whereby a new TSL is Updated on the device within an hour.				
416	Upon re-establishing communications with the host, all back-logged messages, including manually transferred messages, shall be transmitted and synchronized to the host without affecting the real-time operations or degrading the lane operations.				
417	The TRH shall be located at a Contractor provided facility and shall be connected to CEMS and ACSMS for environmental control and security access monitoring purposes. The Contractor shall be responsible for designing, installing, and maintaining the connection between the RSS and the TRH.				
418	The TRH shall be accessible to NCTA via a virtual private network approved by NCTA and operate on a NCTA provided workstations.				
419	The TRH shall include redundancy in the TRH (including transaction processing, reporting, image verification services, and automated image processing) expandable to other NCTA facilities in the future if NCTA decides to consolidate or move any of its facilities. This redundant TRH shall be located at a Contractor provided facility separate from the TRH.				
420	The TRH shall be designed to allow for transaction processing, image verification processing, reporting processing, as well as system monitoring and auditing processing to occur simultaneously.				
	The TRH shall provide access to:				

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421	a) DVAS and ACSMS live and historical recordings;				
	b) Live and historical transaction records, including but not limited to video and images captured;				
	c) Audit application for transaction reconciliation and transaction accuracy verification;				
	d) Operations reports, analytics and dashboards;				
	e) ITSM				
	f) CEMS				
	g) ACSMS				
	h) All required local wide area (LAN), and wide area networks (WAN)				
422	The Contractor shall provide a Critical Environmental Monitoring System (CEMS), which shall consist of an environmental monitoring unit for the HVAC and other environmental conditions. The environments monitored shall vary as appropriate depending on the enclosure type (roadside cabinet, or Equipment enclosure) and shall include:				
	a) HVAC status (on/off);				
	b) temperature;				
	c) humidity;				
	d) utility power;				
	e) UPS power;				
	f) smoke detector; and				
	g) carbon monoxide detector.				
423	The CEMS shall provide historical reports and trends for the monitored conditions.				
424	The CEMS shall interface with ITSM system to generate and transmit alarms, alerts, recovery messages, and operational status. The CEMS shall also be accessible through the TRH interface for real-time and historical monitoring purposes.				
425	The CEMS shall be accessible from the MRTMC and STOC via a virtual private network approved by NCTA and on a NCTA provided workstation.				
426	All roadside Hardware and Equipment required to operate the RTC shall be on UPS. This includes the 10 toll zones, the 17 Toll Rate Sign sites, and 11 standalone Toll Rate Sign Camera sites. The UPS shall be supplied by the Contractor. For the Toll Rate Sign sites, and standalone Toll Rate Camera sites, the Contractor will supply these UPS's to the Constructor for installation so that the Constructor can conduct local testing. For the toll zone sites, the installation is the responsibility of the Contractor. Provide all design services needed to scope, design, and install the required backup.				
427	The Contractor shall interface with the transfer switch and the Contractor-provided smart Power Distribution Units (PDUs) in the toll cabinetry to manage the roadside power distribution. Maintenance technicians shall have remote access to manage power to critical devices.				
428	The UPS shall support the RTCS at each tolling location, the Toll Rate Sign sites, and standalone Toll Rate Camera sites for a minimum of two (2) hours. The Contractor shall describe its proposed approach to properly shut down the RTCS in case of power failure in the RTCS Maintenance Manual. For the Toll Rate Sign sites, and standalone Toll Rate Camera sites, if necessary, provide extra cabinetry (pole-mounted situations) or cabinet extensions (base-mounted situations) needed for the batteries. See **Attachment 10: Additional Toll Site System Details** for additional information.				
429	When utility power is restored, and Hardware/Equipment is no longer on the UPS, a notification shall be reported to the ITSM system.				

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430	The Contractor shall provide image verification services to return the license plate number (LPN), jurisdiction and plate type for rear license plates. Each plate type shall have an assigned code, which could contain up to three (3) digits as agreed to by NCTA and the Contractor during design.				
431	The Contractor shall provide all resources and training needed for review and processing of images throughout the term of the Contract. The Contractor shall provide training materials including plate identification, plate types of repository and training materials provided to its staff or management for image review through the testing period.				
432	The Contractor shall provide a disaster recovery environment (multiple locations) and shall expand/reduce processing for image verification services.				
433	The Contractor shall provide systems, operations and support to download, process images and maintenance all necessary requirement throughout the Term of the Contract and meets all Performance Requirements at all times.				
434	NCTA desires that the Contractor provide out of state Registered Owner Vehicle information that includes name, address and phone number of the Registered Owner to be used for its billing system at no additional cost to NCTA for the Term of the Contract. NCTA may provide these services as part of its CBOS or may procure these services separately. For NC plates, the Contractor shall use NCDMV services provided through NCTA.				
435	In order to support NCTA reporting functions, the Contractor shall provide a data dictionary and entity relationship diagram complete with defined tables, primary keys, and joins. The Contractor shall provide the data dictionary and views listed below.				
436	**Data Dictionary:** Reference the baseline data dictionary provided in **Attachment 6: Data Dictionary** and fill in the Contractor compliance column as part of the Proposal. This dictionary should then be used to track Contractor development and additional fields through the duration of the Contract.				
437	**Transaction Detail Data View:** Listing of transaction identification and all corresponding datapoints as listed in the data dictionary. Parameters shall include start date/time, end date/time, facility, and Toll Zone. This view shall be used by NCTA to create transaction summary reports, conduct detailed audits of transactions to assess system performance and functionality.				
438	**Finance Traffic Details Data View:** Summary of total transactions that occurred in the lane grouped by vehicle class, transaction type and location with search parameters of start date/time, end date/time, facility, and Toll Zone. This view should also include a summary of assigned fares associated with the transactions in the counts. This view shall be used by NCTA to report on roadway usage.				
439	**Transactions Sent to CBOS Data View:** Summary of total transactions sent to the CBOS grouped by vehicle class, transaction type and location with search parameters of start date/time, end date/time, facility, Toll Zone and timestamp reference (transaction time or time sent to CBOS). This view should also include a summary of assigned fares associated with the transactions in the counts and any dispositions received from the CBOS. This view shall be used by NCTA to track transactions sent to CBOS from a financial perspective. This dashboard also provides a transaction reconciliation for the Contractor provided system including data sent or received from the Contractor provided system with external interfaces.				

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440	**Image Verification Services Data View (if provided):** Total number of reviewed images grouped by number of image reviews complete (confirmed value sent to CBOS), number of images escalated, number of images rejected and number of images skipped with search parameters for start date/time, end date/time, facility, reviewer, and timestamp reference (transaction date or review date). This view shall be used by NCTA to monitor image review trends and Contract compliance.				
441	**Rejected Image Data View:** Total number of rejected images grouped by reject reason, with search parameters of start date/time, end date/time, facility, Toll Zone and timestamp reference (transaction time or review time). This view shall be used by NCTA to track trends of reject reasons and ensure Contractor compliance with image quality requirements. This view shall be used by NCTA to monitor image rejection trends and Contract compliance.				
442	**Image Transaction Trend Data View:** Summary of image-based transactions, image video clips, system logs, and image files, showing counts and percentages of images processed using ALPR or MIR, grouped by jurisdiction with search parameters of start date and end date. This view shall be used by NCTA to monitor image processing performance base on license plate jurisdiction.				
443	**Maintenance Ticket Detail Data View:** List of maintenance ticket identification and all corresponding datapoints listed in the data dictionary. This view shall be used by NCTA to create maintenance activity summary reports to analyze trends and Contract compliance.				
444	**Maintenance Ticket Summary Data View:** Summary of all maintenance tickets grouped by priority and response/repair times with search parameters for facility, Toll Zone, lane, device type, start date/time, and end date/time. This view shall be used by NCTA to analyze maintenance trends and Contract compliance.				
445	**Equipment Tracking Detail Data View:** List of Equipment serial numbers and all associated datapoints listed in the data dictionary. Search parameters for Equipment location, Equipment name, Equipment status and Equipment warranty end date. This view shall be used by NCTA to track and monitor the Contractor's Equipment inventory and Equipment performance.				
446	**Vehicle Density and Speed Data View:** List of MVD data by direction and location that includes speed, density and occupancy by lane and at 5-15-minute intervals. Search parameters include Equipment location, name, status, Toll Zone, toll lane, Express Lane or general-purpose lane, date, direction, speed range from 0 through 999 and density from 0 through 999.				
447	Detailed documentation of all data elements listed in this Section 5.4.1 shall be provided to NCTA by the Contractor no later than thirty (30) Calendar Days after NTP.				
448	The Contractor shall provide a replicated database environment independent and separate of the host production environment for reporting and analytics to which NCTA will have full access.				
449	The Contractor shall provide validation that any and all data replicated between the production database(s) and the replicated database is complete and accurate.				
450	The replicated database environment shall be Updated with all non-sensitive data (production data excluding any Personally Identifiable Information (PII) related data) at a minimum once per day.				
451	The data warehouse shall house all data elements listed in the Requirements under Section 5.4.1 Data Summarization of **Part III Scope of Work and Requirements.**				
452	The Contractor shall support the connection of outside interfaces to the data warehouse for NCTA data collection, management and analysis purposes.				
453	The Contractor shall provide, an Interface Test Plan (ITP) as described in Section 2.3.5 of **Part III, Scope of Work and Requirements.**				

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	Requirements	B-Base Product M-Base Modified D-New Development E-Exception	P-Proposer S-Sub T-Third Party NA-Not Applicable	Subcontractor Name and/or 3rd Party Product/Vendor	Comment required if "Exception", optional otherwise.
454	The Contractor shall provide data through its interfaces in open commercially available toolsets.				
455	The Contractor shall provide access to the following data types, at a minimum, as described below:				
	a) microservices, webservices or Batch files: includes AVI or image-based transaction data required to meet the Performance Requirements;				
	b) streaming data that may include video from DVAS or CCTV, system monitoring devices used in ITSM or another related diagnostics tool;				
	c) structured data that includes data from DPS that includes TRS displayed data, transaction data, service records or pricing data;				
	d) unstructured data that includes log files, data or other low-level information or unstructured data that can be used for audit purposes or diagnostics of system issues; and				
	e) any additional data types shall be described by the Contractor in its proposal.				
456	NCTA anticipates using cloud infrastructure tools and related edge analytics tools to build data pipelines to be able to independently review the results provided by the Contractor for the purpose of audit and compliance. NCTA is migrating to a Microsoft Azure platform for its CBOS modernization project. However, NCTA may also use AWS or GDP cloud infrastructure tools or edge data analytics tools, and ETL's to retrieve such data.				
457	The Contractor shall provide read only user access to all databases, data integration services for its provided RTCS required data dictionary for structured and unstructured data. For structured data that is typically in a RDMS or data lake, the Contractor shall include roadside lane transaction data, image review, service management ticket data, Express Lanes pricing and other toll rate data. For unstructured data, NCTA will also have access to real time log files for its independent audit and review of such data using data integration services native to the selected cloud platform.				
458	The Contractor shall provide read-only access to its pertinent databases above 30 days prior to the start of FAT and work with NCTA to establish access to its system via temporary access using a cloud storage, VPN or other access point. The Contractor shall make the read-only access available for NCTA to extract structured data from an Open Database Connectivity (ODBC) connection or cloud-based solution (depending on the Contractor's architecture) for all structured data.				
	For unstructured data including logs, the Contractor shall make such data available using the cloud native data integration services in its raw formats. NCTA plans to create data driven workflows from these endpoints for its audit and data transaction analytics and analysis. The Contractor shall not restrict any tool (custom or COTS) to access any data from the RTCS and shall coordinate access with NCTA at its request through the entire duration of the Contract. NCTA may use multiple cloud storage tiers including S3, Microsoft Azure Blobs, Google Cloud Storage, Web Services, or SFTP to access its data from the RTCS.				
459	The Contractor shall describe in the proposal how NCTA can access both structured (RDMS) and unstructured (txt files, log files etc.) and video streams for any data from the RTCS. The Contractor shall provide a list of all data types, brief description and purpose available on how it is used to meet the requirements, and recommended data format and availability. At a minimum, all data shall be retrievable no greater than 24 hours after it is created in the RTCS. NCTA desires that this data is received near real time and expects to use edge analytics tools to capture such data as it is needed in a streaming manner to monitor and audit its system in lieu of just coping all data for post analysis. Depending on the Contractors architecture and data availability, NCTA may retrieve all data or only data available.				
ion and Validation Program					

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g: Verification and Validation Program					
460	The purpose of the verification and validation program is to ensure the program requirements meet all Requirements set forth in this **Part III, Scope of Work and Requirements** for use in a RTCS Express Lanes environment. The Requirements as described herein are intended to:				
	a) validate and confirm an initial baseline operational system that meets the Requirements;				
	b) confirm all Performance Requirements are met; and				
	c) the RTCS is fit for operations use.				
461	The Contractor shall provide a Master Test Plan (MTP) as described in Section 2.3.5 of **Part III, Scope of Work and Requirements.**				
462	The Contractor shall provide an RTM as described in Section 2.3.2 Requirements Traceability Matrix (RTM) **of Part III, Scope of Work and Requirements** that is used to track all use cases and testable requirements to be verified during the verification and validation program. Verification and validation shall include all RTCS information including data, workflows, applications and reports/dashboards required to conduct testing and validate the RTCS.				
463	The Contractor shall conduct five customer witness and participation test as described in Section 2.3.5 of **Part III, Scope of Work and Requirements.**				
464	The Contractor shall meet all Requirements in the Contract throughout the term of the Contract. For requirements not prescribed in the use cases or those that require verification by analysis or inspection, the Contractor shall describe its compliance in the Contractor provided SDDD as described in Section 2.3.3 System Detailed Design Document (SDDD) of **Part III, Scope of Work and Requirements**.				
465	For all other requirements, the Contractor shall provide evidence for requirements not demonstrated to NCTA within twenty (20) Business Days upon request. NCTA's intention is to ensure compliance of all Contract Requirements while demonstrating and focusing the verification and validation program on those requirements that are needed to meet all Performance Requirements in the Contract.				
466	The verification and validation program are further detailed in the MTP; including the following tests:				
	a) Factory Acceptance Test (FAT);				
	b) Onsite Installation Test (OIT);				
	c) Site Installation Test (SIT);				
	d) Operations Acceptance Test (OAT); and				
	e) System Acceptance Test (SAT).				
467	The Contractor shall provide all maintenance activities associated with the RTCS maintenance and Software support services throughout the term of the Contract as further set forth in this SOW and Requirements.				
468	Hardware, Software, and RTCS Maintenance Services shall be provided from acceptance of the RTCS through the end of Contract Term (including extensions) as further set forth in **Part IV, Terms and Conditions** with full warranties as further set forth therein.				
469	The Contractor shall provide a Software license and associated escrow as further set forth in **Part IV, Terms, and Conditions**.				
470	In the Operations and Maintenance Phase, maintenance shall include all services required to maintain the RTCS, including Hardware, Equipment, Software, and components at the required performance levels. NCTA will not be charged any additional amounts beyond those included in the approved price proposal for all services related to maintenance; notwithstanding the foregoing, force majeure events shall be as set forth in the Contract as further set forth in **Part IV, Terms and Conditions**.				

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471	All Equipment mounting Hardware and brackets provided as a part of this SOW and Requirements shall be included under Maintenance Services and, as such, shall be warrantied for the life of the Contract.				
472	If required by the Contractor, services for fiber-optic/utility location shall be invoiced to NCTA as cost plus $250 per locate.				
473	If required by the Contractor, NCTA approved repair or other services that fall outside the Maintenance Services described herein shall be invoiced at the services as defined in Exhibit D-7.				
474	The Contractor shall be responsible for the development, implementation, and administration of a warranty program for all Hardware, Contractor developed, and third-party Software as further set forth in **Part IV, Terms and Conditions**.				
475	The Contractor shall maintain warranty records and service agreements for all Hardware and third-party Software and shall review and implement Software Upgrades and available patch reports to keep the RTCS current per the approved Management Plan and as further set forth in **Part IV, Terms and Conditions**.				
476	Detailed assignments of levels to incident types shall be in accordance with the requirements and shall be defined and approved during the design of the project.				
477	The Contractor shall monitor ITSM system work orders and initiate corrective actions to meet requirements for the response to maintenance events and incidents that are under the Contractor's responsibility.				
478	As part of the Software support services, Contractor shall develop and test Software as required to accommodate corrective actions, changes to business rules, or configurations. The scope shall include the provision of evidence packages detailing the planned changes for NCTA's review and approval, including installation of new Software and confirmation of successful installation per the approved Management Plan.				
	All Maintenance incidents, activities and monitoring include, but are not limited to:				
	a) monitoring the RTCS for failures and alarms and confirm an ITSM system work order has been created for each failure as defined in the system design;				
	b) acknowledging and responding to work orders assigned to the Contractor;				
	c) creation and assignment of a work order in ITSM system if a work order has not been created;				
	d) performing the necessary maintenance and closing the ITSM system work order upon confirmation that the failure has been successfully corrected;				
	e) monitoring and maintenance of the production, data warehouse, and test environments;				
	f) Updates to operating system and Software infrastructure in the production, data warehouse and test environments;				
	g) performing preventive maintenance in accordance with an approved Maintenance Plan;				
	h) general Equipment and Hardware maintenance, replacement and spare parts inventory in ITSM system;				
	i) general inspection and maintenance of roadside infrastructure;				
	j) ongoing monitoring, Updates, maintenance tasks related to roadside subsystems, operations, controllers, servers and storage systems;				
	k) address and resolve third-party Software issues (OS, third-party, peripheral and infrastructure Software);				
	l) backup system monitoring (verification of successful backups), maintaining (applying Updates when needed) and managing (backup media rotation, offsite storage, etc.);				

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479	m) monitoring, updating and general maintenance and troubleshooting of LAN communications and associated devices;				
	n) monitoring, updating, and general maintenance and troubleshooting of both active and redundant LAN/WAN communications and associated devices;				
	o) deployment of RTCS Software to the production data warehouse and test environments;				
	p) maintaining the ongoing relationship (support and maintenance agreements) with third-party vendors;				
	q) performing Software licensing renewals;				
	r) HOV indicator beacon;				
	s) performance of all system administrative functions at regular intervals if not automated and recording and tracking such activities as preventive maintenance work orders through ITSM system.				
	t) Continuous monitoring of system operations to verify RTCS is functional; security posture is adequate; processes are being executed as scheduled; files are transmitted as specified, and RTCS is operating to Contract Performance Requirements.				
	u) Manual retrieval of data from the Zone Controllers and download of the Transponder status list and toll rate and schedule files in the event of extended communications failure.				
	v) Re-establishing or re-installing system files, programs and parameters, as required, following a failure or damage to the RTCS and returning lanes to fully operational condition.				
	w) Performing Disaster Recovery procedures as needed and return lanes, host and TRH to fully operational condition when disaster recovery situation is initiated.				
	x) Analyzing anomalies and periodic, daily, and weekly trends to identify problems and initiating an investigation and subsequent correction.				
480	Work orders and alerts assigned to the Contractor, as defined during the design;				
	a) development of defect fixes, security fixes, performance fixes and corrections to the Software and applications as identified during audits;				
	b) Updates to all Software drivers to meet any new standard operating system Upgrades as they become available;				
	c) Software changes that are necessary or required to meet the system requirements, parameter changes, or lane configuration changes;				
	d) source code maintenance;				
	e) perform internal testing prior to releasing fixes to production;				
	f) ongoing Software warranty maintenance as set-forth in the Contract; and				
	g) change management and configuration management tasks prior to Software and Hardware changes.				
481	The Contractor shall provide in electronic format all patches and Updates made to the RTCS Software.				
482	Upgrades and enhancements shall be proposed by the Contractor or requested of the Contractor in accordance with the change order/extra work order process as set forth in **Part IV, Terms, and Conditions**. Examples of Upgrades and enhancements include but are not limited to: accommodating major changes to standards, statutes, or interoperability Equipment or the addition of new Equipment or functionality providing demonstrable benefits in performance, costs or productivity.				

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483	Software modifications required to maintain and support the RTCS as a part of the normal course of business **shall not be** considered Upgrades or enhancements paid for by NCTA. These modifications include but are not limited to: patches and security Updates, version changes; configuration or parameter changes; minor changes to Software or code, such as changes to the existing ICDs; Software modifications required to ensure RTCS is compliant to existing standards and changes for the Contractor's benefit that improve the Contractor's ability and efficiency to maintain and support the RTCS.				
484	The Contractor shall, upon request, support NCTA in any audit activity relating to NCTA's RTCS or operations. In addition, the Contractor shall conduct audits in accordance with the Contractor's QA and QC program. All deficiencies identified through the audit process shall be successfully corrected by the Contractor. These audits may include, but are not limited to, the following:				
	a) internal control procedures;				
	b) revenue/transaction reporting;				
	c) financial audit; and				
	d) system processing and performance.				
485	Monitoring and troubleshooting of the RSS including, but not be limited to:				
	a) Zone Controllers;				
	b) AVI system;				
	c) AVDC system;				
	d) Interface to future VOD system provided by others;				
	e) ICPS components and controllers;				
	f) OCR/ALPR Software;				
	g) Dynamic pricing system;				
	h) Card readers;				
	i) Image-based transaction alarms;				
	j) DVAS cameras and system;				
	k) ACSMS cameras and system;				
	l) inspection, test, and repair of cables, wiring and terminations;				
	m) Contractor supplied network Equipment; and				
	n) all Roadside Contractor and third-party Software.				
486	The Contractor shall perform automated routine diagnostics on all in-lane peripherals and in-lane subsystems.				
487	The Contractor shall provide Level III support of the inspection and maintain of environmental control devices, UPS, generators, and CEMS monitoring devices. Inspection and Maintenance of such devices will be provided by Level I and Level II maintenance service providers.				
488	The Contractor shall monitor and maintain RSS Software processes, operations, and interfaces to the host, TRH and to NCTA CBOS/OBO.				
489	The Contractor shall monitor real-time roadway operations screens and dashboards and responding to issues.				
490	The Contractor shall analyze periodic, daily, and weekly trends to identify problems, including but not limited to:				
	a) a high number of transactions without Transponder;				
	b) a high number of class mismatch transactions;				
	c) abnormal changes in traffic counts and class;				

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490	d) a high number of exceptions or unusual occurrences as described in this SOW;				
	e) transaction exceptions;				
	f) a high number of invalid Transponder transactions;				
	g) abnormal changes in Transponder counts and status changes; and				
	h) a high number of rejected images.				
491	All RTCS administrative functions, if not automated, shall be performed by the Contractor at regular intervals as part of the RTCS preventive Maintenance Services according to the approved Maintenance Plan to ensure system performance is optimized. All such system administrative functions shall be scheduled as preventive maintenance work orders through ITSM system and tracked.				
492	Continuous monitoring of system operations shall be performed by the Contractor in conjunction with NCTA to verify that the system is functional, security posture is adequate, processes are being executed as scheduled, files are transmitted as specified, and system is operating to Contract Performance Requirements.				
493	Continuous monitoring of operations, including but not be limited to:				
	a) confirming and verifying receipt of all the ITSM system messages and alerts;				
	b) verifying the ITSM system is receiving and processing system events and reporting the correct status;				
	c) evaluating sample transactions data for exception;				
	d) confirming data and image transmission to the host;				
	e) verifying processes, programs and scheduled jobs are successful;				
	f) reviewing comparative reports to identify system degradation;				
	g) confirming the successful transfer of Transponder status list to the lanes;				
	h) reviewing OCR/ALPR or manual image processing results and poor-quality images;				
	i) monitoring the DVAS video and event data;				
	j) verifying security access cameras are operational;				
	k) reviewing sample images from each tolling location;				
	l) monitoring traffic detectors;				
	m) correcting performance issues identified;				
	n) evaluating storage requirements;				
	o) verify time synchronization is occurring as configured and system clocks are not drifting beyond acceptable threshold; and				
	p) reviewing error logs and alerts.				
494	Provide continuous 24x7 system administration services coverage on the RTCS to ensure that it is performing and shall continue to perform at a satisfactory level.				
	System administration services shall include monitoring and corrective action to ensure system performance is in accordance with Requirements of this SOW. This shall include but is not limited to:				
	a) monitoring host Hardware at the TRH servers, storage devices and backup systems;				
	b) verifying processes, programs, and scheduled jobs are successful;				
	c) all transactions and images are successfully transmitted to the receiving systems;				
	d) all messages described in the ICD are being successfully exchanged between the RTCS, and NCTA CBOS/OBO;				
	e) confirm applications are functional and available to authorized users;				
	f) all scheduled reports are successfully generated and available to authorized users;				
	g) all processes are functioning, and data and images are moving successfully through the queues;				

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	h) all third-party interfaces are functioning and successfully exchanging files;				
	i) scheduling of preventive, corrective and predictive maintenance activities;				
	j) any daily, weekly, or periodic maintenance required to maintain the RTCS at required performance levels (for example: indexing and tuning databases; archiving and purging in accordance with NCTA's retention policy);				
	k) maintaining and updating records of all maintenance events and activities in the ITSM system;				
495	l) third-party Software or firmware Upgrades in conjunction with NCTA, as required and to be compliant to security requirements including but not limited to performing security Software Upgrades, database Upgrades, and operating system Upgrades;				
	m) contact with NCTA, operations and contractors regarding system issues, performance, security posture, Software release, and maintenance scheduling;				
	n) approved manual actions, adjustments and Updates to the system data based on predefined criteria to correct issues and as authorized by NCTA;				
	o) re-establishment or re-installation of system files, programs, and parameters, as required, following a failure or damage to the system;				
	p) monitoring of error logs and system logs;				
	q) maintenance of up-to-date Software backups (all system Software and data);				
	r) installation of new Software and confirmation of successful installation;				
	s) assisting NCTA operations staff as requested by NCTA;				
	t) troubleshooting RTCS issues;				
	u) creation of ad-hoc data queries requested by NCTA;				
	v) generation of queries as requested by NCTA; and				
	w) analysis of data as requested by NCTA.				
	Software support services shall include monitoring and corrective action to ensure system performance is in accordance with Requirements of this SOW, to include database management and operation. This shall include but is not limited to investigation and analysis of errors and exceptions and taking corrective action, including correcting the problem and reprocessing the data, monitoring of notifications, and initiating corrective actions on application programs to meet the requirements listed below:				
	a) Updates to the RTCS and application to support Upgrades to Hardware or third-party Software;				
	b) Updates to the RTCS and application to support all changes to business rules and RTCS configurable parameters, and deploy changes in production;				
	c) attend interoperability meetings as requested by NCTA;				
496	d) Updates to the RTCS and application to support minor changes to NCTA interoperable partner and national interoperability ICD;				
	e) Updates to the RTCS and application to support the addition of new interoperable agencies;				
	f) Updates to the RTCS and application to support changes to continue its compliance to Updated security requirements; and				
	g) Updates to the RTCS and application to support legislative and statutory changes.				
	h) As part of the Software support services, the Contractor shall develop, and test Software as required in accordance with NCTA change order process to accommodate corrective action and changes to Business Rules. The Contractor shall include the provision of evidence packages detailing changes for NCTA's review and approval, installation of new Software and confirmation of successful installation.				

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	i) As part of the network administration, the Contractor shall monitor all network alerts and alarms, as well as to detect intrusion attempts and prevent intrusions.				
497	The Contractor shall Upgrade and Update the network security and provide the required Software and monitoring tools to ensure the RTCS is always in compliance with the most recent penetration and vulnerability test requirements.				
498	The Contractor shall provide and perform onsite preventive maintenance on the RSS Hardware, host Hardware, Contractor LAN/WAN communications Equipment, and Software in accordance with the approved Maintenance Plan.				
499	The Contractor shall inspect all Contractor installed Equipment, both major components and support components (fans, cables, connectors, cabinets, Equipment racks, storage units) that constitute the RTCS and shall make such repairs, cleaning, adjustments, and replacements of components as necessary to maintain the Equipment in normal operating condition in accordance with the approved Maintenance Plan.				
500	The Contractor shall include in the Maintenance Plan their preventative maintenance program, which includes a schedule of all preventative maintenance activities requiring lane closures for the upcoming month at least five (5) Business Days before the beginning of the month.				
501	Level III preventive maintenance shall be performed by the Contractor during the normal working hours when maintenance technicians are scheduled to be onsite. NCTA approved diagnostic aids, tools, and Equipment to perform preventive maintenance Equipment analysis shall be provided by the Contractor, as necessary.				
502	Preventive maintenance requiring lane closure shall be scheduled by the Contractor for off-peak travel periods, evenings, Saturdays, and Sundays and coordinated with NCTA, so that the work shall not interfere with normal traffic flow unless otherwise approved by NCTA.				
503	The Contractor shall provide changes to the approved Maintenance Plan schedule as soon as changes become known due to weather, contractor availability, or any other reason.				
504	In addition to required ongoing Contractor monitoring, the servers and data processing units shall be periodically checked by the Contractor to verify that storage space is not reaching limits, disks are not fragmented or damaged, Software being used is of latest version per the configuration management and data is being processed and transferred in an appropriate manner.				
505	Transaction and image processing volumes and times shall be monitored by the Contractor and Systems optimized for performance with NCTA approval to meet all Contractual Requirements.				
506	Report generation times, system access times, and system response time shall be monitored by the Contractor to ensure performance meets the Contractual Requirements.				
507	The Contractor shall include all Equipment and systems as part of the preventive maintenance in accordance with the original Equipment manufacturer's guidelines. Any variations or exceptions shall be noted by the Contractor and approved in advance by NCTA.				
508	The Contractor shall provide a preventive maintenance schedule, to be approved by NCTA, as detailed in the Maintenance Plan.				
509	The preventive maintenance schedule shall be entered by the Contractor into the ITSM system, and work orders shall be automatically created to alert Contractor staff of required preventive maintenance. Failure of the Contractor to perform required preventive maintenance in accordance with the approved schedule shall result in monthly fee adjustments, as specified below in the maintenance Performance Requirements.				

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510	All work performed by the Contractor to correct Software defects or problems to meet the requirements of the Contract shall be considered as corrective maintenance. Such problems include but are not limited to:				
	a) failure of subsystem functions and devices;				
	b) problems identified by the users, including the TMC, and customers;				
	c) interface issues and devices;				
	d) failure of processes and programs;				
	e) data reconciliation issues;				
	f) report issues;				
	g) application failures;				
	h) RTCS network issues;				
	i) inadequate security posture;				
	j) degraded RTCS or component performance; and				
	k) non-conforming availability or MTBF.				
511	Contractor shall notify NCTA before any corrective maintenance is performed.				
512	Notwithstanding the foregoing, for the repeated failure of Equipment, components, or systems, the Contractor shall undertake an investigation. If the problem is determined by NCTA to be a pervasive defect, the Contractor shall be responsible for resolution as set forth in **Part IV, Terms and Conditions**.				
513	The Contractor shall immediately notify NCTA of any incident or event whereby the potential or actual loss of revenue occurred. The Contractor shall take immediate action to rectify the condition and return the RTCS to normal functioning.				
514	A monthly incident report shall be provided by the Contractor that includes a breakdown of lost transaction data and revenue by roadway for each incident. If the condition is determined to be due to the fault of the Contractor, damages shall be assessed in accordance with the **Part IV, Terms of the Contract.**				
515	NCTA will provide a storage location for the Contractor's use for the storage of the RTCS spare parts.				
516	The Contractor shall be responsible to deliver all NCTA ordered spare parts to a Department specified storage facility that shall be within 200 miles of the Project limits.				
517	Thirty (30) Calendar Days prior to placing the RTCS in revenue collection, the Contractor shall have purchased and have on hand, and provided to designated NCTA facilities, an adequate inventory of spare parts to maintain the system in accordance with all system availability KPIs.				
518	The spare parts shall be purchased on behalf of NCTA and shall be owned by NCTA.				
519	Any spare parts that are lost or damaged due to the negligence, intentional act, or omission of the Contractor or its employees, Subcontractors, agents, or invitees shall be replaced by the Contractor at its sole cost.				
520	The Contractor shall be responsible for providing to NCTA spare parts inventory during the Contract period as requested by NCTA or its designated Level I and Level II Maintenance providers. NCTA is responsible for monitoring and identifying the existing spare parts inventory, ordering spare parts as required, and proposing the quantity needed to maintain the required performance.				

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521	NCTA will, on a quarterly basis, Update and recommend a spare part quantity to be maintained in order to support the RTCS functionality and operational readiness. The Contractor shall provide a document with all lead times for all Spare Parts to NCTA no later than 180 Calendar Days after NTP. The longest lead order time for any Spare Part shall not exceed 90 Calendar Days but NCTA expects most shall be available less than thirty (30) days from an order placed by NCTA to the Contract.				
522	Initially NCTA will record the inventory into the ITSM system, monitoring the inventory quantity, and ensuring that the inventory is maintained to the levels required. NCTA reserves its rights at any time throughout the Term of Contract to use a different ITSM and inventory tracking systems.				
523	The Contractor shall also be responsible for tracking of all warranty replacement for Contractor provided Equipment through returned material authorization process. If the replaced part is under warranty, the part shall be immediately replaced with a new part. If the replaced part is out of warranty, Contractor shall make every effort to repair the replaced item to a usable status and place the part back into spares inventory.				
524	If the Contractor is unable to repair the part, a new part shall be purchased and placed into spares inventory. The details of the repair efforts, including problem, status, inventory, and repair disposition, shall be included in the ITSM inventory and repair database.				
525	The entry of a problem (either by the RTCS or an authorized user) into the ITSM system or the presence of a failure notification shall constitute the start of the acknowledgment time for purposes of measuring the Contractor's acknowledgment time and response/repair time.				
526	For purposes of measurement of performance and for the development of maintenance policy and procedures, notification of RTCS malfunctions, problems and discrepancies may be provided to the Contractor in three (3) different methods, summarized below.				
	a) Verbal Notification: Defined as an in-person notification or telephone call to the Contractor's designated maintenance personnel. In all cases, the first conversation with, or notification of the Contractor shall signify the start of the response time for purposes of measuring the Contractor's response time. All verbal notifications shall be recorded in ITSM system by the Contractor.				
	b) Written Notification: Defined as a written description of a problem or condition, typically provided by NCTA or its representatives by email. The time of receipt email shall signify the start of the response time for purposes of measuring the Contractor's response time. All written notifications shall be recorded in ITSM system by the Contractor.				
	c) ITSM System Notification: Defined as an automatic notification through the ITSM system identifying a problem within the RTCS that is the maintenance responsibility of the Contractor and sending out an automatic work order message by email or text to a Contractor's maintenance staff to respond to the failure. In addition to the Contractor notification, the work order shall be posted on the ITSM system and available via reports. The presence of an ITSM system notification in the RTCS shall constitute the start of the acknowledgement time for purposes of measuring the Contractor's acknowledgement and response time.				
	d) Generation of Alert: Defined as automatic creation of an alert identifying a problem within the RTCS that is the maintenance responsibility of the Contractor. The generation of the automatic alert in the RTCS shall constitute the start of the acknowledgement time for purposes of measuring the Contractor's acknowledgement time.				
527	The Contractor shall provide NCTA TMC with any requests for lane closures to address emergency corrective repairs. The request shall be submitted immediately after the system failure is detected.				

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	Requirements	B-Base Product M-Base Modified D-New Development E-Exception	P-Proposer S-Sub T-Third Party NA-Not Applicable	Subcontractor Name and/or 3rd Party Product/Vendor	Comment required if "Exception", optional otherwise.
528	NCTA will have access to all maintenance and Software service records at any time for review and audit, upon reasonable notice. The Contractor shall provide monthly reports generated in the RTCS that permits NCTA to evaluate Contractor's maintenance performance. The Contractor shall provide a template at least 180 Calendar Days prior to Go-Live for NCTA review and approval.				
529	The Contractor's maintenance manager shall maintain current, complete, and accurate records for all maintenance and Software support services activities. The Contractor's maintenance manager shall institute procedures that make sure the maintenance staff enters complete information into the ITSM before closing a work order or trouble ticket.				
530	All preventive, pervasive, and predictive maintenance activities shall be reported in the same manner as corrective or emergency maintenance activities by the Contractor. The information shall be contained on the ITSM and shall be made available through various ITSM system reports.				
531	The Contractor and NCTA will utilize the ITSM for initiating the work orders. ITSM shall be utilized for recording and tracking all maintenance and Software support services performed on the RTCS. Additionally, all Equipment provided under this Contract shall be tracked through ITSM from the purchase to their disposal.				
532	In all cases, the Contractor is responsible for logging all reported maintenance activities into the ITSM. The Contractor shall also be responsible for documenting all information and issues related to a failure condition, including all actions taken to complete the correction into the ITSM.				
533	The work order shall contain as much information as possible in order for persons other than the technician or his supervisor to reasonably determine the fault, when it was worked on, the corrective action, and any other information pertaining to the individual maintenance event, including replacement of parts.				
534	All Maintenance performance metrics shall be recorded and tracked through the ITSM, and compliance to Performance Requirements shall be validated using ITSM reports.				
535	It is the Contractor's responsibility to ensure that its maintenance staff has real-time access to the ITSM and that all the required connections are established and ongoing to ensure that the maintenance staff has secure remote access approved by NCTA. Maintenance staff shall be trained in the use of the ITSM.				
536	The Contractor shall be responsible for maintaining an adequate level of technical staff to perform Maintenance and Software support services on the RTCS. The Contractor shall ensure that sufficient staffing is available to cover all maintenance activities identified in this SOW and Requirements at all times but particularly during the following periods:				
	a) weekends;				
	b) holidays;				
	c) personnel on vacation/sick time;				
	d) after regularly scheduled work hours (on-call); and				
	e) unexpected emergency or crisis.				
	The Contractor shall provide comprehensive training for the Contractor maintenance staff, including but not be limited to, the following:				
	a) a thorough understanding and operating knowledge of the ITSM system is required of all maintenance personnel;				
	b) an in-depth understanding of the RTCS, design, and operations, including all Equipment, Software, interfaces, file transfers, and interconnections;				
	c) use of maintenance documentation such as maintenance manuals, drawings, Contractor manuals, and parts list;				

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537	d) functions of the RTCS monitoring tools used to manage the system monitoring tasks;				
	e) preventive maintenance of all systems and sub-systems;				
	f) Troubleshooting, diagnostics, repair, testing, and maintenance follow up;				
	g) system logs, errors logs, and processing of exceptions;				
	h) system dataflow and workflow queues;				
	i) review of the dashboard data and analysis;				
	j) discussion on the areas of responsibility;				
	k) special use maintenance and monitoring tools; and				
	l) queries and reports.				
538	Training material shall consist of maintenance manuals, Contractor manuals, and any other documentation that provides for the efficient and effective maintenance of the RTCS and its components.				
539	NCTA will have the right to make recordings and copies of all training program materials. The Contractor shall provide releases from all employees/contractors to allow unlimited, royalty-free use and copies of recordings.				
540	All Contractor personnel shall be subject to appropriate security and background checks to the satisfaction of NCTA. The Contractor shall obtain written approval from NCTA for all service personnel, and each Contractor personnel shall be required to sign an acceptable use agreement.				
541	The Services and Work performed under the Contract are considered highly confidential, and the Contractor personnel shall at all times comply with NCTA security and privacy requirements.				
542	NCTA will identify and designate a primary point of contact for the Contractor. Under most circumstances, The Contractor shall limit communication with NCTA authorized staff and to NCTA's designated point of contact unless otherwise directed by NCTA.				
543	Discussion by the Contractor of any services or work performed under the Contract with the media, in oral presentations, in written publications, or in any other form, not related to this Contract shall be approved in advance by NCTA. The Contractor personnel shall be required to sign a Non-Disclosure Agreement (NDA) at NTP, or when first beginning work on this Project.				
544	The Operations Center shall monitor the RTCS for failures and alarms and confirm an ITSM system work order has been created for each failure as defined regardless of the Maintenance level.				
545	The Contractor shall perform the necessary maintenance and close the work order upon confirmation that the failure has been successfully corrected. The Contractor shall notify network control that the repair action is complete, and the work order has been closed.				
546	The Contractor shall perform Level III Maintenance Services for all daily, weekly, and scheduled preventive maintenance on all RTCS Hardware.				
547	The Contractor shall inspect and test cables, wiring, and terminations to detect problems and degradation. Any item not in compliance with Contract Requirements shall be replaced by the Contractor at no cost to NCTA unless such failure is considered non-chargeable, as described in Section 7.9 Non-Chargeable and Chargeable Failures of **Part III, Scope of Work and Requirements**.				
548	The Contractor shall maintain the RTCS LAN/WAN that includes all Contractor network connections in the toll Equipment cabinets and interconnections between the toll Equipment cabinets as defined in **Attachment 3: I-5507 Constructor Plans & Requirements.**				
549	The Contractor shall perform any maintenance, daily, weekly, or periodic, required to maintain the RTCS at required performance levels (for example: archival and purging in accordance with NCTA's retention policy).				

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550	The Contractor shall retrieve data manually from the Zone Controllers and download the Transponder status list and toll rate and schedule files in the event there is an extended communications failure.				
551	The Contractor shall re-establish or re-install system files, programs, and parameters, as required, following a failure or damage to the System and return lanes to fully operational condition.				
552	The Contractor shall perform DR procedures as needed and return lanes to fully operational condition.				
553	As part of the Software support services, the Contractor shall develop and test Software as required to accommodate corrective action, changes to business rules or lane configurations. The scope shall include the provision of evidence packages detailing changes for NCTA review and approval, installation of new Software and confirmation of successful installation.				
554	The requirements in Section 6.2.7 Types of Maintenance of **Part III Scope of Work and Requirements**, shall apply to ITS Equipment and subsystems and the Contractor shall provide Level III maintenance that includes support for items not corrected by Level I and Level II.				
555	The requirements in Section 6.2.9 Spare Parts of **Part III Scope of Work and Requirements**, shall apply to ITS Equipment and subsystems. The specific ITS Equipment parts and models (to be initially provided by others) are provided in **Attachment 3: I-5507 Constructor Plans & Requirements** and **Attachment 5: I-485 ITS Equipment List.**				
556	The requirements in Section 4.1.9 General MOT Requirements and Conditions of **Part III Scope of Work and Requirements**, shall apply to ITS Equipment and subsystems.				
557	The requirements in Section 7.6 Maintenance Priorities, Response and Repair Times of **Part III Scope of Work and Requirements**, shall apply to ITS Equipment and subsystems listed in **Attachment 5: I-485 ITS Equipment List.**				
558	All ITS maintenance activity shall be maintained in RTCS, ITSM system, and inventory tracking systems. NCTA will at its discretion change its ITSM and inventory tracking systems at its own discretion at any time in the Contract. The Contractor shall support by a change order a transition to another ITSM and inventory tracking system.				
559	The Contractor shall meet the Release and Change Management process as defined in in **Attachment 11- NCTA Change and Release Management Process**. The Contractor shall meet with NCTA and provide documentation to support proposed Contractor changes and Department Changes that affect the RTCS. The Contractor shall participate and provide resources through the testing and release process as defined below and throughout the Term of the Contract.				
	a) Development and Unit Testing				
	b) Regression Testing				
	c) Performance Testing				
	d) IT Security Testing				
	e) Rollout and backout plan				
	f) Post-implementation validation				
	The Contractor shall build, provide NCTA(including designated agents) access and maintain the following DevOps pipeline as requested below during the Term of the Contract. The Devops pipeline with configured, tested and available nonproduction environments will streamline release management minimize defects and increase efficiencies to the business and technical operations. The Contractor shall provide the following environments. The Proposer shall describe its Dev-ops approach including how it will meet the requirements below in its Technical Proposal. The minimum required Environments are below, the Proposer shall describe additional environments if required in its Technical Proposal.				

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560					
	Development Environment				
	The Contractor shall establish and maintain this environment on their own for developers who are responsible for development of software code, unit testing, automation test code, and merge the changes into the release branch once it's peer-reviewed and approved.				
	Test Environment				
	The Contractor shall establish and maintain this environment on their own for testers who are responsible for functional and regression (Automation) testing of software build deployed to test environment. This environment will not be integrated end to end and it will be used only to test their own software product. The Contractor should cover both automation and manual testing and produce test results.				
	Integration Test Environment				
	The Contractor shall set up and maintain this integration test environment for integration testing of the software package delivered. The software package built and delivered to NCTA will be picked up and deployed using automation. The Contractor shall train NCTA how to use and access releases from this environment.				
	UAT / Training Environment				
	The Contractor shall set up and maintain this UAT / training environment to test end to end test transaction flow, all functionalities. The UAT/Training Environment shall be similar configuration with production. The software package built and delivered to NCTA will be picked up and deployed using automation. The contractor QA team certified package will be deployed in this environment.				
	Production Environment				
	The Contractor shall setup and maintain the production environment for NCTA. All changes to this production environment are controlled and only approved changes by NCTA should be implemented in the production environment.				
	Continuous Integration / Continuous Delivery Pipeline:				
	The Contractor shall create the below pipeline model to assist NCTA migrate to a NCTA DevOps service management organization. The Contractor shall setup environments, provide NCTA (and its designated agents) access to environments and train NCTA (and its designated agents) on the use of its environments. The Contractor shall also work with NCTA to determine how to streamline and refine the DevOps environment to provide efficient releases. The diagram below is intended to provide a DRAFT vision for the Dev-Ops Pipeline. The Proposer shall describe how it will support this DevOps pipeline in its Technical Proposal.				
561	NCTA uses Service Now IT Service Management system. The Contract shall integrate into the Service Now IT service management system for the creation, updates, and closure of all incidents, change orders, and configuration in the RTCS.				

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562	The Contractor shall allow NCTA to add agent-based monitoring to the Contractor provided RTCS to monitor its applications, infrastructure, database and network systems including all external interfaces for the RTCS.				
563	For all maintenance or field checking conducted in-lane at the toll site, a full closure of the Express Lane segment is required. The closest upstream egress from the toll site shall mandate traffic to exit the Express Lanes. Ingresses located upstream of the toll site (without an egress between the ingress and the toll site) shall be closed to traffic. See **Attachment 10: Additional Toll Site System Details** for more details. The Contractor is responsible for all planning, design, coordination, implementation, maintenance and removal of all Maintenance of Traffic.				
564	Toll Rate Sign or Signs associated with the toll zone under maintenance shall display the "CLOSED" message. This includes downstream Toll Rate Signs located over the Express Lanes at a dedicated egress, but upstream of the next ingress.				
565	Traffic Management DMS shall be used to supplement the "CLOSED" messages on the Toll Rate Signs, where appropriate.				
566	The Contractor shall prepare, and receive NCTA approval of, maintenance of traffic plans that envision the closure of each individual toll site for maintenance. Plans shall also be prepared for concurrent maintenance at a combination of toll sites.				
567	NCTA will conduct a review of the Contractor's performance on a monthly basis, utilizing a combination of reports generated by the RTCS, including ITSM systems, and other approved reports provided by the Contractor, as determined by NCTA to be necessary. The Contractor shall provide systems, processes and procedures to meet all Performance Requirements.				
568	The Contractor shall immediately notify NCTA of any failure observed by the Contractor whereby actual loss of revenue occurred, or the potential for losses exist.				
569	If the resolution of any failure is under the Contractor's control and/or responsibility, the Contractor shall take action to correct the failure condition and return the RTCS to normal functioning in accordance with the Contract. If the failure condition is determined to be due to the Contractor's fault and it results in failure to meet the Performance Requirements, NCTA will assess non-compliance points for each failure as described in this performance section and may be subject to other remedies in accordance with the Contract.				
570	For failure to maintain spare parts inventory at adequate levels for the month, the Contractor may be subject to monthly fee adjustment of $500 per month for each failure to maintain spare parts inventory per the counts required.				
571	Each Express Lane within a Toll Zone with all of its subsystems is properly functioning and available to collect revenue and send required transactions and images to the host 99.9% of the time excluding scheduled and approved maintenance.				
	Availability shall be calculated based on the following calculation:				
	Availability = 1- (chargeable downtime min / (minutes in period-exception min in period))				
572	a) RTCS reporting detailing the Express Lane availability along with ITSM and help desk tickets, work orders, and feedback from customers, CBOS staff, NCTA staff, and consultants shall be utilized to identify availability failures.				
	b) For any month in which **all** components of the Toll Zones are not fully available and operational at least 99.9% of the time excluding scheduled and approved maintenance, The Contractor shall be assessed 1.0 point for each 0.1% or portion thereof below the Performance Requirement.				

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573	Each TRS and TRS audit camera must be operating and displaying the toll amount accurately 99.95% of the time excluding scheduled and approved maintenance.				
	Availability shall be calculated based on the following calculation:				
	Availability = 1- (chargeable downtime min / (minutes in period - exception min in period))				
	a) System reporting detailing the TRS and TRS audit cameras availability along with ITSM system and help desk tickets, work orders, and feedback from customers, CBOS staff, NCTA staff and consultants shall be utilized to identify availability failures.				
	b) For any month in which **all** TRS and TRS audit cameras are not fully available and operational at least 99.95% of the time excluding scheduled and approved maintenance, Contractor shall be assessed 1.0 point for each 0.1% or portion thereof below the Performance Requirement.				
574	The TRH with all of its devices, Software, applications, and processes are properly functioning and available to the authorized users, successfully transmitting transactions to the existing NCTA CBOS/OBO systems and communicating with the in-lane systems 99.9% of the time excluding scheduled and approved maintenance.				
	Availability shall be calculated based on the following calculation:				
	Availability = 1- (chargeable downtime min / (minutes in period-exception min in period))				
	a) System reporting detailing the TRH availability along with ITSM and help desk tickets, work orders, and feedback from customers, CBOS staff, NCTA staff and consultants shall be utilized to identify availability failures.				
	b) For any month in which **all** components of the TRH are not fully available and operational at least 99.9% of the time excluding scheduled and approved maintenance, Contractor shall be assessed 1.0 point for each 0.1% or portion thereof below the Performance Requirement.				
575	The TRH shall be transaction host I-485 and required to store 90 Calendar Days of toll transactions, vehicle and toll fare sign images and logs. The Contractor shall cooperate with NCTA, and any designated and authorized other contractors' access to provide full access to the TRH. NCTA and any designated and authorized other contractors' access to all data on the TRH shall be solely decided by NCTA.				
	Proposers shall identify any constraints or assumptions in its Proposal.				
576	The DPS with all of its devices, Software, applications and processes				
	properly functioning and available to the authorized users, successfully communicating with				
	the in-lane systems 99.95% of the time excluding scheduled and approved maintenance.				
	Availability shall be calculated based on the following calculation:				
	Availability = 1- (chargeable downtime min / (minutes in period-exception min in period))				
	a) System reporting detailing the DPS availability along with ITSM and help desk tickets, work orders and feedback from customers, CBOS staff, NCTA staff and consultants shall be utilized to identify availability failures.				
	b) For any month in which all required traffic data is not transmitted 99.5% if the time, the Contractor shall be assessed 1.0 point for each 0.1% or portion thereof below the Performance Requirement.				
	The Contractor shall process and transmit all AVI transactions to the NCTA provided CBOS/OBO within twenty-four (24) hours after the vehicle travels through the tolling point.				

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577	a) System reporting detailing the transaction date/time and the date/time that the transaction was acknowledged by the CBOS/OBO shall be compared to a matching CBOS Report.				
	b) The CBOS/OBO validates the transactions to ensure that they comply with the agreed-upon ICD, and transactions that do not meet the ICD shall be rejected as incomplete or inaccurate. Unless a rejected transaction is corrected and resubmitted with in the two (2) hour transmission period, they shall not meet this KPI.				
578	For any month in which 99.995% of the AVI transactions are not transmitted in accordance with the approved ICD to the CBOS/OBO, The Contractor shall be assessed 1.0 point for each 0.1% or portion thereof below the Performance Requirement.				
579	The Contractor shall process and transmit all image transactions to NCTA developed CBOS/OBO within one hundred-twenty (120) hours after the vehicle travels through the tolling point. This includes entering all required plate data or rejecting the plate if it meets the criteria to be rejected.				
	a) System reporting detailing the transaction date/time and the date/time that the transaction was acknowledged by the CBOS/OBO shall be compared to a matching TRH Report.				
	b) The RTCS and CBOS/OBO validates the transactions to ensure that they comply with the agreed-upon ICD, and transactions that do not meet the ICD shall be rejected as incomplete or inaccurate. Unless a rejected transaction is corrected and resubmitted within the ninety-six (96) hour transmission period, they shall not meet this KPI.				
580	For any month in which 99.995% of the image transactions are not transmitted in accordance with the approved ICD to the CBOS within 120 hours, the Contractor shall be assessed 1.0 point for each 0.1% or portion thereof below the Performance Requirement.				
581	The Contractor shall correctly build the transaction, including all the necessary transaction components incorporating inputs from the AVI, AVDC, and ICPS subsystems to accurately identify the toll amount, the type of transaction, the vehicle class and all other required transaction data. Ultimately the AVI transaction shall be correctly associated with the vehicle with the correct classification and toll amount.				
	a) Feedback from customers, CBOS staff, NCTA staff, and consultants shall be utilized to identify inaccurate or incomplete transactions.				
	b) NCTA will utilize trend reporting to identify transactions, or lanes/Toll Zones for further review to identify possibly inaccurate transactions.				
	c) Transactions rejected by the CBOS/OBO shall also be reviewed.				
	d) NCTA may conduct unannounced controlled testing in live traffic as well.				
582	For any month in which the AVI transaction accuracy falls below 99.9%, the Contractor shall be assessed 1.0 point for each 0.1% or portion thereof below the Performance Requirement.				
583	The Contractor shall correctly build the transaction including all the necessary transaction components incorporating inputs from the AVI, AVDC, and image capture subsystems to accurately identify the toll amount, the type of transaction, the vehicle class and all other required transaction data.				
	a) Feedback from customers, NCTA staff, and consultants shall be utilized to identify inaccurate or incomplete transactions. The Contractor shall develop a SOP that may include automated steps that NCTA can use to verify the image transaction accuracy.				
	b) NCTA will utilize trend reporting to identify transactions, or lanes/Toll Zones for further review to identify possibly inaccurate transactions.				
	c) Transactions rejected by the CBOS/OBO shall also be reviewed.				
	d) NCTA may conduct unannounced controlled testing in live traffic as well.				

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	Requirements	B-Base Product M-Base Modified D-New Development E-Exception	P-Proposer S-Sub T-Third Party NA-Not Applicable	Subcontractor Name and/or 3rd Party Product/Vendor	Comment required if "Exception", optional otherwise.
584	For any month in which the image transaction posting falls below 99.8%, the Contractor shall be assessed 1.0 point for each 0.1% or portion thereof below the Performance Requirement.				
585	The Contractor shall correctly provide the License Plate Number, jurisdiction and Plate Type for all license plates reviewed. The Contractor shall process image transactions to the NCTA provided Operational Back Office within 120 hours after the transaction posts to the TRH. This includes entering all required plate data or rejecting the plate if it meets the criteria to be rejected.				
	a) A statistically significant sample set of image transactions which were not rejected shall be selected by the RTCS (random sample) based on the number of images reviewed that month and provided to NCTA for their review of the image review outputs.				
	b) In addition, transactions that were successfully disputed for the reason that the image was incorrectly reviewed shall be added to the errors for that month.				
	c) Feedback from customers, CBOS staff, NCTA staff, and consultants shall be utilized to identify inaccurate or incomplete transactions.				
	d) NCTA will utilize trend reporting to identify transactions, or lanes/Toll Zones for further review to identify possibly inaccurate transactions.				
	e) Transactions rejected by the CBOS shall also be reviewed and entered in the problem plate list for manual review.				
	f) NCTA may conduct unannounced controlled testing in live traffic as well.				
586	For any month in which the image transaction accuracy falls below 99.5%, the Contractor shall be assessed 1.0 point for each 0.1% or portion thereof below the Performance Requirement.				
587	The Contractor shall correctly determine that the plate meets the criteria for rejection and select the correct reject reason for all images which do not meet the criteria for identification.				
	a) The correct reject reason code shall be selected 98.5% of the time.				
	b) A statistically significant sample set of rejected image transactions shall be selected by the RTCS (random sample) based on the number of images reviewed that month and provided to NCTA for their review of the image review outputs				
	c) Feedback from customers, CBOS staff, NCTA staff, and consultants shall be utilized to identify inaccurate or incomplete transactions.				
	d) NCTA will utilize trend reporting to identify transactions, or lanes/Toll Zones for further review to identify possibly inaccurate transactions.				
	e) Transactions rejected by the CBOS shall also be reviewed.				
	f) NCTA may conduct unannounced controlled testing in live traffic as well.				
588	For any month in which the image rejection accuracy falls below 98.5%, The Contractor shall be assessed 1.0 point for each 0.1% or portion thereof below the Performance Requirement.				
589	The RTCS shall provide images of sufficient image quality to achieve the Contractor's desired automation rate and NCTA's Requirements such that less than 0.1% of the images are rejected for reasons under the Contractor's control. Reject reasons not under the Contractor's control are:				
	a) the vehicle has no plate;				
	b) the plate is not in the normal camera field of view because it is not mounted in accordance with State laws;				
	c) the plate is covered by dirt, a trailer hitch, tailgate, or some other material such that the numbers/letters are not human-readable; or				
	d) the plate is damaged so that numbers/letters are not human readable.				

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590	The number of images rejected for reasons within the Contractor's control shall be compared to the number of images reviewed that month to calculate whether or not the Contractor's image quality met the standard.				
591	For any month in which the requirement is not met, the Contractor shall be assessed 1.0 point for each 0.1% or portion thereof below the Performance Requirement.				
592	The Contractor shall receive, process, transmit and apply the files and Updates. 99.95% shall be processed within 2 hours and 100% shall be processed within 24 hours.				
593	For any month in which the files and Updates are not applied within the applicable time (20 minutes for daily files and 15 minutes for Updates), the Contractor shall be assessed 1.0 point for each file not received and processed within the applicable time.				
594	File incremental Updates – NCTA or designee will select locations and acquire validation data from the CSC to verify Updates have been applied to files in downstream portions of the RTCS System. Failure is determined by the current status of a RTCS file that should be Updated is not after more than ten (10) minutes following the Update transmission. 1 point will be assessed each Calendar Day that this testing fails.				
595	The Contractor shall provide a WWVD system that integrates the Constructor provided Wrong-way detection system at Westinghouse Boulevard direct connector on-ramp and the Contractor provided detection system at the toll zones.				
596	The Contractor shall accurately detect all vehicles traveling in the wrong direction and shall send notifications and alerts in accordance with these requirements.				
	a) The Contractor shall perform an end-to-end test on the WWV detection and notification system by performing a controlled test at Toll Zone at minimum of everyone hundred eighty (180) Calendar Days.				
	b) The DVAS shall record a five (5) second looping video file upon detection of a WWV.				
	c) The RTCS shall transmit the video file to the MRTMC, STOC and CBOS/OBO and any designated locations with authorized access and transmit an alert to STOC personnel (via email and SMS text message) within ten (10) seconds of the vehicle passing through the Toll Zones.				
	d) The video file shall be prominently displayed on the operators' video wall or monitors at the STOC and MRTMC.				
	e) An audio alarm shall be promptly generated when the video is displayed in the operators' video wall or monitors at the STOC and MRTMC				
	f) The RTCS shall transmit image(s) (configurable) of the WWV to NCTA CBOS.				
	g) NCTA will perform periodic end-to-end testing on the WWVD system by performing a controlled test at each Toll Zone at minimum of every one hundred eighty (180) Calendar Days. The Contractor shall support the Department or its other contractors with this test as required.				
597	Response and repair times for every maintenance event shall be recorded in the ITSM system and reported, and such reports shall be provided to NCTA in accordance with the reporting Requirements of this SOW and Requirements.				
598	The Contractor shall post a weekly schedule identifying personnel and times for onsite and on-call maintenance. NCTA approval is required for any change in Contractor staff. The Contractor shall provide to NCTA the Updated active personnel list and contact information when there is a change in personnel.				

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599	Response to calls and repair times shall be determined by priority, as described below. Contractor failure to meet the response and repair time criteria described below shall result in monthly fee adjustments as specified in this Section.				
600	Regardless of coverage, onsite or on-call service, the Contractor shall acknowledge receipt of a maintenance issue within ITSM system within thirty (30) minutes after the failure notification was recorded or the problem was reported.				
601	The priority of failures shall be defined during the design. Time to respond and complete repair is determined by priority and is defined as below.				
602	Priority 1: Defined as any malfunction or fault that results in the immediate loss of revenue; security breach; closure of lanes outside of NCTA lane closure requirements; hazard to personnel or driving public; loss of audit data; loss of functionality that impacts Interoperable Agencies or failure that negatively impacts the RTCS (RSS and ITS) operations. For RSS maintenance, this priority shall have a two (2) hour time to respond and complete repair.				
603	Priority 2: Defined as any malfunction or fault that degrades the RTCS performance but not the operational ability of the RTCS. It includes, but is not limited to, inaccurate reporting, inability to reconcile revenue or loss of system functionality that impacts access to data. For RTCS (RSS and ITS) maintenance, this priority shall have a four (4) hour time to respond and complete repair.				
604	Priority 3: Defined as any action or event that has the potential to result in a malfunction or degrading of the System performance but has not impacted performance and is not anticipated to impact performance immediately, including, but not limited to loss of redundancy in any redundant System components. For RTCS (RSS and ITS) maintenance, this priority shall have a twenty-four (24) hour time to respond and complete repair.				
605	Outages and tasks performed under the approved preventive maintenance period shall be defined as Priority 4. The RTCS shall be available and fully operational within the approved time schedule for such activities and upon completion of the preventive maintenance period. Delays and problems associated with not completing scheduled preventive maintenance within the window specified may be included in the Performance Requirement calculations. Any failures generated or resulting from preventive maintenance activities shall be accounted for as priorities 1, 2, or 3 and be addressed in accordance with these requirements.				
606	The Contractor shall respond and fulfill NCTA's requests for research, analysis, and/or explanation and provide feedback/report within one (1) week or one (1) month as agreed to by NCTA.				
607	Any failure to meet a Performance Requirement that requires the completion of a specific action(s), which is not completed in accordance with the requirement, does not relieve the Contractor of the responsibility to perform in accordance with the RTCS requirements. The required specific action(s) must be completed within 48 hours. For example, if the Contractor fails to transmit all transaction files to the agency within two (2) hours, the files must still be sent to the agency.				
608	The Contractor shall develop a corrective action plan for each failure to meet a Performance Requirement identifying the root cause(s) and providing a plan to rectify the current situation, if applicable, and prevent future occurrences.				
609	The corrective action provided by the Contractor shall be in a format approved by NCTA.				
610	The Contractor shall submit a corrective action plan for each failure to meet a Performance Standard for NCTA's review and approval. Until NCTA approves the corrective action plan, the failure cannot be considered resolved.				

No.		Required Inputs			
		Status	Source	If Applicable	Comments
	Requirements	B-Base Product M-Base Modified D-New Development E-Exception	P-Proposer S-Sub T-Third Party NA-Not Applicable	Subcontractor Name and/or 3rd Party Product/Vendor	Comment required if "Exception", optional otherwise.
611	The corrective action plan shall identify the subsystem(s), component(s), processes, and activities associated with the failure to meet a Performance Requirement in sufficient detail to allow NCTA to understand the issue and why the proposed solution shall prevent future occurrences. The RTCS elements include but are not limited to the elements below:				
	a) vehicle throughput rate;				
	b) Transponder capture rate;				
	c) Transponder reporting accuracy;				
	d) vehicle detection accuracy;				
	e) Transponder association accuracy;				
	f) vehicle classification accuracy;				
	g) image capture reporting accuracy;				
	h) license plate extraction (OCR/ALPR) accuracy, if provided;				
	i) image review accuracy				
	j) image quality;				
	k) assignment of the correct toll to the transaction;				
	l) transaction processing requirements;				
	m) false read processing;				
	n) image transaction transmission requirements;				
	o) AVI transaction transmission requirement;				
	p) Toll Zone and Toll Facility speed accuracy; and				
	q) ITSM system.				
	Non-chargeable failures shall include:				
	a) Force majeure, as defined in the Contract documents;				
	b) vandalism;				
	c) RTCS component failures caused by externally applied stress conditions outside of the requirements of this SOW and Requirements;				
	d) RTCS component failures caused by environmental or operating conditions outside of the Requirements of this SOW and Requirements;				
	e) normal operating adjustments as allowed in the MTP or Maintenance Plan, as applicable;				
	f) failures where NCTA have approved to waive a chargeable failure in advance; and				
	g) failures that are customer or NCTA user induced or are caused by a third-party service provider not under the contractor's control as determined by NCTA.				
613	The Contractor shall describe in detail how the performance against a requirement shall be tracked, tested, and reported, identifying specific reports and data elements. In the case of a KPI which cannot be tracked by the RTCS, the form of manual tracking or testing must be described and included in the Maintenance Plan.				
614	The Contractor shall prepare and submit to NCTA the performance report package on an agreed-upon Day each month as defined in these requirements.				

No.		Required Inputs			
		Status	Source	If Applicable	Comments
	Requirements	B-Base Product M-Base Modified D-New Development E-Exception	P-Proposer S-Sub T-Third Party NA-Not Applicable	Subcontractor Name and/or 3rd Party Product/Vendor	Comment required if "Exception", optional otherwise.
615	The performance report package shall include a performance scorecard calculating the non-compliance points assessed that month, if applicable, a series of reports, one (1) per Performance Requirement detailing the Contractor's performance against the requirement that month supporting the scorecard for each KPI and a historical report detailing the Contractor's performance against each requirement for the most recent twelve (12) months. See Section 7.1.1 Performance Measurement for details on these reports. Copies of all corrective action plans related to failures for that month must be approved and included.				
616	The Contractor shall provide the required performance report package to NCTA before an invoice is considered for payment.				
617	Performance reporting by the Contractor and any associated adjustments related to Performance Requirements shall begin for the period beginning on the first Day of the Operations and Maintenance Phase and shall continue for the duration of the Contract.				

Form D-7

Price Proposal Form

(An Excel version of the forms are "paper clipped" to this NCTA RTCS Exhibits file for ease of completion.)

Sheet 1
NCTA I-485 Express Lanes RTCS Project Summary
(Summary Only - No Proposer Input Required)

	Grand Total Cost ($)
Implementation Phase and Installation and System Acceptance Phase	
RSS, TRH and ITS Cost (Sheet 2)	$ -
RTCS (including RSS, TRH and ITS) Cost (Sheet 3)	$ -
Total Implementation Phase and Installation and System Acceptance Phase	**$ -**
Operations and Maintenance Phase	
Level 3 Maintenance Services for RSS and ITS (Sheet 4)	$ -
Total Maintenance and Operations	$ -
Image Verifications Services	
Image Verification Services Operations Cost (Sheet 6)	$ -
Total Maintenance and Operations (including Image Verification Services Operations Cost)	$ -
TOTAL IMPLEMENTATION, OPERATIONS AND MAINTENANCE COST	**$ -**
Optional Extension Phase	
Extension #1 Level 3 Maintenance Services for RSS and ITS (Sheet 4)	$ -
Extension #1 Image Verification Services Operations Cost (Sheet 6)	$ -
Extension #2 Level 3 Maintenance Services for RSS and ITS (Sheet 4)	$ -
Extension #2 Image Verification Services Operations Cost (Sheet 6)	$ -
Total Optional Extension Phases	**$ -**
TOTAL IMPLEMENTATION, OPERATIONS AND MAINTENANCE COST INCLUDING OPTIONAL EXTENSION PHASES	**$ -**

Grand Total Dollars

Officer Signature Date

Sheet 2
RSS and ITS Cost Summary
(Summary Only - No Proposer Input Required)

	Total # of Toll Locations	Hardware Cost Per Toll Zone ($)	Labor Cost Per Toll Zone ($)	Total Cost Per Toll Zone ($)
Tolling Location 1	1	$ -	$ -	$ -
Tolling Location 2	1	$ -	$ -	$ -
Tolling Location 3	1	$ -	$ -	$ -
Tolling Location 4	1	$ -	$ -	$ -
Tolling Location 5	1	$ -	$ -	$ -
Tolling Location 6	1	$ -	$ -	$ -
Tolling Location 7	1	$ -	$ -	$ -
Tolling Location 8	1	$ -	$ -	$ -
Tolling Location 9	1	$ -	$ -	$ -
Tolling Location 10	1	$ -	$ -	$ -
Total I-485 Express Lanes Roadside	**10**	**$ -**	**$ -**	**$ -**

Sheet 2-1 Backup
AET 1: RSS and ITS Cost Schedule

Lane Types & Item Description	Quantity per Toll Zone	Unit ($)	Total Unit ($)	Labor ($)	Total Cost ($)
Zone Type: AET 1 (Shoulder + 1 x 12' travel + Buffer Zone)					
1. Redundant Toll Zone Controller and In-lane Electronics					
Servers	0	$ -	$ -	$ -	$ -
Cable and Connectors	0	$ -	$ -	$ -	$ -
	0	$ -	$ -	$ -	$ -
	0	$ -	$ -	$ -	$ -
Total Redundant Toll Zone Controller and In-lane Electronics			$ -	$ -	$ -
2. AVI System					
ETC Reader Modules (provided by NCTA) - Quantity	1	$ -	$ -	$ -	$ -
ETC Antennas (provided by NCTA) - Quantity	1	$ -	$ -	$ -	$ -
ODC / Subcontractor Costs	0	$ -	$ -	$ -	$ -
	0	$ -	$ -	$ -	$ -
	0	$ -	$ -	$ -	$ -
	0	$ -	$ -	$ -	$ -
Total AVI System			$ -	$ -	$ -
3. AVDC System					
Overhead Scanners	0	$ -	$ -	$ -	$ -
Cables and Connectors	0	$ -	$ -	$ -	$ -
ODC / Subcontractor Costs	0	$ -	$ -	$ -	$ -
	0	$ -	$ -	$ -	$ -
	0	$ -	$ -	$ -	$ -
Total AVC System			$ -	$ -	$ -
4. ICPS					
Rear Cameras	0	$ -	$ -	$ -	$ -
Illumination	0	$ -	$ -	$ -	$ -
Servers	0	$ -	$ -	$ -	$ -
ODC / Subcontractor Costs	0	$ -	$ -	$ -	$ -
Cables and Connectors	0	$ -	$ -	$ -	$ -
	0	$ -	$ -	$ -	$ -
	0	$ -	$ -	$ -	$ -
Total ICPS			$ -	$ -	$ -
5. Communications Equipment					
Hub Switch	0	$ -	$ -	$ -	$ -
Edge Switches	0	$ -	$ -	$ -	$ -
	0	$ -	$ -	$ -	$ -
	0	$ -	$ -	$ -	$ -
Total Communications Equipment			$ -	$ -	$ -
6. Equipment Cabinets/Enclosures and Racks					
Equipment Cabinets/Enclosure	0	$ -	$ -	$ -	$ -
Equipment Racks	0	$ -	$ -	$ -	$ -
Cabinet HVAC	0	$ -	$ -	$ -	$ -
Beacons	0	$ -	$ -	$ -	$ -
Portable Generators	0	$ -	$ -	$ -	$ -
UPS	0	$ -	$ -	$ -	$ -
	0	$ -	$ -	$ -	$ -
	0	$ -	$ -	$ -	$ -
Total Equipment Racks			$ -	$ -	$ -
7. DVAS					
Cameras	0	$ -	$ -	$ -	$ -
Servers	0	$ -	$ -	$ -	$ -
Cable and Connectors	0	$ -	$ -	$ -	$ -
	0	$ -	$ -	$ -	$ -
	0	$ -	$ -	$ -	$ -
Total DVAS			$ -	$ -	$ -
8. Access Control and Security Monitoring System					
Access Card Encoder	0	$ -	$ -	$ -	$ -
Card Readers	0	$ -	$ -	$ -	$ -
Cards	0	$ -	$ -	$ -	$ -
Critical Environmental Monitoring System	0	$ -	$ -	$ -	$ -
	0	$ -	$ -	$ -	$ -
	0	$ -	$ -	$ -	$ -
Total Access Control and Security Monitoring System			$ -	$ -	$ -
9. Commissioning Test					
Commissioning Test	0	$ -	$ -	$ -	$ -
	0	$ -	$ -	$ -	$ -
	0	$ -	$ -	$ -	$ -
Total Commissioning Test			$ -	$ -	$ -
10. Dynamic Pricing System					
Dynamic Pricing Subsystem	0	$ -	$ -	$ -	$ -
	0	$ -	$ -	$ -	$ -
	0	$ -	$ -	$ -	$ -
Total Dynamic Pricing Subsystem			$ -	$ -	$ -
Total			**$ -**	**$ -**	**$ -**
Total Anticipated Labor (all ties)				$ -	

Note 1: All hardware/software provided under this Contract should be included in these costs.
Note 2: Use the additional rows as needed to itemize each components
Note 3: All roadways are current Year Cost.
Note 4: Single redundant zone controller is inclusive of two redundant units in all cases.
Note 5: Costs must include all in-lane installation costs, including cost of installation check and inspection as detailed in the Scope of Work
Note 6: Commissioning Test shall also include all costs to provide the individual tolling plaza testing as detailed in the Scope of Work.
Note 7: Unit cost for AVI Readers and Antennas will be zero dollars as they are provided by NCTA from the AVI RFP Contract.
Note 8: Pass-Through Costs will be actual costs up to and not to exceed cost provided in the proposal. If actual cost exceeds 25% or more the Price Proposal cost, NCTA reserves the right to re-negotiate those costs for the Pass-Through Cost items.

Sheet 2-1a Backup
RSS+ TRH+ ITS - Staff and Position Classifications with Rates

Item #	Staff Names	Position/Classification	Loaded Hourly Billing Rates by Task		
			Roadside System Cost		
			Rate	Hours	Total Labor Cost
1		Project Principal	$ -	0	$ -
2		Contractor Project Manager	$ -	0	$ -
3		Technical Manager	$ -	0	$ -
4		Installation/Maintenance Manager	$ -	0	$ -
5		Quality Assurance Manager	$ -	0	$ -
6		Test Manager	$ -	0	$ -
7		CADD Technician	$ -	0	$ -
8		Database Analyst	$ -	0	$ -
9		Electrician Helper	$ -	0	$ -
10		Hardware Engineer/Lead	$ -	0	$ -
11		Installation Supervisor	$ -	0	$ -
12		Installation Technician	$ -	0	$ -
13		Licensed Electrical Engineer	$ -	0	$ -
14		Licensed Electrician	$ -	0	$ -
15		Maintenance Manager	$ -	0	$ -
16		Maintenance Supervisor	$ -	0	$ -
17		Maintenance Technician	$ -	0	$ -
18		Network Administrator	$ -	0	$ -
19		Network Engineer	$ -	0	$ -
20		Senior Maintenance Technician	$ -	0	$ -
21		Software Architect	$ -	0	$ -
22		Software Development Engineer	$ -	0	$ -
23		Software Development Manager	$ -	0	$ -
24		Software Lead	$ -	0	$ -
25		Software Programmer I	$ -	0	$ -
26		Software Programmer II	$ -	0	$ -
27		Software Programmer III	$ -	0	$ -
28		System Administrator	$ -	0	$ -
29		System Analyst	$ -	0	$ -
30		Technical Writer	$ -	0	$ -
31			$ -	0	$ -
32			$ -	0	$ -
33			$ -	0	$ -
34			$ -	0	$ -
35			$ -	0	$ -
36			$ -	0	$ -
37			$ -	0	$ -
38			$ -	0	$ -
39			$ -	0	$ -
40			$ -	0	$ -
41			$ -	0	$ -
42			$ -	0	$ -
43			$ -	0	$ -
44			$ -	0	$ -
45			$ -	0	$ -
46			$ -	0	$ -
47			$ -	0	$ -
48			$ -	0	$ -
49			$ -	0	$ -
50			$ -	0	$ -
	Total Labor Cost				$ -

Use as many pages as necessary to develop the Staff Listing (please label each page with number)

Sheet 3
RTCS (including RSS, TRH and ITS) Cost
(Summary Only - No Proposer Input Required)

Item #	Description	Unit	Total Cost ($)
1	System Hardware, Third Party Software, Installation and Commissioning not Otherwise Covered	LS	$ -
2	Communications Equipment	LS	$ -
3	Roadside System Software Costs	LS	$ -
4	Software (GUI, Back-end), Host System, MOMS, DVAS and License	LS	$ -
5	Design Documentation	LS	$ -
6	User, Maintenance, and Project Documentation	LS	$ -
7	Training (manuals, materials and delivery)	LS	$ -
8	Factory Acceptance Test	LS	$ -
9	Onsite Installation Test	LS	$ -
10	Site Installation Test	LS	$ -
11	Operations and System Acceptance Test	LS	$ -
12	Third Party Warranty and Licenses	LS	$ -
13	Initial Spare Parts and Equipment - One year	LS	$ -
14	Insurance and Bonding	LS	$ -
15	Project Management	LS	$ -
16	Engineering and Design	LS	$ -
17	Transition Costs	LS	$ -
18	Dynamic Pricing System	LS	$ -
	Total RTCS Costs		**$ -**

Sheet 3-1 Backup
RTCS (including RSS + TRH and ITS) Cost Schedule

	Description of Items	# Unit	Unit ($)	Total Unit ($)	Labor ($)	Total Cost ($)
1	**System Hardware, Third Party Software, Installation and Commissioning not Otherwise Covered**					
	RSS and ITS - equipment, purchase, install, configure and test	0	$ -	$ -	$ -	$ -
		0	$ -	$ -	$ -	$ -
		0	$ -	$ -	$ -	$ -
	Total System Hardware, Third Party SW and Installation not Otherwise Covered			**$ -**	**$ -**	**$ -**
2	**Communications Equipment**					
	Switches	0	$ -	$ -	$ -	$ -
	LAN Hardware and Installation	0	$ -	$ -	$ -	$ -
		0	$ -	$ -	$ -	$ -
		0	$ -	$ -	$ -	$ -
	Total Communications Equipment			**$ -**	**$ -**	**$ -**
3	**Roadside System Software Costs**					
	Zone Controller Software Licenses	0	$ -	$ -	$ -	$ -
		0	$ -	$ -	$ -	$ -
		0	$ -	$ -	$ -	$ -
	Total Zone Controller Software Costs			**$ -**	**$ -**	**$ -**
4	**Software (GUI, Back-end), Host System, MOMS, DVAS and License**					
	TRH Software	0	$ -	$ -	$ -	$ -
	System Monitoring	0	$ -	$ -	$ -	$ -
	DVAS	0	$ -	$ -	$ -	$ -
	OCR/ALPR Software	0	$ -	$ -	$ -	$ -
	Access Control Software	0	$ -	$ -	$ -	$ -
	Critical Environmental Monitoring System	0	$ -	$ -	$ -	$ -
		0	$ -	$ -	$ -	$ -
		0	$ -	$ -	$ -	$ -
	Total Software (GUI, Back-end), Host System, MOMS, DVAS and License			**$ -**	**$ -**	**$ -**
5	**Design Documentation**					
	Requirements Traceabiltiy Matrix	0	$ -	$ -	$ -	$ -
	System Detailed Design Document	0	$ -	$ -	$ -	$ -
	Master Test Plan and all Test Cases and Test Procedures	0	$ -	$ -	$ -	$ -
	Installation Plan	0	$ -	$ -	$ -	$ -
	Other Contract Documents	0	$ -	$ -	$ -	$ -
		0	$ -	$ -	$ -	$ -
		0	$ -	$ -	$ -	$ -
	Total Design Documentation			**$ -**	**$ -**	**$ -**
6	**User, Maintenance, and Project Documentation**					
	User Manuals	0	$ -	$ -	$ -	$ -
	Maintenance Manuals	0	$ -	$ -	$ -	$ -
	Other Manuals	0	$ -	$ -	$ -	$ -
		0	$ -	$ -	$ -	$ -
		0	$ -	$ -	$ -	$ -
	Total User, Maintenance and Project Documentation			**$ -**	**$ -**	**$ -**
7	**Training (manuals, materials and delivery)**					
	Level 1, 2 and 3 Maintenance Training	0	$ -	$ -	$ -	$ -
	Trainer	0	$ -	$ -	$ -	$ -
	LMS	0	$ -	$ -	$ -	$ -
	Document	0	$ -	$ -	$ -	$ -
		0	$ -	$ -	$ -	$ -
		0	$ -	$ -	$ -	$ -
	Total Training			**$ -**	**$ -**	**$ -**
8	**Factory Acceptance Test**					
	Factory Acceptance Test	0	$ -	$ -	$ -	$ -
		0	$ -	$ -	$ -	$ -
		0	$ -	$ -	$ -	$ -
	Total Factory Acceptance Test			**$ -**	**$ -**	**$ -**
9	**Onsite Installation Test**					
	Onsite Installation Test	0	$ -	$ -	$ -	$ -
		0	$ -	$ -	$ -	$ -
		0	$ -	$ -	$ -	$ -
	Total Onsite First Installation Test			**$ -**	**$ -**	**$ -**
10	**Site Installation Test**					
	Site Installation Test	0	$ -	$ -	$ -	$ -
		0	$ -	$ -	$ -	$ -
		0	$ -	$ -	$ -	$ -
	Total Installation and Commissioning Test			**$ -**	**$ -**	**$ -**
11	**Operations and System Acceptance Test**					
	Operations and System Acceptance Test	0	$ -	$ -	$ -	$ -
		0	$ -	$ -	$ -	$ -
		0	$ -	$ -	$ -	$ -
	Total System Operational and Acceptance Test			**$ -**	**$ -**	**$ -**
12	**Third Party Warranty and Licenses**					
	DB Licenses	0	$ -	$ -	$ -	$ -
	OS Licenses	0	$ -	$ -	$ -	$ -
	Other	0	$ -	$ -	$ -	$ -
		0	$ -	$ -	$ -	$ -
		0	$ -	$ -	$ -	$ -
	Total Third Party Warranty and Licenses			**$ -**	**$ -**	**$ -**

Sheet 3-1 Backup
RTCS (including RSS + TRH and ITS) Cost Schedule

	Description of Items	# Unit	Unit ($)	Total Unit ($)	Labor ($)	Total Cost ($)
13	**Initial Spare Parts and Equipment - One year**					
	Roadside System Spares (From Sheet 3-2)			$ -		$ -
	Roadway Support Systems Spares (From Sheet 3-2)			$ -		$ -
	Total Initial Spare Parts and Equipment			**$ -**		**$ -**
14	**Insurance and Bonding**					
	Insurance	0	$ -	$ -	$ -	$ -
	Bid Bond	0	$ -	$ -	$ -	$ -
	Payment and Performance Bond	0	$ -	$ -	$ -	$ -
		0	$ -	$ -	$ -	$ -
		0	$ -	$ -	$ -	$ -
	Total Insurance and Bonding			**$ -**	**$ -**	**$ -**
15	**Project Management**					
	Project Management	0	$ -	$ -	$ -	$ -
		0	$ -	$ -	$ -	$ -
		0	$ -	$ -	$ -	$ -
	Total Project Management			**$ -**	**$ -**	**$ -**
16	**Engineering and Design**					
	Lane Installation Design Drawings	0	$ -	$ -	$ -	$ -
	Engineering and Design	0	$ -	$ -	$ -	$ -
		0	$ -	$ -	$ -	$ -
		0	$ -	$ -	$ -	$ -
	Total Engineering and Design			**$ -**	**$ -**	**$ -**
17	**Transition Costs**					
	Transition Staff	0	$ -	$ -	$ -	$ -
		0	$ -	$ -	$ -	$ -
		0	$ -	$ -	$ -	$ -
	Total Transition Costs			**$ -**	**$ -**	**$ -**
18	**Dynamic Pricing System**					
	Dynamic Pricing System	0	$ -	$ -	$ -	$ -
		0	$ -	$ -	$ -	$ -
		0	$ -	$ -	$ -	$ -
	Total Dynamic Pricing System			**$ -**	**$ -**	**$ -**
	Total RTCS System Costs			**$ -**	**$ -**	**$ -**
	Labor Check (from Sheet 3-1a, cell F50) should equal cell F168				$ -	

Sheet 3-1a Backup
RTCS (including RSS, TRH and ITS) Back Office
Staff and Position Classifications with Rates

Item #	Staff Names	Position/Classification	Loaded Hourly Billing Rates by Task		
			I-485 Express Lanes		
			Rate	Hours	Total Labor Cost
1		Project Principal	$ -	0	$ -
2		Contractor Project Manager	$ -	0	$ -
3		Technical Manager	$ -	0	$ -
4		Installation/Maintenance Manager	$ -	0	$ -
5		Quality Assurance Manager	$ -	0	$ -
6		Test Manager	$ -	0	$ -
7		CADD Technician	$ -	0	$ -
8		Database Analyst	$ -	0	$ -
9		Electrician Helper	$ -	0	$ -
10		Hardware Engineer/Lead	$ -	0	$ -
11		Installation Supervisor	$ -	0	$ -
12		Installation Technician	$ -	0	$ -
13		Licensed Electrical Engineer	$ -	0	$ -
14		Licensed Electrician	$ -	0	$ -
15		Maintenance Manager	$ -	0	$ -
16		Maintenance Supervisor	$ -	0	$ -
17		Maintenance Technician	$ -	0	$ -
18		Network Administrator	$ -	0	$ -
19		Network Engineer	$ -	0	$ -
20		Senior Maintenance Technician	$ -	0	$ -
21		Software Architect	$ -	0	$ -
22		Software Development Engineer	$ -	0	$ -
23		Software Development Manager	$ -	0	$ -
24		Software Lead	$ -	0	$ -
25		Software Programmer I	$ -	0	$ -
26		Software Programmer II	$ -	0	$ -
27		Software Programmer III	$ -	0	$ -
28		System Administrator	$ -	0	$ -
29		System Analyst	$ -	0	$ -
30		Technical Writer	$ -	0	$ -
31					$ -
32					$ -
33					$ -
34					$ -
35					$ -
36					$ -
37					$ -
38					$ -
39					$ -
40					$ -
41					$ -
42					$ -
43					$ -
44					$ -
45					$ -
46					$ -
47					$ -
48					$ -
49					$ -
50					$ -
	Total Labor Cost				$ -

Use as many pages as necessary to develop the Staff Listing (please label each page with number)

Sheet 3-2 Backup
RTCS (including RSS, TRH and ITS) Initial Spare Parts and Equipment Cost

Spare Parts Description	Total Quantity	Unit ($)	Total Unit ($)
RSS and ITS	One Tolling Location		
1. Redundant Toll Zone Controller and In-lane Electronics[1]			
Servers	0	$ -	$ -
PDU	0	$ -	$ -
Power Supply	0	$ -	$ -
	0	$ -	$ -
	0	$ -	$ -
	0	$ -	$ -
	0	$ -	$ -
	0	$ -	$ -
	0	$ -	$ -
	0	$ -	$ -
	0	$ -	$ -
	0	$ -	$ -
	0	$ -	$ -
Total Redundant Toll Zone Controller and In-lane Electronics[1]			**$ -**
2. AVI System (Provided by NCTA)			
AVI Reader Modules	0	$ -	$ -
AVI Antennas	0	$ -	$ -
Cables and Connectors	0	$ -	$ -
	0	$ -	$ -
	0	$ -	$ -
	0	$ -	$ -
	0	$ -	$ -
	0	$ -	$ -
	0	$ -	$ -
	0	$ -	$ -
	0	$ -	$ -
	0	$ -	$ -
	0	$ -	$ -
Total AVI System			**$ -**
3. AVDC System			
Primary AVDC Sensor	0	$ -	$ -
AVDC Power Supply	0	$ -	$ -
Cables and Connectors	0	$ -	$ -
	0	$ -	$ -
	0	$ -	$ -
	0	$ -	$ -
	0	$ -	$ -
	0	$ -	$ -
	0	$ -	$ -
	0	$ -	$ -
	0	$ -	$ -
	0	$ -	$ -
	0	$ -	$ -
Total AVC System			**$ -**
4. ICPS			
Rear Cameras	0	$ -	$ -
Illuminators	0	$ -	$ -
Servers	0	$ -	$ -
Transaction Status Indicator (TSI) (beacon)	0	$ -	$ -
	0	$ -	$ -
	0	$ -	$ -
	0	$ -	$ -
	0	$ -	$ -
	0	$ -	$ -
	0	$ -	$ -
	0	$ -	$ -
	0	$ -	$ -
	0	$ -	$ -

Sheet 3-2 Backup
RTCS (including RSS, TRH and ITS) Initial Spare Parts and Equipment Cost

Spare Parts Description	Total Quantity	Unit ($)	Total Unit ($)
Total ICPS			**$ -**
5. TRH & Communications Equipment			
Switches	0	$ -	$ -
Power Supply	0	$ -	$ -
Router	0	$ -	$ -
TRH	0	$ -	$ -
	0	$ -	$ -
	0	$ -	$ -
	0	$ -	$ -
	0	$ -	$ -
	0	$ -	$ -
	0	$ -	$ -
	0	$ -	$ -
	0	$ -	$ -
	0	$ -	$ -
Total Communications Equipment			**$ -**
6. Equipment Cabinets/Enclosures and Racks			
Equipment Cabinets/Enclosure	0	$ -	$ -
Equipment Racks	0	$ -	$ -
Cabinet HVAC	0	$ -	$ -
UPS	0	$ -	$ -
	0	$ -	$ -
	0	$ -	$ -
	0	$ -	$ -
	0	$ -	$ -
	0	$ -	$ -
	0	$ -	$ -
	0	$ -	$ -
	0	$ -	$ -
	0	$ -	$ -
Total Equipment Racks			**$ -**
7. DVAS			
Cameras	0	$ -	$ -
Servers including SAN	0	$ -	$ -
	0	$ -	$ -
	0	$ -	$ -
	0	$ -	$ -
	0	$ -	$ -
	0	$ -	$ -
	0	$ -	$ -
	0	$ -	$ -
	0	$ -	$ -
	0	$ -	$ -
	0	$ -	$ -
Total DVAS			**$ -**
8. Access Control and Security Monitoring System			
Card Readers	0	$ -	$ -
Cards	0	$ -	$ -
Access Controller	0	$ -	$ -
	0	$ -	$ -
	0	$ -	$ -
	0	$ -	$ -
	0	$ -	$ -
	0	$ -	$ -
	0	$ -	$ -
	0	$ -	$ -
	0	$ -	$ -
	0	$ -	$ -
	0	$ -	$ -
Total Access Control and Security Monitoring System			**$ -**

Sheet 3-2 Backup
RTCS (including RSS, TRH and ITS) Initial Spare Parts and Equipment Cost

Spare Parts Description	Total Quantity	Unit ($)	Total Unit ($)
RSS Initial Spare Parts and Equipment			**$ -**
ITS Equipment (Provided by Contractor)	One Tolling Location		
1. Tolls 10Gbs Layer 3 Hub Switch	0	$ -	$ -
2. Tolls 1Gbs Ethernet Edge Switch	0	$ -	$ -
3. MVDs	0	$ -	$ -
4. CCTVs	0	$ -	$ -
5. Toll rate signs	0	$ -	$ -
	0	$ -	$ -
	0	$ -	$ -
	0	$ -	$ -
	0	$ -	$ -
	0	$ -	$ -
	0	$ -	$ -
	0	$ -	$ -
	0	$ -	$ -
	0	$ -	$ -
	0	$ -	$ -
Total ITS Equipment			**$ -**
ITS Initial Spare Parts and Equipment			**$ -**
Total RSS and ITS Initial Spare Parts and Equipment			**$ -**

Note 1: Unit cost for AVI Readers and Antennas will be zero dollars as they are provided by NCTA from the AVI RFP Contract.
Note 2: Pass-Through Costs will be considered in the Price Proposal totals. Pass-Through Costs will be actual costs up to and not to exceed cost provided in the proposal. If actual cost exceeds 25% or more the Price Proposal cost, NCTA reserves the right to re-negotiate those costs for the Pass-Through Cost items.

Sheet 4
Base Contract and Optional Extensions
RTCS (including RSS, TRH and ITS) Hardware Maintenance and Software Support Services Cost
(Summary Only - No Proposer Input Required)

Item #	Description of Items	Total Annual Cost ($)
	Base Contract Maintenance Costs	
1	Year 1 of Maintenance	$ -
2	Year 2 of Maintenance	$ -
3	Year 3 of Maintenance	$ -
4	Year 4 of Maintenance	$ -
5	Year 5 of Maintenance	$ -
	Total Roadside System Hardware Maintenance and Software Support Services Base Contract Cost (Maintenance Years 1 - 5)	$ -
	Optional Extension 1 Costs	
6	Extension 1 - Year 1 of Maintenance	$ -
7	Extension 1 - Year 2 of Maintenance	$ -
8	Extension 1 - Year 3 of Maintenance	$ -
	Total Extension 1 Cost	$ -
	Optional Extension 2 Costs	
9	Extension 2 - Year 1 of Maintenance	$ -
10	Extension 2 - Year 2 of Maintenance	$ -
11	Extension 2 - Year 3 of Maintenance	$ -
	Total Extension 2 Cost	$ -
Total Base and Optional Roadside System Hardware Maintenance and Software Support Services		**$ -**

Sheet 4-1
Base Contract and Optional Extensions
RTCS (including RSS, TRH and ITS) Maintenance Services Schedule by Year
(Summary Only - No Proposer Input Required)

Description of Items	Total Monthly Cost ($) All Toll Zone	Number of Months	Annual Cost ($)
Base Contract Maintenance Costs			
Total Year 1 Level 3 RSS and ITS Maintenance Services	$ -	12	$ -
Total Year 2 Level 3 RSS and ITS Maintenance Services	$ -	12	$ -
Total Year 3 Level 3 RSS and ITS Maintenance Services	$ -	12	$ -
Total Year 4 Level 3 RSS and ITS Maintenance Services	$ -	12	$ -
Total Year 5 Level 3 RSS and ITS Maintenance Services	$ -	12	$ -
Optional Extension 1 Costs			
Total Extension 1 Year 1 Level 3 RSS and ITS Maintenance Services	$ -	12	$ -
Total Extension 1 Year 2 Level 3 RSS and ITS Maintenance Services	$ -	12	$ -
Total Extension 1 Year 3 Level 3 RSS and ITS Maintenance Services	$ -	12	$ -
Optional Extension 2 Costs			
Total Extension 2 Year 1 Level 3 RSS and ITS Maintenance Services	$ -	12	$ -
Total Extension 2 Year 2 Level 3 RSS and ITS Maintenance Services	$ -	12	$ -
Total Extension 2 Year 3 Level 3 RSS and ITS Maintenance Services	$ -	12	$ -

Note 1: CPI Composite of 2% - 3% used for evaluation purposes. Adjustments will made to the monthly Maintenance Cost based on actual CPI (Labor) for each year of the Contract Term.

Sheet 4-2 Backup
Base Contract and Optional Extensions
RTCS (including RSS, TRH and ITS) Maintenance and Software Support Services - Fixed Cost Items by Month

Description of Items	Monthly Total ($)
Base Contract Maintenance Costs	
Year 1 of Maintenance - Level 3 Maintenance and Software Support Services	
RSS Fixed Cost	$ -
ITS Fixed Cost	$ -
Total Monthly Year 1	$ -
Year 2 of Maintenance - Level 3 Maintenance and Software Support Services	
RSS Fixed Cost	$ -
ITS Fixed Cost	$ -
Total Monthly Year 2	$ -
Year 3 of Maintenance - Level 3 Maintenance and Software Support Services	
RSS Fixed Cost	$ -
ITS Fixed Cost	$ -
Total Monthly Year 3	$ -
Year 4 of Maintenance - Level 3 Maintenance and Software Support Services	
RSS Fixed Cost	$ -
ITS Fixed Cost	$ -
Total Monthly Year 4	$ -
Year 5 of Maintenance - Level 3 Maintenance and Software Support Services	
RSS Fixed Cost	$ -
ITS Fixed Cost	$ -
Total Monthly Year 5	$ -
Optional Extension 1 Costs	
Extension 1 Year 1 of Maintenance - Level 3 Maintenance and Software Support Services	
RSS Fixed Cost	$ -
ITS Fixed Cost	$ -
Total Monthly Extension 1 Year 1	$ -
Extension 1 Year 2 of Maintenance - Level 3 Maintenance and Software Support Services	
RSS Fixed Cost	$ -
ITS Fixed Cost	$ -
Total Monthly Extension 1 Year 2	$ -
Extension 1 Year 3 of Maintenance - Level 3 Maintenance and Software Support Services	
RSS Fixed Cost	$ -
ITS Fixed Cost	$ -

Sheet 4-2 Backup
Base Contract and Optional Extensions
RTCS (including RSS, TRH and ITS) Maintenance and Software Support Services - Fixed Cost Items by Month

Description of Items	Monthly Total ($)
Total Monthly Extension 1 Year 3	$ -
Optional Extension 2 Costs	
Extension 2 Year 1 of Maintenance -Level 3 Maintenance and Software Support Services	
RSS Fixed Cost	$ -
ITS Fixed Cost	$ -
Total Monthly Extension 2 Year 1	$ -
Extension 2 Year 2 of Maintenance - Level 3 Maintenance and Software Support Services	
RSS Fixed Cost	$ -
ITS Fixed Cost	$ -
Total Monthly Extension 2 Year 2	$ -
Extension 2 Year 3 of Maintenance -Level 3 Maintenance and Software Support Services	
RSS Fixed Cost	$ -
ITS Fixed Cost	$ -
Total Monthly Extension 2 Year 3	$ -

Note 1: Unit cost for AVI Readers and Antennas will be revised based on actual cost from AVI RFP Contract.

Base Contract and Optional Extensions

Item #	Description of Items	Annual Cost ($)
	Base Contract	Image Verification Services
1	Year 1 of Operations	$ -
2	Year 2 of Operations	$ -
3	Year 3 of Operations	$ -
4	Year 4 of Operations	$ -
5	Year 5 of Operations	$ -
	Total Transaction Processing Operations Base Contract Cost (Operations Years 1 - 5)	$ -
	Optional Years - Extension-1	Image Verification Services
1	Year 1 of Operations	$ -
2	Year 2 of Operations	$ -
3	Year 3 of Operations	$ -
	Total Transaction Processing Operations Optional Contract Cost (Operations Years 6 -8)	$ -
	Optional Years - Extension-2	Image Verification Services
4	Year 1 of Operations	$ -
5	Year 2 of Operations	$ -
6	Year 3 of Operations	$ -
	Total Transaction Processing Operations Optional Contract Cost (Operations Years 9 - 11)	$ -
	Total Base and Optional Transaction Processing Operations Cost	**$ -**

Sheet 5-1 Backup

Description of Items	Sample Monthly Units	Unit ($)	Total Monthly Cost ($)	Total Annual Cost ($)
Base Contract Image Transaction Processing Costs				
Year 1 - Image Verification Services per Vehicle (up to 4 images per vehicle)				
Cost Per Image Verification per Vehicle	402,792	$ -	$ -	$ -
Total Monthly/Annual Year 1	402,792		$ -	$ -
Year 2 - Image Verification Services per Vehicle (up to 4 images per vehicle)				
Cost Per Image Verification per Vehicle	345,250	$ -	$ -	$ -
Total Monthly/Annual Year 2	345,250		$ -	$ -
Year 3- Image Verification Services per Vehicle (up to 4 images per vehicle)				
Cost Per Image Verification per Vehicle	287,708	$ -	$ -	$ -
Total Monthly/Annual Year 3	287,708		$ -	$ -
Year 4- Image Verification Services per Vehicle (up to 4 images per vehicle)				
Cost Per Image Verification per Vehicle	287,708	$ -	$ -	$ -
Total Monthly/Annual Year 4	287,708		$ -	$ -
Year 5 - Image Verification Services per Vehicle (up to 4 images per vehicle)				
Cost Per Image Verification per Vehicle	287,708	$ -	$ -	$ -
Total Monthly/Annual Year 5	287,708		$ -	$ -
Total Base Contract Image Verification Services Costs			**$ -**	**$ -**
Year 6 - Image Verification Services per Vehicle (up to 4 images per vehicle)				
Cost Per Image Verification per Vehicle	287,708	$ -	$ -	$ -
Total Monthly/Annual Year 6	287,708		$ -	$ -
Year 7 - Image Verification Services per Vehicle (up to 4 images per vehicle)				
Cost Per Image Verification per Vehicle	287,708	$ -	$ -	$ -
Total Monthly/Annual Year 7	287,708		$ -	$ -
Year 8 - Image Verification Services per Vehicle (up to 4 images per vehicle)				
Cost Per Image Verification per Vehicle	287,708	$ -	$ -	$ -
Total Monthly/Annual Year 8	287,708		$ -	$ -
Total Optional Extension-1 Contract Image Verification Services Costs			**$ -**	**$ -**
Year 9 - Image Verification Services per Vehicle (up to 4 images per vehicle)				
Cost Per Image Verification per Vehicle	287,708	$ -	$ -	$ -
Total Monthly/Annual Year 9	287,708		$ -	$ -
Year 10 - Image Verification Services per Vehicle (up to 4 images per vehicle)				
Cost Per Image Verification per Vehicle	287,708	$ -	$ -	$ -
Total Monthly/Annual Year 10	287,708		$ -	$ -
Year 11 - Image Verification Services per Vehicle (up to 4 images per vehicle)				
Cost Per Image Verification per Vehicle	287,708	$ -	$ -	$ -
Total Monthly/Annual Year 11	287,708		$ -	$ -
Total Optional Extension-2 Contract Image Verification Services Costs			**$ -**	**$ -**

Note:

1. Image Verification Services cost per transaction should include all costs (e.g., labor, facilities, supplies, etc.)

Sheet 10-1
Additional Services Rates (2021 Values)

Overhead including Burden	0.0000%
Profit	0.0000%
STAFF POSITION/CLASSIFICATION	LOADED HOURLY RATE
CADD Technician	$ -
Database Administrator	$ -
Database Analyst	$ -
Devops Engineer	$ -
Data Engineer	$ -
Electrician Helper	$ -
Finance Manager (Design/Implementation)	$ -
Finance Manager (Operations)	$ -
Hardware Engineer/Lead	$ -
Installation Manager	$ -
Installation Supervisor	$ -
Installation Technician	$ -
Licensed Electrical Engineer	$ -
Licensed Electrician	$ -
Maintenance Manager	$ -
Maintenance Supervisor	$ -
Maintenance Technician	$ -
Network Administrator	$ -
Network Engineer	$ -
Operations Manager	$ -
Project Manager	$ -
Project Principal	$ -
Quality Assurance Manager	$ -
Senior Maintenance Technician	$ -
Software Architect	$ -
Software Development Engineer	$ -
Software Development Manager	$ -
Software Lead	$ -
Software Programmer I	$ -
Software Programmer II	$ -
Software Programmer III	$ -
System Administrator	$ -
System Analyst	$ -
Systems Engineer	$ -
Technical Manager	$ -
Solution Architect	$ -
Technical Writer	$ -
Test Manager	$ -
Training Manager	$ -
Transition Manager	$ -
	$ -
	$ -
	$ -
	$ -
	$ -
	$ -
	$ -
	$ -
	$ -
	$ -
	$ -
	$ -
	$ -
	$ -
	$ -
	$ -
	$ -

Note 1: CPI adjustments will be made to the Cost based on actual CPI change for the previous year as further described in the Price Proposal Instructions.

Form D-8

Proposer Questions Form

(A Word version of the Proposer Questions Form is "paper clipped" to this NCTA RTCS Exhibits file for ease of completion.)

Proposer Questions	North Carolina Turnpike Authority (NCTA)				
#	Page	Section	Section Description	Proposer Question	NCTA Response
1.					
2.					
3.					
4.					

Form D-9

Non-Collusion Forms

(Please complete a single form that is applicable to your firm structure. PDFs of each form are presented below. Fillable PDFs of the form are "paper clipped" to this NCTA RTCS Exhibits file for ease of completion.)

Non-Collusion Affadavit, Debarment Certification, and Gift Ban Certification are required prior to bidding. Rev. 5-19-11
Submit to the Prequalification Office.

NON-COLLUSION AFFIDAVIT, DEBARMENT CERTIFICATION AND GIFT BAN CERTIFICATION

CORPORATION

The prequalified bidder being duly sworn, solemnly swears (or affirms) that neither he, nor any official, agent or employee has entered into any agreement, participated in any collusion, or otherwise taken any action which is in restraint of free competitive bidding in connection with any bid or contract, that the prequalified bidder has not been convicted of violating *N.C.G.S. § 133-24* within the last three years, and that the prequalified bidder intends to do the work with its own bonafide employees or subcontractors and will not bid for the benefit of another contractor.

By submitting this non-collusion affidavit, the Contractor is certifying his status under penalty of perjury under the laws of the United States in accordance with the Debarment Certification attached, provided that the Debarment Certification also includes any required statements concerning exceptions that are applicable.

N.C.G.S. § 133-32 and Executive Order 24 prohibit the offer to, or acceptance by, any State Employee of any gift from anyone with a contract with the State, or from any person seeking to do business with the State. By execution of any response in this procurement, you attest, for your entire organization and its employees or agents, that you are not aware that any such gift has been offered, accepted, or promised by any employees of your organization.

SIGNATURE OF PREQUALIFIED BIDDER

_____
Full name of Corporation

_____
Address as Prequalified

Attest _____ By _____

Secretary/Assistant Secretary
Select appropriate title

President/Vice President/Assistant Vice President
Select appropriate title

_____
Print or type Signer's name

_____
Print or type Signer's name

CORPORATE SEAL

AFFIDAVIT MUST BE NOTARIZED

Subscribed and sworn to before me this the

_____ day of _____ 20__.

NOTARY SEAL

_____
Signature of Notary Public

of _____County

State of _____

My Commission Expires:_____

Non-Collusion Affadavit, Debarment Certification, and Gift Ban Certification are required prior to bidding. Rev. 5-19-11
Submit to the Prequalification Office.

DEBARMENT CERTIFICATION

Conditions for certification:

1. The prequalified bidder shall provide immediate written notice to the Department if at any time the bidder learns that his certification was erroneous when he submitted his debarment certification or explanation filed with the Department, or has become erroneous because of changed circumstances.

2. The terms *covered transaction, debarred, suspended, ineligible, lower tier covered transaction, participant, person, primary covered transaction, principal, proposal,* and *voluntarily excluded,* as used in this provision, have the meanings set out in the Definitions and Coverage sections of the rules implementing Executive Order 12549. A copy of the Federal Rules requiring this certification and detailing the definitions and coverages may be obtained from the Contract Officer of the Department.

3. The prequalified bidder agrees by submitting this form, that he will not knowingly enter into any lower tier covered transaction with a person who is debarred, suspended, declared ineligible, or voluntarily excluded from participation in NCDOT contracts, unless authorized by the Department.

4. For Federal Aid projects, the prequalified bidder further agrees that by submitting this form he will include the Federal-Aid Provision titled *Required Contract Provisions Federal-Aid Construction Contract (Form FHWA PR* 1273) provided by the Department, without subsequent modification, in all lower tier covered transactions.

5. The prequalified bidder may rely upon a certification of a participant in a lower tier covered transaction that he is not debarred, suspended, ineligible, or voluntarily excluded from the covered transaction, unless he knows that the certification is erroneous. The bidder may decide the method and frequency by which he will determine the eligibility of his subcontractors.

6. Nothing contained in the foregoing shall be construed to require establishment of a system of records in order to render in good faith the certification required by this provision. The knowledge and information of a participant is not required to exceed that which is normally possessed by a prudent person in the ordinary course of business dealings.

7. Except as authorized in paragraph 6 herein, the Department may terminate any contract if the bidder knowingly enters into a lower tier covered transaction with a person who is suspended, debarred, ineligible, or voluntarily excluded from participation in this transaction, in addition to other remedies available by the Federal Government.

Non-Collusion Affadavit, Debarment Certification, and Gift Ban Certification are required prior to bidding. Rev. 5-19-11
Submit to the Prequalification Office.

DEBARMENT CERTIFICATION

The prequalified bidder certifies to the best of his knowledge and belief, that he and his principals:

a. Are not presently debarred, suspended, proposed for debarment, declared ineligible, or voluntarily excluded from covered transactions by any Federal department or agency;

b. Have not within a three-year period preceding this proposal been convicted of or had a civil judgment rendered against them for commission of fraud or a criminal offense in connection with obtaining, attempting to obtain, or performing a public (Federal, State or local) transaction or contract under a public transaction; violation of Federal or State antitrust statutes or commission of embezzlement, theft, forgery, bribery, falsification or destruction of records; making false statements; or receiving stolen property;

c. Are not presently indicted for or otherwise criminally or civilly charged by a governmental entity (Federal, State or local) with commission of any of the offenses enumerated in paragraph b. of this certification; and

d. Have not within a three-year period preceding this proposal had one or more public transactions (Federal, State or local) terminated for cause or default.

e. Will submit a revised Debarment Certification immediately if his status changes and will show in his bid proposal an explanation for the change in status.

If the prequalified bidder cannot certify that he is not debarred, he shall provide an explanation with this submittal. An explanation will not necessarily result in denial of participation in a contract.

Failure to submit a non-collusion affidavit and debarment certification will result in the prequalified bidder's bid being considered non-responsive.

☐ Check here if an explanation is attached to this certification.

Non-Collusion Affadavit, Debarment Certification, and Gift Ban Certification are required prior to bidding. Rev. 5-19-11
Submit to the Prequalification Office.

NON-COLLUSION AFFIDAVIT, DEBARMENT CERTIFICATION AND GIFT BAN CERTIFICATION

INDIVIDUAL DOING BUSINESS IN HIS OWN NAME

The prequalified bidder, being duly sworn, solemnly swears (or affirms) that neither he, nor any official, agent or employee has entered into any agreement, participated in any collusion, or otherwise taken any action which is in restraint of free competitive bidding in connection with any bid or contract, that the prequalified bidder has not been convicted of violating *N.C.G.S. § 133-24* within the last three years, and that the prequalified bidder intends to do the work with its own bonafide employees or subcontractors and will not bid for the benefit of another contractor.

By submitting this non-collusion affidavit, the Contractor is certifying his status under penalty of perjury under the laws of the United States in accordance with the Debarment Certification attached, provided that the Debarment Certification also includes any required statements concerning exceptions that are applicable.

N.C.G.S. § 133-32 and Executive Order 24 prohibit the offer to, or acceptance by, any State Employee of any gift from anyone with a contract with the State, or from any person seeking to do business with the State. By execution of any response in this procurement, you attest, for your entire organization and its employees or agents, that you are not aware that any such gift has been offered, accepted, or promised by any employees of your organization.

SIGNATURE OF PREQUALIFIED BIDDER

Name of Prequalified Bidder _____
Print or type name

_____
Address as Prequalified

_____
Signature of Prequalified Bidder, Individually

_____
Print or type Signer's Name

_____
Signature of Witness

_____
Print or type Signer's name

AFFIDAVIT MUST BE NOTARIZED

Subscribed and sworn to before me this the

NOTARY SEAL

_____ day of _____ 20__.

_____
Signature of Notary Public

of _____County

State of _____

My Commission Expires:_____

Non-Collusion Affadavit, Debarment Certification, and Gift Ban Certification are required prior to bidding. Rev. 5-19-11
Submit to the Prequalification Office.

DEBARMENT CERTIFICATION

Conditions for certification:

1. The prequalified bidder shall provide immediate written notice to the Department if at any time the bidder learns that his certification was erroneous when he submitted his debarment certification or explanation filed with the Department, or has become erroneous because of changed circumstances.

2. The terms *covered transaction, debarred, suspended, ineligible, lower tier covered transaction, participant, person, primary covered transaction, principal, proposal,* and *voluntarily excluded,* as used in this provision, have the meanings set out in the Definitions and Coverage sections of the rules implementing Executive Order 12549. A copy of the Federal Rules requiring this certification and detailing the definitions and coverages may be obtained from the Contract Officer of the Department.

3. The prequalified bidder agrees by submitting this form, that he will not knowingly enter into any lower tier covered transaction with a person who is debarred, suspended, declared ineligible, or voluntarily excluded from participation in NCDOT contracts, unless authorized by the Department.

4. For Federal Aid projects, the prequalified bidder further agrees that by submitting this form he will include the Federal-Aid Provision titled *Required Contract Provisions Federal-Aid Construction Contract (Form FHWA PR* 1273) provided by the Department, without subsequent modification, in all lower tier covered transactions.

5. The prequalified bidder may rely upon a certification of a participant in a lower tier covered transaction that he is not debarred, suspended, ineligible, or voluntarily excluded from the covered transaction, unless he knows that the certification is erroneous. The bidder may decide the method and frequency by which he will determine the eligibility of his subcontractors.

6. Nothing contained in the foregoing shall be construed to require establishment of a system of records in order to render in good faith the certification required by this provision. The knowledge and information of a participant is not required to exceed that which is normally possessed by a prudent person in the ordinary course of business dealings.

7. Except as authorized in paragraph 6 herein, the Department may terminate any contract if the bidder knowingly enters into a lower tier covered transaction with a person who is suspended, debarred, ineligible, or voluntarily excluded from participation in this transaction, in addition to other remedies available by the Federal Government.

Non-Collusion Affadavit, Debarment Certification, and Gift Ban Certification are required prior to bidding. Rev. 5-19-11
Submit to the Prequalification Office.

DEBARMENT CERTIFICATION

The prequalified bidder certifies to the best of his knowledge and belief, that he and his principals:

a. Are not presently debarred, suspended, proposed for debarment, declared ineligible, or voluntarily excluded from covered transactions by any Federal department or agency;

b. Have not within a three-year period preceding this proposal been convicted of or had a civil judgment rendered against them for commission of fraud or a criminal offense in connection with obtaining, attempting to obtain, or performing a public (Federal, State or local) transaction or contract under a public transaction; violation of Federal or State antitrust statutes or commission of embezzlement, theft, forgery, bribery, falsification or destruction of records; making false statements; or receiving stolen property;

c. Are not presently indicted for or otherwise criminally or civilly charged by a governmental entity (Federal, State or local) with commission of any of the offenses enumerated in paragraph b. of this certification; and

d. Have not within a three-year period preceding this proposal had one or more public transactions (Federal, State or local) terminated for cause or default.

e. Will submit a revised Debarment Certification immediately if his status changes and will show in his bid proposal an explanation for the change in status.

If the prequalified bidder cannot certify that he is not debarred, he shall provide an explanation with this submittal. An explanation will not necessarily result in denial of participation in a contract.

Failure to submit a non-collusion affidavit and debarment certification will result in the prequalified bidder's bid being considered non-responsive.

☐ Check here if an explanation is attached to this certification.

Non-Collusion Affadavit, Debarment Certification, and Gift Ban Certification are required prior to bidding. Rev. 5-19-11
Submit to the Prequalification Office.

NON-COLLUSION AFFIDAVIT, DEBARMENT CERTIFICATION AND GIFT BAN CERTIFICATION

INDIVIDUAL DOING BUSINESS UNDER A FIRM NAME

The prequalified bidder, being duly sworn, solemnly swears (or affirms) that neither he, nor any official, agent or employee has entered into any agreement, participated in any collusion, or otherwise taken any action which is in restraint of free competitive bidding in connection with any bid or contract, that the prequalified bidder has not been convicted of violating *N.C.G.S. § 133-24* within the last three years, and that the prequalified bidder intends to do the work with its own bonafide employees or subcontractors and will not bid for the benefit of another contractor.

By submitting this non-collusion affidavit, the Contractor is certifying his status under penalty of perjury under the laws of the United States in accordance with the Debarment Certification attached, provided that the Debarment Certification also includes any required statements concerning exceptions that are applicable.

N.C.G.S. § 133-32 and Executive Order 24 prohibit the offer to, or acceptance by, any State Employee of any gift from anyone with a contract with the State, or from any person seeking to do business with the State. By execution of any response in this procurement, you attest, for your entire organization and its employees or agents, that you are not aware that any such gift has been offered, accepted, or promised by any employees of your organization.

SIGNATURE OF PREQUALIFIED BIDDER

Name of Prequalified Bidder _____
Individual name

Trading and doing business as _____
Full name of Firm

_____
Address as Prequalified

_____ _____
Signature of Witness Signature of Prequalified Bidder, Individually

_____ _____
Print or type Signer's name Print or type Signer's name

AFFIDAVIT MUST BE NOTARIZED

Subscribed and sworn to before me this the

NOTARY SEAL

_____ day of _____ 20__.

_____
Signature of Notary Public

of _____County

State of _____

My Commission Expires:_____

Non-Collusion Affadavit, Debarment Certification, and Gift Ban Certification are required prior to bidding. Rev. 5-19-11
Submit to the Prequalification Office.

DEBARMENT CERTIFICATION

Conditions for certification:

1. The prequalified bidder shall provide immediate written notice to the Department if at any time the bidder learns that his certification was erroneous when he submitted his debarment certification or explanation filed with the Department, or has become erroneous because of changed circumstances.

2. The terms *covered transaction, debarred, suspended, ineligible, lower tier covered transaction, participant, person, primary covered transaction, principal, proposal,* and *voluntarily excluded,* as used in this provision, have the meanings set out in the Definitions and Coverage sections of the rules implementing Executive Order 12549. A copy of the Federal Rules requiring this certification and detailing the definitions and coverages may be obtained from the Contract Officer of the Department.

3. The prequalified bidder agrees by submitting this form, that he will not knowingly enter into any lower tier covered transaction with a person who is debarred, suspended, declared ineligible, or voluntarily excluded from participation in NCDOT contracts, unless authorized by the Department.

4. For Federal Aid projects, the prequalified bidder further agrees that by submitting this form he will include the Federal-Aid Provision titled *Required Contract Provisions Federal-Aid Construction Contract (Form FHWA PR* 1273) provided by the Department, without subsequent modification, in all lower tier covered transactions.

5. The prequalified bidder may rely upon a certification of a participant in a lower tier covered transaction that he is not debarred, suspended, ineligible, or voluntarily excluded from the covered transaction, unless he knows that the certification is erroneous. The bidder may decide the method and frequency by which he will determine the eligibility of his subcontractors.

6. Nothing contained in the foregoing shall be construed to require establishment of a system of records in order to render in good faith the certification required by this provision. The knowledge and information of a participant is not required to exceed that which is normally possessed by a prudent person in the ordinary course of business dealings.

7. Except as authorized in paragraph 6 herein, the Department may terminate any contract if the bidder knowingly enters into a lower tier covered transaction with a person who is suspended, debarred, ineligible, or voluntarily excluded from participation in this transaction, in addition to other remedies available by the Federal Government.

Non-Collusion Affadavit, Debarment Certification, and Gift Ban Certification are required prior to bidding. Rev. 5-19-11
Submit to the Prequalification Office.

DEBARMENT CERTIFICATION

The prequalified bidder certifies to the best of his knowledge and belief, that he and his principals:

a. Are not presently debarred, suspended, proposed for debarment, declared ineligible, or voluntarily excluded from covered transactions by any Federal department or agency;

b. Have not within a three-year period preceding this proposal been convicted of or had a civil judgment rendered against them for commission of fraud or a criminal offense in connection with obtaining, attempting to obtain, or performing a public (Federal, State or local) transaction or contract under a public transaction; violation of Federal or State antitrust statutes or commission of embezzlement, theft, forgery, bribery, falsification or destruction of records; making false statements; or receiving stolen property;

c. Are not presently indicted for or otherwise criminally or civilly charged by a governmental entity (Federal, State or local) with commission of any of the offenses enumerated in paragraph b. of this certification; and

d. Have not within a three-year period preceding this proposal had one or more public transactions (Federal, State or local) terminated for cause or default.

e. Will submit a revised Debarment Certification immediately if his status changes and will show in his bid proposal an explanation for the change in status.

If the prequalified bidder cannot certify that he is not debarred, he shall provide an explanation with this submittal. An explanation will not necessarily result in denial of participation in a contract.

Failure to submit a non-collusion affidavit and debarment certification will result in the prequalified bidder's bid being considered non-responsive.

☐ Check here if an explanation is attached to this certification.

Non-Collusion Affadavit, Debarment Certification, and Gift Ban Certification are required prior to bidding. Rev. 5-19-11
Submit to the Prequalification Office.

NON-COLLUSION AFFIDAVIT, DEBARMENT CERTIFICATION AND GIFT BAN CERTIFICATION

LIMITED LIABILITY COMPANY

The prequalified bidder, being duly sworn, solemnly swears (or affirms) that neither he, nor any official, agent or employee has entered into any agreement, participated in any collusion, or otherwise taken any action which is in restraint of free competitive bidding in connection with any bid or contract, that the prequalified bidder has not been convicted of violating *N.C.G.S. § 133-24* within the last three years, and that the prequalified bidder intends to do the work with its own bonafide employees or subcontractors and will not bid for the benefit of another contractor.

By submitting this non-collusion affidavit, the Contractor is certifying his status under penalty of perjury under the laws of the United States in accordance with the Debarment Certification attached, provided that the Debarment Certification also includes any required statements concerning exceptions that are applicable.

N.C.G.S. § 133-32 and Executive Order 24 prohibit the offer to, or acceptance by, any State Employee of any gift from anyone with a contract with the State, or from any person seeking to do business with the State. By execution of any response in this procurement, you attest, for your entire organization and its employees or agents, that you are not aware that any such gift has been offered, accepted, or promised by any employees of your organization.

SIGNATURE OF PREQUALIFIED BIDDER

_____
Full Name of Firm

_____
Address as Prequalified

_____ Signature of Witness	_____ Signature of Member/Manager/Authorized Agent *Select appropriate title*
_____ Print or type Signer's name	_____ Print or type Signer's Name

AFFIDAVIT MUST BE NOTARIZED

Subscribed and sworn to before me this the **NOTARY SEAL**

_____ day of _____ 20__.

_____
Signature of Notary Public

of _____County

State of _____

My Commission Expires:_____

Non-Collusion Affadavit, Debarment Certification, and Gift Ban Certification are required prior to bidding. Rev. 5-19-11
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Conditions for certification:

1. The prequalified bidder shall provide immediate written notice to the Department if at any time the bidder learns that his certification was erroneous when he submitted his debarment certification or explanation filed with the Department, or has become erroneous because of changed circumstances.

2. The terms *covered transaction, debarred, suspended, ineligible, lower tier covered transaction, participant, person, primary covered transaction, principal, proposal,* and *voluntarily excluded,* as used in this provision, have the meanings set out in the Definitions and Coverage sections of the rules implementing Executive Order 12549. A copy of the Federal Rules requiring this certification and detailing the definitions and coverages may be obtained from the Contract Officer of the Department.

3. The prequalified bidder agrees by submitting this form, that he will not knowingly enter into any lower tier covered transaction with a person who is debarred, suspended, declared ineligible, or voluntarily excluded from participation in NCDOT contracts, unless authorized by the Department.

4. For Federal Aid projects, the prequalified bidder further agrees that by submitting this form he will include the Federal-Aid Provision titled *Required Contract Provisions Federal-Aid Construction Contract (Form FHWA PR* 1273) provided by the Department, without subsequent modification, in all lower tier covered transactions.

5. The prequalified bidder may rely upon a certification of a participant in a lower tier covered transaction that he is not debarred, suspended, ineligible, or voluntarily excluded from the covered transaction, unless he knows that the certification is erroneous. The bidder may decide the method and frequency by which he will determine the eligibility of his subcontractors.

6. Nothing contained in the foregoing shall be construed to require establishment of a system of records in order to render in good faith the certification required by this provision. The knowledge and information of a participant is not required to exceed that which is normally possessed by a prudent person in the ordinary course of business dealings.

7. Except as authorized in paragraph 6 herein, the Department may terminate any contract if the bidder knowingly enters into a lower tier covered transaction with a person who is suspended, debarred, ineligible, or voluntarily excluded from participation in this transaction, in addition to other remedies available by the Federal Government.

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Submit to the Prequalification Office.

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b. Have not within a three-year period preceding this proposal been convicted of or had a civil judgment rendered against them for commission of fraud or a criminal offense in connection with obtaining, attempting to obtain, or performing a public (Federal, State or local) transaction or contract under a public transaction; violation of Federal or State antitrust statutes or commission of embezzlement, theft, forgery, bribery, falsification or destruction of records; making false statements; or receiving stolen property;

c. Are not presently indicted for or otherwise criminally or civilly charged by a governmental entity (Federal, State or local) with commission of any of the offenses enumerated in paragraph b. of this certification; and

d. Have not within a three-year period preceding this proposal had one or more public transactions (Federal, State or local) terminated for cause or default.

e. Will submit a revised Debarment Certification immediately if his status changes and will show in his bid proposal an explanation for the change in status.

If the prequalified bidder cannot certify that he is not debarred, he shall provide an explanation with this submittal. An explanation will not necessarily result in denial of participation in a contract.

Failure to submit a non-collusion affidavit and debarment certification will result in the prequalified bidder's bid being considered non-responsive.

☐ Check here if an explanation is attached to this certification.

Non-Collusion Affadavit, Debarment Certification, and Gift Ban Certification are required prior to bidding. Rev. 5-19-11
Submit to the Prequalification Office.

NON-COLLUSION AFFIDAVIT, DEBARMENT CERTIFICATION AND GIFT BAN CERTIFICATION

PARTNERSHIP

The prequalified bidder, being duly sworn, solemnly swears (or affirms) that neither he, nor any official, agent or employee has entered into any agreement, participated in any collusion, or otherwise taken any action which is in restraint of free competitive bidding in connection with any bid or contract, that the prequalified bidder has not been convicted of violating *N.C.G.S. § 133-24* within the last three years, and that the prequalified bidder intends to do the work with its own bonafide employees or subcontractors and will not bid for the benefit of another contractor.

By submitting this non-collusion affidavit, the Contractor is certifying his status under penalty of perjury under the laws of the United States in accordance with the Debarment Certification attached, provided that the Debarment Certification also includes any required statements concerning exceptions that are applicable.

N.C.G.S. § 133-32 and Executive Order 24 prohibit the offer to, or acceptance by, any State Employee of any gift from anyone with a contract with the State, or from any person seeking to do business with the State. By execution of any response in this procurement, you attest, for your entire organization and its employees or agents, that you are not aware that any such gift has been offered, accepted, or promised by any employees of your organization.

SIGNATURE OF PREQUALIFIED BIDDER

_____
Full Name of Partnership

_____
Address as Prequalified

_____ By _____
Signature of Witness Signature of Partner

_____ _____
Print or type Signer's name Print or type Signer's name

AFFIDAVIT MUST BE NOTARIZED

Subscribed and sworn to before me this the **NOTARY SEAL**

_____ day of _____ 20__.

_____
Signature of Notary Public

of _____County

State of _____

My Commission Expires:_____

Non-Collusion Affadavit, Debarment Certification, and Gift Ban Certification are required prior to bidding. Rev. 5-19-11
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c. Are not presently indicted for or otherwise criminally or civilly charged by a governmental entity (Federal, State or local) with commission of any of the offenses enumerated in paragraph b. of this certification; and

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If the prequalified bidder cannot certify that he is not debarred, he shall provide an explanation with this submittal. An explanation will not necessarily result in denial of participation in a contract.

Failure to submit a non-collusion affidavit and debarment certification will result in the prequalified bidder's bid being considered non-responsive.

☐ Check here if an explanation is attached to this certification.

Form D-10

Surety Commitment Letter

(A Word version of the Surety Commitment Letter is "paper clipped" to this NCTA RTCS Exhibits file for ease of completion.)

CONSENT OF SURETY

TO: North Carolina Turnpike Authority

We have reviewed the proposal of _____
(Proposer)

_____
(Address)

for the Roadside Toll Collection System for which Proposals will be received on: _____
(Proposal Due Date)

and wish to advise that should this Proposal of the Proposer be accepted, and the Contract awarded to, such Proposer, this company agrees to become the surety and provide the Payment and Performance Bonds required by the Contract for both the Implementation and Operations and Maintenance Phases. Such bonds will be in the amounts identified in the Price Proposal as referenced in the RFP Part I, Section 6.1 Notification of Award with terms of the bonds as also provided in that section.

We are duly authorized to do business in the State of North Carolina.

Surety Company/Address:

_____

_____

_____

_____
(Authorized Signature)

ATTEST:

_____
[Attach Power of Attorney]

(Corporate Seal, if any. If no seal, write "No Seal" across this place and sign.)

Form D-11

Acknowledgement of Receipt of Addenda

(A Word version is "paper clipped" to this NCTA RTCS Exhibits file for ease of completion.)

ACKNOWLEDGEMENT OF RECEIPT OF ADDENDA

The Proposer shall acknowledge receipt of each addendum to this Request for Proposal by completing this form and including same in the Technical Proposal.

Addenda	Date	By
_____	_____	_____
_____	_____	_____
_____	_____	_____
_____	_____	_____
_____	_____	_____
_____	_____	_____

Failure to confirm receipt of addenda may result in rejection of the Proposer's Proposal.

Dated_____, 2021

_____
Legal Name of Firm

By_____
Signature

_____
Title

NOTE: Attach additional pages as necessary

Form D-12

Bid Bond Forms

(A Word version is "paper clipped" to this NCTA RTCS Exhibits file for ease of completion.)

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH, NC

BID BOND

Principal: _____
Name of Principal Contractor

Surety: _____
Name of Surety

Contract Number: I-485 Roadside Toll Collection System (NCTA) County: _____

Date of Bid: _____

KNOW ALL MEN BY THESE PRESENTS, That we, the PRINCIPAL CONTRACTOR (hereafter, PRINCIPAL) and SURETY above named, are held and firmly bound unto the Department of Transportation in the full and just sum of five (5) percent of the total amount bid by the Principal for the project stated above, for the payment of which sum well and truly to be made, we bind ourselves, our heirs, executors, administrators, and successors, jointly and severally, firmly by these presents.

NOW, THEREFORE, the condition of this obligation is: the Principal shall not withdraw its bid within sixty (60) days after the opening of the bids, or within such other time period as may be provided in the proposal, and if the Board of Transportation shall award a contract to the Principal, the Principal shall, within fourteen (14) calendar days after written notice of award is received by him, provide bonds with good and sufficient surety, as required for the faithful performance of the contract and for the protection of all persons supplying labor, material, and equipment for the prosecution of the work. In the event the Principal requests permission to withdraw his bid due to mistake in accordance with the provisions of Article 103-3 of the *Standard Specifications for Roads and Structures*, the conditions and obligations of this Bid Bond shall remain in full force and effect until the Department of Transportation makes a final determination to either allow the bid to be withdrawn or to proceed with award of the contract. In the event a determination is made to award the contract, the Principal shall have fourteen (14) calendar days to comply with the requirements set forth above. In the event the Principal withdraws its bid after bids are opened except as provided in Article 103-3, or after award of the contract has been made fails to execute such additional documents as may be required and to provide the required bonds within the time period specified above, then the amount of the bid bond shall be immediately paid to the Department of Transportation as liquidated damages.

IN TESTIMONY WHEREOF, the Principal and Surety have caused these presents to be duly signed and sealed.

This the _____ day of _____, 20 _____

_____
Surety

By _____
General Agent or Attorney-in-Fact Signature

Seal of Surety

_____
Print or type Signer's Name

BID BOND

CORPORATION

SIGNATURE OF CONTRACTOR (Principal)

_____

Full name of Corporation

_____

Address as prequalified

By _____

Signature of **President**, **Vice President**, **Assistant Vice President**
Select appropriate title

_____

Print or type Signer's name

Affix Corporate Seal

Attest _____

Signature of **Secretary**, **Assistant Secretary**
Select appropriate title

_____

Print or type Signer's name

BID BOND

LIMITED LIABILITY COMPANY

SIGNATURE OF CONTRACTOR (Principal)

Name of Contractor _____

Full name of Firm

_____

Address as prequalified

Signature of Member/ Manager/Authorized Agent _____

Individually

_____

Print or type Signer's name

BID BOND

PARTNERSHIP

SIGNATURE OF CONTRACTOR (Principal)

_____

Full name of Partnership

_____

Address as prequalified

By _____

Signature of Partner

_____

Print or type Signer's name

_____

Signature of Witness

_____

Print or type Signer’s name