# QUESTIONS FOR CT DOT REGARDING RFP #13 DOT7001

1) Is the State open to negotiation on the liquidated damages terms and conditions per the proposed contract included in the RFP documents?

   RESPONSE: No

2) Is a permanent bar code sticker containing the required information spelled out in section 2.24 acceptable?

   RESPONSE: Yes. Section 2.24 has been revised and included in Addendum No. 1.

3) Please clarify the following regarding the externally mounted MTV:
   - Will the MTV's be mounted to Mains powered TVM's only?
   - Will the TVM provider be an active participant in the customized MTV installation planning?

   RESPONSE:

   - CTDOT will provide for a standalone MTV (now referred to as the EMTV). Section 3.2.4 has been deleted by Addendum No. 1.
   - See response above regarding MTV mounting.

4) Please clarify the following regarding selection criteria for this RFP.
   - Section A of the technical evaluation criteria stated that an additional 15 points are available if additional value elements are proposed. Does this mean that a score of 15 points is possible for this element if the state deems that the response is less than 100% compliant for this section and that a total of 55 points are possible if the state deems that the response is 100% compliant?
   - Please clarify the points available for section C. Is full compliance valued at 5 points or 10 points?

   RESPONSE:

   - No. See Addendum No. 1 for revised scoring.
   - No. See Addendum No. 1 for revised scoring.

5) In reference to escrow for the TVMS, what is the desired procedure when a patron inserts more than one bill but then cancels the transaction? The description reads as though only 1 bill can be returned. How is escrow handled for the coins inserted in the system?

RESPONSE: The specification is correct as written, although the proposer can propose a procedure that exceeds the specified requirements.

6) Is it possible to have a second opportunity to ask questions after the initial deadline?

RESPONSE: Yes. Questions will be accepted until close of business on January 24, 2014.

7) There are several forms that are included with the RFP package that are included with the RFP package that are not indicated as needed to be returned with our response submission. Please let me know if the completion / return of the following is required with our RFP response:
-- Non-discrimination certification (Form C)
-- OPM Ethics Form 1
-- OPM Ethics Form 3
-- OPM Iran Certification Form 7

RESPONSE: No. Forms will be required from the successful proposer per the requirements listed on the DAS website.

8) Please clarify the 20 page limit request is for the following areas only and not for our detailed product / CMS and services description in response to the scope of work [*note that the text below was modified from the question to reflect the language contained in the Addendum*].

1. Cover Letter (1 page)
2. Identification of the firm. The Contractor will be required to be registered to do business in the State of Connecticut as of the date of Notice to Proceed. The Proposer submitting the Proposal should list all principals and their percentage of ownership. If a corporation, limited partnership, or limited liability company, the Proposer should submit a current corporate, partnership, or company record print-out from Secretary of State's Office.
3. Table of organization for the Proposer and the project team.

4. Description of the project team, including a brief profile of the persons responsible for performing the work under the Agreement

RESPONSE: No. The 20 page limit applies to all items listed in the RFP.

9) Please indicate when the addendum referred to at the pre-bid conference will be available.

RESPONSE: Addendum No. 1 is planned for release on January 22, 2014.

# REQUEST FOR PROPOSALS (RFP)
# INSTRUCTIONS TO PROPOSERS

# TICKET VENDING MACHINE SYSTEM (TVMS) FOR CTfastrak STATIONS AND RELATED LOCATIONS

## I. INTRODUCTION:

The State of Connecticut, Department of Transportation (CTDOT) wishes to procure from a ticket vending machine system (TVMS) manufacturer or supplier (hereafter, a "Contractor"), who may be selected from among Proposers who respond to this Request for Proposals (RFP), a TVMS for CT***fastrak***. CT***fastrak*** is a bus rapid transit system that CTDOT is constructing and plans to operate in Central Connecticut. The Scope of Work and other Contract Documents that are an integral part of this RFP provide a description of CT***fastrak*** as well as detailed requirements for the TVMS.

The agreement (Agreement) that may result from this procurement will be for a period which comprises design, manufacturing and installation, warranty, and operations, and will commence on the Notice to Proceed date and extend through the specified Agreement duration that will include services and warranties, plus any options selected and exercised by the State that are defined elsewhere in the Contract Documents.

This RFP will be for all materials and all services described in the Scope of Work attached to the Agreement as Schedule A (Scope of Work),~~,~~ elsewhere in the RFP, and the Agreement. Definitions of undefined, capitalized terms included in this RFP ~~may be~~are found in the "Definitions" section of the Agreement.

The basis for awarding the Agreement is outlined in Section VI of this RFP.

## II. SCOPE OF WORK OVERVIEW:

This RFP anticipates the award of an Agreement for the work, materials, and services described in the Scope of Work and the other Contract Documents. The successful Contractor will provide the following, which are specified in detail in the Scope of Work:

1. Ticket Vending Machines
2. Central Management System
3. Project Management
4. Systems Services and Support
5. Design (subject to CTDOT review)
6. Inspection and Testing
7. Warranty
8. Hardware Maintenance Services after Final Acceptance and Warranty Period (Optional)
9. Software Maintenance after Final Acceptance and Warranty Period (Optional)
10. CMS Operations during Revenue Service
11. Any options exercised by the State

Proposals should reflect and incorporate all requirements specified in the Agreement. Pricing should be provided in accordance with the Price Proposal ~~-~~and its attachments. The Proposer's Technical Proposal should reflect the requirements stated in this RFP and the ~~contract documents~~Contract Documents.

## III. SUBMISSION REQUIREMENTS:

Proposers should provide the following information in a Technical Proposal that should not exceed twenty (20) pages in length:

1. Cover Letter (1 page)
2. Identification of the firm. The Contractor will be required to be registered to do business in the State of Connecticut as of the date of Notice to Proceed. The Proposer submitting the Proposal should list all principals and their percentage of ownership. If a corporation, limited partnership, or limited liability company, the Proposer should submit a current corporate, partnership, or company record print-out from Secretary of State's Office.
3. Table of organization for the Proposer and the project team.

4. Description of the project team, including a brief profile of the persons responsible for performing the work under ~~this~~ the Agreement:
    a. Organization chart, highlighting:
        i. Design, manufacturing, installation, testing, and warranty phase
        ii. Optional services for operations (after completion of acceptance testing and warranty periods)
    b. Resumes for key personnel (maximum of two (2) pages per person and not included in the twenty (20) page limit)
5. Experience providing and implementing similar systems in the United States in the last five years, highlighting equipment and system reliability, including performance under the environmental and operating conditions identified in the Scope of Work.
6. Technical response to the requirements for the TVMS – The Proposer will be evaluated on the extent of compliance with the Scope of Work, other requirements specified in the Contract Documents, and elements of the Proposal that exceed the specified requirements or provide desired equipment / system enhancements that are identified in the Scope of Work.
7. Statement of acceptance of the terms and conditions of the Contract Documents and the Agreement.
8. The following forms shall be completed, properly signed, and returned as part of the Technical Proposal, but will not be included in the page count:
    a. Non-collusion Affidavit
    b. OPM Ethics Form 5
    c. OPM Ethics Form 6

In addition to the Technical Proposal described above, the Proposer will provide the Price Proposal in a separate, sealed envelope labeled, "PRICE PROPOSAL".

## IV. GENERAL INSTRUCTIONS TO PROPOSERS

1. Questions regarding the RFP shall be ~~received~~ provided in writing or via e-mail, and submitted to: Mr. Philip Scarrozzo, 2800 Berlin Turnpike, Newington, CT 06131-7546 or Philip.Scarrozzo@ct.gov
2. Delivery of responses- RFP responses shall be in sealed envelopes upon which a clear indication has been made of the RFP reference title, as well as the date and time the bid is due. The name and address of the firm shall appear on the envelope. The Price Proposal will be provided in a separate, sealed envelope.
3. Signature and responsible persons - The Proposal shall be signed by an authorized official. The Proposal shall also provide name, title, address, and telephone number for individuals with authority to negotiate and contractually bind the Proposer, and for those who may be contacted for the purpose of clarifying the information provided.
4. Proposals shall be received by **January 31, 2014 no later than 3:00 p.m.**, at the Connecticut Department of Transportation, 2800 Berlin Turnpike, Newington, CT 06131-7546. No proposals will be accepted after this time.
5. Please submit eight (8) copies of your proposal and one electronic (.pdf) version.

NOTE: THE DEPARTMENT OF TRANSPORTATION WILL REJECT PROPOSALS WHICH ARE SUBSTANTIALLY INCOMPLETE AND WILL NOT ALLOW THE SUBMISSION OF ANY ADDITIONAL WRITTEN INFORMATION AFTER THE RFP DEADLINE.

THE DEPARTMENT OF TRANSPORTATION RESERVES THE RIGHT TO REJECT ANY OR ALL PROPOSALS.

PRE-BID CONFERENCE IS SCHEDULED FOR FRIDAY, JANUARY 10, 2014.

Conference to begin at 8:00 a.m. at the Connecticut Department of Transportation, 2800 Berlin Turnpike, Newington, CT.

No questions will be answered at the pre-bid conference. Questions must be submitted in writing. All questions must be submitted no later than the close of business on January 10, 2014. Except as may be determined by the State, no questions will be considered or addressed after this time. Questions will be responded to in writing with a copy provided to each prospective proposer by January 17, 2014.

All prospective Proposers are strongly encouraged to attend the pre-bid conference. Proposers are requested to pre-register via email to Philip.Scarrozzo@ct.gov by noon on January 7, 2014. Pre-registration will ensure that proper notifications can be made should the conference date change due to inclement weather.

## V. CONDITIONS OF PROPOSALS:

1. ~~Any~~ All Proposers~~Proposer~~ shall adhere to the following conditions as stated below:
    a. Acceptance or rejection by the State - The State reserves the right to accept or reject any or all Proposals submitted.
    b. Conformance with statutes - Any Agreement entered as a result of this RFP shall be in full conformance with statutory requirements of the State of Connecticut and the Federal Government.
    c. Ownership of Proposals- All Proposals in response to this RFP are to be the sole property of the State, and subject to the provisions of Section 1-210 of the Connecticut General Statutes (Re: Freedom of Information).
    d. Oral agreements- Any alleged oral agreements or arrangements made by a Proposer with any agency or employee will be superseded by the written agreement.
    e. Amending or canceling requests -The State reserves the right to amend or cancel this RFP prior to the due date and time or after, if it is in the best interests of the agency and the State.
    f. Rejection for default or misrepresentation - The State reserves the right to reject the Proposal of any Proposer which is in default of any prior contract or for misrepresentation.
    g. State's clerical errors in awards- The State reserves the right to correct inaccurate awards resulting from its clerical errors.
    h. Rejection of qualified proposals - Proposals are subject to rejection in whole or in part if they limit or modify any of the terms and/or specifications of the RFP.
    i. Changes to proposal- No additions or changes to the original Proposal will be allowed after submittal. While changes are not permitted, clarification at the request of the State may be required at the Proposer's expense.
    j. Collusion - By responding, the Proposer implicitly states that its Proposal is not made in connection with any competing Proposer submitting a separate response to the RFP, and is in all respects fair and without collusion or fraud. It is further implied that the Proposer did not participate in the RFP development process, had no knowledge of the specific contents of the RFP prior to its issuance, and that no employee of the agency participated directly or indirectly in the Proposer's Proposal preparation.
    k. Please be advised that when the Agreement is awarded, a minimum of 1.5% (one and one half percent) of this contract award must be set-aside for certified CTDOT Disadvantaged Business Enterprises (DBE's) in accordance with the Agreement Appendix A, Section 18.
    l. The Contractor warrants that ~~he~~ it shall not sublet, subcontract, sell, transfer, assign, or otherwise dispose of the ~~contract~~ Agreement or any portion thereof, or of the work provided ~~therein~~pursuant thereto, or his right, title, or interest therein, to any person, firm, partnership, or corporation without the written consent of the State. For breach or violation of the above stipulation the State shall have the right to annul the Agreement without liability.

2. Rights reserved to the State:
    a. The State reserves the right to award in part, to reject any and all Proposals in whole or in part, and waive technical defects, irregularities, and omissions if, in its judgment, the best interest of the State be served.
    b. The State reserves the right to terminate any future agreement arising from this RFP.
    c. The State reserves the right to schedule interviews with any or all prospective Proposers after review of Proposals.
    d. The State reserves the right to:

i. award the Agreement to the Proposer with the highest Total Score identified in the "Selection Criteria" section,
ii. negotiate a final Agreement with that highest scoring Proposer if, in the State's sole discretion, negotiations are necessary,
iii. enter negotiations with the second highest scoring Proposer if the State cannot reach agreement with that highest scoring Proposer, or
iv. repeat this process, if necessary, with other Proposers.

## VI. SELECTION CRITERIA:

The evaluation of TVMS Proposals received will use the following general criteria and relative weights:

- Technical Proposal ~~70~~50%
- Price Proposal 50~~30~~%

Technical Evaluation

The main criteria for evaluation of the Technical Proposals are identified below. The maximum number of points that will be awarded for each criterion is shown. These are based on verification of experience and the requirements as stated in the RFP for each criterion below:

| | ***Criterion*** | ***Maximum Points per Criterion (**"Technical Score"**)*** |
|---|---|---|
| A. | Technical Response: Proposed System – Extent of compliance with Scope of Work requirements. Compliance with Scope of Work = ~~25~~ 20 (twenty~~-five~~) points. Less than full compliance with Scope of Work = 0 (zero) points. Up to ~~15~~ 10 (~~fifteen~~ten) additional points may be awarded by the State evaluators for additional value elements offered to the State in the Proposer's Technical Proposal. | ~~40~~30 |
| B. | Proposer Experience: Proposer qualifications, experience and references in providing and implementing similar systems based on:<br>• Proposer shall have at least 10 years of experience in providing similar systems (components, size and nature).<br>• Provide examples of up to 5 previous projects similar to this project that were procured in the last 3-5 years.<br>• Demonstrate experience with public sector transit systems.<br>• Demonstrate experience in Central Management System hosting.<br>• Demonstrate experience performing on-site training programs.<br>• Demonstrate experience with hardware and software support.<br>• Owner/client references will be a critical element of this evaluation. Up to three owner / client references are expected, although the State considers more, well documented references to be preferable.<br>Compliance with Experience criteria, as documented by references = 10 (ten) | 15~~20~~ |

| | | |
|---|---|---|
| | points. Less than full compliance with Experience criteria = 0 (zero) points. Up to ~~10~~ 5 (~~ten~~five) additional points may be awarded by the State evaluators for additional experience/qualifications offered to the State in the Proposer's Technical Proposal. | |
| C. | Project Management: Proposed project team qualifications, experience and certifications for personnel and organization, based on:<br><br>• Demonstrated competence of each key team member, documented by client / owner references in the function assigned in the organizational chart.<br>• Cross-reference each key team member with their involvement on the example projects presented under firm's experience in Section B.<br>• Provide evidence of qualifications, as applicable, for each key team member. This may include degrees, certifications, licenses, or other documents to support an individual's abilities for the role proposed.<br>• Approach to quality assurance, including the related qualifications and experience of the individual(s) proposed for this specific role.<br><br>Compliance with proposed p~~P~~roject t~~T~~eam criteria, as documented by references = ~~5~~ 3 (~~five~~three) points. Less than full compliance with p~~P~~roject t~~T~~eam criteria = 0 (zero) points. Up to ~~5~~2 (~~five~~two) additional points may be awarded by the State evaluators for additional experience/qualifications offered to the State in the Proposer's Technical Proposal by the proposed p~~P~~roject t~~T~~eam. | 5~~10~~ |

The State may identify and use more detailed evaluation criteria, which will be based on the main criteria identified above.

Price Evaluation

The Proposal with the lowest proposed price for the Base System (excluding Options) will receive the maximum of ~~30~~ 50 points for the price. Other higher priced Proposals will receive fewer points based on the following formula.

> Price Score = (Lowest proposed price for total cost (Base System) / proposed price for total cost (Base System)) X ~~30~~50

Total Score

Total Score = Price Score + Technical Score

Award may be made to the Proposer with the highest Total Score on the basis of the above criteria and calculations and on the rights reserved to the State in the Conditions of Proposal section of this RFP.

Options will be considered for inclusion in the Agreement at the State's sole discretion and may be reflected in the Proposer's Technical Score, but will not be considered in the Price Score evaluation leading to the award of the Contract.

AGREEMENT NO. X.XX-XX(XX)
CORE I.D.# XXXXXXXXXXX

AGREEMENT
BETWEEN
THE STATE OF CONNECTICUT, DEPARTMENT OF TRANSPORTATION
AND
(CONTRACTOR)
TO PROVIDE TICKET VENDING MACHINE SYSTEM
FOR
CT***FASTRAK***

NOTE: ANY REFERENCE TO DEPARTMENT OF TRANSPORTATION IN THIS AGREEMENT SHALL BE CONSTRUED TO MEAN "STATE".

ANY ITEM STAMPED "DNA" OR "DOES NOT APPLY" IS HEREBY DELETED PRIOR TO THE EXECUTION OF THIS AGREEMENT WITH THE CONCURRENCE OF THE CONTRACTOR

INDEX OF SPECIFICATIONS AND STIPULATIONS


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GUIDE TO THE CODE OF ETHICS FOR CURRENT OR POTENTIAL STATE CONTRACTORS
NONCOLLUSION AFFIDAVIT

AGREEMENT NO. X.XX-XX(XX)
CORE I.D.# XXXXXXXXXXX

A G R E E M E N T

THIS AGREEMENT has been concluded at Newington, Connecticut, by and between the State of Connecticut, Department of Transportation, James Redeker, Commissioner, duly authorized, hereinafter referred to as ~~the "State" or~~ "CTDOT", and _____, a _____ authorized to do business in the State of Connecticut, having a principal place of business located at _____, acting herein by _(NAME) _____, ___(TITLE)____, hereunto duly authorized, hereinafter referred to as the "Contractor."

WITNESSETH, THAT,

WHEREAS, the State wishes to procure from a Ticket Vending Machine System ("TVMS") manufacturer or supplier ~~(hereafter, a "Contractor")~~ a TVMS for CT***fastrak,*** a bus rapid transit system that CTDOT is constructing and plans to operate in central Connecticut. This procurement includes design, manufacture, installation, maintenance, warranty and operation of the TVMS (herein after referred to as the "Project"), as required in the Scope of Work, a copy of which is attached hereto and made a part hereof~~,~~ as Schedule A, the ~~Request for Proposals ("RFP")~~RFP, and this Agreement and its attachments~~ thereto~~, and

WHEREAS, as part of its statewide bus system, CTDOT has the right to assign this Agreement to an operator or management company that will operate CT***fastrak*** as a part of that statewide system, and

WHEREAS, the State, pursuant to Sections 4-8, 13b-4.~~subsection (a) of Section~~ 13b-34(a) and 13b-36 of the General Statutes of Connecticut, as revised, is authorized to enter this Agreement and James Redeker, Commissioner of the Department of Transportation, has made the Express Finding as required by Section 13b-35 of the General Statutes of Connecticut, as revised.

~~NOW, THEREFORE, KNOW YE THAT:~~

Now therefore, in consideration of these presents, and for other good and valuable consideration, the receipt and sufficiency of which the parties acknowledge, the Contractor and CTDOT agree as follows~~NOW, THEREFORE, KNOW YE THAT~~:

DEFINITIONS

The following definitions shall apply to this Agreement:

- "Access Constraint" means availability of work locations, materials, or services provided by others.
- "Base System" means the TVMS as specified in the Scope of Work, and detailed in the Price Proposal Forms A through E.
- "Central Management System" ("CMS") means the system specified in the Scope of Work Section 4.
- "Change Order" is defined in Article 6.
- "Claims" means all actions, suits, claims, demands, investigations and proceedings of any kind, open, pending or threatened, whether mature, unmature, contingent, known or unknown, at law or in equity in any forum.
- "Confidential Information" shall mean any name, number or other information that may be used, alone or in conjunction with any other information, to identify a specific individual including, but not limited to, such individual's name, date of birth, mother's maiden name, motor vehicle

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operator's license number, Social Security number, employee identification number, employer or taxpayer identification number, alien registration number, government passport number, health insurance identification number, demand deposit account number, savings account number, credit card number, debit card number or unique biometric data such as fingerprint, voice print, retina or iris image, or other unique physical representation. Without limiting the foregoing, Confidential Information shall also include any information that CTDOT classifies as "confidential" or "restricted." Confidential Information shall not include information that may be lawfully obtained from publicly available sources or from federal, state, or local government records which are lawfully made available to the general public.

- "Confidential Information Breach" shall mean, generally, an instance where an unauthorized person or entity accesses Confidential Information in any manner, including but not limited to the following occurrences: (1) any Confidential Information that is not encrypted or protected is misplaced, lost, stolen or in any way compromised; (2) one or more third parties have had access to or taken control or possession of any Confidential Information that is not encrypted or protected without prior written authorization from the State; (3) the unauthorized acquisition of encrypted or protected Confidential Information together with the confidential process or key that is capable of compromising the integrity of the Confidential Information; or (4) if there is a substantial risk of identity theft or fraud to the client, the Contractor, the Department or State.
- "Contract Documents" means the executed documents comprising the TVMS contract between the State and the Contractor, including this Agreement, the Scope of Work, Price Proposal, and other documents referenced in the Table of Contents for this Agreement.
- "Contract Drawings" means the drawings provided as part of the Contract Documents.
- "Contractor Parties", or "Contractor Party" means a Contractor's members, directors, officers, shareholders, partners, managers, principal officers, representatives, agents, servants, consultants, employees, subcontractors, vendors, and subcontractors or any one of them or any other person or entity with whom the Contractor is in privity of oral or written contract and the Contractor intends for such other person or entity to perform under the Agreement in any capacity.
- ~~"CTDOT" means the State of Connecticut, Department of Transportation that operates fixed route public transit service, and that will operate the TVMS.~~
- "CT***fastrak***" means the bus rapid transit system operating in central Connecticut which will include the TVMS.
- "Engineer" as it is used in Form 816 shall be construed to mean "~~State~~CTDOT~~State~~".
- "Extra Work" means work, services, materials requested by the State from the Contractor that are not included in the Agreement.
- "Federal Transit Administration" or ~~(~~"FTA"~~)~~" means the division of the United States Department of Transportation (USDOT) that is funding a portion of CT***fastrak*** via a Full Funding Grant Agreement (FFGA). The FTA, via the FFGA, imposes requirements on CT***fastrak*** that are reflected in these Contract Document requirements.
- "Final Acceptance" means ~~the State's~~CTDOT's determination that the work under the Agreement is complete.
- "Form 816" means the CTDOT's Standard Specification for Roads, Bridges and Incidental Construction, available at http://www.ct.gov/dot/lib/dot/documents/dpublications/816/newver/_July13_Form_816.pdf, and is included in this Agreement in part, via specific

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references and inclusions.

- "Full Funding Grant Agreement" or ~~(~~"FFGA"~~)~~ means the contract between CTDOT and FTA to participate in the funding of the CTfastrak Project.
- "Liquidated Damages" means a dollar amount associated with Milestone schedule dates determined by ~~the State~~CTDOT to be representative of the losses the State will incur as a result of the Contractor's failure to complete a portion or all of the work specified in the Agreement within the time specified in the Agreement. Liquidated Damages are not construed as a penalty.
- "Lump Sum" is the contract value less the per month costs for monthly-invoiced services.
- "Milestone" means a required completion date for a portion or all of the Contractor's work as defined by the Agreement.
- "Notice to Proceed" or ~~(~~"NTP"~~")~~ means the State's written direction to the Contractor to start work on the Project pursuant to the terms and conditions of the Agreement.
- "Options" means Scope of Work elements that are not included in the Contractor's Base System;~~,~~ ~~optional elements as~~such Options are detailed in Price Proposal Form F.
- "PMO" means project management oversight, including a function performed by the FTA to assure conformance with the FTA's FFGA for the Project.
- "Price Proposal" means the portion of the Contractor's Proposal that specifies the price for the Base System and Options.
- ~~"Price Score" means the means the portion of the Total Score that represents the evaluation of a Proposer's Price Proposal evaluated in comparison with the lowest price received in accordance with the RFP evaluation criteria.~~
- "Project" means the design, manufacture, installation, maintenance, warranty, and operation of the TVMS.
- "Proposal" means the documents and materials provided by the Contractor in response to the State's Request for Proposals for this Agreement. The Contractor's Proposal will include, but not be limited to the Technical Proposal and Price Proposal specified in and required by the RFP. The State, in its sole discretion, may include the Contractor's Proposal in the Contract Documents.
- "Proposer" or "Proposers" means the Contractor providing a Proposal in response to the State's Request for Proposals for this Agreement.
- "RFP" means the State's Request for proposals for this Project.
- "Records" means all working papers and such other information and materials as may have been accumulated by the Contractor in performing the Agreement, including but not limited to, documents, data, plans, books, computations, drawings, specifications, notes, reports, records, estimates, summaries, memoranda and correspondence, kept or stored in any form.
- "Scope of Work" means the document, so named in the Table of Contents, attached hereto as Schedule A, that establishes specific requirements for this Agreement. ~~The Scope of Work may also be referenced as Technical Specifications.~~
- "Shop Drawings" means the drawings or sketches prepared by the Contractor for use in its manufacturing facility, assembly facility, or shop, to fabricate, assemble, and/or install parts of the TVMS, whether manufactured by it from raw materials or purchased from others in a ready-to-use condition.
- "SSMP" means the Safety and Security Management Plan, a document, so named in the Table of Contents, and included in this Agreement.
- "State" means the State of Connecticut, including the Department of Transportation ("Department" or "CTDOT"), and any office, department, board, council, commission, institution or other agency or entity of the State.
- "Technical Proposal" means the portion of the Proposal submitted in

response to the RFP that provides technical information on the proposed equipment and services.

- ~~"Technical Score" means the portion of the Total Score that represents the State's evaluation of the extent to which the Proposer meets the technical criteria, firm experience, and project team qualifications.~~
- ~~"Technical Specifications" means the Scope of Work.~~
- ~~"Total Score" means the value used in final evaluation of Proposals by the State. The Total Score is the combination of the Technical Score added to the Price Score.~~
- "TVMS" means the Ticket Vending Machine System ~~. CTDOT's new ticket vending machine system~~ to be deployed on the new bus rapid transit corridor known as CT***fastrak*** in accordance with this Agreement.

Additionally, any undefined, capitalized terms used in this Agreement shall have the meanings that are ascribed to them in the Scope of Work.

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~~THE CONTRACTOR AGREES:~~

ARTICLE 1. FEDERAL AND STATE CODES, STANDARDS AND GUIDELINES

~~That all~~All work required under the terms of this Agreement shall be performed in accordance with all applicable Federal and State codes, standards and guidelines including, but not limited to:

A. Federal Requirements: The Contractor agrees to comply with all applicable Federal Transit Administration Requirements, referred to in Appendix "A", attached hereto and hereby made a part of this Agreement.

B. Codes, standards and guidelines as specifically listed in the Scope of Work, Paragraph 1.7.

C. Department of Transportation P5800.5, 1990 Emergency Response Guidebook.

D. Federal Register - Volume 56 No. 173/Friday, September 6, 1991, Appendix A to part 37 - "Standards for Accessible Transportation Facilities", ADA Accessibility Guidelines for Buildings and Facilities" or latest revised edition.

In case of conflict between the State and Federal codes, standards and guidelines listed above, the more stringent guidelines will prevail as the minimum.

ARTICLE 2. CONTRACT TIME AND LIQUIDATED DAMAGES

To meet the Milestones stipulated in Table 1-1 below, ~~it is expected that~~ the Contractor ~~will be working~~shall work extended shifts and ~~using~~ use premium time simultaneously at multiple project locations~~,~~ and multiple station locations ~~, etc.~~ in order to complete the Project by the ~~specified~~ completion date~~.~~ specified in this Agreement. The ~~selected~~ Contractor shall ~~demonstrate to the State that they have~~employ and maintain the necessary labor force and equipment to meet the ~~allowable contract time~~deadlines set forth in this Agreement.

The Contractor ~~can expect that it will~~may be required ~~that~~ to perform temperature sensitive work ~~will be performed~~ during the winter months. ~~Therefore, preparations must be made by the~~ Contractor ~~to~~ shall protect this work from the cold and adverse conditions that the winter months may bring. There will be no additional compensation paid to the Contractor for this work but it shall be included in the general cost of the work.

~~The Contractor is hereby advised that this contract contains activities which have been deemed critical to the start of revenue operations for CT***fastrak***. In order to ensure that the program is completed on schedule, the State has established specific Milestones for completion of these critical activities.~~ Failure of the Contractor to complete ~~this~~ its work within the ~~specified~~ timeframes specified in the below Table 1-1 will result in the assessment against the Contractor of Liquidated Damages as described below. ~~Although the Contractor is responsible for developing its own phasing plan, the~~The Contractor shall comply with the following Milestones and access constraints:

**TABLE 1-1, PROJECT MILESTONES**

| # | Description | Date |
|---|---|---|
| | Notice to Proceed (estimated) | January 31, 2014 |
| Access Constraints Nos. 1 – 4 | Availability (not earlier than dates) of CT***fastrak*** stations for installation of TVMS: | |
| | ~~Contract 1 –~~ Downtown New Britain (New Britain) | March 26, 2014 |
| | ~~Contract 2 –~~ East Main St. (New Britain) and East Street (New Britain) | April 9, 2014<br>August 8, 2014 |
| | ~~Contract 3 –~~ Cedar St. (Newington), Newington Jct. (Newington), Elmwood (West Hartford), Flatbush Ave. (West Hartford), Kane St. (Hartford), Parkville (Hartford), Sigourney St. (Hartford) | April 1, 2014 |
| | ~~Contract 4 –~~ Union (Hartford) | |
| Access Constraint No. 5 | CT***fastrak*** downtown Hartford stations available for TVMS installation | August 8, 2014 |
| Milestone No. 1 | All inspection and testing complete, excluding the Revenue Service Acceptance Testing (RSAT) specified in Scope of Work, Section 8.7. | January 15, 2015 |
| Start of Revenue Service | CT***fastrak*** start of revenue service and start of Central Management System (CMS) hosting per Scope of Work | On or about February 1, 2015, subject to final determination by ~~State~~CTDOT |
| | Start of RSAT per Schedule A Scope of Work | Four (4) weeks after start of revenue service |
| Milestone No. 2 | TVMS Final Acceptance | June 1, 2015 |
| | Completion of hardware warranty | 1 Year after Final TVMS Acceptance |
| | Completion of software warranty | 2 Years after Final TVMS Acceptance |

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| | Completion of CMS services per Scope of Work, Section 4 | 60 months after start of revenue service |
| | Optional Services | To be determined by ~~State~~CTDOT pursuant to the Scope of Work |

**Milestone No. 1 – January 15, 2015**

Contractor shall complete all installation and testing per the Scope of Work, Section 8, excluding Section 8.7, Revenue Service Acceptance Testing (RSAT) and have ready for service the TVMS in advance of the CT***fastrak*** start of revenue service.

**Liquidated Damages for Late Completion of Milestone No. 1:** $8,500 per day for each day following January 15, 2015, with no maximum payment.

**Milestone No. 2 – June 1, 2015**

Contractor shall complete all work required on this Agreement for Final Acceptance. This work includes completion of all installation, testing and reporting as required in the Scope of Work. ~~The State's~~CTDOT's granting of Final TVMS Acceptance shall be subject to the terms defined in Section 8 of the Scope of Work, and shall be predicated on successful completion of all prerequisite dependent Milestones as described throughout the Scope of Work.

**Liquidated Damages for Late Completion of Milestone No. 2:** $1,000 per day for each day following June 1, 2015, $2,000 per day for each day following September 29, 2015, with no maximum payment.

**Liquidated Damages Terms and Conditions**

These Liquidated Damages provisions shall apply to all circumstances in which ~~the State~~CTDOT does not verify in writing that the pertinent Agreement work has been completed by the Milestone completion dates and maximum work durations listed above. If the Contractor does not complete the pertinent work on or before the applicable dates, ~~the State~~CTDOT will deduct from monies otherwise owed to the Contractor the pertinent ~~liquidated~~ Lliquidated Ddamages daily amount listed above for each calendar day that it takes the Contractor to complete said work beyond the Milestone date.

ARTICLE 3. CONTRACTOR RESPONSIBILITIES

~~To~~ Contractor shall perform ~~such~~ the services and obligations ~~, as~~ required ~~in~~ by this Agreement, including the Scope of Work and all other Schedules attached to and made a part of this Agreement.~~, and in accordance with the specifications and bid under which this Agreement was awarded. In addition, Schedule B entitled "Price Summary and Proposal Forms" Forms A through E and, if applicable, Form F, Schedule C entitled "Request for Proposals and Instructions to Bidders" and Schedule D entitled "Station ITS Plans, all attached hereto and made part hereof, are integral parts of this Agreement, except as amended specifically during negotiation~~.

The Contractor ~~agrees to~~shall design, manufacture, install, maintain, warrant, and manage operations of a TVMS for CT***fastrak*** in an efficient and satisfactory manner in accordance with relevant State of Connecticut standards, as may be amended, the provisions of this Agreement, and all applicable laws, rules and regulations. The Contractor shall pay for all permits, licenses and fees to the city or town in which the work is to be performed.

ARTICLE 4. PERSONNEL

~~That the State's selection of the Contractor for the performance of the RFP's Scope of Work is based in part upon a careful consideration of the qualifications and experience of Contractor's personnel, including subcontractors, and/or subconsultants who will participate in the Scope of Work. The names of key personnel and their areas of participation under this Agreement are set forth in the Proposal.~~ The Contractor shall be responsible for the performance of all of the work performed under this Agreement and shall utilize to the fullest extent

the specialized expertise and experience of the personnel listed in the Proposal.

~~The State~~CTDOT, at its discretion, shall have the right to demand the removal of any Contractor/subcontractor personnel by written notice. All personnel removed shall be suitably replaced in a timely fashion. The replacement personnel submitted for ~~State~~ CTDOT approval must possess expertise and experience that, in the opinion of ~~the State~~CTDOT, are equivalent to that which ~~should have been~~were being provided by the ~~originally listed~~removed person. ~~The State~~CTDOT must ~~shall~~ approve all replacement personnel prior to their beginning work. The Contractor however, shall replace neither the personnel listed in the Proposal, nor their replacements, without the prior written approval of ~~the State~~CTDOT, which ~~the State~~ CTDOT agrees~~,~~ will not be unduly withheld.

If the Contractor, through circumstances beyond its control, is unable to provide the services of the personnel listed in the Proposal, the Contractor shall be responsible for providing suitable other personnel for the performance of the particular items of work involved. The personnel submitted to CTDOT for approval ~~by the State,~~ must possess expertise and experience, which, in the opinion of the ~~State~~CTDOT, are equivalent to what would have been provided by the originally listed person~~.~~ in the Proposal (or any replacements previously approved by CTDOT).

The Contractor shall be responsible for any additional costs caused by the substitution of personnel. In no event shall any substitution of personnel result in an increase in compensation to be paid by the State or a modification to the project schedule.

ARTICLE 5. COMPLIANCE WITH LAWS

~~To be~~Contractor shall be and remain in ~~responsible for determining~~ full compliance with Federal, State and municipal laws, ordinances, rules, regulations and orders relative to the use, operation, and maintenance of the TVMS. The Contractor shall promptly notify the State of any violation of any such law, ordinance, rule, regulation or order which comes to the Contractor's attention, and take action to promptly remedy such violation.

ARTICLE 6. CHANGE ORDERS

A. ~~That the State~~CTDOT may, at any time, with written notice to the Contractor, request changes to the Agreement~~.~~ (any such request, a "Change Order"). Such changes shall not be unreasonably denied or delayed by the Contractor. Such changes may include, but are not be limited to, modifications or other changes required by new or amended State and/or Federal laws and regulations relating to functional requirements and processing procedures, or involving the correction of deficiencies. Prior to expiration of any warranty period, any changes required because the TVMS does not fully perform in accordance with this Agreement~~,~~ shall be made by the Contractor without charge to the State. Any investigation necessary to determine the source of the problem requiring the change shall be done by the Contractor at its sole cost and expense.

B. A ~~change order request~~Change Order may be issued only by ~~the State~~CTDOT and must be in writing. As soon as possible after the Contractor receives a written ~~change order request~~Change Order, but in no event later than fifteen (15) calendar days thereafter, the Contractor shall provide ~~the State~~CTDOT with a written statement confirming the change has no price impact on the Agreement or, if there is a price impact, the Contractor shall provide ~~the State~~CTDOT a written statement explaining the price increase or decrease involved in implementing the requested change.

C. No ~~change order~~Change Order with a price impact will be effective until the Contractor receives written confirmation from ~~the State~~CTDOT.

D. The following sections of Form 816 apply to ~~change orders~~Change Orders that occur prior to Milestone No. 2 - TVMS Final Acceptance:

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Article 1.04.02—Increased or Decreased Quantities of Minor Items, and Elimination of Minor Items
Article 1.04.03—Changes in Quantities and Significant Changes in the Character of Work
Article 1.04.04—Differing Site Conditions
Article 1.04.05—Extra Work
Article 1.08.08—Extension of Time

Article 1.09.03—Increased or Decreased Quantities
Article 1.09.04—Extra and Cost-Plus Work
Article 1.09.05—Eliminated Items

ARTICLE 7. PAYMENT TERMS

~~That the State~~CTDOT will make all payments to the Contractor upon presentation of an invoice acceptable to ~~the State~~CTDOT based on the payment schedule items listed in Table 2-1 - Schedule of Payments. All payments will be made in United States Dollars, with no adjustments for fluctuation of valuation of this currency. Work performed is eligible for payment only when: 1) schedule payment items are successfully completed in the sequential order listed in Table 2-1 - Schedule of Payments, and 2) the Contractor submits a valid invoice that can be approved for processing.

A. General

The Contractor agrees that under the provisions of this Agreement, as reimbursement for those actual, reasonable and necessary costs incurred by the Contractor, which are directly attributable or properly allocable to the Project, the Contractor may bill the State as defined herein. Payments will be made by ~~the State~~CTDOT within forty- five (45) days after receipt of properly prepared invoices submitted as specified herein. All payments shall be governed by the following:

1. For payment purposes only, ~~the State~~CTDOT will adjust the TVMS pricing on Table 2-1 - Schedule of Payments in accordance with any executed Options and Change Orders.
2. In no event shall the amount set forth in the invoices forwarded to ~~the State~~CTDOT exceed 100% of the cost incurred by the Contractor to the date of the invoice.
3. The Contractor shall provide written certification of completion at the time of each payment schedule item, certifying the successful completion of the item. Additionally, for payment approval by ~~the State~~CTDOT, all requests for payment must be in compliance with all requirements of the Contract Documents.
4. Documentation must be on file with the Contractor and forwarded, to ~~the State~~CTDOT, to support the Contractor's invoice costs. The Contractor's invoice ~~shall~~ will show a complete breakdown of the work components, CORE CT Contract Identification Number, and a completed Invoice Summary and Processing (ISP) form. In addition, the invoices must contain the level of detail as required by ~~the State~~CTDOT. All invoices must meet or exceed generally accepted accounting standards, and must be in a format suitable for ~~the State's~~CTDO''s audit requirements. ~~The State~~CTDOT shall promptly pay the Contractor for all valid, complete and correct invoices or items set forth in such invoices, which are not in dispute.
5. The Contractor shall maintain books and records as related to this Project in such a manner that supports each invoice based upon the actual costs incurred.
6. Incomplete or incorrect entries in such records will be grounds for disallowance by ~~the State~~CTDOT of any fees or expenses

based upon such entries. If an audit should disclose any invoices that were submitted by the Contractor, and paid, exceed 100% of the Contractor's actual costs, this excess shall be returned to the State.

7. If the TVMS does not meet all of the requirements set forth in the Scope of Work, ~~the State~~CTDOT may conditionally accept the TVMS and place it in revenue service pending receipt ~~of~~ from Contractor of furnished materials and/or labor necessary to effectuate corrective action.
8. If Options are accepted, the Contractor and ~~the State~~CTDOT will negotiate and agree upon mutually satisfactory payment terms in accordance with the provisions of this Agreement.

B. Invoice Rejection

An invoice, or portion thereof, submitted by the Contractor may be rejected by ~~the State~~CTDOT for any or all of the following reasons:

1. The amount invoiced is inconsistent with Table 2-1 - Schedule of Payments, herein.
2. The invoice is for performance of work under the Agreement that is in dispute or the Contractor has failed to otherwise comply with stated Agreement provisions.
3. The item or services presented in the invoice, have not been accepted, and/or completed to ~~the State's~~CTDOT's satisfaction.
4. The quantity of items delivered by the Contractor is less than the quantity ordered by ~~the State~~CTDOT.
5. The items or services delivered by the Contractor, and being invoiced, do not meet the quality requirements of this Agreement.
6. The Contractor has not submitted satisfactory documentation or other evidence required by ~~the State~~CTDOT for processing of invoices.

C. Schedule of Payments

Excluding payments associated with monthly-invoiced services (e.g., CMS and ~~State~~ CTDOT authorized Options), payments of the ~~contract~~ Agreement lump sum shall be made according to Table 2-1 below. The percentage for each payment schedule item shall be based on the total executed Agreement value, less the total contracted value of monthly-invoiced services. Completion of all Milestones shall be subject to ~~State~~ CTDOT approval, according to the terms stipulated in the Scope of Work.

**TABLE 2-1, SCHEDULE OF PAYMENTS**

| # | Payment Schedule Item | Payment Percentage of Lump Sum |
|---|---|---|
| 1 | Completion of Preliminary Design Review | 5% |
| 2 | Completion of Final Design Review | 5% |
| 3 | Completion of First Article Configuration Inspections | 11% |
| 4 | Completion of Factory Qualification Test | 20% |
| 5 | Commencement of CMS Hosting Services | 20% |
| 6 | Completion of Ticket Vending Machine Installation | 10% |
| 7 | Installation of all Support Systems | 2% |
| 8 | Delivery of all Spare Parts | 2% |
| 10 | Completion of all Training and Delivery of all Training Materials | 2% |
| 11 | Delivery of all Manuals and Documentation | 2% |
| 12 | Completion of Pilot Test | 2% |
| 13 | Completion of Revenue Service Acceptance Test | 5% |
| 14 | Final TVMS Acceptance | 10% |
| 15 | Completion of Hardware Warranty | 2% |
| 16 | Completion of Software Warranty | 2% |
| | TOTAL (Excluding payments associated with monthly-invoiced services (e.g., CMS and Proposal Options) | 100% |

Payments associated with monthly-invoiced services (e.g., CMS and ~~State~~ CTDOT authorized proposal options) will be made at the monthly amount specified in the Price Proposal Form for CMS and, if authorized by ~~the State~~CTDOT, any proposal options.

D. Basis of Payment

Basis for payment for all work and services described within the Agreement ~~between the State and the Contractor~~ shall be as follows:

1. For each payment, the Contractor will be required to provide a waiver and release of lien document for all work performed. In the event the Contractor has subcontracted any of the work, all subcontractors, prior to final payment, shall furnish the Contractor a valid waiver and release of lien document in a form acceptable to ~~the State~~CTDOT for all work performed or the equipment or material furnished by each subcontractor.
2. The acceptance by the Contractor of the final payment shall operate as and shall be a release of the State, and every member, agent, and employee thereof, from all claim and liability to the Contractor for anything done or furnished for, or relating to, the work, or for any act or neglect of the State or any person relating to or affecting the work.

E. Payment for Change Orders

The Contractor shall prepare invoice(s) for only executed valid ~~change order~~Change Order(s) that are eligible for payment. This eligibility is determined by either completion of the work or as defined per the ~~C~~Change Order documentation.

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~~ARTICLE 8. MAINTENANCE AND AUDIT OF RECORDS~~

~~To incorporate the entire Maintenance and Audit of Records article of this Agreement in all subcontractor agreements.~~

~~A. Cost Records: The Contractor shall maintain detailed cost and revenue records supporting hours incurred by job classifications, direct costs incurred for out-of-pocket expenses and revenue collected.~~

~~B. Audit and Inspection of Records: The Contractor shall permit the authorized representatives of the State, the U.S. Department of Transportation and the Comptroller General of the United States to inspect and audit all data and records of the Contractor relating to its performance under the Agreement until the expiration of three (3) years after final payment under this Agreement. At any time, the State reserves the right to conduct financial audits of any and all portions of the operation at its discretion. The Contractor shall fully cooperate and make available any and all requested documents necessary at the opinion of the State to conduct a full audit.~~

~~1. The Contractor further agrees to include in all its subcontracts hereunder a provision to the effect that the subcontractor agrees that the State, the U.S. Department of Transportation and the Comptroller General of the United States or any of their duly authorized representatives shall, until the expiration of three (3) years after final payment under the subcontract, have access to and the right to examine any directly pertinent books, documents, papers and records of such subcontractor involving transactions related to the subcontractor. The term "subcontract" as used in this clause excludes work not exceeding $2,500.~~

~~2. The periods of access and examination described above, for records which relate to (1) appeals for disputes, (2) litigation of the settlement of claims arising out of the performance of this Agreement, or (3) costs and expenses of this Agreement as to which exception has been taken by the State, the Comptroller General, or any of their duly authorized representatives, shall continue until such appeals, litigation, claims or exceptions have been disposed of.~~

~~C. Record Retention: The Contractor agrees that it shall preserve all of its records and accounts concerning the implementation of the Agreement including, but not limited to, any records, books, or other documents relative to charges, alleged breaches of agreement, settlement of claims, or any other matter involving the Contractor's or subcontractor's demand for compensation by the State for a period of not less than three (3) years from the date of the final payment under the Agreement. If any litigation, claim, or audit is started before the expiration of the three (3) year period, the records shall be retained until all litigations, claims, or audit findings involving the records have been resolved.~~

ARTICLE 9. COOPERATION

~~That should~~Should any claims, demands, suits or other legal proceedings be made or instituted by any person against the State in connection with this Agreement, the

Contractor shall give the State all pertinent information and reasonable assistance in defense or other disposition thereof. The terms of this paragraph shall not be construed as a waiver of sovereign immunity.

ARTICLE 10. REVIEW OF WORK

~~To~~ Contractor shall permit ~~the State~~CTDOT and/or the Federal Transit Administration or other Federal agencies to review at any time, all work performed under the terms of this Agreement at any stage of the work.

ARTICLE 11. RESPONSIBILITY FOR ACCURACY OF WORK

~~To assume~~Contractor assumes full responsibility for the accuracy of ~~all products/services of~~ its work produced under this Agreement, including any supplements thereto.

ARTICLE 12. RELATIONSHIP WITH OTHERS

~~To~~ Contractor shall cooperate fully with all representatives of all allied disciplines involved, including, but not necessarily limited to, other contractors, state personnel, municipalities, official visitors, National Passenger Railroad Corporation (Amtrak), public utility companies and others engaged in the construction and readiness of CT***fastrak*** and related projects; attend such meetings, discussions, hearings as may be requested from time to time by ~~the State~~CTDOT to effectuate this cooperation; and comply with all directives given by ~~the State~~CTDOT.

ARTICLE 13. INSURANCE FOR THE CONTRACTOR AND SUBCONTRACTOR(S)

~~That with respect to the operations performed by the Contractor under the terms of this Agreement, and also those performed for the Contractor by its subcontractor(s), the Contractor will be required~~The Contractor shall ~~to~~ carry, and shall ensure that its subcontractor(s) carry, for the duration of this Agreement, and any ~~supplements~~ extensions of this Agreement~~thereto~~, with the State being named as an additional insured party, for paragraphs A and B below, the following minimum insurance coverage at no direct cost to the State. In the event the Contractor secures excess/umbrella liability insurance to meet the minimum requirements specified in paragraphs A and/or B below, the State of Connecticut shall be named as an additional insured.

A. COMMERCIAL GENERAL LIABILITY –

The Contractor shall carry Commercial General Liability Insurance, including Contractual Liability Insurance, providing for a total limit of One Million Dollars($1,000,000) for all damages arising out of bodily injuries to or death of all persons in any one accident or occurrence, and for all damages arising out of injury to or destruction of property in any one accident or occurrence, and, subject to that limit per accident, a total (or aggregate) limit of Two Million Dollars ($2,000,000) for all damages arising out of bodily injuries to or death of all persons in all accidents or occurrences and out of injury to or destruction of property during the policy period.

B. AUTOMOBILE LIABILITY –

The operation of all motor vehicles, including those hired or borrowed, used in connection with the Agreement shall be covered by Automobile Liability Insurance providing for a total limit of One Million Dollars ($1,000,000) for all damages arising out of bodily injuries to or death of all persons in any one accident or occurrence, and for all damages arising out of injury to or destruction of property in any one accident or occurrence. In cases where an insurance policy shows an aggregate limit as part of the automobile liability coverage, the aggregate limit must be at least Two Million Dollars ($2,000,000).

C. RAILROAD PROTECTIVE LIABILITY –

When the Agreement involves work within fifty (50) feet of the railroad right-of-way or State-owned rail property, with respect to the operations performed by the Contractor and/or its subcontractor(s), the Contractor shall carry, and/or require each subcontractor to carry, Railroad Protective Liability insurance providing coverage of at least Two Million Dollars ($2,000,000) for each accident or occurrence resulting in damages from (1) bodily injury to or death of all persons and/or (2) injury to or destruction of property, and subject to that limit per accident or occurrence, an aggregate coverage of at least Six Million Dollars ($6,000,000) for all damages during the policy period, and with all entities falling within any of the following listed categories named as insured parties: (i) the owner of the railroad right-of-way, (ii) the owner of any railcar licensed or permitted to travel within that affected portion of railroad right-of-way, and (iii) the operator of any railcar licensed or permitted to travel within that affected portion of the railroad right-of-way, and with the State, if not falling within any of the above-listed categories, also named as an insured party. If such insurance is required, the Contractor shall obtain and submit evidence of the minimum coverage indicated above to ~~the State~~CTDOT prior to commencement of the rail related work and~~/or~~ activities and shall maintain coverage until the work and~~/or~~ activities ~~is/~~are accepted by ~~the State~~CTDOT.

D. WORKERS' COMPENSATION –

With respect to all operations the Contractor performs, and all those performed for the Contractor by its subcontractor(s), the Contractor shall carry, and shall ensure that its subcontractor(s) carry, Workers' Compensation Insurance and, as applicable, insurance required in accordance with the U.S. Longshore and Harbor Workers' Compensation Act, in accordance with the requirements of the laws of the State of Connecticut and the laws of the United States respectively.

E. BUILDER'S RISK –

The Contractor shall maintain comprehensive replacement cost builder's risk (completed value) insurance providing coverage for the entire work at the Project sites, including all fixtures, machinery and equipment, any heating, cooling and constituting a permanent part of the building and shall cover portions of work located away from the site, but intended for use at the site. If it is determined that all or a portion of the Project is located within an area designated as a Special Flood Hazard Area, the Contractor shall maintain flood insurance (no less than $10,000,000 sublimit). The State of Connecticut shall be named as Loss Payee.

In conjunction with the above, the Contractor agrees to furnish to ~~the State,~~CTDOT a Certificate of Insurance, on a form acceptable to ~~the State~~CTDOT, fully executed by an insurance company or companies satisfactory to ~~the State~~CTDOT, for the insurance policy or policies required hereinabove, which policy or policies shall be in accordance with the terms of said Certificate of Insurance.

The Contractor shall produce, within five (5) business days, a copy or copies of all applicable insurance policies requested by ~~the State~~CTDOT. In providing said policies, the Contractor may redact provisions of the policy that are proprietary. This provision shall survive the suspension, expiration or termination of this Agreement.

ARTICLE 14. BONDING REQUIREMENTS

~~That the State~~CTDOT ~~shall require~~requires the Contractor to obtain Performance and Payment Bonds for this Agreement. All bonds shall be reduced in the amount of the payments made to and by the Contractor at each of the payment Milestones. The values of the bonds provided for this Agreement are as follows:

Performance Bond - The Contractor shall obtain a performance bond in the amount of the Agreement.

Payment Bond ~~-~~ The Contractor shall obtain a~~A~~ Payment Bond shall ~~also be obtained~~ in an amount not less than the amount equal to the Agreement.

ARTICLE 15. INDEMNIFICATION

A. The Contractor shall indemnify, defend and hold harmless the State and its officers, representatives, agents, servants, employees, successors and assigns from and against any and all (1) Claims arising, directly or indirectly, in connection with the Agreement, including the acts of commission or omission (collectively, the "Acts") of the Contractor or Contractor Parties; and (2) liabilities, damages, losses, costs and expenses, including but not limited to, attorneys' and other professionals' fees, arising, directly or indirectly, in connection with Claims, Acts or the Agreement. The Contractor shall use counsel reasonably acceptable to the State in carrying out its obligations under this section. The Contractor’s obligations under this section to indemnify, defend and hold harmless against Claims includes Claims concerning confidentiality of any part of or all of the Contractor’s bid, proposal or any Records, any intellectual property rights, other proprietary rights of any person or entity, copyrighted or uncopyrighted compositions, secret processes, patented or unpatented inventions, articles or appliances furnished or used in the performance.

B. The Contractor shall not be responsible for indemnifying or holding the State harmless from any liability arising due to the negligence of the State or any third party acting under the direct control or supervision of the State of Connecticut.

C. The Contractor shall reimburse the State for any and all damages to the real or personal property of the State caused by the Acts of the Contractor or any Contractor Parties. The State shall give the Contractor reasonable notice of any such Claims.

D. The Contractor’s duties under this section shall remain fully in effect and binding in accordance with the Agreement, without being lessened or compromised in any way, even where the Contractor is alleged or is found to have merely contributed in part to the Acts giving rise to the Claims and/or where the State is alleged or is found to have contributed to the Acts giving rise to the Claims.

E. The Contractor shall carry and maintain at all times during the term of the Agreement, and during the time that any provisions survive the term of the Agreement, sufficient general liability insurance to satisfy its obligations under this Agreement. The Contractor shall name the State as an additional insured on the policy and shall provide a copy of the policy to CTDOT prior to the effective date of the Agreement. The Contractor shall not begin performance until the delivery of the policy to CTDOT. The State shall be entitled to recover under the insurance policy even if a body of competent jurisdiction determines that ~~the State~~CTDOT or the State ~~of Connecticut~~ is contributorily negligent.

F. This section shall survive the termination of the Agreement and shall not be limited by reason of any insurance coverage.

ARTICLE 16. NEGLIGENCE OR OMISSIONS OF THE CONTRACTOR OR SUBCONTRACTOR

~~That the~~The Contractor shall be responsible for paying any and all fines or damages associated with negligent acts or omissions of the Contractor, its employees, or subcontractors employed by the Contractor. The cost of all such fines and damages are not transferable to the State.

ARTICLE 17. COVENANT AGAINST CONTINGENT FEES

~~To warrant~~Contractor warrants that it has not employed or retained any company or person other than a bona fide employee working solely for the Contractor, to solicit or secure this Agreement, and that it has not paid or agreed to pay any company or person, other than bona fide employees working solely for the Contractor, any fee, commission, percentage, brokerage fee, gift, or any other consideration, contingent upon or resulting from the award or making of this Agreement. In the event of a breach or violation of the above stipulation, ~~the State~~CTDOT shall have the right to annul this Agreement without liability, or, in its discretion, to deduct from the agreed price or consideration, or otherwise recover, the full amount of such fee, commission, percentage, brokerage fee, gift, or contingent fee.

ARTICLE 18. ASSIGNMENT OR TRANSFER OF AGREEMENT

~~To~~ Contractor ~~warrant that it~~ shall not sublet, sell, transfer, assign, or otherwise dispose of the Agreement or any portion ~~thereof~~of it, or of the work provided for ~~therein~~in the Agreement, or of its right, title, or interest ~~therein~~in the Agreement, to any person, firm, partnership, or corporation without the written consent of ~~the State~~CTDOT. For breach or violation of the above stipulation, ~~the State~~CTDOT shall have the right to annul this Agreement without liability.

The Contractor shall not subcontract any portion of the work required for the completion of this Agreement without the prior written approval of ~~the State~~CTDOT. The form of any subcontract shall be as developed by the Contractor and must be approved by ~~the State~~CTDOT.

ARTICLE 19. SAFETY AND SECURITY

~~That the~~The Contractor assumes full responsibility for the safety and security of ~~their~~ its work. All work shall be performed in a manner that will ensure the safety of personnel and the work, and prevent safety hazards and exposure of personnel and equipment to hazardous or potentially hazardous conditions. All work performed in conjunction with the Project shall comply with the requirements of the Department of Labor, Occupational Safety and Health Administration (OSHA) provisions, as well as those of State and local regulations.

The Contractor shall take all steps necessary to protect public safety in and around all work areas and shall comply with all State rules and regulations including attending safety certification training. Prior to the start of revenue service on a daily basis, Contractor shall take provisions, including the following, ~~shall be taken~~ to ensure public safety. Proper signage and barricades shall be placed around all work areas to facilitate pedestrian flow and prevent personal injury. Floor surfaces shall be left in a sound and level condition, and all tripping hazards shall be eliminated. ~~Additional~~ Contractor shall take additional safety precautions ~~shall be taken~~ when, in the opinion of ~~the~~

~~State~~CTDOT, unsafe conditions exist.

Stations and other property where and when the Contractor or ~~their~~ its subcontractor(s) are engaged in Project activities shall be protected by the Contractor and/or ~~their~~ its subcontractor(s) at all times. Contractor~~s~~ shall not create any conditions which compromise security or allow unpaid use of State services.

The Contractor shall comply with all safety and security requirements associated with the CT***fastrak*** "Safety and Security Management Plan (SSMP)", a copy of the ~~most recent~~current version of which is attached hereto and made a part hereof~~,~~ as Schedule E. This document is reviewed and amended at regular intervals to appropriately address the site conditions of safety and security for the program. Contractor shall be responsible for complying with the most up-to-date version of the SSMP throughout the term of this Agreement.

ARTICLE 20. WARRANTY

~~That it hereby~~Contractor unconditionally warrants and guarantees to the State~~,~~ all TVMS components and systems. The Warranty shall include, but not be limited to, all software, equipment, designs, workmanship, installation, services, material, devices, apparatus, components, assemblies, parts, and operational spare parts furnished under this Agreement. The Contractor shall certify in writing that all materials and workmanship supplied under the Agreement are: 1) in compliance with the Agreement requirements, 2) fit for the intended purpose, as specified in the Agreement, and 3) free of defects.

The Contractor additionally ~~shall represent~~represents and ~~warrant~~warrants ~~in writing to the State that the Contractor has~~: 1) that the Contractor has reviewed and evaluated, or shall review and evaluate, all information furnished by the State whether in the Scope of Work, Contract Documents, design meetings, reviews ~~and~~ or testing, 2) that the Contractor has made or shall make all inquiries necessary such that Contractor is fully aware of the business requirements and intended uses of the TVMS as set forth or referenced in the Contract Documents, 3) that all work performed by the Contractor shall satisfy such requirements in all material respects, and, 4) that the Contractor is not aware of any material discrepancies among objectives as set forth in the Scope of Work.

The design and manufacture of the TVMS ~~shall~~ will reflect its intended use as defined in the Agreement. The TVMS ~~shall~~ will meet the standards of safety and reliability for the intended environment, as specified in the Agreement, and all applicable Federal, State and local design and construction codes, ordinances and standards.
The Contractor shall maintain objective evidence that the TVMS meets the contractual requirements, and document any areas where the contractual requirements are not met.

A. General
The Contractor ~~shall warrant to the State~~warrants that all of the TVMS equipment and software to be furnished under this Agreement ~~shall~~ will be free from defects in material and workmanship and meet the requirements of the Agreement.

B. Duration
All Contractor-supplied TVMS hardware and software ~~shall~~ will be warranted from TVMS Final Acceptance, which ~~shall~~ will be also be defined as the beginning of the "warranty count-down."

1. Software Warranty
For all Contractor-supplied TVMS software, the Contractor shall provide a warranty for a period of two (2) years after warranty count-down commences~~.~~ (the "Software Warranty").

The period from first TVMS delivery to the conclusion of the 2-year software warranty shall constitute the "Software Warranty Period."

All warranties supplied by the providers of software shall be conveyed to the State upon delivery.

2. Hardware Warranty

For TVMS e~~E~~quipment, the Contractor shall provide ~~such~~ a warranty for a period of two (2) years after warranty count-down commences~~.~~ (the "Hardware Warranty").

The period from first TVMS delivery to the conclusion of the ~~1~~2-year hardware warranty shall constitute the "Hardware Warranty Period."

C. Work To Be Performed Under Warranty

As described in the Scope of Work and as modified by any exercised O~~o~~ptions for hardware maintenance services, the Contractor shall perform the remedial work to correct any and all actual and reported deficiencies, which shall include the repair or replacement, at the Contractor's option, of equipment, components, devices, and/or materials, and the reprogram/update of software defects.

Unless ~~the State~~CTDOT exercises the Options for hardware maintenance services, ~~the State~~CTDOT shall be exclusively responsible for performing any remedial tasks identified in the Scope of Work. ~~The State~~CTDOT shall also manage and control the deployment of all software corrections and updates, and no software corrections or updates shall be deployed in the TVMS software without ~~the State's~~CTDOT's written authorization and prior verification in ~~the State's~~CTDOT's maintenance and test facility.

1. Software Warranty

During the Software Warranty Period, the Contractor shall provide the warranty services described in the Scope of Work.

Software Corrections

Failure of the Contractor to provide effective software corrections in the allotted time may result in reductions to the final Software Warranty close-out payment as defined below. Such reduced payments shall be at the sole discretion of ~~the State~~CTDOT. The penalties provided for herein shall be ~~the State's~~CTDOT's sole remedy for the Contractor's failure to meet the stated w~~W~~arranty response times.

Late Resolution Penalties defined below shall apply only to software defects identified after commencement of the Software Warranty count-down. The Contractor shall resolve software defects identified prior to the Software Warranty count-down.

For critical and urgent defects, if a workaround is delivered on time, or if late penalties were assessed for a late workaround, no further penalties shall be assessed for late delivery of a permanent solution; nonetheless, the Contractor shall make all reasonable efforts to provide permanent solutions according to ~~the agreed-upon schedule.~~a schedule agreed upon by CTDOT.

| Defect Severity | Resolution Due | Late Resolution Penalty |
|---|---|---|
| 1 – Critical | As defined in the Scope of Work | $250 per hour<br>$10,000 cap per incident |
| 2 – Urgent | As defined in the Scope of Work | $500 per day<br>$2,500 cap per incident |
| 3 – Important | As defined in the Scope of Work | $50 per day<br>$1,000 cap per incident |
| 4 – Low | As defined in the Scope of Work | No Late Resolution Penalties apply<br><br>$500 withholding per unresolved incident as per Paragraph F.1 below |

The Contractor's obligations for software updates during the Software Warranty Period are defined in the Scope of Work.

2. Hardware Warranty

During the Hardware Warranty Period, all shipping costs shall be billed directly from the shipping company to the Contractor. For those items the Contractor deems fragile, the Contractor shall supply shipping containers in sufficient quantity to support anticipated need.

The Hardware Warranty ~~shall~~ will cover all parts and Contractor labor associated with the factory repair or replacement of the equipment during the Hardware Warranty Period.

For each defective TVMS component returned to the Contractor's facility, the Contractor shall, at its discretion, repair or replace the defective component and return the functioning unit to the State within an average of 30 calendar days, not to exceed 45 calendar days of receipt of the defective component.

Hardware items repaired or replaced under warranty shall be warrantied against further failures and defects for a period of 90 calendar days or the remaining Hardware Warranty Period, whichever is longer.

D. Warranty Exceptions

The Warranty shall not apply to any equipment which has been damaged through accident or negligence, or which has been subjected to other than normal use, or modified by ~~the State~~CTDOT without the Contractor's prior written approval. For purposes of this Warranty, normal use shall mean conditions prevalent in the State's vehicles and on the State's rail platforms. Temperature, humidity, solar heating, precipitation (for outdoor equipment), vehicle vibration (for on-board equipment), routine cleaning activities, routine snow-removal methods (for outdoor equipment), and all other ambient conditions present in the central Connecticut region shall be considered normal operating conditions for this equipment.

E. Items Not Covered

The Warranty shall not cover the replacement of consumable parts nor items which are replaced in a usual and scheduled preventative maintenance program such as light bulbs, or items which are subject to normal wear and tear as a result normal use.

F. Unresolved Warrantable Items Remaining at Conclusion of Warranty Periods

All warrantable defects that remain unresolved upon the expiration of the Software Warranty Period and/or the Hardware Warranty Period, as applicable, shall be subject to the following resolution criteria:

1. Unresolved Warrantable Software Defects

The final Software Warranty payment, as stipulated in Article 7, may, at ~~the State's~~CTDOT's discretion, be reduced by a value representing the sum of the maximum late resolution penalties or withholding amounts of all unresolved warrantable software defects. As the unresolved software defects are corrected and verified by ~~the State~~CTDOT, the withheld values shall be paid; such payments may, at ~~the State's~~CTDOT's discretion, be reduced by any applicable late resolution penalties.

2. Unresolved Warrantable Hardware Defects

The final Hardware Warranty payment, as stipulated in Article 7, may, at ~~the State's~~CTDOT's discretion, be reduced by a value representing the sum of the value of all warrantable hardware items that are pending repair or replacement. These values shall be based on the relevant prices included on the TVMS pricing forms. As hardware items are repaired or replaced, ~~the State~~CTDOT shall pay the withheld amount upon satisfactory conclusion of the 90-day warranty for repaired / returned parts.

ARTICLE 21. SPARE PARTS FOR STATE INVENTORY

The Contractor shall guarantee that all parts and modules ~~shall~~ will be made available in the latest configuration of such parts and modules for a period of ten (10) years after completion of the w~~W~~arranty for a price equivalent to the negotiated contract price indexed to the United States Producer Price Index (PPI) published in the Wall Street Journal the month prior to the issuance of a purchase order for such parts.

ARTICLE 22. CONTROL OF THE WORK AND CLAIMS (from FORM 816)

The following sections of Form 816 apply to this Agreement and capitalized terms referenced in such sections have the definitions ascribed to them in Form 816. In the event of any conflict between the following sections of Form 816 and any other provision of the Agreement, the more stringent term or terms will govern, with preference given, otherwise, to the following sections of Form 816:

SECTION 1.05 CONTROL OF THE WORK
1.05.01—Authority of Engineer
1.05.02—Plans, Working Drawings and Shop Drawings
1.05.03—Conformity with Plans and Specifications
1.05.05—Cooperation by Contractor
1.05.06—Cooperation with Utilities (Including Railroads)
1.05.07—Coordination with Work by Other Parties
1.05.08—Schedules and Reports
1.05.09—Authority of Inspectors
1.05.10—Inspection
1.05.11—Removal of Defective or Unauthorized Work
1.05.12—Payrolls
1.05.13—Examining and Copying Contractor's Records
1.05.15—Markings for Underground Facilities
1.05.16—Dimensions and Measurements

SECTION 1.11 CLAIMS
1.11.01—General
1.11.02—Notice of Claim
1.11.03—Record Keeping
1.11.04—Claim Compensation
1.11.05—Required Claim Documentation
1.11.06—Auditing of Claims

ARTICLE 23. ~~ENCRYPTION OF DATA; BREACH OF SECURITY OR LOSS~~INTENTIONALLY OMITTED

~~A. Agree that the Contractor and Contractor Parties, at their own expense, shall encrypt any and all data which they come to possess or control, wherever and however stored or maintained, and which data Department of Administrative Services, Bureau of Enterprise Systems and Technology (DAS-BEST) or a Department, at any time, classifies as confidential or restricted. The Contractor and Contractor Parties shall encrypt the data in accordance with the Connecticut Enterprise Architecture – Technology Architecture (CTEA-TA) protocols. The Contractor and Contractor Parties shall have a continuing obligation always to keep and maintain the data encryption consistent with CTEA-TA, as CTEA-TA may change from time to time.~~

~~B. The Contractor and Contractor Parties shall notify DAS-BEST, the State and the Connecticut Office of the Attorney General as soon as practical, but no later than twenty-four (24) hours, after they become aware of or suspect that any and all data which the Contractor has come to possess or control under Section A above has been subject to a "data breach." For purposes of this Section, a "data breach" is an occurrence where (1) any or all of the data is misplaced, lost, stolen or in any way compromised; or (2) one or more third parties have had access to or taken control or possession of any or all of the data without prior written authorization from DAS-BEST or the State.~~

~~C. In addition to the notification requirements of Section B, should a data breach occur, the Contractor shall, within three (3) business days after the notification, present to DAS-BEST, the State, and the Connecticut Office of the Attorney General, for review and approval, a credit monitoring or protection plan that the Contractor shall make available at its own cost and expense to all individuals affected by the data breach. Unless otherwise agreed to in writing by the Connecticut Office of the Attorney General, such a plan shall be offered to each such individual free of charge and shall consist of, at a minimum, the following:~~

~~1. Reimbursement for the cost of placing and lifting one (1) security freeze per credit file pursuant to Connecticut General Statutes § 36a-701a;~~

~~2. Credit monitoring services consisting of automatic daily monitoring of at least three (3) relevant credit bureau reports;~~

~~3. Fraud resolution services, including writing dispute letters, initiating fraud alerts and security freezes, to assist affected individuals to bring matters to resolution; and~~

~~4. Identity theft insurance with at least $25,000 coverage.~~

~~Such credit monitoring or protection plans shall cover a length of time commensurate with circumstances of the data breach, but under no circumstances shall the Contractor's credit monitoring or protection~~

~~plan be for less than two (2) calendar years from the plan start date. The Contractors' costs and expenses for the credit monitoring or protection plan shall not be recoverable from DAS-BEST, the State or any State of Connecticut entity.~~

~~D. The Contractor represents and warrants that it shall obligate each Contractor Party in a written contract to all of the terms of this Section just as if each Contractor Party had executed this Agreement as an original signatory and each were bound by this Section to the same extent that the Contractor is bound.~~

~~E. The Contractor's or Contractor Parties' failure to encrypt the data, provide notice, or to provide the credit monitoring or protection plan shall be deemed to be, without more, a material breach of this Agreement. The Contractor shall be responsible for any Contractor Parties breach as if the Contractor itself had breached the Agreement. Consequently, and without otherwise limiting the rights of DAS-BEST or the Department at law or in equity, the Contractor shall indemnify and hold harmless DAS-BEST, the Department and the State, as appropriate, for any and all damages, costs and expenses associated directly or indirectly with the Contractor's or Contractor Parties' breach. The damages, costs and expenses shall include, but not be limited to, those resulting from any corresponding contracting for credit or identity protection services, or both, and from any subsequent non-State use of any data.~~

~~THE STATE SHALL:~~

ARTICLE 24. DETERMINATION OF EXTRA WORK

~~Consider~~ CTDOT shall consider as Extra Work that work which the Contractor is directed to perform beyond the scope and character of this Agreement. Upon presentation by the Contractor of a request for payment for such work, the request shall be evaluated by ~~the State~~CTDOT and, if found valid, ~~the State~~CTDOT shall authorize payment therefore. In the event the Contractor requests payment for Extra Work which ~~the State~~CTDOT determines is without basis or foundation, ~~the State~~CTDOT may reject such request. The decision of ~~the State~~CTDOT on the request for payment of Extra Work shall be final and binding.

ARTICLE 25. PROGRESS PAYMENTS

~~Pay~~ CTDOT shall pay the Contractor for work performed in accordance with the terms specified ~~herein~~in this Agreement. Contractor requests for payment may be submitted not more frequently than monthly in accordance with the payment schedule and shall be made on forms furnished by ~~the State~~CTDOT in accordance with the then current format of the State.

ARTICLE 26. CONTRACT ASSIGNMENT

This contract is assignable by ~~the State~~CTDOT at any time for the duration of the Project as identified in the Scope of Work and the Agreement.

~~THE STATE AND THE CONTRACTOR FURTHER MUTUALLY AGREE:~~

ARTICLE 27. OWNERSHIP OF DOCUMENTS AND RIGHTS IN DATA

~~That the~~The Contractor warrants that the processes, design, equipment, materials, or devices used in providing the services shall be delivered free of any rightful claim of any third party for infringement of any patent, copyright, or other intellectual property or proprietary right. If a suit or proceeding based on a claimed infringement of a patent or copyright is brought against the State the Contractor shall, at its own expense, defend or settle any such suit or proceeding if authorized to do so in writing by ~~the State~~CTDOT, and indemnify and hold harmless ~~the State~~CTDOT, its subsidiaries, agents, and employees from all liability, reasonable damages, costs, and expenses associated therewith, including, without limitation, defense costs and attorney fees.

All documents, materials, procedures, and processes prepared and/or developed by the Contractor, its subcontractors and/or subconsultants pursuant to this Agreement shall become the intellectual property of the State. All documents, materials, procedures, and processes prepared and/or developed by the Contractor, its subcontractors and/or subconsultants shall be provided to ~~the State~~CTDOT ~~at any time during the term of this agreement~~. Original copies, including any electronic media of such shall be delivered to ~~the State~~CTDOT upon completion of the services or termination of the services. With ~~the State's~~CTDOT's concurrence, the Contractor shall be permitted to retain copies of such documents, materials, procedures, and processes prepared and/or developed by the Contractor, its subcontractors and/or subconsultants for the Contractor to further its general technical proficiency; however, publication and/or use of this material is subject to the terms and conditions of this agreement.

No material or technical data prepared by the Contractor under this Agreement is to be released to or used by any other person except as necessary for the performance of the contracted services. All press releases or information to be published in print or electronic media shall be distributed only after the Contractor has first received in writing, authorization from ~~the State~~CTDOT.

Except for the Contractor's pre-existing proprietary software, ~~the State~~CTDOT shall have the right to use, duplicate, modify, or disclose the technical data and the information conveyed therein, in whole or in part, in any manner whatsoever, and to have or permit others within the State to do so. Except for the Contractor's pre-existing proprietary software, the Contractor ~~shall agree to grant~~grants to the State and to its officers, agents, and employees acting within the scope of their official duties, a royalty-free license to publish, translate, reproduce, deliver, and use as they deem fit all technical data supplied for this Agreement covered by copyright. No such copyrighted matter shall be included in the technical data furnished hereunder without the written permission of the copyright owner for the State to use in the manner herein described.

ARTICLE 28. REVISIONS IN ORGANIZATION

~~That the~~The Contractor shall notify the State in writing when there is a change in its Connecticut Certificate of Registration with the Connecticut Secretary of State's Office, or a change in the individual(s) in charge of the work specified herein. Neither change shall relieve the Contractor of any responsibility for the accuracy and completeness of all services and products of the work under this Agreement, including any supplements thereto.

ARTICLE 29. BREACH

A. ~~That if~~If either party breaches the Agreement in any respect, the non-breaching party shall provide written notice of the breach to the breaching party by overnight or certified mail, return receipt requested, to the most current address the breaching party has furnished for the purposes of correspondence and afford the breaching party an opportunity to cure such breach within thirty (30) days from the date that the breaching party receives the notice. In the case of a Contractor breach, ~~the State~~CTDOT may set forth any period

greater or less than thirty (30) days, so long as such time period is otherwise consistent with the provisions of this Agreement (for the purposes of this paragraph, the time period set forth by the non-breaching party shall be referred to as the "right to cure period"). The right to cure period shall be extended if the non-breaching party is satisfied that the breaching party is making a good faith effort to cure, but the nature of the breach is such that it cannot be cured within the right to cure period.

B. In the event of a breach, ~~the State~~CTDOT may require the Contractor to prepare and submit to ~~the State~~CTDOT a corrective action plan in connection with an identified breach. The corrective action plan ~~shall~~ will provide a detailed explanation of the reasons for the cited deficiency, the Contractor's assessment or diagnosis of the cause, and a specific proposal to cure or resolve the deficiency. The Contractor shall submit the corrective action plan within ten (10) business days following the request for the plan by ~~the State~~CTDOT and is subject to approval by ~~the State~~CTDOT, which approval shall not unreasonably be withheld. Notwithstanding the submission and acceptance of a corrective action plan, the Contractor remains responsible for achieving all performance criteria as identified in the Scope of Work. The acceptance of a corrective action plan shall not excuse prior substandard performance, relieve the Contractor of its duty to comply with performance standards, or prohibit ~~the State~~CTDOT from pursuing additional remedies or other approaches to correct substandard performance.

C. The written notice of the breach may include an effective termination date. If the identified breach is not cured by the stated termination date, unless otherwise modified by the non-breaching party in writing prior to such date, no further action shall be required of any party to effect the termination as of the stated date. If the notice does not set forth an effective termination date, the non-breaching party shall be required to provide the breaching party no less than twenty-four (24) hours written notice prior to terminating the Agreement, such notice to be provided in accordance with Article 33 hereof.

D. If ~~the State~~CTDOT reasonably and in good faith determines the Contractor has not performed in accordance with the Agreement, ~~the State~~CTDOT may withhold payment in whole or in part in an amount reasonably related to the non-performance pending resolution of the performance issue, provided that ~~the State~~CTDOT notifies the Contractor in writing prior to the date that the payment would have been due.

E. Notwithstanding any provisions in this Agreement, ~~the State~~CTDOT may terminate this Agreement with no right to cure period for the Contractor's breach or violation of any of the provisions in the section concerning representations and warranties and revoke any consent to assignments given as if the assignments had never been requested or consented to, without liability to the Contractor or Contractor Parties or any third party.

F. Termination under this Breach section is subject to the provisions of the Termination section in this Agreement.

ARTICLE 30. TERMINATION

A. Notwithstanding any provisions in this Agreement, ~~the State~~CTDOT, through a duly authorized employee, may terminate the Agreement whenever ~~the State~~CTDOT makes a written determination that such termination is in the best interests of the State. ~~The State~~CTDOT

shall notify the Contractor in writing of termination pursuant to this section, which notice shall specify the effective date of termination and the extent to which the Contractor must complete its performance under the Agreement prior to such date.

B. Notwithstanding any provisions in this Agreement, ~~the State~~CTDOT, through a duly authorized employee, may, after making a written determination that the Contractor has breached the Agreement, terminate the Agreement in accordance with the provisions in the Breach section of this Agreement.

C. ~~The State~~CTDOT shall send the notice of termination via certified mail, return receipt requested, to the Contractor at the most current address which the Contractor has furnished to ~~the State~~CTDOT for purposes of correspondence, or by hand delivery. Upon receiving the notice from ~~the State~~CTDOT, the Contractor shall immediately discontinue all services affected in accordance with the notice, undertake commercially reasonable efforts to mitigate any losses or damages and deliver to ~~the State~~CTDOT all Records. The Records are deemed to be the property of ~~the State~~CTDOT and the Contractor shall deliver them to ~~the State~~CTDOT no later than thirty (30) days after the termination of the Agreement or fifteen (15) days after the Contractor receives a written request from ~~the State~~CTDOT for the Records. The Contractor shall deliver those Records that exist in electronic, magnetic or other intangible form in a non-proprietary format, such as, but not limited to, ASCII or .TXT. ~~Such transfer of Records shall not transfer ownership of intellectual property contained in such Records.~~

D. Upon receipt of a written notice of termination from ~~the State~~CTDOT, the Contractor shall cease operations as ~~the State~~CTDOT directs in the notice, and take all actions that are necessary or appropriate, or that ~~the State~~CTDOT may reasonably direct, for the protection, and preservation of the goods and any other property. Except for any work which ~~the State~~CTDOT directs the Contractor to perform in the notice prior to the effective date of termination, and except as otherwise provided in the notice, the Contractor shall terminate or conclude all existing subcontracts and purchase orders and shall not enter into any further subcontracts, purchase orders or commitments.

E. ~~The State~~CTDOT shall, within forty-five (45) days of the effective date of termination, reimburse the Contractor for its work rendered and accepted by ~~the State~~CTDOT or for any goods delivered by the Contractor, in addition to all reasonable actual costs incurred after termination in completing those portions of the work which the notice required the Contractor to complete. However, the Contractor is not entitled to receive and ~~the State~~CTDOT is not obligated to tender to the Contractor any payments for anticipated or lost profits or loss of overhead. Upon request by ~~the State~~CTDOT, the Contractor shall assign to ~~the State~~CTDOT, or any replacement contractor which ~~the State~~CTDOT designates, all subcontracts, purchase orders, and other commitments, deliver to CTDOT all Records and other information pertaining to its ~~work~~performance, and remove from State premises, whether leased or owned, all of the Contractor's property, equipment, waste material and rubbish related to its work, all as ~~the State~~CTDOT may request.

F. Materials obtained by the Contractor for the Project, if they have been inspected, tested as required, and accepted by ~~the State~~CTDOT, but have not been incorporated into the Project construction, shall, if ~~the State~~CTDOT and the Contractor so agree, be purchased by ~~the State~~CTDOT from the Contractor at their actual cost shown on

receipted bills. To this cost shall be added all actual costs for delivery at such points of delivery as may be designed by the State, as shown by actual cost records. If ~~the State~~CTDOT does not agree to purchase such materials, ~~the State~~CTDOT shall reimburse the Contractor for any reasonable restocking fees and handling costs incurred by the Contractor in returning said materials to the vendor.

G. For breach or violation of any of the provisions in the section concerning representations and warranties, ~~the State~~CTDOT may terminate the Agreement in accordance with its terms and revoke any consents to assignments given as if the assignments had never been requested or consented to, without liability to the Contractor or Contractor Parties or any third party.

H. Upon termination of the Agreement, all rights and obligations shall be null and void, so that no party shall have any further rights or obligations to any other party, except with respect to the sections which survive termination. All representations, warranties, agreements and rights of the parties under the Agreement shall survive such termination to the extent not otherwise limited in the Agreement and without each one of them having to be specifically mentioned in the Agreement.

I. Termination of the Agreement pursuant to this section shall not be deemed to be a breach of the Agreement by ~~the State.~~CTDOT or the State.

J. Termination of the Contract shall not relieve the Contractor of its responsibilities for the completed Project, nor shall it relieve the Contractor's surety of its obligation concerning any claims arising out of the work performed, until the requirements of this section and Form 816 Article 1.08.13 have been met.

ARTICLE 31. CONFLICTS BETWEEN DOCUMENTS AND AGREEMENT

~~That in~~In case of conflict between the terms of this Agreement and the terms or requirements of documents mentioned herein, the more stringent requirement, as determined by the State, shall govern.

ARTICLE 32. CONNECTICUT REQUIRED CONTRACT/AGREEMENT PROVISIONS - SPECIFIC EQUAL EMPLOYMENT OPPORTUNITY RESPONSIBILITIES

~~That the~~ Contractor hereby acknowledges and agrees to comply with the Connecticut Required Contract/Agreement Provisions entitled "Specific Equal Employment Opportunity Responsibilities", dated March 3, 2009, as may be amended from time to time, a copy of which is attached hereto and made a part hereof as Schedule F.

ARTICLE 33. NOTICE BETWEEN PARTIES TO AGREEMENT

~~That any~~Any "Official Notice" from one such party to the other such party (or parties), in order for such Notice to be binding thereon, shall:

A. Be in writing (hardcopy) addressed to:

1. When ~~the State~~CTDOT is to receive such Notice -

Commissioner of Transportation
Connecticut Department of Transportation,

2800 Berlin Turnpike
P.O. Box 317546,
Newington, Connecticut 06131-7546;

2. When the Contractor is to receive such Notice-

TBD

B. Be delivered in person with acknowledgement of receipt or be mailed by the United States Postal Service - "Certified Mail" to the address recited herein as being the address of the party(ies) to receive such Notice; and

C. Contain complete and accurate information in sufficient detail to properly and adequately identify and describe the subject matter thereof.

The term "Official Notice" as used herein, shall be construed to include, but not be limited to, any request, demand, authorization, direction, waiver, and/or consent of the party(ies) as well as any document(s), including any electronically - produced versions, provided, permitted, or required for the making or ratification of any change, revision, addition to or deletion from the document, contract, or agreement in which this "Official Notice" specification is contained.

Further, it is understood and agreed that nothing hereinabove contained shall preclude the parties hereto from subsequently agreeing, in writing, to designate alternate persons (by name, title, and affiliation) to which such Notice(s) is (are) to be addressed; alternate means of conveying such Notice(s) to the particular party(ies); and/or alternate locations to which the delivery of such Notice(s) is (are) to be made, provided such subsequent agreement(s) is (are) concluded pursuant to the adherence to this specification.

ARTICLE 34. PROMPT PAYMENT TO SUBCONTRACTOR(S) AND RELEASE OF RETAINAGE

~~That the~~ Contractor hereby acknowledges and agrees to comply with the policies enumerated in “Commissioner's Letter dated October 26, 1988 Re: Prompt Payment to Subcontractor(s)”, a copy of which is attached hereto and made a part hereof as Schedule G.

The Contractor shall pay the subcontractor for work performed within thirty (30) days after the Contractor receives payment for the work performed by the subcontractor. Also, any retained monies regarding a subcontractor's work shall be paid to the subcontractor within thirty (30) days after satisfactory completion of all the subcontractor's work.

For the purpose of this Article, satisfactory completion shall have been accomplished when:

- The subcontractor has fulfilled the contract requirements of both the State and the subcontract for the subcontracted work, including the submission of all submittals and audit requirements stipulated in this Agreement, when applicable, and

- The work done by the subcontractor has been reviewed and accepted by the Contractor and final approval of the subcontractor's work has been determined and agreed upon.

If the Contractor determines that a subcontractor's work is not complete, the Contractor shall notify the subcontractor and ~~the State~~CTDOT, in writing, of the reasons why the subcontractor's work is not complete. This written notification shall be provided to the subcontractor and ~~the State~~CTDOT within twenty-one (21) days of the subcontractor's completion of work.

The above requirements are also applicable to all sub-tier subcontractors and the above provisions shall be made a part of all subcontract agreements.

Failure of the Contractor to comply with the provisions of this Article will be considered when opportunities for similar work arise in the future.

ARTICLE 35. CONNECTICUT DEPARTMENT OF TRANSPORTATION SUBCONSULTANT PAYMENT LOG

~~That the~~ Contractor understands and agrees that if requested, a "Connecticut Department of Transportation Subconsultant Payment Log" Form shall be completed quarterly (January, April, July, and October) and furnished to ~~the State~~CTDOT for each subcontractor the Contractor utilizes under this Agreement. Instructions for completing and processing this form are stipulated on its reverse side. A copy of said form is attached hereto and made a part hereof as Schedule H. (~~Note:~~ All references to "Subconsultant" or "subconsultant" appearing in the "Subconsultant Payment Log" attached to and made a part of said Commissioner's Letter shall be construed to mean "Subcontractor" or "subcontractor.")

ARTICLE 36. ETHICS SUMMARY

~~That pursuant~~Pursuant to the requirements of Section 1-101qq of the Connecticut General Statutes, the summary of State ethics laws developed by the State Ethics Commission pursuant to section 1-81b of the Connecticut General Statutes is incorporated by reference into and made a part of the Agreement as if the summary had been fully set forth in the Agreement.

ARTICLE 37. CODE OF ETHICS FOR PUBLIC OFFICIALS AND LOBBYISTS

~~That the~~The Contractor hereby acknowledges and agrees to comply with the policies enumerated in "Connecticut Department of Transportation Policy Statement No. F&A-10 Subject: Code of Ethics Policy", June 1, 2007, a copy of which is attached hereto and made part hereof as Schedule I. The Contractor is also required to complete the "Certification Regarding Lobbying", a copy of which is attached hereto and made part hereof as Schedule M.~~.~~

The Contractor shall comply with the provisions contained in Section 1-86e of the Connecticut General Statutes, which provides as follows:

(a) No person hired by the state as a consultant or independent contractor shall:

(1) Use the authority provided to the person under the contract, or any confidential information acquired in the performance of the contract, to obtain financial gain for the person, an employee of the person or a member of the immediate family of any such person or employee;

(2) Accept another state contract which would impair the independent judgment of the person in the performance of the existing contract; or

(3) Accept anything of value based on an understanding that the actions of the person on behalf of the state would be influenced.

(b) No person shall give anything of value to a person hired by the state as a consultant or independent contractor based on an understanding that the actions of the consultant or independent contractor on behalf of the state would be influenced.

ARTICLE 38. CORE AGREEMENT/CONTRACT PURCHASE ORDER

~~That this~~This Agreement itself is not an authorization for the Contractor to provide goods or begin performance in any way. The Contractor may provide goods or begin performance only after it has received a duly issued purchase order against the Agreement. A Contractor providing goods or commencing performance without a duly issued purchase order in accordance with this section does so at the Contractor's own risk.

~~The State~~CTDOT shall issue a purchase order against the Agreement directly to the Contractor and to no other party.

ARTICLE 39. PAYMENT OF RECOVERABLE COSTS DUE THE STATE

~~That the State~~CTDOT shall have the right to set-off against amounts otherwise due the Contractor under this Agreement or under any other agreement or arrangement that the Contractor has with the State (a) any costs that the State incurs which are due to the Contractor's non-compliance with this Agreement and (b) any other amounts that are due and payable from the Contractor to the State. Any sum taken in set-off from the Contractor shall be deemed to have been paid to the Contractor for purposes of the Contractor's payment obligations under Connecticut General Statute Section 49-41c.

ARTICLE 40. EXECUTIVE ORDERS

That this Agreement is subject to the provisions of Executive Order No. Three of Governor Thomas J. Meskill, promulgated June 16, 1971, concerning labor employment

practices, Executive Order No. Seventeen of Governor Thomas J. Meskill, promulgated February 15, 1973, concerning the listing of employment openings, and Executive Order No. Sixteen of Governor John G. Rowland, promulgated August 4, 1999, concerning violence in the workplace, all of which are incorporated into and are made a part of the Agreement as if they had been fully set forth in it. The Agreement may also be subject to the applicable parts of Executive Order No. 7C of Governor M. Jodi Rell, promulgated July 13, 2006, concerning contracting reforms and Executive Order No. 14 of Governor M. Jodi Rell, promulgated April 17, 2006, concerning procurement of cleaning products and services and Executive Order NO. 19 of Governor M. Jodi Rell, promulgated June 19, 2008 concerning use of System Development, in accordance with their respective terms and conditions. If Executive Orders 7C ~~and~~, 14 and ~~14~~ 19 are applicable, they are deemed to be incorporated into and are made a part of the Agreement as if they had been fully set forth in it. At the Contractor's request, ~~the State~~CTDOT shall provide a copy of these orders to the Contractor.

ARTICLE 41. STATE ELECTIONS ENFORCEMENT COMMISSION CAMPAIGN CONTRIBUTION AND SOLICITATION BAN

~~That for~~For all State contracts, as defined in Conn. Gen. Stat. §9-612(g)(1) having a value in a calendar year of $50,000 or more, or a combination or series of such agreements or contracts having a value of $100,000 or more, the authorized signatory to this Agreement expressly acknowledges receipt of the State Elections Enforcement Commission's notice advising state contractors of state campaign contribution and solicitation prohibitions, and will inform its principals of the contents of the notice, as set forth in "Notice to Executive Branch State Contractors and Prospective State Contractors of Campaign Contribution and Solicitation Limitations", a copy of which is attached hereto and hereby made a part of this Agreement as Schedule J.

ARTICLE 42. CONTRACTOR ASSURANCES

That as a condition to receiving federal financial assistance under the Agreement, if any, the Contractor shall comply with Title VI of the Civil Rights Act of 1964 (42 U.S.C. §§ 2000d – 2000d-7), all requirements imposed by the regulations of the United States Department of Transportation (49 CFR Part 21) issued in implementation thereof, and the "Title VI Contractor Assurances", a copy of which is attached hereto and hereby made a part of this Agreement as Schedule K.

ARTICLE 43~~2~~. JURISDICTION AND FORUM LANGUAGE

~~That the~~The parties deem the Agreement to have been made in the City of Hartford, State of Connecticut. Both parties agree that it is fair and reasonable for the validity and construction of the Agreement to be, and it shall be, governed by the laws and court decisions of the State of Connecticut, without giving effect to its principles of conflicts of laws. To the extent that any immunities provided by Federal law or the laws of the State of Connecticut do not bar an action against the State, and to the extent that these courts are courts of competent jurisdiction, for the purpose of venue, the complaint shall be made returnable to the Judicial District of Hartford only or shall be brought in the United States District Court for the District of Connecticut only, and shall not be transferred to any other court, provided, however, that nothing here constitutes a waiver or compromise of the sovereign immunity of the State of Connecticut. The Contractor waives any objection which it may now have or will have to the laying of venue of any Claims in any forum and further irrevocably submits to such jurisdiction in any suit, action or proceeding.

ARTICLE 44~~3~~. LITIGATION

Except as stipulated in Form 816 for activities prior to Milestone #2, the Contractor agrees that the sole and exclusive means for the presentation of any claim against the State arising from or in connection with this Agreement shall be in accordance with Chapter 53 of the Connecticut General Statutes (Claims against the State) and the Contractor further agrees not to initiate legal proceedings in any State or Federal Court in addition to, or in lieu of, said Chapter 53 proceedings.

ARTICLE 4~~4~~5. WHISTLEBLOWER

**That the following clause is applicable to those Agreements with an aggregate value of Five Million Dollars ($5,000,000.00) or more.** This Agreement may be subject to the provisions of Section 4-61dd of the Connecticut General Statutes. In accordance with this statute, i~~I~~f an officer, employee or appointing authority of the Contractor takes or threatens to take any personnel action against any employee of the Contractor in retaliation for such employee's disclosure of information to any employee of the contracting state or quasi-public agency or the Auditors of Public Accounts or the Attorney General under the provisions of subsection (a) of such statute, the Contractor shall be liable for a civil penalty of not more than five thousand dollars for each offense, up to a maximum of twenty per cent of the value of this Agreement. Each violation shall be a separate and distinct offense and in the case of a continuing violation, each calendar day's continuance of the violation shall be deemed to be a separate and distinct offense. The State may request that the Attorney General bring a civil action in the Superior Court for the Judicial District of Hartford to seek imposition and recovery of such civil penalty. In accordance with subsection (f) of such statute, each large state contractor, as defined in the statute, shall post a notice of the provisions of the statute relating to large state contractors in a conspicuous place which is readily available for viewing by the employees of the Contractor.

ARTICLE 4~~5~~6. DISCLOSURE OF RECORDS

**The following clause is applicable to those Agreements with an aggregate value of Two Million Five Hundred Thousand Dollars ($2,500,000.00) or more.** This Agreement may be subject to the provisions of section 1-218 of the Connecticut General Statutes. In accordance with this statute, each contract in excess of two million five hundred thousand dollars between a public agency and a person for the performance of a governmental function shall (a) provide that the public agency is entitled to receive a copy of records and files related to the performance of the governmental function, and (b) indicate that such records and files are subject to FOIA and may be disclosed by the public agency pursuant to FOIA. No request to inspect or copy such records or files shall be valid unless the request is made to the public agency in accordance with FOIA. Any complaint by a person who is denied the right to inspect or copy such records or files shall be brought to the Freedom of Information Commission in accordance with the provisions of Sections 1-205 and 1-206 of the Connecticut General Statutes.

ARTICLE 4~~6~~7. TANGIBLE PERSONAL PROPERTY

A. The Contractor on its behalf and on behalf of its subcontractors; as defined below, shall comply with the provisions of Conn. Gen. Stat. §12-411b, as follows:

1. For the term of the Agreement, the Contractor and its ~~subcontractors~~ Affiliates shall collect and remit to the State of Connecticut, Department of Revenue Services, any Connecticut use tax due under the provisions of Chapter 219 of the Connecticut General Statutes for items of tangible personal property sold by the Contractor or by any of its ~~subcontractors~~

Affiliates in the same manner as if the Contractor and such ~~subcontractors~~ Affiliates were engaged in the business of selling tangible personal property for use in Connecticut and had sufficient nexus under the provisions of Chapter 219 to be required to collect Connecticut use tax;

2. A customer's payment of a use tax to the Contractor or its ~~subcontractors~~ Affiliates relieves the customer of liability for the use tax;

2. The Contractor and its ~~subcontractors~~ Affiliates shall remit all use taxes they collect from customers on or before the due date specified in the Agreement, which may not be later than the last day of the month next succeeding the end of a calendar quarter or other tax collection period during which the tax was collected;

3. The Contractor and its ~~subcontractors~~ Affiliates are not liable for use tax billed by them but not paid to them by a customer; and

3. Any Contractor or ~~subcontractor~~ Affiliate who fails to remit use taxes collected on behalf of its customers by the due date specified in the Agreement shall be subject to the interest and penalties provided for persons required to collect sales tax under chapter 219 of the general statutes.

B. For purposes of this section of the Agreement, the word "~~subcontractor~~Affiliate" means any person, as defined in Section 12-1 of the Connecticut General Statutes, that controls, is controlled by, or is under common control with another person. A person controls another person if the person owns, directly or indirectly, more than ten percent of the voting securities of the other person. The word "voting security" means a security that confers upon the holder the right to vote for the election of members of the board of directors or similar governing body of the business, or that is convertible into, or entitles the holder to receive, upon its exercise, a security that confers such a right to vote. "Voting security" includes a general partnership interest.

C. The Contractor represents and warrants that each of its ~~subcontractors~~ Affiliates has vested in the Contractor plenary authority to so bind the ~~subcontractors~~ Affiliates in any agreement with the State of Connecticut. The Contractor on its own behalf and on behalf of its ~~subcontractors~~ Affiliates shall also provide, no later than 30 days after receiving a request by the State's contracting authority, such information as the State may require to ensure, in the State's sole determination, compliance with the provisions of Chapter 219 of the Connecticut General Statutes, including, but not limited to, §12-411b.

ARTICLE 4~~7~~8. ~~NON-WAIVER OF STATE'S IMMUNITIES~~SOVEREIGN IMMUNITY

~~That nothing~~Nothing in the Agreement shall be construed as a modification, compromise or waiver by the State of any rights or defenses of any immunities provided by Federal law or the laws of the State of Connecticut to the State or any of its officers and employees, which they may have had, now have or will have with respect to all matters arising out of the Agreement. To the extent that this section conflicts with any other section, this section shall govern.

ARTICLE 4~~8~~9. PUBLICITY

~~That the~~The Contractor shall refer all inquiries and requests for information regarding the Contractor's task or any other aspect of the work to the State. The Contractor shall refrain from divulging any information whatsoever unless authorized to do so by the State.

ARTICLE ~~49~~50. NONDISCRIMINATION CLAUSE

"Non-discrimination. References in this section to "contract" shall mean this Agreement.

(a) For purposes of this Section, the following terms are defined as follows:

i. "Commission" means the Commission on Human Rights and Opportunities;
ii. "Contract" and "contract" include any extension or modification of the Contract or contract;
iii. "Contractor" and "contractor" include any successors or assigns of the Contractor or contractor;
iv. "gender identity or expression" means a person's gender-related identity, appearance or behavior, whether or not that gender-related identity, appearance or behavior is different from that traditionally associated with the person's physiology or assigned sex at birth, which gender-related identity can be shown by providing evidence including, but not limited to, medical history, care or treatment of the gender-related identity, consistent and uniform assertion of the gender-related identity or any other evidence that the gender-related identity is sincerely held, part of a person's core identity or not being asserted for an improper purpose.
v. "good faith" means that degree of diligence which a reasonable person would exercise in the performance of legal duties and obligations;
vi. "good faith efforts" shall include, but not be limited to, those reasonable initial efforts necessary to comply with statutory or regulatory requirements and additional or substituted efforts when it is determined that such initial efforts will not be sufficient to comply with such requirements;
vii. "marital status" means being single, married as recognized by the state of Connecticut, widowed, separated or divorced;
viii. "mental disability" means one or more mental disorders, as defined in the most recent edition of the American Psychiatric Association's "Diagnostic and Statistical Manual of Mental Disorders", or a record of or regarding a person as having one or more such disorders;
ix. "minority business enterprise" means any small contractor or supplier of materials fifty-one percent or more of the capital stock, if any, or assets of which is owned by a person or persons: (1) who are active in the daily affairs of the enterprise, (2) who have the power to direct the management and policies of the enterprise, and (3) who are members of a minority, as such term is defined in subsection (a) of Connecticut General Statutes § 32-9n; and
x. "public works contract" means any agreement between any individual, firm or corporation and the State or any political subdivision of the State other than a municipality for construction, rehabilitation, conversion, extension, demolition or repair of a public building, highway or other changes or improvements in real property, or which is financed in whole or in part by the State, including, but not limited to, matching expenditures, grants, loans, insurance or guarantees.

For purposes of this Section, the terms "Contract" and "contract" do not

include a contract where each contractor is (1) a political subdivision of the state, including, but not limited to, a municipality, (2) a quasi-public agency, as defined in Conn. Gen. Stat. Section 1-120, (3) any other state, including but not limited to any federally recognized Indian tribal governments, as defined in Conn. Gen. Stat. Section 1-267, (4) the federal government, (5) a foreign government, or (6) an agency of a subdivision, agency, state or government described in the immediately preceding enumerated items (1), (2), (3), (4) or (5).

(b)(1) The Contractor agrees and warrants that in the performance of the Contract such Contractor will not discriminate or permit discrimination against any person or group of persons on the grounds of race, color, religious creed, age, marital status, national origin, ancestry, sex, gender identity or expression, mental retardation, mental disability or physical disability, including, but not limited to, blindness, unless it is shown by such Contractor that such disability prevents performance of the work involved, in any manner prohibited by the laws of the United States or of the State of Connecticut; and the Contractor further agrees to take affirmative action to insure that applicants with job-related qualifications are employed and that employees are treated when employed without regard to their race, color, religious creed, age, marital status, national origin, ancestry, sex, gender identity or expression, mental retardation, mental disability or physical disability, including, but not limited to, blindness, unless it is shown by the Contractor that such disability prevents performance of the work involved; (2) the Contractor agrees, in all solicitations or advertisements for employees placed by or on behalf of the Contractor, to state that it is an "affirmative action-equal opportunity employer" in accordance with regulations adopted by the Commission; (3) the Contractor agrees to provide each labor union or representative of workers with which the Contractor has a collective bargaining Agreement or other contract or understanding and each vendor with which the Contractor has a contract or understanding, a notice to be provided by the Commission, advising the labor union or workers' representative of the Contractor's commitments under this section and to post copies of the notice in conspicuous places available to employees and applicants for employment; (4) the Contractor agrees to comply with each provision of this Section and Connecticut General Statutes §§ 46a-68e and 46a-68f and with each regulation or relevant order issued by said Commission pursuant to Connecticut General Statutes §§ 46a-56, 46a-68e and 46a-68f; and (5) the Contractor agrees to provide the Commission on Human Rights and Opportunities with such information requested by the Commission, and permit access to pertinent books, records and accounts, concerning the employment practices and procedures of the Contractor as relate to the provisions of this Section and Connecticut General Statutes § 46a-56. If the contract is a public works contract, the Contractor agrees and warrants that he will make good faith efforts to employ minority business enterprises as subcontractors and suppliers of materials on such public works projects.

(c) Determination of the Contractor's good faith efforts shall include, but shall not be limited to, the following factors: The Contractor's employment and subcontracting policies, patterns and practices; affirmative advertising, recruitment and training; technical assistance activities and such other reasonable activities or efforts as the Commission may prescribe that are designed to ensure the participation of minority business enterprises in public works projects.

(d) The Contractor shall develop and maintain adequate documentation, in a manner prescribed by the Commission, of its good faith efforts.

(e) The Contractor shall include the provisions of subsection (b) of this Section in every subcontract or purchase order entered into in order to fulfill any obligation of a contract with the State and such provisions shall be binding on a subcontractor, vendor or manufacturer unless exempted by regulations or orders of the Commission. The Contractor shall take such action with respect to any such subcontract or purchase order as the

Commission may direct as a means of enforcing such provisions including sanctions for noncompliance in accordance with Connecticut General Statutes §46a-56; provided if such Contractor becomes involved in, or is threatened with, litigation with a subcontractor or vendor as a result of such direction by the Commission, the Contractor may request the State of Connecticut to enter into any such litigation or negotiation prior thereto to protect the interests of the State and the State may so enter.

(f) The Contractor agrees to comply with the regulations referred to in this Section as they exist on the date of this Contract and as they may be adopted or amended from time to time during the term of this Contract and any amendments thereto.

(g) (1) The Contractor agrees and warrants that in the performance of the Contract such Contractor will not discriminate or permit discrimination against any person or group of persons on the grounds of sexual orientation, in any manner prohibited by the laws of the United States or the State of Connecticut, and that employees are treated when employed without regard to their sexual orientation; (2) the Contractor agrees to provide each labor union or representative of workers with which such Contractor has a collective bargaining Agreement or other contract or understanding and each vendor with which such Contractor has a contract or understanding, a notice to be provided by the Commission on Human Rights and Opportunities advising the labor union or workers' representative of the Contractor's commitments under this section, and to post copies of the notice in conspicuous places available to employees and applicants for employment; (3) the Contractor agrees to comply with each provision of this section and with each regulation or relevant order issued by said Commission pursuant to Connecticut General Statutes § 46a-56; and (4) the Contractor agrees to provide the Commission on Human Rights and Opportunities with such information requested by the Commission, and permit access to pertinent books, records and accounts, concerning the employment practices and procedures of the Contractor which relate to the provisions of this Section and Connecticut General Statutes § 46a-56.

(h) The Contractor shall include the provisions of the foregoing paragraph in every subcontract or purchase order entered into in order to fulfill any obligation of a contract with the State and such provisions shall be binding on a subcontractor, vendor or manufacturer unless exempted by regulations or orders of the Commission. The Contractor shall take such action with respect to any such subcontract or purchase order as the Commission may direct as a means of enforcing such provisions including sanctions for noncompliance in accordance with Connecticut General Statutes § 46a-56; provided, if such Contractor becomes involved in, or is threatened with, litigation with a subcontractor or vendor as a result of such direction by the Commission, the Contractor may request the State of Connecticut to enter into any such litigation or negotiation prior thereto to protect the interests of the State and the State may so enter."

ARTICLE 5~~0~~1. AUDIT AND INSPECTION OF PLANTS, PLACES OF BUSINESS, AND RECORDS

A. ~~That the~~The State and its agents, including, but not limited to, the Connecticut Auditors of Public Accounts, Attorney General and State's Attorney and their respective agents, may, at reasonable hours, inspect and examine all of the parts of the Contractor's and Contractor's Parties' plants and places of business which, in any way, are related to, or involved in, the performance of this Agreement.

B. The Contractor shall maintain, and shall require each of the Contractor Parties to maintain, accurate and complete Records. The Contractor shall make all of its and the Contractor Parties' Records available at all reasonable hours for audit and inspection by the

State and its agents.

C. The State shall make all requests for any audit or inspection in writing and shall provide the Contractor with at least twenty-four (24) hours' notice prior to the requested audit and inspection date. If the State suspects fraud or other abuse, or in the event of an emergency, the State is not obligated to provide any prior notice.

D. The Contractor shall keep and preserve or cause to be kept and preserved all of its and the Contractor Parties' Records until three (3) years after the latter of (i) final payment under this Agreement, or (ii) the expiration or earlier termination of this Agreement, as the same may be modified for any reason. The State may request an audit or inspection at any time during this period. If any Claim or audit is started before the expiration of this period, the Contractor shall retain or cause to be retained all Records until all Claims or audit findings have been resolved.

E. The Contractor shall cooperate fully with the State and its agents in connection with an audit or inspection. Following any audit or inspection, the State may conduct and the Contractor shall cooperate with an exit conference.

F. The Contractor shall incorporate this entire Section verbatim into any contract or other agreement that it enters in to with any Contractor Party.

ARTICLE 5~~1~~2. AGENT FOR SERVICE OF PROCESS

~~That the~~The Secretary of the State of the State of Connecticut is hereby appointed by the Contractor as its agent for service of process for any action arising out or as a result of this Agreement, such appointment to remain in effect throughout the life of this Agreement including any supplements hereto and all renewals thereof, if any, and six (6) years thereafter.

ARTICLE 5~~3~~2. STATE COMPTROLLER SPECIFICATIONS

In accordance with Conn. Gen. Stat. § 4d-31, this Agreement is deemed to have incorporated within it, and the Contractor shall deliver the Goods and Services in compliance with, all specifications established by the State Comptroller to ensure that all policies, procedures, processes and control systems, including hardware, software and protocols, which are established or provided by the Contractor or Contractor Parties, are compatible with and support the State's core financial systems, including but not limited to, accounting, payroll, time and attendance, and retirement systems.

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~~ARTICLE 53. CIO SUBCONTRACT APPROVAL~~

~~In accordance with Conn. Gen. Stat. § 4d-32, the Contractor shall not award a subcontract for work under this Agreement without having first obtained the written approval of the Chief Information Officer of the Department of Administrative Services ("**DAS**") or their designee of the selection of the subcontractor and of the provisions of the subcontract. The Contractor shall deliver a copy of each executed subcontract or amendment to the subcontract to the Chief Information Officer, who shall maintain the subcontract or amendment as a public record, as defined in Conn. Gen. Stat. § 1-200.~~

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ARTICLE 54. RIGHTS TO AND INTEGRITY OF PUBLIC RECORDS

In accordance with Conn. Gen. Stat. § 4d-34, (a) neither the Contractor nor Contractor's Parties shall have any Title in or to (1) any public records which

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the Contractor or Contractor's Parties possess, modify or create pursuant to a contract, subcontract or amendment to a contract or subcontract, or (2) any modifications by such contractor, subcontractor, employee or agent to such public records; (b) neither the Contractor nor Contractor's Parties shall impair the integrity of any public records which they possess or create; and (c) public records which the Contractor or Contractor's Parties possess, modify or create pursuant to this Agreement or other contract, subcontract or amendment to a contract or subcontract shall at all times and for all purposes remain the property of the State. For purposes of this section, "public records" shall have the meaning set forth in Conn. Gen. Stat. § 4-33, as it may be modified from time to time.

ARTICLE 55. PUBLIC RECORDS AND FOIA

In accordance with Conn. Gen. Stat. § 4d-35, any public record which a state agency provides to the Contractor or Contractor's Parties shall remain a public record for the purposes of subsection (a) of section 1-210 and as to such public records, the State, the Contractor and Contractor's Parties shall have a joint and several obligation to comply with the obligations of the state agency under the Freedom of Information Act, as defined in section 1-200, provided that the determination of whether or not to disclose a particular record or type of record shall be made by such state agency.

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ARTICLE 56. DISCLOSURE OF PUBLIC RECORDS

In accordance with Conn. Gen. Stat. § 4d-36, neither the Contractor nor Contractor's Parties shall disclose to the public any public records (a) which they possess, modify or create pursuant to this Agreement or any contract, subcontract or amendment to a contract or subcontract and (b) which a state agency (1) is prohibited from disclosing pursuant to state or federal law in all cases, (2) may disclose pursuant to state or federal law only to certain entities or individuals or under certain conditions or (3) may withhold from disclosure pursuant to state or federal law. This provision shall not be construed to prohibit the Contractor from disclosing such public records to any Contractor's Parties to carry out the purposes of its subcontract. For purposes of this section, "public records" shall have the meaning set forth in Conn. Gen. Stat. § 1-200, as it may be modified from time to time.

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ARTICLE 57. PROFITING FROM PUBLIC RECORDS

In accordance with Conn. Gen. Stat. § 4d-37, neither the Contractor nor Contractor's Parties shall sell, market or otherwise profit from the disclosure or use of any public records which are in their possession pursuant to this Agreement or any contract, subcontract or amendment to a contract or subcontract, except as authorized in this Agreement. For purposes of this section, "public records" shall have the meaning set forth in Conn. Gen. Stat. § 1-200, as it may be modified from time to time.

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ARTICLE 58. CONTRACTOR'S OBLIGATION TO NOTIFY DAS CONCERNING PUBLIC RECORDS

In accordance with Conn. Gen. Stat. § 4d-38, if the Contractor or Contractor Parties learn of any violation of the provisions of Conn. Gen. Stat. §§ 4d-36 or 4d-37 they shall, no later than seven calendar days after learning of such violation, notify the Chief Information Officer of DAS of such violation.

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ARTICLE 59. GENERAL ASSEMBLY ACCESS TO RECORDS

In accordance with Conn. Gen. Stat. § 4d-40, the Joint Committee on Legislative Management and each nonpartisan office of the General Assembly shall continue to

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have access to DAS records that is not less than the access that said committee and such offices have on July 1, 1997.

ARTICLE 60. CONTINUITY OF SYSTEMS

This Section is intended to comply with Conn. Gen. Stat. §4d-44.

(a) The Contractor acknowledges that the Base System and associated services are important to the function of State government and that they must continue without interruption. Pursuant to Conn. Gen. Stat. §4d-44, if the work under the Agreement, any subcontract, or amendment to either, is transferred back to the State or to another contractor at any time for any reason, then the Contractor shall cooperate fully with the State, and do and perform all acts and things that CTDOT deems to be necessary or appropriate, to ensure continuity of state agency information system and telecommunication system facilities, equipment and services so that there is no disruption or interruption in performance as required or permitted in the Agreement. The Contractor shall not enter into any subcontract for any part of the performance under the Agreement without approval of such subcontract by DAS, as required by Conn. Gen. Stat. §4d-32, and without such subcontract including a provision that obligates the subcontractor to comply fully with Conn. Gen. Stat. §4d-44 as if the subcontractor were in fact the Contractor. The Contractor shall make a full and complete disclosure of and delivery to DAS or its representatives of all Records and "Public Records," as that term is defined in Conn. Gen. Stat. §4d-33, as it may be amended, in whatever form they exist or are stored and maintained and wherever located, directly or indirectly concerning the Agreement.

(b) The parties shall follow the following applicable and respective procedures in order to ensure the orderly transfer to the State of:

(1) Such facilities and equipment: Unless a shorter period is necessary or appropriate to ensure compliance with subsection (a) above, in which case that shorter period shall apply, the Contractor shall deliver to CTDOT, F.O.B. Newington, Connecticut or other State location which CTDOT identifies, all facilities and equipment related to or arising out of the Agreement, subcontract or amendment, no later than 10 days from the date that the work under the Agreement is transferred back to the State or to another contractor for any reason. The Contractor shall deliver the facilities and equipment to CTDOT, during the CTDOT's business hours, in good working order and in appropriately protective packaging to ensure delivery without damage. Concurrent with this delivery, the Contractor shall also deliver all related operation manuals and other documentation in whatever form they exist and a list of all related passwords and security codes;

(2) All software created or modified pursuant to the Agreement,

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subcontract or amendment: Unless a shorter period is necessary or appropriate to ensure compliance with subsection (a) above, in which case that shorter period shall apply, the Contractor shall deliver to CTDOT, F.O.B. Newington, Connecticut or other location which CTDOT identifies, all Deliverables, no later than 10 days from the date that the work under Agreement is transferred back to the State or to another contractor for any reason. The Contractor shall deliver such Deliverables to CTDOT, during CTDOT's business hours, in good working order, and if equipment shall be delivered, in appropriately protective packaging to ensure delivery without damage. Concurrent with this delivery, the Contractor shall also deliver all Deliverable-related operation manuals and other documentation in whatever form they exist, if delivery of such manuals and documentation is required by this Agreement, and a list of all Deliverable passwords and security codes; and

(3) All public records, as defined in Conn. Gen. Stat. §4d-33, which the Contractor or Contractor Parties possess or create pursuant to the Agreement, subcontract or amendment: Unless a shorter period is necessary or appropriate to ensure compliance with subsection (a) above, in which case that shorter period shall apply, the Contractor shall deliver to CTDOT, F.O.B. Newington, Connecticut or other State location which CTDOT identifies, all Public Records created or modified pursuant to the Agreement, subcontract or amendment and requested in writing by CTDOT (provided that Contractor may redact confidential information of Contractor, its personnel or third parties to the extent permitted by applicable law) no later than the latter of (1) the time specified in the section in this Agreement concerning Termination for the return of Public Records and (2) 10 days from the date that the work under the Agreement is transferred back to the State or to another contractor for any reason. The Contractor shall deliver to CTDOT those Public Records in electronic, magnetic or other intangible form in a non-proprietary format, such as, but not limited to, ASCII or TXT. The Contractor shall deliver to CTDOT, during CTDOT's business hours, those Public Records and a list of all applicable passwords and security codes, all in appropriately protective packaging to ensure delivery without damage.

(c) If the Contractor employs former State employees, the Contractor shall facilitate the exercising of any reemployment rights that such State employees may have with the State, including, but not limited to, affording them all reasonable opportunities during the workday to interview for State jobs. The Contractor shall include language similar to this section in all of its contracts with its subcontractors and applicable Contractor Parties so that they are similarly obligated.

ARTICLE 61. PROTECTION OF CONFIDENTIAL INFORMATION

(a) Contractor and Contractor Parties, at their own expense, have a duty to and shall protect from a Confidential Information Breach any and all Confidential Information which they come to possess or control,

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wherever and however stored or maintained, in a commercially reasonable manner in accordance with current industry standards.

(b) Each Contractor or Contractor Party shall develop, implement and maintain a comprehensive data - security program for the protection of Confidential Information. The safeguards contained in such program shall be consistent with and comply with the safeguards for protection of Confidential Information, and information of a similar character, as set forth in all applicable federal and state law and written policy of DAS or State concerning the confidentiality of Confidential Information. Such data-security program shall include, but not be limited to, the following:

(1) A security policy for employees related to the storage, access and transportation of data containing Confidential Information;

(2) Reasonable restrictions on access to records containing Confidential Information, including access to any locked storage where such records are kept;

(3) A process for reviewing policies and security measures at least annually;

(4) Creating secure access controls to Confidential Information, including but not limited to passwords; and

(5) Encrypting of Confidential Information that is stored on laptops, portable devices or being transmitted electronically.

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(c) The Contractor and Contractor Parties shall notify DAS, the Client Agency and the Connecticut Office of the Attorney General as soon as practical, but no later than twenty-four (24) hours, after they become aware of or suspect that any Confidential Information which Contractor or Contractor Parties have come to possess or control has been subject to a Confidential Information Breach. If a Confidential Information Breach has occurred, the Contractor shall, within three (3) business days after the notification, present a credit monitoring and protection plan to the Commissioner of Administrative Services, the Client Agency and the Connecticut Office of the Attorney General, for review and approval. Such credit monitoring or protection plan shall be made available by the Contractor at its own cost and expense to all individuals affected by the Confidential Information Breach. Such credit monitoring or protection plan shall include, but is not limited to reimbursement for the cost of placing and lifting one (1) security freeze per credit file pursuant to Connecticut General Statutes § 36a-701a. Such credit monitoring or protection plans shall be approved by the State in accordance with this Section and shall cover a length of time

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commensurate with the circumstances of the Confidential Information Breach. The Contractors' costs and expenses for the credit monitoring and protection plan shall not be recoverable from DAS, the Client Agency, any State of Connecticut entity or any affected individuals.

(d) The Contractor shall incorporate the requirements of this Section in all subcontracts requiring each Contractor Party to safeguard Confidential Information in the same manner as provided for in this Section.

(e) Nothing in this Section shall supersede in any manner Contractor's or Contractor Party's obligations pursuant to HIPAA or the provisions of this Contract concerning the obligations of the Contractor as a Business Associate of Covered Entity.

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**Agreement No. xx.xx-xx(xx)**

**APPENDIX "A"**

**Federal Transit Administration Requirements**

**1. Buy America Requirements.** Buy America - The contractor agrees to comply with 49 U.S.C. 5323(j) and 49 C.F.R. Part 661, which provide that Federal funds may not be obligated unless steel, iron, and manufactured products used in FTA-funded projects are produced in the United States, unless a waiver has been granted by FTA or the product is subject to a general waiver. General waivers are listed in 49 C.F.R. 661.7, and include final assembly in the United States for 15 passenger vans and 15 passenger wagons produced by Chrysler Corporation, and microcomputer equipment and software. Separate requirements for rolling stock are set out at 49 U.S.C. 5323(j)(2)(C) and 49 C.F.R. 661.11. Rolling stock must be assembled in the United States and have a 60 percent domestic content.

~~**1.** The Contractor shall include a notice of the "Buy America" provision in its equipment and construction contracts/subcontracts valued greater than One Hundred Thousand Dollars ($100,000). These contracts/subcontracts must also include a "Buy America" certificate as set forth in Title 49, Part 661, revised October 1, 1998, the provisions of which are hereby incorporated herein by reference.~~

~~The Contractor shall obtain and submit to the State copies of all signed Buy America certifications, including Buy America certifications that may be required of its contractor/subcontractors if the dollar thresholds established by FTA are exceeded.~~A bidder or offeror must submit to the FTA recipient the appropriate Buy America certification (below) with all bids or offers on FTA-funded contracts, except those subject to a general waiver. Bids or offers that are not accompanied by a completed Buy America certification must be rejected as nonresponsive. This requirement does not apply to lower tier subcontractors.

**Certification requirement for procurement of steel, iron, or manufactured products.**

*Certificate of Compliance with 49 U.S.C. 5323(j)(1)*

The bidder or offeror hereby certifies that it will meet the requirements of 49 U.S.C. 5323(j)(1) and the applicable regulations in 49 CFR Part 661.5.

Date _____

Signature _____

Company Name _____

Title _____

*Certificate of Non-Compliance with 49 U.S.C. 5323(j)(1)*

The bidder or offeror hereby certifies that it cannot comply with the requirements of 49 U.S.C. 5323(j)(1) and 49 C.F.R. 661.5, but it may qualify for an exception

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pursuant to 49 U.S.C. 5323(j)(2)(A), 5323(j)(2)(B), or 5323(j)(2)(D), and 49 C.F.R. 661.7.

Date

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Signature

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Company Name

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Title _____

**Certification requirement for procurement of buses, other rolling stock and associated equipment.**

*Certificate of Compliance with 49 U.S.C. 5323(j)(2)(C).*

The bidder or offeror hereby certifies that it will comply with the requirements of 49 U.S.C. 5323(j)(2)(C) and the regulations at 49 C.F.R. Part 661.11.

Date

_____

Signature

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Company Name

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Title

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*Certificate of Non-Compliance with 49 U.S.C. 5323(j)(2)(C)*

The bidder or offeror hereby certifies that it cannot comply with the requirements of 49 U.S.C. 5323(j)(2)(C) and 49 C.F.R. 661.11, but may qualify for an exception pursuant to 49 U.S.C. 5323(j)(2)(A), 5323(j)(2)(B), or 5323(j)(2)(D), and 49 C.F.R. 661.7.

Date

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Signature

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Company Name

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Title _____

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2. **Energy Conservation.** The Contractor and its subcontractors in connection with the work will comply with, the mandatory standards and policies relating to energy efficiency which are contained in the State Energy conservation plan issued in compliance with the Energy Policy and Conservation Act, as amended, 42 U.S.C. 6321 et. seq.

3. **Access to Records and Reports.** The Contractor agrees to provide ~~the State~~CTDOT, the FTA Administrator or his authorized representatives, including any PMO Contractor, access to the Contractor's records and construction sites pertaining to a major capital project, defined at 49 U.S.C.5302(a)1, which is receiving federal financial assistance through the programs described at 49 U.S.C. 5307, 5309, 5311, 5316 or 5317. By definition, a major capital project excludes contracts of less than the simplified acquisition threshold currently set at $100,000.

   The Contractor shall make available records related to the Agreement to ~~the State~~CTDOT, the Secretary of Transportation, and the Comptroller General or any authorized officer or employee of any of them for the purposes of conducting an audit and inspection.

   The Contractor agrees to permit any of the foregoing parties to reproduce by any means whatsoever or to copy excerpts and transcriptions as reasonably needed.

   The Contractor agrees to maintain all books, records, accounts and reports required under this Agreement for a period of not less than three (3) years after the date of termination or expiration of this Agreement, except in the event of litigation or settlement of claims arising from the performance of this Agreement, in which case the Contractor agrees to maintain same until the State, the FTA Administrator, the Comptroller General, or any of their duly authorized representatives, have disposed of all such litigation, appeals, claims or exceptions related thereto. Reference 49 CFR 18.39(i)(11).

4. **Federal Changes.** If applicable, the Contractor agrees to comply, at all times, with all applicable FTA regulations, policies, procedures and directives, including without limitation those listed directly or by reference in the Master Agreement between the State and FTA, as they may be amended or promulgated from time to time until such time as all work described in Schedule A Scope of Work attached and made part of the Agreement, is completed. The Contractor's failure to so comply shall constitute a material breach of this Agreement.

5. **Recycled Products.** The Contractor agrees to comply with all the requirements of Section 6002 of the Resource Conservation and Recovery Act (RCRA), as amended (42 U.S.C. 6962), including but not limited to the regulatory provisions of 40 CFR Part

247, and Executive Order 12873, as they apply to the procurement of the items designated in Subpart B of 40 CFR Part 247.

**6. <u>No Government Obligation to Third Parties</u>.** ~~The State~~CTDOT, the Contractor and its contractor/subcontractors in connection with the work, acknowledge and agree that, notwithstanding any concurrence by the Federal Government in or approval of the solicitation or award of the underlying contract, absent the express written consent by the Federal Government, the Federal Government is not a party to this Agreement and shall not be subject to any obligations or liabilities to the State, the Contractor or its contractor/ subcontractors, or any other party (whether or not a party to the Agreement) pertaining to any matter resulting from the underlying Agreement.

The Contractor agrees to include the above clause in each contract/subcontract financed in whole or in part with Federal assistance provided by FTA. It is further agreed that the clause shall not be modified, except to identify the contractor/subcontractor who will be subject to its provisions.

**7. <u>Program Fraud and False or Fraudulent Statements and Related Acts</u>.**

A. The Contractor acknowledges that the provisions of the Program Fraud Civil Remedies Act of 1986, as amended, 31 U.S.C. §§3801 et seq. and U.S. DOT regulations, "Program Fraud Civil Remedies," 49 C.F.R. Part 31, apply to its actions pertaining to this Project. Upon execution of the underlying Agreement, the Contractor certifies or affirms the truthfulness and accuracy of any statements it has made, it makes, it may make, or causes to be made, pertaining to the underlying Agreement or the FTA assisted project for which this Agreement work is being performed. In addition to other penalties that may be applicable, the Contractor further acknowledges that if it makes, or causes to be made, a false, fictitious, or fraudulent claim, statements, submission, or certification, the Federal Government reserves the right to impose the penalties of the Program Fraud Civil Remedies Act of 1986 on the Contractor to the extent the Federal Government deems appropriate.

B. The Contractor also acknowledges that if it makes, or causes to be made, a false, fictitious, or fraudulent claim, statement, submission, or certification to the Federal Government under an agreement connected with a project that is financed in whole or in part with Federal assistance originally awarded by FTA under the authority of 49 U.S.C. § 5307, the Government reserves the right to impose the penalties of 18 U.S.C. § 1001 and 49 U.S.C. § 5307(n)(1) on the Contractor, to the extent the Federal Government deems appropriate.

C. The Contractor agrees to include these two clauses in each subcontract financed in whole or in part with Federal assistance provided by FTA. It is further agreed that the clauses shall not be modified, except to identify the contractor/subcontractors who will be subject to the provisions.

**APPENDIX "A"**

**Federal Transit Administration Requirements**

**10. Privacy Act.** The Contractor agrees to comply with, and assures the compliance of its employees with, the information restrictions and other applicable requirements of the Privacy Act of 1974, 5 U.S.C. § 522a. Among other things, the Contractor agrees to obtain the express consent of the Federal Government before the Contractor or its employees operate a system of records on behalf of the Federal Government. The Contractor understands that the requirements of the Privacy Act, including the civil and criminal penalties for violation of that Act, apply to those individuals involved, and that failure to comply with the terms of the Privacy Act may result in termination of the underlying Agreement.

The Contractor also agrees to include these requirements in each contract/subcontract to administer any system of records on behalf of the Federal Government financed in whole or in part with Federal assistance provided by FTA.

**11. Civil Rights Requirements.** As a condition to receiving federal financial assistance under the Contract/Agreement, if any, the Contractor shall comply with Title VI of the Civil Rights Act of 1964 (42 U.S.C. §§ 2000d – 2000d-7), all requirements imposed by the regulation of the United States Department of Transportation (49 CFR Part 21) issued in implementation thereof, and the Title VI Contractor Assurances attached hereto, all of which are hereby made a part of this Agreement as Schedule K.

**12. Davis-Bacon and Copeland Anti-Kickback Acts**

(1) **Minimum wages** - (i) All laborers and mechanics employed or working upon the site of the work (or under the United States Housing Act of 1937 or under the Housing Act of 1949 in the construction or development of the project), will be paid unconditionally and not less often than once a week, and without subsequent deduction or rebate on any account (except such payroll deductions as are permitted by regulations issued by the Secretary of Labor under the Copeland Act (29 CFR part 3)), the full amount of wages and bona fide fringe benefits (or cash equivalents thereof) due at time of payment computed at rates not less than those contained in the wage determination of the Secretary of Labor which is attached hereto and made a part hereof, regardless of any contractual relationship which may be alleged to exist between the contractor and such laborers and mechanics.

Contributions made or costs reasonably anticipated for bona fide fringe benefits under section 1(b)(2) of the Davis-Bacon Act on behalf of laborers or mechanics are considered wages paid to such laborers or mechanics, subject to the provisions of paragraph (1)(iv) of this section; also, regular contributions made or costs incurred for more than a weekly period (but not less often than quarterly) under plans, funds, or programs which cover the particular weekly period, are deemed to be constructively made or incurred during such weekly period. Such laborers and mechanics shall be paid the appropriate wage rate and fringe

benefits on the wage determination for the classification of work actually performed, without regard to skill, except as provided in 29 CFR Part 5.5(a)(4). Laborers or mechanics performing work in more than one classification may be compensated at the rate specified for each classification for the time actually worked therein: provided, that the employer's payroll records accurately set forth the time spent in each classification in which work is performed. The wage determination (including any additional classifications and wage rates conformed under paragraph (1)(ii) of this section) and the Davis-Bacon poster (WH-1321) shall be posted at all times by the contractor and its subcontractors at the site of the work in a prominent and accessible place where it can be easily seen by the workers.

(ii)(A) The contracting officer shall require that any class of laborers or mechanics, including helpers, which is not listed in the wage determination and which is to be employed under the contract shall be classified in conformance with the wage determination. The contracting officer shall approve an additional classification and wage rate and fringe benefits therefore only when the following criteria have been met:

(1) Except with respect to helpers as defined as 29 CFR 5.2(n)(4), the work to be performed by the classification requested is not performed by a classification in the wage determination; and

(2) The classification is utilized in the area by the construction industry; and

(3) The proposed wage rate, including any bona fide fringe benefits, bears a reasonable relationship to the wage rates contained in the wage determination; and

(4) With respect to helpers as defined in 29 CFR 5.2(n)(4), such a classification prevails in the area in which the work is performed.

(B) If the contractor and the laborers and mechanics to be employed in the classification (if known), or their representatives, and the contracting officer agree on the classification and wage rate (including the amount designated for fringe benefits where appropriate), a report of the action taken shall be sent by the contracting officer to the Administrator of the Wage and Hour Division, Employment Standards Administration, U.S. Department of Labor, Washington, DC 20210. The Administrator, or an authorized representative, will approve, modify, or disapprove every additional classification action within 30 days of receipt and so advise the contracting officer or will notify the contracting officer within the 30-day period that additional time is necessary.

(C) In the event the contractor, the laborers or mechanics to be employed in the classification or their representatives, and the contracting officer do not agree on

the proposed classification and wage rate (including the amount designated for fringe benefits, where appropriate), the contracting officer shall refer the questions, including the views of all interested parties and the recommendation of the contracting officer, to the Administrator for determination. The Administrator, or an authorized representative, will issue a determination within 30 days of receipt and so advise the contracting officer or will notify the contracting officer within the 30-day period that additional time is necessary.

(D) The wage rate (including fringe benefits where appropriate) determined pursuant to paragraphs (a)(1)(ii) (B) or (C) of this section, shall be paid to all workers performing work in the classification under this contract from the first day on which work is performed in the classification.

(iii) Whenever the minimum wage rate prescribed in the contract for a class of laborers or mechanics includes a fringe benefit which is not expressed as an hourly rate, the contractor shall either pay the benefit as stated in the wage determination or shall pay another bona fide fringe benefit or an hourly cash equivalent thereof.

(iv) If the contractor does not make payments to a trustee or other third person, the contractor may consider as part of the wages of any laborer or mechanic the amount of any costs reasonably anticipated in providing bona fide fringe benefits under a plan or program, provided, that the Secretary of Labor has found, upon the written request of the contractor, that the applicable standards of the Davis-Bacon Act have been met. The Secretary of Labor may require the contractor to set aside in a separate account assets for the meeting of obligations under the plan or program.

(v)(A) The contracting officer shall require that any class of laborers or mechanics which is not listed in the wage determination and which is to be employed under the contract shall be classified in conformance with the wage determination. The contracting officer shall approve an additional classification and wage rate and fringe benefits therefor only when the following criteria have been met:

(1) The work to be performed by the classification requested is not performed by a classification in the wage determination; and

(2) The classification is utilized in the area by the construction industry; and

(3) The proposed wage rate, including any bona fide fringe benefits, bears a reasonable relationship to the wage rates contained in the wage determination.

(B) If the contractor and the laborers and mechanics to be employed in the classification (if known), or their representatives, and the contracting officer agree on the classification and wage rate (including the amount designated for fringe

benefits where appropriate), a report of the action taken shall be sent by the contracting officer to the Administrator of the Wage and Hour Division, Employment Standards Administration, Washington, DC 20210. The Administrator, or an authorized representative, will approve, modify, or disapprove every additional classification action within 30 days of receipt and so advise the contracting officer or will notify the contracting officer within the 30-day period that additional time is necessary.

(C) In the event the contractor, the laborers or mechanics to be employed in the classification or their representatives, and the contracting officer do not agree on the proposed classification and wage rate (including the amount designated for fringe benefits, where appropriate), the contracting officer shall refer the questions, including the views of all interested parties and the recommendation of the contracting officer, to the Administrator for determination. The Administrator, or an authorized representative, will issue a determination with 30 days of receipt and so advise the contracting officer or will notify the contracting officer within the 30-day period that additional time is necessary.

(D) The wage rate (including fringe benefits where appropriate) determined pursuant to paragraphs (a)(1)(v) (B) or (C) of this section, shall be paid to all workers performing work in the classification under this contract from the first day on which work is performed in the classification.

(2) **Withholding** – The State shall upon its own action or upon written request of an authorized representative of the Department of Labor withhold or cause to be withheld from the contractor under this contract or any other Federal contract with the same prime contractor, or any other federally-assisted contract subject to Davis-Bacon prevailing wage requirements, which is held by the same prime contractor, so much of the accrued payments or advances as may be considered necessary to pay laborers and mechanics, including apprentices, trainees, and helpers, employed by the contractor or any subcontractor the full amount of wages required by the contract. In the event of failure to pay any laborer or mechanic, including any apprentice, trainee, or helper, employed or working on the site of the work (or under the United States Housing Act of 1937 or under the Housing Act of 1949 in the construction or development of the project), all or part of the wages required by the contract, the State may, after written notice to the contractor, sponsor, applicant, or owner, take such action as may be necessary to cause the suspension of any further payment, advance, or guarantee of funds until such violations have ceased.

(3) **Payrolls and basic records** - (i) Payrolls and basic records relating thereto shall be maintained by the contractor during the course of the work and preserved for a period of three years thereafter for all laborers and mechanics working at the site of the work (or under the United States Housing Act of 1937, or under the Housing Act of 1949, in the construction or development of the

project). Such records shall contain the name, address, and social security number of each such worker, his or her correct classification, hourly rates of wages paid (including rates of contributions or costs anticipated for bona fide fringe benefits or cash equivalents thereof of the types described in section 1(b)(2)(B) of the Davis-Bacon Act), daily and weekly number of hours worked, deductions made and actual wages paid. Whenever the Secretary of Labor has found under 29 CFR 5.5(a)(1)(iv) that the wages of any laborer or mechanic include the amount of any costs reasonably anticipated in providing benefits under a plan or program described in section 1(b)(2)(B) of the Davis-Bacon Act, the contractor shall maintain records which show that the commitment to provide such benefits is enforceable, that the plan or program is financially responsible, and that the plan or program has been communicated in writing to the laborers or mechanics affected, and records which show the costs anticipated or the actual cost incurred in providing such benefits. Contractors employing apprentices or trainees under approved programs shall maintain written evidence of the registration of apprenticeship programs and certification of trainee programs, the registration of the apprentices and trainees, and the ratios and wage rates prescribed in the applicable programs.

(ii)(A) The contractor shall submit weekly for each week in which any contract work is performed a copy of all payrolls to the State for transmission to the Federal Transit Administration. The payrolls submitted shall set out accurately and completely all of the information required to be maintained under section 5.5(a)(3)(i) of Regulations, 29 CFR part 5. This information may be submitted in any form desired. Optional Form WH-347 is available for this purpose and may be purchased from the Superintendent of Documents (Federal Stock Number 029-005-00014-1), U.S. Government Printing Office, Washington, DC 20402. The prime contractor is responsible for the submission of copies of payrolls by all subcontractors.

(B) Each payroll submitted shall be accompanied by a "Statement of Compliance," signed by the contractor or subcontractor or his or her agent who pays or supervises the payment of the persons employed under the contract and shall certify the following:

(1) That the payroll for the payroll period contains the information required to be maintained under section 5.5(a)(3)(i) of Regulations, 29 CFR part 5 and that such information is correct and complete;

(2) That each laborer or mechanic (including each helper, apprentice, and trainee) employed on the contract during the payroll period has been paid the full weekly wages earned, without rebate, either directly or indirectly, and that no deductions have been made either directly or indirectly from the full wages earned, other than permissible deductions as set forth in Regulations, 29 CFR part 3;

(3) That each laborer or mechanic has been paid not less than the applicable wage rates and fringe benefits or cash equivalents for the classification of work performed, as specified in the applicable wage determination incorporated into the contract.

(C) The weekly submission of a properly executed certification set forth on the reverse side of Optional Form WH-347 shall satisfy the requirement for submission of the "Statement of Compliance" required by paragraph (a)(3)(ii)(B) of this section.

(D) The falsification of any of the above certifications may subject the contractor or subcontractor to civil or criminal prosecution under section 1001 of title 18 and section 231 of title 31 of the United States Code.

(iii) The contractor or subcontractor shall make the records required under paragraph (a)(3)(i) of this section available for inspection, copying, or transcription by authorized representatives of the Federal Transit Administration or the Department of Labor, and shall permit such representatives to interview employees during working hours on the job. If the contractor or subcontractor fails to submit the required records or to make them available, the Federal agency may, after written notice to the contractor, sponsor, applicant, or owner, take such action as may be necessary to cause the suspension of any further payment, advance, or guarantee of funds. Furthermore, failure to submit the required records upon request or to make such records available may be grounds for debarment action pursuant to 29 CFR 5.12.

(4) **Apprentices and trainees** - (i) Apprentices - Apprentices will be permitted to work at less than the predetermined rate for the work they performed when they are employed pursuant to and individually registered in a bona fide apprenticeship program registered with the U.S. Department of Labor, Employment and Training Administration, Bureau of Apprenticeship and Training, or with a State Apprenticeship Agency recognized by the Bureau, or if a person is employed in his or her first 90 days of probationary employment as an apprentice in such an apprenticeship program, who is not individually registered in the program, but who has been certified by the Bureau of Apprenticeship and Training or a State Apprenticeship Agency (where appropriate) to be eligible for probationary employment as an apprentice. The allowable ratio of apprentices to journeymen on the job site in any craft classification shall not be greater than the ratio permitted to the contractor as to the entire work force under the registered program. Any worker listed on a payroll at an apprentice wage rate, who is not registered or otherwise employed as stated above, shall be paid not less than the applicable wage rate on the wage determination for the classification of work actually performed. In addition, any apprentice performing work on the job site in excess of the ratio permitted under the registered program shall be paid not less

than the applicable wage rate on the wage determination for the work actually performed. Where a contractor is performing construction on a project in a locality other than that in which its program is registered, the ratios and wage rates (expressed in percentages of the journeyman's hourly rate) specified in the contractor's or subcontractor's registered program shall be observed. Every apprentice must be paid at not less than the rate specified in the registered program for the apprentice's level of progress, expressed as a percentage of the journeymen hourly rate specified in the applicable wage determination. Apprentices shall be paid fringe benefits in accordance with the provisions of the apprenticeship program. If the apprenticeship program does not specify fringe benefits, apprentices must be paid the full amount of fringe benefits listed on the wage determination for the applicable classification. If the Administrator of the Wage and Hour Division of the U.S. Department of Labor determines that a different practice prevails for the applicable apprentice classification, fringes shall be paid in accordance with that determination. In the event the Bureau of Apprenticeship and Training, or a State Apprenticeship Agency recognized by the Bureau, withdraws approval of an apprenticeship program, the contractor will no longer be permitted to utilize apprentices at less than the applicable predetermined rate for the work performed until an acceptable program is approved.

(ii) Trainees - Except as provided in 29 CFR 5.16, trainees will not be permitted to work at less than the predetermined rate for the work performed unless they are employed pursuant to and individually registered in a program which has received prior approval, evidenced by formal certification by the U.S. Department of Labor, Employment and Training Administration. The ratio of trainees to journeymen on the job site shall not be greater than permitted under the plan approved by the Employment and Training Administration. Every trainee must be paid at not less than the rate specified in the approved program for the trainee's level of progress, expressed as a percentage of the journeyman hourly rate specified in the applicable wage determination. Trainees shall be paid fringe benefits in accordance with the provisions of the trainee program. If the trainee program does not mention fringe benefits, trainees shall be paid the full amount of fringe benefits listed on the wage determination unless the Administrator of the Wage and Hour Division determines that there is an apprenticeship program associated with the corresponding journeyman wage rate on the wage determination which provides for less than full fringe benefits for apprentices. Any employee listed on the payroll at a trainee rate who is not registered and participating in a training plan approved by the Employment and Training Administration shall be paid not less than the applicable wage rate on the wage determination for the classification of work actually performed. In addition, any trainee performing work on the job site in excess of the ratio permitted under the registered program shall be paid not less than the applicable wage rate on the wage determination for the work actually performed. In the event the Employment and Training Administration withdraws approval of a training

program, the contractor will no longer be permitted to utilize trainees at less than the applicable predetermined rate for the work performed until an acceptable program is approved.

(iii) Equal employment opportunity - The utilization of apprentices, trainees and journeymen under this part shall be in conformity with the equal employment opportunity requirements of Executive Order 11246, as amended, and 29 CFR part 30.

(5) **Compliance with Copeland Act requirements** - The Contractor shall comply with the requirements of 29 CFR part 3, which are incorporated by reference in this contract.

(6) **Subcontracts** - The contractor or subcontractor shall insert in any subcontracts the clauses contained in 29 CFR 5.5(a)(1) through (10) and such other clauses as the Federal Transit Administration may by appropriate instructions require, and also a clause requiring the subcontractors to include these clauses in any lower tier subcontracts. The prime contractor shall be responsible for the compliance by any subcontractor or lower tier subcontractor with all the contract clauses in 29 CFR 5.5.

(7) **Contract termination: debarment** - A breach of the contract clauses in 29 CFR 5.5 may be grounds for termination of the contract, and for debarment as a contractor and a subcontractor as provided in 29 CFR 5.12.

(8) **Compliance with Davis-Bacon and Related Act requirements** - All rulings and interpretations of the Davis-Bacon and Related Acts contained in 29 CFR parts 1, 3, and 5 are herein incorporated by reference in this contract.

(9) **Disputes concerning labor standards** - Disputes arising out of the labor standards provisions of this contract shall not be subject to the general disputes clause of this contract. Such disputes shall be resolved in accordance with the procedures of the Department of Labor set forth in 29 CFR parts 5, 6, and 7. Disputes within the meaning of this clause include disputes between the contractor (or any of its subcontractors) and the contracting agency, the U.S. Department of Labor, or the employees or their representatives.

(10) **Certification of eligibility** - (i) By entering into this contract, the contractor certifies that neither it (nor he or she) nor any person or firm who has an interest in the contractor's firm is a person or firm ineligible to be awarded Government contracts by virtue of section 3(a) of the Davis-Bacon Act or 29 CFR 5.12(a)(1).

(ii) No part of this contract shall be subcontracted to any person or firm ineligible for award of a Government contract by virtue of section 3(a) of the Davis-Bacon Act or 29 CFR 5.12(a)(1).

(iii) The penalty for making false statements is prescribed in the U.S. Criminal Code, 18 U.S.C. 1001.

**13. Americans With Disabilities Act.** This clause applies to those contractors who are or will be responsible for compliance with the terms of the Americans with Disabilities Act of 1990 ("Act"), Public Law 101-336, during the term of the Agreement. The Contractor represents that it is familiar with the terms of this Act and that it is in compliance with the Act. Failure of the Contractor to satisfy this standard as the same applies to performance under this Agreement, either now or during the term of the Agreement as it may be amended, will render the Agreement voidable at the option of the State upon notice to the Contractor. The Contractor warrants that it will hold the State harmless and indemnify the State from any liability which may be imposed upon the State as a result of any failure of the Contractor to be in compliance with this Act, as the same applies to performance under this License Agreement.

The Contractor agrees to comply with 49 U.S.C. § 5301(d), which states that the Federal policy that elderly individuals and individuals with disabilities have the same right as other individuals to use public transportation services and facilities, and that special efforts shall be made in planning and designing those services and facilities to implement transportation accessibility rights for elderly individuals and individuals with disabilities. These regulations provide that no handicapped individual, solely for reason of his or her handicap, be excluded from participation in, be denied the benefits of, or be subjected to discrimination under any program or activity including or resulting from this Agreement.

**14. Grant Management Guidelines for Grantees and Third Party Contracting Guidelines.** The Contractor agrees that its subcontractors in connection with the work will be governed by the rules and regulations of the Federal Transit Administration's "Grant Management Guidelines for Grantees – Circular 5010.1D", dated August 27, 2012, and "Third Party Contracting Guidelines-Circular C4220.1F", dated March 13, 2013.

**15. Suspension or Debarment.** That suspended or debarred contractors, suppliers, materialmen, lessors or other vendors may not submit proposals for a State contract or subcontract during the period of suspension or debarment regardless of their anticipated status at the time of contract award or commencement of work.

A. The signature on the Agreement by the Contractor shall constitute certification that to the best of its knowledge and belief the Contractor or any person associated therewith in the capacity of the owner, partner, director, officer, principal investor, project director, manager, auditor or any position involving the administration of Federal or State funds:

**APPENDIX "A"**

**Federal Transit Administration Requirements**

1) Is not presently debarred, suspended, proposed for debarment, declared ineligible, or voluntarily excluded from covered transactions by any Federal department or agency;

2) Has not within the prescribed statutory time period preceding this Agreement been convicted of or had a civil judgment rendered against him/her for commission of fraud or 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 anti-trust statutes or commission of embezzlement, theft, forgery, bribery, falsification or destruction of records, making false statements, or receiving stolen property;

3) Is 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 A)2) of this certification; and

4) Has not, within a five-year period preceding this Agreement, had one or more public transactions (Federal, State, or local) terminated for cause or default.

B. Where the Contractor is unable to certify to any of the statements in this certification, such Contractor shall attach an explanation to this Agreement.

The Contractor agrees to insure that the following certification be included in each subcontract Agreement to which it is a party, and further, to require said certification to be included in any subcontracts, sub-subcontracts and purchase orders:

1) The prospective subcontractors, sub-subcontractors participants certify, by submission of its/their proposal, that neither it nor its principals is presently debarred, suspended, proposed for debarment, declared ineligible, or voluntarily excluded from participation in this transaction by any Federal department or agency.

2) Where the prospective subcontractors, sub-subcontractors participants are unable to certify to any of the statements in this certification, such prospective participants shall attach an explanation to this proposal.

**16. Code of Federal Regulations.** The Contractor shall ensure that all parties are in compliance with the audit requirements set forth in Title 48, Section 31 of the Code of Federal Regulations (CFR) and Title 23, Section 172 CFR, as revised, with retaining consultants.

**17. Incorporation of Federal Transit Administration (FTA) Terms.** The preceding provisions include, in part, certain Standard Terms and Conditions required by USDOT, whether or not expressly set forth in the preceding terms and conditions. All contractual provisions required by USDOT, as set forth in FTA Circular 4220.1F are hereby

incorporated by reference. Anything to the contrary herein notwithstanding, all FTA mandated terms shall be deemed to control in the event of a conflict with other provisions contained in this Agreement. The contractor/subcontractors shall not perform any act, fail to perform any act, or refuse to comply with any of the State's requests which would cause the State to be in violation of the FTA terms and conditions.

**18. Special Provisions Disadvantaged Business Enterprises.** The Contractor hereby acknowledges and agrees to comply with "Agreements With Goals Special Provisions Disadvantaged Business Enterprises as Subcontractors and Material Suppliers or Manufacturers For Federal Funded Projects" dated October 16, 2000, attached hereto and hereby made a part of this Agreement as Schedule L.

**19. Contract Work Hours and Safety Standards Act.**

A. The Contractor agrees to include a provision in contracts with its subcontractors in carrying out the work, which may require or involve the employment of laborers or mechanics, which shall not require nor permit any such laborer or mechanic in any workweek in which he or she is employed on such work to work in excess of forty (40) hours in such workweek, unless such laborer or mechanic receives compensation at a rate not less than one and one-half times the basic rate of pay for all hours worked in excess of forty (40) hours in such workweek.

B. In the event of any violation of the clause set forth in paragraph (a) of this Article, any contractor/subcontractors responsible therefor shall be liable for the unpaid wages. In addition, contractor/subcontractors shall be liable to the United States for liquidated damages. Such liquidated damages shall be computed with respect to each individual laborer or mechanic, including watchmen and guards, employed in violation of the clause set forth in paragraph (a) of this Article, in the sum of Ten Dollars ($10.00) for each calendar day on which such individual was required or permitted to work in excess of the standard workweek of forty (40) hours without payment of the overtime wages required by the clause set forth in paragraph (a) of this Article.

C. ~~The State~~CTDOT upon its own action or upon written request of an authorized representative of the Department of Labor shall cause the Contractor to withhold or cause to be withheld, from any moneys payable by the Contractor on account of work performed for it by subcontractors under any such contract/agreement or any other Federal Contract/Agreement or any Federal contract with the same prime contractor, or any other federally-assisted contract subject to the Contract Work Hours and Safety Standards Act, which is held by the same prime contractor, such sums as may be determined to be necessary to satisfy any liabilities of such contractor or subcontractor for unpaid wages and liquidated damages as provided in the clause set forth in paragraph (b) of this Article.

D. The Contractor's subcontractors shall insert in any contract/subcontract the clauses set forth in paragraphs A and B of this Article and also a clause requiring the subcontractors to include these clauses in any lower tier subcontracts. The prime contractor shall be responsible for compliance by any subcontractor or lower tier subcontractor with the clauses set forth in paragraphs A through D of this Article.

**20. Drug and Alcohol Testing** The Contractor agrees to establish and implement a drug and alcohol testing program that complies with 49 CFR Parts 653 and 654, produce any documentation necessary to establish its compliance with Parts 653 and 654, and permit any authorized representative of the United States Department of Transportation or its operating administrations, the State Oversight Agency of Connecticut, or a representative of the State, to inspect the facilities and records associated with the implementation of the drug and alcohol testing program as required under 49 CFR Parts 653 and 654 and review the testing process. The Contractor agrees further to certify annually its compliance with Parts 653 and 654 and to submit the Management Information System (MIS) reports to the State. To certify compliance, the Contractor shall use the "Substance Abuse Certifications" in the "Annual List of Certifications and Assurances for Federal Transit Administration Grants and Cooperative Agreements," which is published annually in the Federal Register.

**21. State and Federally Funded Capital Projects.** With the prior written approval of the State, the Contractor shall undertake capital projects utilizing its own forces and equipment, or, with the prior written approval of the State, the Contractor may subcontract on behalf of the State to effect the procurement of capital goods or services. All capital projects undertaken in accordance with this Agreement shall be governed by all applicable State and federal laws and regulations. With respect to capital projects, the Contractor will adhere to the scope of work and cost estimates as approved in writing by the State. When undertaking capital projects utilizing federal funds, the Contractor and its subcontractors will be governed by the rules and regulations of the Federal Transit Administration's "Grant Management Guidelines for Grantees-Circular 5010.1D", dated August 27, 2012, and "Third Party Contracting Guidelines-Circular C4220.1F", dated March 13, 2013, and the following:.

A. Federally-Required Certifications and Assurances The signature on this Agreement by the Contractor shall constitute certification that the Contractor, will comply with the federal regulations listed in Appendix "A" and that the Contractor will ensure to pass through these federal regulations, as applicable, to its subcontractors financed in whole or in part with Federal assistance provided by the U.S. Department of Transportation.

B. Title of Capital Equipment. Title of the equipment will be maintained by the State. The Contractor shall not transfer title of any capital equipment to any third party without the prior written approval of the State.

**APPENDIX "A"**

**Federal Transit Administration Requirements**

C. Use of Capital Equipment. The capital equipment shall be used exclusively in operations provided under the terms of this Agreement or under conditions approved by the State.

D. Motor Vehicle Safety Standards. Motor vehicles purchased or utilized by the operator for purposes of this Agreement will comply with the Motor Vehicle Safety Standards as established by the U.S. Department of Transportation

E. Federal Vehicle Requirements. When new motor vehicles are purchased with grant funds, the Contractor will submit a certification in writing that:

1. The horsepower of the vehicle is adequate for the speed, range and terrain in which it will be required and also meet the demands of all auxiliary power equipment.

2. All gases and vapors emanating from the crankcase of a spark-ignition engine are controlled to minimize their escape into the atmosphere.

3. Visible emission from the exhaust will not exceed No. 1 on the Ringlemann Scale when measured six inches from the tailpipe with the vehicle in steady operation.

4. When the vehicle has been idled for three (3) minutes and then accelerated to 80 percent of rated speed under load, the opacity of the exhaust will not exceed No. 2 on the Ringlemann Scale for more than five (5) seconds, and not more than No. 1 on the Ringlemann Scale thereafter.

5. No member of, or delegate to, the Congress of the United States shall be admitted to a share or part of this Agreement or to any benefit arising therefrom.

**22. Notification of Federal Participation.** To the extent required by law, ~~the State~~CTDOT agrees that any request for proposals, solicitation, award notice, press release, or other publication involving the distribution of FTA assistance for the Program or Project having and aggregate value of $500,000 or more, shall indicate that FTA is the Federal agency that is providing the Federal assistance, the Catalog of Federal Domestic Assistance Number of the program from which the Federal assistance is authorized, as may be applicable, and the amount of Federal assistance FTA provided.

**23. Clean Air.** The Contractor agrees to comply with all applicable standards, orders or regulations issued pursuant to the Clean Air Act, as amended, 42 U.S.C. §§ 7401 et seq. The Contractor agrees to report each violation to the State and understands and

agrees the State will, in turn, report each violation as required to assure notification to FTA and the appropriate EPA Regional Office.

The Contractor also agrees to include these requirements in each contract/subcontract exceeding $100,000 financed in whole or in part with Federal assistance provided by FTA.

**24. Clean Water Requirements.** The Contractor agrees to comply with all applicable standards, orders or regulations issued pursuant to the Federal Water Pollution Control Act, as amended, 33 U.S.C. 1251 et seq. The Contractor agrees to report each violation to the State and understands and agrees that the State will, in turn, report each violation as required to assure notification to the FTA (Federal Transit Administration) and the appropriate EPA Regional Office.

The Contractor also agrees to include these requirements in each contract/subcontract exceeding $100,000 financed in whole or in part with Federal assistance provided by FTA.

**25. Lobbying.** The Contractors who apply or bid for an award of $100,000 or more shall file the certification required by 49 CFR Part 20, "Certification Regarding Lobbying" attached hereto as Schedule M. Each tier certifies to the tier above that it will not and has not used Federal appropriated funds to pay any person or organization for influencing or attempting to influence an officer or employee of any agency, a member of Congress, officer or employee of Congress, or an employee of a member of Congress in connection with obtaining any Federal contract, grant or any other award covered by 31 U.S.C. 1352. Each tier shall also disclose the name of any registrant under the Lobbying Disclosure Act of 1995 who has made lobbying contacts on its behalf with non-Federal funds with respect to that Federal contract, grant or award covered by 31 U.S.C. 1352. Such disclosures are forwarded from tier to tier up to the recipient.

**26. Cargo Preference – Use of United States Flag Vessels.** The Contractor agrees:

A. To utilize privately owned United States-flag commercial vessels to ship at least fifty percent (50%) of the gross tonnage (computed separately for dry bulk carriers, dry cargo liners, and tankers) involved, whenever shipping any equipment, materials, or commodities pursuant to this Agreement to the extent such vessels are available at fair and reasonable rates for United States-flag commercial vessels.

B. To furnish within twenty (20) working days following the date of loading for shipment originating within the United States, or within thirty (30) working days following the date for loading for shipment originating outside the United States, a legible copy of a rated, "on-board" Commercial ocean bill-of-lading in English for each shipment of cargo described in paragraph (a) above to the State (through the prime contractor in the case of subcontractor bills-of-lading) and to the Division of National Cargo, Office of Market Development, Maritime

Administration, Washington, D.C. 20230, marked with appropriate identification of the project.

C. To insert the substance of the provisions of this clause in all contracts/subcontracts issued pursuant to this Agreement.

**27. <u>Fly America Requirements.</u>** The Contractor agrees to comply with 49 U.S.C. 40118 (the "Fly America" Act). In accordance with the General Services Administration's regulations at 41 CFR Part 301-10, which provides that recipients and sub recipients of Federal funds and their contractors are required to use U.S. Flag air carriers for U.S. Government-financed International air travel and transportation of their personal effects or property, to the extent such service is available, unless travel by foreign air carrier is a matter of necessity, as defined by the Fly America Act. The Contractor shall submit, if a foreign air carrier was used, an appropriate certification or memorandum adequately explaining why service by a U.S. flag air carrier was not available or why it was necessary to use a foreign air carrier and shall, in any event, provide a certificate of compliance with the Fly American requirements. The Contractor agrees to include the requirements of this section in all subcontracts that may involve international air transportation.

# Ticket Vending Machine System

Scope of Work

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# 1 Project Overview

## 1.1 General

This Scope of Work specifies the requirements for the design, manufacture, installation, testing, maintenance, warranty, operation and inspection of the new Ticket Vending Machine System (TVMS) for the new bus rapid transit system for Connecticut Department of Transportation (CTDOT) known as CT***fastrak***.

The TVMS shall consist of Ticket Vending Machines (TVMs), related data communication networks, spare parts, tools, test equipment, documentation, training, technical assistance, and warranty required as part of the Agreement. In addition, the Contractor shall provide central data system hosting and on-site maintenance (during and after warranty) as specified herein.

The fare collection equipment specified herein shall be used as follows:

- The TVMs are intended for the purpose of selling paper tickets and passes to State transit customers using coins, bills and bank cards (credit/debit). Tickets issued by the TVMs shall be for short term use (*i.e.*, single trip tickets, two trips, day passes), and shall be issued on nonmagnetic, thermal receipt-type ticket stock, with security provisions included.
- Via a dedicated Ethernet communications system and wireless data communications, all TVMs shall communicate a wide variety of data with the Central Management System (CMS), which shall monitor and control the TVMs, and generate reports necessary for maintenance, administration, reconciliation and settlement.

The Contractor shall provide the TVMS as defined herein. The Contractor shall provide materials that are new and free of defects and which conform to the requirements of this Scope of Work.

## 1.2 Summary System Description

The new bus rapid transit line named CT***fastrak*** is scheduled for implementation in February 2015. The project involves the purchase of 38 vehicles that will ~~be dedicated to~~ operate on ~~the~~ dedicated bus rapid transit lanes called a guideway. The new CT***fastrak*** fleet will be commingled with other State buses that will also operate along the BRT corridor.

A new fare collection system is envisioned for all buses that serve the entire state of Connecticut. The new statewide system involves a fixed-route bus fleet of approximately 600 vehicles in 8 operating divisions and the CT***fastrak*** corridor with 13 stations and 38 dedicated vehicles.

Coincident with the procurement and implementation of the TVMS is the procurement and implementation of a New Fare Technologies System (NFTS). The NFTS will implement a smart card-based system that will operate throughout the State's operational area, including for the new CT***fastrak*** line. Because the TVMs procured under the Agreement are to vend plain-paper tickets only, there is no interface or integration of the TVMS with the NFTS.

The Contractor shall supply and install TVMs at the following locations:

Table 1.2: Base TVMS Equipment Quantities

| Station / Location | Platform | Power | Network | TVMs |
|---|---|---|---|---|
| UCONN Health Center | TBD | 125 VAC or Solar | Wireless | 2 |
| Westfarms | TBD | 125 VAC or Solar | Wireless | 2 |
| State House Square | Sidewalk | 125 VAC or Solar | Wireless | 2 |
| Trumbull Street | Sidewalk | 125 VAC or Solar | Wireless | 2 |
| High Street / Union Station | Sidewalk | 125 VAC or Solar | Wireless | 2 |
| Sigourney Street Station | Northbound | 125 VAC | Wired | 0 |
| | Southbound | 125 VAC | Wired | 2 |
| Parkville Station | Northbound | 125 VAC | Wired | 0 |
| | Southbound | 125 VAC | Wired | 2 |
| Kane Street Station | Northbound | 125 VAC | Wired | 0 |
| | Southbound | 125 VAC | Wired | 2 |
| Flatbush Avenue Station | Center | 125 VAC | Wired | 2 |
| Elmwood Station | Northbound | 125 VAC | Wired | 0 |
| | Southbound | 125 VAC | Wired | 2 |
| Newington Junction Station | Northbound | 125 VAC | Wired | 0 |
| | Southbound | 125 VAC | Wired | 2 |
| Cedar Street Station | Northbound | 125 VAC | Wired | 0 |
| | Southbound | 125 VAC | Wired | 2 |
| East Street Station | Northbound | 125 VAC | Wired | 0 |
| | Southbound | 125 VAC | Wired | 2 |
| East Main Street Station | Northbound | 125 VAC | Wired | 2 |
| | Southbound | 125 VAC | Wired | 2 |
| Downtown New Britain Station | Center | 125 VAC | Wired | 4 |
| Maintenance Test Facility | | 125 VAC | Wired | 1 |
| **Total Installed** | | | | **35** |
| Operational Spares | | | | 5 |
| **Total Ticket Vending Machines** | | | | **40** |

## 1.3 Project Schedule

~~Time is of the essence for this Project.~~ The Contractor shall install, test, and make ready for full revenue service the TVMS and all its components in accordance with the stipulated contract time and Milestones contained in Article 2 of the Agreement.

## 1.4 System Implementation

The State is seeking to implement the TVMS on an aggressive schedule, and with a maximum degree of flexibility in how the new system is put into effect. The State recognizes that the NFTS will require the agency to adopt many new internal procedures and organizational modifications. The State acknowledges that its customers may also see numerous changes in how they interact with the agency and pay their fares.

Wishing to balance its desire for rapid TVMS deployment with the realization that both the State and its customers are limited in the rate at which change can be absorbed, the Contractor shall plan and implement the TVMS to satisfy the following objectives:

- The Contractor shall design, develop, test, and install all elements of the TVMS as a single, coherent program, and make all aspects of the system functional and ready for revenue service in a single coordinated phase.
- The Contractor shall develop the TVMS so that the State may activate features and fare policies independently and on a schedule defined by the State.

In any case, the Contractor shall install and make ready the entire TVMS in a single coordinated phase. Regardless of the number of features and capabilities active at any time, the TVMS shall satisfy all functional requirements of a modern fare collection system.

## 1.5 Definitions

A list of definitions may be found in the Agreement under the "Definitions" section. In addition, there are some definitions specific to this Scope of work. Wherever in these Contract Documents the following terms and abbreviations are used, the intent and meaning shall be interpreted as follows:

Availability – The time or rate, usually expressed as a percentage, that a device or system is fully operational.

Bankcard – A credit or debit card issued by a bank or financial institution.

Contract Deliverables Requirement List (CDRL) – Items to be provided by the Contractor to the State to be reviewed and approved as defined by these Contract Documents.

CT – Documents to be provided by the Owner (Connecticut Department of Transportation) to the Contractor.

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Days – Unless otherwise designated, days as used in the Contract Documents shall be understood to mean calendar days.

Equal – Whenever the words "equal" or "approved equal" are used in connection with make or quality of material or equipment in these Contract Documents, the State's decision as to whether any material or equipment proposed is equal to that specified shall be binding and final on both the Contractor and the State.

Exact Fare Only Mode – A mode of operations where the TVM accepts coins and/or bills for payment but may have insufficient coins to make change, or has no change-making capability.

Failure – The inability of a component or equipment to function or perform its intended function as designed or specified.

Failure Rate – The frequency of failure, expressed as failures per unit of time (in days) or failures per number of cycles (number of transactions). Failure rate is the mathematical reciprocal of MTBF and MCBF.

First Article – The first one of any production component of the fare collection equipment that is produced. The Contract Documents provide that production components not be manufactured prior to drawing approval, so the First Article shall have been made to approved drawings.

Interface – The points where two or more systems, subsystems or structures meet and transfer energy, data or information.

Lowest Level Replaceable Unit – The lowest unit (component) of a system or subsystem that is removable and replaceable from an installed position by standard attachments (*e.g.*, bolts and nuts, quick disconnects, units such as printed circuit boards, displays, keypads, wiring harnesses, and complete electromechanical assemblies sold by the Contractor or OEM suppliers as spare parts, etc.).

Maintainability – The ability of the fare collection system to be maintained by the State's applicable maintenance staff or provider, including enhancement of access to equipment and components that require maintenance.

Mean Cycles Between Relevant Failures (MCBF) – The mean number of operating cycles between successive independent failures.

Mean Time Between Relevant Failures (MTBF) – The mean operating time interval between successive independent failures.

Modular – Composed of standardized, interchangeable units, designed to facilitate maintenance and repair.

Module – A standardized, interchangeable unit, designed to facilitate maintenance and repair.

Non-Relevant Failure - A malfunction caused by conditions external to the machine or subsystem or caused by out of scope conditions.

Overpayment – Surplus payment made for a selected fare when sufficient change may not be available, *i.e.* the TVM is in Exact Fare Only Mode.

Proof (used as a suffix) – Apparatus is designated as dustproof, waterproof, etc., when so constructed, protected, or treated that its successful operation is not interfered with when subjected to the specified material or condition.

Relevant Failure – A malfunction that prevents a fare collection device or computer system from performing its intended function with the performance criteria specified.

Reliability – The probability of performing a specified function without failure and within design parameters for the period of time or the number of cycles specified under service conditions.

Safe/Safety – The condition in which persons are free from threat or danger, harm, or loss arising from improper design, manufacture, assembly, malfunction, or failure of the fare collection system or any of its components or elements. Safety and security are an integral part of this contract and will be implemented in a manner that complies with the CT***fastrak***'s Safety and Security Management Plan (SSMP).

Service-Proven – Identical or near identical equipment which has demonstrated successful operation in a transit industry environment similar to that anticipated for the State.

System Accuracy – The measurement of the fare collection system's precision in accounting for monies deposited and dispensed.

Tamperproof – Items are designated as tamperproof when they cannot be easily loosened, opened, or penetrated with commonly available tools such as a flat blade or Phillips screwdriver or pliers.

Ticket – A printed medium to provide proof of payment.

Tight (used as a suffix) – Apparatus is designated as watertight, dust-tight, etc., when so constructed that the enclosing case shall exclude the specified material.

Time-Out – When a prescribed amount of time has elapsed during which a specified action has not occurred.

Transaction – A complete transaction: for the TVM, the purchase of one or more tickets by a customer in a single operation (*e.g.,* the purchase of two round-trip tickets is one operating cycle).

## 1.6 Abbreviations

| | |
|---|---|
| ABA | American Bankers Association |
| ADA | Americans with Disabilities Act |
| AES | Advanced Encryption Standard |
| ANSI | American National Standards Institute |
| API | Application Program Interface |
| ASCII | American Standard Code for Information Interchange |
| BIN | Bank Identification Number |
| BRT | Bus Rapid Transit |
| BTU | British Thermal Unit |
| °C | Degrees Centigrade |
| CDRL | Contract Deliverables Requirement List |
| CMS | Central Management System |
| COTS | Commercial Off The Shelf |
| CTDOT | Connecticut Department of Transportation |
| dB | Decibel |
| DES | Data Encryption Standard |
| ECU | Electronic Control Unit |
| EPROM | Erasable Programmable Read-Only Memory |
| ERD | Entity Relationship Diagram |
| °F | Degrees Fahrenheit |
| FACI | First Article Configuration Inspection |
| FDR | Final Design Review |
| FIT | Factory Integration Test |
| FRB | Failure Review Board |
| IEC | International Electrotechnical Commission |
| IEEE | Institute of Electrical and Electronics Engineers |
| ISO | International Organization for Standardization |
| LAN | Local Area Network |
| LCD | Liquid Crystal Display |
| LED | Light Emitting Diode |
| LLRU | Lowest Level Replaceable Unit |
| Mbps | Megabits per second |
| MCBF | Mean Cycles Between Relevant Failures |
| MIL-STD | Military Standard |
| mph | Miles per Hour |

| | |
|---|---|
| MTBF | Mean Time Between Relevant Failures |
| NEC | National Electrical Code |
| NEMA | National Electrical Manufacturers Association |
| NFPA | National Fire Protection Association |
| NTP | Notice to Proceed |
| ODBC | Open Data Base Connectivity |
| PC | Personal Computer |
| PCI | Payment Card Industry |
| PDR | Preliminary Design Review |
| PIN | Personal Identification Number |
| PRM | Progress Review Meeting |
| RDBM | Relational Database Manager |
| RSAT | Revenue Service Acceptance Test |
| SIT | System Integration Test |
| SNMP | Simple Network Management Protocol |
| SQL | Structured Query Language |
| SSMM | Solid State Memory Module |
| SSMP | Safety and Security Management Plan |
| TVM | Ticket Vending Machine |
| UL | Underwriters Laboratories, Inc. |
| VAC | Volts, Alternating Current |
| VDC | Volts, Direct Current |

## 1.7 Reference Standards

In the case of conflict between provisions of codes, laws, and ordinances, the more stringent requirement shall apply.

The following is a list of standards referenced in the Contract Documents. The list is not intended to be all-inclusive. The latest revision in effect for each standard at the time of NTP shall be used in conjunction with the Contract Documents.

- Americans with Disabilities Act
- ANSI X9.24, Financial Services Retail Key Management
- Eurocard / MasterCard / Visa (EMV) Standards
- Federal Communications Commission emission limits
- IEC 529
- ISO/IEC 7811
- ISO/IEC 7816
- ISO 9001
- NFPA 70
- NFPA 130
- National Electrical Code
- Payment Card Industry Data Security Standards (PCI DSS)
- UL Standard 60950, “Information Technology Equipment – Safety”

## 1.8 Environmental Conditions

The Fare Collection Equipment shall be capable of being operated at the specified performance levels, stored, and maintained without impairment resulting from the natural or induced environmental conditions within which the State will use or store the equipment.

TVMs shall be designed to be resistant to liquid ingress caused by driving rain, blowing snow, and incidentally splashed water such as would occur during routine equipment and/or platform cleaning. Equipment enclosures shall comply with International Electrotechnical Commission standard 529 (IEC 529) to level IP34 or equivalent.

The following environmental factors shall be used as design guidelines and shall be considered as operational requirements. The Contractor shall ensure that no equipment damage occurs during manufacture, storage, and shipment as a result of climatic conditions that differ from those below.

Table 1.8: BRT Station Environmental Conditions

| Temperature and Solar Load | |
|---|---|
| Minimum ambient air temperature, external to equipment (storage) | 20°F |
| Minimum ambient air temperature, external to equipment (operational) | -15°F |
| Maximum ambient air temperature, external to equipment | 115°F |
| Maximum hourly temperature range | ±30°F |
| Maximum solar radiation | 300 BTU/hr/ft$^2$ |
| **Precipitation** | |
| Maximum rainfall rate (may include freezing rain) | 6 inches per hour |
| Maximum snowfall rate<br>(Either may occur simultaneously with worst case wind) | 12 inches per hour |
| **Humidity** | |
| Relative Humidity (non-condensing) | 30% to 98% |
| **Wind** | |
| Maximum sustained for 1 minute | 75 mph |
| Maximum gusting | 120 mph |

TVMs shall operate as specified in the climate common to the State's bus service region.

TVMs may be installed with no shelter provided over the equipment. TVMs shall be designed and be capable of operating or being stored without shelter under the conditions specified within this Section. If fans or other active methods are required to maintain suitable internal operating temperatures, such devices shall be thermostatically controlled to operate only when needed.

Coin, bill, ticket, and other openings and enclosure joints will be subject to wind-driven rain, snow, freezing rain, fog, and freezing fog, and shall be designed to assure proper operation of the equipment under such adverse conditions. All exposed surfaces including the push buttons, display screen, and coin and bill components shall be unaffected by detergents and cleaning solvents used by the State, including the infiltration of such materials into the machine as caused by using a sponge or brush to hand clean the unit. Means shall be provided to expel moisture within the TVMs to assure continued, reliable operation. Ticket stock shall be maintained in condition for proper feed and printing.

TVM finish, graphics panels, and all surfaces, including lettering, maps, and other information displayed on the equipment shall be resistant to ultraviolet radiation and air contaminants.

## 1.9 Electrical Power Source

Power circuits provided in the stations for the TVMs will be rated 125 VAC, 60 Hz, 20 amp (maximum), single-phase alternating current with separate ground wires. The TVMs shall tolerate voltage range of +10% to -20% and frequency variability range of +1 Hz to -3 Hz. TVMs, including any internal heaters, shall draw no more current than permitted by the National Electric Code for a 20-amp circuit.

In the downtown stations, commercial 125 VAC power remains an issue for the State and the City of Hartford. To facilitate TVM installation at some or all of the downtown stations, the State may exercise an option for TVMs to operate using self-contained solar power systems.

# 2 System Design Requirements

## 2.1 General Requirements

This Scope of Work defines the requirements for the design, manufacture, fabrication, furnishing, assembly, testing, inspection, and installation of the TVMS. The system shall be an integrated, electronic fare payment and collection system utilizing smart payment media. The TVMS and its equipment and software shall:

- Be ergonomic, aesthetically pleasing and designed and constructed in a manner that is easy to use, functional, and safe
- Meet all ADA requirements
- Facilitate easy access by authorized service and maintenance personnel
- Prevent any unauthorized access to machine components
- Be robust and suitable for non-stop continuous operation in a public transportation environment
- Provide full accountability and auditing of all transactions to a level of accuracy defined herein

## 2.2 Design Life

The TVMS shall be designed for a minimum service life of 15 years of operation in the State's bus service area. All equipment is expected to operate seven days per week and twenty four hours per day.

## 2.3 Prior Service Performance

Design of all equipment of the TVMS shall be identical to or derived from existing designs or fully functional prototypes slated for an operating environment equal to or more severe than experienced in State's bus service area. Prior performance in a controlled environment is insufficient.

## 2.4 Supply and Availability

At the time of delivery, TVMS equipment, and all associated components and software shall contain no non-standard, prototype, obsolete or discontinued products.

## 2.5 Materials and Workmanship

The TVMS shall be constructed of the highest quality materials suitable for trouble-free use in the intended environment. The Contractor shall be responsible for all materials and workmanship. It is the Contractor's responsibility to design, select, and apply all materials and workmanship to meet the requirements in the Contract Documents. Where alternate materials are offered, it is the responsibility of the Contractor to demonstrate the alternate materials are equivalent to the specified materials and to gain the ~~the~~ State's approval for the substitution.

All materials exposed to the outdoor environment shall be resistant to fading and ultraviolet light.

For all TVMS equipment, where dissimilar metals come in contact, the joint both inside and out shall be painted with an approved coating to exclude moisture from the joint, and provide a suitable insulating barrier separating the metals. Dissimilar metals are defined as those metals, which are incompatible with one another in the presence of moisture, as determined from their relative positions in the Electrochemical Series, or from test data.

## 2.6 Human Engineering

The TVMS shall be designed to ensure the safe, reliable and simple interface with customers and maintenance/servicing personnel. The equipment shall provide customers with displays, graphics and signage, controls and mechanisms that are simple to use, easy to understand, and conveniently located, and meet all ADA requirements. By following instructions given on and by the equipment, an inexperienced customer shall be able to understand the ticket purchase transactions. All such customer interfaces shall be user-friendly; that is, safe, predictable, simple to use, and in accordance with other applicable human engineering principles.

## 2.7 Aesthetic Requirements

The TVMS shall be designed to be attractive, with all controls, primary instructions, and customer interface display and inputs on a common front face of the enclosure. Lettering, lines, arrows, pictographs, signage, maps, color coding, indicator lights, and colors and physical features such as raised lettering and Braille (collectively referred to a “graphics”), and lighting shall be used to present aesthetically attractive and functional equipment.

All wording, graphics and other Customer information elements shall meet the specified language requirements and shall be subject to approval by the State. The Contractor shall submit a conceptual depiction of the TVMS appearance, including graphics panels and other aesthetic design considerations, for review and approval at the Preliminary Design Review. **CDRL 1**

## 2.8 Modular Components

Each of the basic functions within each type of machine shall be performed by modular components, which permit ready field replacement of inoperative modules to return the machine to service in minimal time.

The individual modules shall be fixed in unitized frames, rails, or slides with fast latching devices, captive fasteners, or other means that do not require the use of tools to remove and replace modules. Where required in this Scope of Work, modules shall also be secured by keyed locks to prevent unauthorized removal.

Internal control and power connections shall be made via plug-in connections. Plugs and receptacles for modules shall be keyed to prevent a module from being plugged into the wrong receptacle. Each module shall be installable in only one correct position and that position shall be readily apparent to maintenance and servicing personnel.

## 2.9 Interchangeability

All parts, components, modules, assemblies, and removable devices provided under this contract shall be fully interchangeable among machines without the need to make adjustment for proper compatibility. Mechanical parts shall not require use of matched sets of parts. Equipment enclosure mounting shall be identical for each TVMS so that the equipment is fully interchangeable among stations without the need to make installation adjustments.

Modules and components that are not interchangeable shall not appear to be interchangeable nor shall they be able to be installed into an incorrect slot, receptacle, rack, or location.

## 2.10 Inspection of Materials and Workmanship

All supplies, materials, and workmanship shall be subject to inspection at the Contractor's facilities, and to inspection and test prior to acceptance by the State, in accordance with the Contract Documents. In case of defective material or workmanship, or nonconformity to the Contract Documents, ~~the State~~CTDOT shall have the right either to reject the equipment with or without instructions as to their disposition, or to require their correction.

## 2.11 Structural Materials

All TVMS materials shall be suitably robust and made of materials to function in the State's bus service region, and to withstand normal use of a public device, without deformity, corrosion, or degradation, for the entire expected life of the equipment. The TVMS shall be constructed to meet the following structural design requirements:

A. The TVM cabinets shall form an integrated structure capable of resisting, without permanent deformation, fatigue, failure, or undue wear: impacts, vandalism, maximum wind conditions specified.

B. TVMs shall be designed to distribute evenly the equipment weight over the mounting pedestal.

C. Apparatus requiring frequent inspection, maintenance or adjustment shall be readily accessible and replaceable.

D. TVMs shall be capable of being anchored into locations other than station platforms, such as building floors, mezzanine floors, and on concrete slabs.

## 2.12 Source of Supply

The Contractor shall be responsible for all of the workmanship, and all of the materials, components, equipment, and accessories in the design, supply, and testing of the TVMS.

A. The Contractor shall furnish equipment and materials from the manufacturers identified in Contractor's submittals, unless otherwise approved by ~~the State~~CTDOT.

B. Only new and first quality materials conforming to the requirements of the Contract Documents and approved by ~~the State~~CTDOT shall be used in the TVMS, except for material used by the Contractor for convenience and which is not to be permanently incorporated in the TVMS.

C. If it is found that sources of supply that have been approved do not furnish a uniform product, or if the product from such source proves unacceptable per terms of the Scope of Work at any time prior to acceptance, the Contractor shall, at no additional expense to the State, take any and all steps necessary to furnish acceptable materials.

## 2.13 Electrical Design Requirements

All electrical and electronic systems shall be designed using only materials and components of proven quality and reliability. All devices shall be de-rated to operate within the acceptable range for electrical stress versus temperature for the type of service for which this TVMS is required.

Separate ground wires shall be used to properly ground the TVMs; all equipment, components and parts shall be grounded, both electrically and to the station's ground plane. The grounding scheme shall be configured so that performance of the equipment is not compromised due to common mode impedance coupling. The Contractor shall submit the grounding scheme to ~~the State~~CTDOT for review and approval at the Preliminary Design Review. **CDRL 2**

### 2.13.1 Electrical Design Criteria

Variations in the supply voltage and frequency shall cause an orderly shutdown of the TVMs at the point where the voltage or frequency falls outside the reliable operating range of a module.

### 2.13.2 Transient and Surge Suppression

High voltage transients on power or signal interface lines, including those due to nearby lightning strikes, shall not damage the TVMs.

Voltage transient suppression shall be provided for the protection of components and circuitry involving semiconductor devices. The TVMs shall be capable of withstanding transients of 5.0 kV peak pulse with a total energy of 750 joules without damage, improper operation or shutdown. The functional status of any such surge and transient suppressor circuitry shall be visible at all times when the outer door is open.

## 2.14 Code Requirements

The TVMS shall be designed to comply with all applicable local, State, or national codes, ordinances, statutes, standards, and federal rules and regulations existing at the time of Agreement execution date. The Contractor shall be responsible for identifying all local, State, or national design codes, ordinances, statutes, standards, and federal rules and regulations applicable to TVMS at the time of award. The TVMs shall comply with the Americans with Disabilities Act.

## 2.15 Installation Requirements

The Contractor shall install all TVMs and make all power and data connections to those devices.

The design of the TVMs shall permit installation as stand-alone units, side-by-side units (accommodating installation with 12 inches or less between cabinets), back-to-back units (with units abutted to each other), and in recessed areas.

## 2.16 Security

The design of the TVMS shall:

A. Discourage and minimize the effects of vandalism and theft

B. Prevent unauthorized access to the interior of the TVMs

C. Prevent unauthorized removal of the equipment from its installed location

D. Provide controlled levels of access to the interior of the equipment for maintenance personnel, revenue servicing personnel, and money processing personnel at the State's revenue-counting facility

E. Provide without undue delay, access to the equipment by authorized personnel equipped with proper keys and individual access code(s)

F. Additionally, the TVMS shall address all CT***fastrak*** requirements as indicated in the CT***fastrak*** Safety and Security Management Plan (SSMP). This applies to the TVMs, the TVMS in its entirety, the CMS, the Contractor's own operations, and all other activities associated with the Agreement.

The Contractor shall provide a Security Plan that describes the security methods and features incorporated into the TVMS, and the procedures to monitor and maintain TVMS security. The Contractor shall submit the System Security Plan for ~~the State's~~CTDOT's review and approval. **CDRL 3**

## 2.17 Fault Tolerance and Disaster Recovery

TVMS design shall provide the ability to quickly recover from power, communications and system software failures. The system shall automatically return to its operating state, without loss of data. The Contractor shall provide documentation explaining how this fault tolerance and recovery capability will be achieved at the Preliminary Design Review **CDRL 4**, and shall identify the files, databases, and software required to recreate an operational New Fare Technologies System in the event of a disaster.

## 2.18 Interchangeability

All parts, components, modules, assemblies, and removable devices provided under this contract shall be fully interchangeable among devices without the need to make adjustment for proper compatibility. Mechanical parts shall not require use of matched sets of parts. Equipment enclosure mounting shall be identical for each device so that the equipment is fully interchangeable among vehicles and locations without the need to make installation adjustments.

Modules and components that are not interchangeable shall not appear to be interchangeable nor shall they be able to be installed into an incorrect slot, receptacle, rack, or location.

## 2.19 Protection against Vandalism and Burglary

For protecting against vandalism and burglary for each TVM, the following requirements shall be met:

- All latches shall be secure and robust.
- All external screws shall be tamperproof.
- All fasteners used to secure equipment shall be concealed and tamperproof.
- All hinges for the front door and external access panels shall be concealed.
- Security locks with profile catches shall be used. All security locks shall capture and hold the key whenever the lock is open.
- Locks and keepers shall be drill-resistant stainless steel, and be mounted flush with the outside surface of the access door.
- The cabinet designs shall hinder any use of burglary tools.
- All gaps between doors/access panels and the cabinet shall be consistent along each edge and shall not exceed 0.05 inches when the door/access panel is latched.
- Reinforcement shall be provided at the positions where there is the possibility of burglary.

- Each TVM shall be equipped with an alarm system as described in Section 3.10~~3.10~~ for indicating unauthorized intrusion, burglaries, and faults.
- While the outer doors are secured, the TVM shall remain operational and undamaged after experiencing a kick, punch, or other impact resulting in a concentrated load of 300 pounds to one square inch to any part of the enclosure.

The Contractor shall submit conceptual security provisions, including lock(s) and door latching schemes for the TVMs, for ~~the State's~~CTDOT's review and approval at the Preliminary Design Review. **CDRL 5**

## 2.20 Data Communications

All TVMs shall communicate with the CMS, and shall be equipped with all necessary communications hardware and software to meet the requirements of the Contract Documents. Each station shall have a communications link that connects all TVMs at that station together into a Local Area Network (LAN). For non-station locations off the guideway, such as the downtown stations, Bradley Airport, Union Station, and any other non-guideway locations (including spares), the TVMs shall use wireless communication with the CMS.

The TVM shall communicate with their station LAN utilizing TCP/IP protocols over an Ethernet link providing data transmission speeds no less than 100 Mbps.

Alternatively, and in all the non-station locations off the guideway, the TVMs shall communicate wirelessly with the CMS via cellular service, Wi-Fi or some other revenue service-proven method provided by the Contractor and approved by the State.

## 2.21 Safety and Security

The TVMs shall be free from safety hazards. The equipment shall be designed to comply with relevant UL Standards, NFPA 70, “National Electric Code,” and applicable requirements.

The exterior surfaces of TVMs, including all controls and appurtenances, shall have no sharp edges. Particular attention shall be given to protecting blind persons who may explore the surfaces with their fingers. The edges of all panels, graphic displays and faceplates, and the surfaces of all exposed hardware such as hinges, locks, handles, and fasteners shall be free of sharp edges or burrs.

All interior surfaces and components with which maintenance personnel could come in contact shall be free of sharp edges and other hazards. Internally, there shall be no protruding screws or exposed wires that could injure maintenance personnel.

Objects shall not protrude from the fare vending equipment in the planes nominally perpendicular to the station platform.

The TVM light fixture shall extend no more than four inches beyond the front face of the TVM cabinets, and shall not be positioned in such a manner as to cause a bumping hazard.

All objects that protrude 1 inch or more from any exterior surface of the TVMs, including the TVM light hood, shall be designed with rounded corners and edges with minimum 0.25-inch radii to reduce the chances of injury.

All components shall be electrically grounded and shall prevent electrical leakage or static charge. Electrical components shall have suitable warning graphics indicating the voltage present and other hazards.

Additionally, the TVMS needs to address all CT***fastrak*** requirements as indicated in the Safety and Security Management Plan (SSMP). This applies to the TVM's, the TVMS in its entirety, the CMS, the Contractor's own operations, and all other activities associated with the Agreement. The current version of the SSMP is included as Schedule E to the Agreement.

## 2.22 Software Requirements

### 2.22.1 Software Design

Design criteria identified in this section, unless otherwise indicated, shall apply to all software in the TVMS:

A. Be developed with flexibility in mind employing a language that is fully functional within its implementation for the selected microprocessor system, and shall be commercially available in English.

B. Be sufficiently robust, so that the system can recover from error conditions and power losses with a minimal impact on operations.

C. Include provisions for setting and verifying date and time, with automatic adjustments for leap year, and daylight savings time changeovers.

D. Be fully integrated with the operating system to support all required functions of the applications programs in both a networked and a stand-alone environment.

E. Allow for the distribution of software modifications to all TVMS devices from a centralized location.

F. Allow the ability to revert to a previous software version.

G. Be fully debugged, documented, and includes all approved revisions introduced up to the time of final acceptance.

H. Where the TVMS software is a derivative of a previous developed system, ensure that all software patches and modifications for known errors have been successfully installed prior to installation.

I. Perform self-diagnostic routines and respond promptly, safely, and predictably to detected faults. The self diagnostics shall include tests for program corruption and integrity in read/write memories.

J. Respond safely and predictably when powering up or recovering from power interruptions.

K. Permit thorough interrogation of all input, output, and internal conditions by external diagnostic equipment.

L. Utilize central tables of codes and values for each function, and provide a facility update central tables prior to implementation of changes, with an effective date designating the actual implementation of each change.

M. Provide Software error codes that contain easily understood explanatory text –and include the manner in which the error can be corrected.

N. Be designed using best practices that allow for an OS or database patches and upgrades with minimal testing.

### 2.22.2 Coding

Software shall be coded in a non-proprietary language. Except as expressly permitted by the State, hard-coding of configuration parameter values shall be prohibited. All programs and routines shall reference central tables of codes and values for each function. A process shall be provided to facilitate updating of tables prior to implementation of changes, with a future effective date designating the actual implementation of each change. No less than five (5) years of effective date code and values shall be maintained so that reports can be constructed from historical data spanning changes in fares and other parameters.

CMS and TVM software error code entries shall be available for editing at the CMS level with the ability to add additional error codes as required. The procedure for these modifications shall be provided to the State for review at the Preliminary Design Review and for approval at the Final Design Review. **CDRL 6**

All source code, including comments and development tools, shall be in English. Source code shall be well structured, modular, and clearly documented to allow easy comprehension and straightforward traceability to the Software Design Description documents. Software comments shall also include explanations of all significant memory addresses such as interrupt vectors, I/O addresses, and memory locations for RAM, ROM and other memory devices.

All CMS and Customer-interface software shall be menu-driven and easy for Customers and/or non-technical employees to use. Software shall utilize a Graphical User Interfaces (GUI), with pull down menus, icon command prompts, on-line help features, capable of activation in combination with the keyboards or keypads.

Microcomputers, or any other system components, shall not rely on, or employ, the use of PROMs or EPROMs. All code updates at the device level shall be implemented without requiring mechanical intervention or component exchange to accomplish the change.

### 2.22.3 Capacity

Software shall be capable of being configured to communicate and process with a minimum of 100 TVMS devices (simultaneous, online). This information is provided to assist the Contractor in estimating the size, communications throughput, and minimum memory requirements of the New Fare Technologies System. The ability to accommodate an expansion to two times the above number of transactions shall be included in the system design.

### 2.22.4 Testability

All features and functions of software systems shall be testable on a systems level. Specific approval by the State is required for any feature that is not testable on a systems level. For features that are only testable with special equipment, the Contractor shall supply all such equipment as test equipment, which shall become the property of the State. This equipment shall provide the logic, sequencing, and emulation necessary to verify that the software functions as intended.

## 2.23 Maintainability and Serviceability

TVMs shall provide reliable operation over its design life, and shall be designed to require simple, minimal scheduled and unscheduled maintenance tasks. The time for entry into a machine, removal, and replacement of a module, and restoration of the machine to an operating condition shall not exceed three minutes.

TVMs shall provide for maintenance through the front of the machine. The interior of the TVMs shall be designed to allow easy and safe access to service equipment and subassemblies. Adequate space shall be available to insert keys, to grasp, lift, and turn internal components, and to remove and replace units, components, connections, and ticket stock. As appropriate, guides, rails, tracks, handles, and captive fasteners shall be provided to facilitate installation and removal of modules. The means to access for service, remove, and replace all modules shall be subject to ~~the State's~~CTDOT's review and approval at the Preliminary Design Review. **CDRL 7**

Any component or module that must be lifted, except coin vaults when full, and coin hoppers when full, shall not weigh more than 20 pounds. Any exceptions to this weight limitation shall be subject to ~~the State's~~CTDOT's approval. **CDRL 8**

For ease of service, all electrical connections between components and subassemblies shall be established by means of connectors to allow rapid removal of a component and/or subassembly from the TVMs. Plug-in connections shall be made simply, quickly and securely, and shall be equipped with strain relief to prevent damage to cables and connectors.

## 2.24 Component Serialization

All major parts and equipment shall identify the manufacturer, part nomenclature, part number, revision number and serial number. Part numbers and serial numbers shall be identified using a barcode or similar method. Within a type or model series, all serial numbers shall be unique. With the approval of the State, a separate identification plate, permanently affixed to each serial numbered component, may be applied below the prescribed area for the barcode data. The location of bar coding data shall be chosen for readability and scanning without disassembly of equipment or components other than normal maintenance access covers or removal of the component.

~~All major parts and equipment shall have nameplates that identify the manufacturer, part nomenclature, part number, revision number and serial number. Part numbers and serial numbers shall be permanently stamped or engraved on the nameplate. Within a type or model series, all serial numbers shall be unique. The nameplate shall have provisions for applying bar coding data to identify the stamped or engraved part number and serial number. With the approval of the State~~CTDOT~~, a separate identification plate, permanently affixed to each serial numbered component, may be applied below the prescribed nameplate for the barcode data. The location of the nameplate and bar coding data shall be chosen for readability and scanning without disassembly of equipment or components other than normal maintenance access covers or removal of the component.~~

The Contractor shall establish serialized identification procedures for use in identifying part numbers and serial numbers of parts and equipment furnished by the Contractor and all subcontractors. The Contractor shall assign designated codes and blocks of numbers for identification of both Contractor and subcontractor part numbers and serial numbers. The serial numbering scheme to be utilized shall be subject to approval by ~~the State~~CTDOT as part of the Final Design Review. **CDRL 9**

Within 30 days after the Final Design Review, the Contractor shall furnish for ~~the State~~CTDOT review and approval a list of the items to be serial numbered. **CDRL 10**

## 2.25 Fare Policies and Pricing

As noted herein, TVMs and the CMS shall support all current and future fare policies *for low-value fare transactions*. The Contractor shall configure all TVMs with fare tables supporting the

low-value fare policies and pricing structure in effect at the time the equipment enters revenue service. All fare products and pricing shall be State-configurable via the CMS.

The TVM shall support the fare polices in effect as of the revenue service date identified in Section 1.3.

Table 2.25 depicts the State's current fare pricing structure.

Table 2.25: Tickets to be Vended

| Type | Full Fare | Youth Fare | Reduced Fare |
|---|---|---|---|
| Single Trip | $1.30 | $1.05 | $0.60 |
| 3-Hour Pass | $2.60 | TBD | TBD |
| Day Pass | $3.25 | [redacted] | [redacted] |

# 3 Ticket Vending Machines

## 3.1 General

The TVMs shall be designed to sell tickets and passes with cash (any combination of coins and bills) and bank cards. TVMs shall be capable of issuing different tickets, passes or combinations thereof from within the same housing. In general, each TVM shall:

- Accept U.S. coins and bills
- Accept authorized bank cards
- Respond to customer's choice of action
- Display the current amount due based on customer selections and payments
- Print and issue paper fare media that are valid upon issue
- Print and issue receipts and audit tickets
- Display instructions and notices
- Return deposited funds when a transaction is cancelled
- Store all transaction data
- Provide audio output of messages and instructions
- Contain a security and alarm system
- Communicate over a network to send and receive data and commands with the Central Management System (CMS)

The TVMs shall be fully compliant with the relevant Payment Card Industry (PCI) Standards in effect at the time of contract award. Preliminary design drawings of the interior and exterior of the TVMs and all major assemblies identified shall be submitted for ~~State~~ CTDOT approval at the Preliminary Design Review. **CDRL 11**

A complete description of the functionality of the TVMs shall be provided for ~~State~~ CTDOT review and approval at each stage of the design review with the final document fully describing the operation, capabilities, and functionality of the TVM as described within section. Sufficient detail shall be provided to permit verification that all required functions are satisfactorily included. **CDRL 12**

Contractor shall provide~~d~~ dimensioned drawings of the TVMs showing each side and with the doors and covers both opened and closed. This shall also show the position of all modules, sensors, controls, connections and interfaces internal to the TVM for review by ~~the State~~CTDOT. **CDRL 13**

## 3.2 TVM Cabinet Construction

### 3.2.1 Equipment Enclosure

All TVM modules shall be enclosed in a sturdy cabinet that shall conform to the following specifications:

A. The TVM cabinets shall be constructed of stainless steel or epoxy powder-coat painted steel of sufficient thickness to satisfy the requirements stated herein. Contractor shall submit a sample and specifications of the finished steel of the TVM cabinets for ~~the State's~~CTDOT's review and approval as part of the Preliminary Design Review. **CDRL 14**

B. The TVM cabinets shall be sufficiently robust to withstand long-term use by the public. When properly installed according to the Contractor's installation procedures, the TVM

cabinets shall withstand, without permanent deformation, a force of 300 pounds applied horizontally in any direction at the top of the machine cabinet.

C. An open TVM door shall be able to withstand a concentrated vertical force of 100 pounds applied at the extreme open edge of the door without causing damage or deformation of any part of the door or TVM cabinets.

D. All external controls and displays shall be robust and vandal-resistant.

E. Access to the equipment shall be provided by a hinged front door having a minimum of 110 degrees of opening and be equipped with a latch to hold the door.

F. The door hinges and pivoting mechanism shall be tamperproof and adjustable to allow for proper alignment of the door and locking devices during installation and when in operation.

G. The TVM door shall be secured using a multipoint locking system.

H. The TVM interior shall be illuminated by a standard service lamp that shall operate by a manual switch and only while the outer door is open.

I. The top of the TVMs shall slope to the rear or sides sufficient to prevent any accumulation of precipitation on the top of the TVMs.

J. All displays shall be protected by polycarbonate or other revenue service proven materials, which do not inhibit operation.

### 3.2.2 Information Signage Holder

An information signage holder shall be provided for the front of the TVM to allow suitable printed information explaining the operation of the TVM and fares, State information, and service announcements or newsletters.

~~The State~~CTDOT shall be responsible for the design and production of the signage to be placed in the information signage holder. Completed information signage shall be provided by ~~the State~~CTDOT at least 30 days prior to TVM shipment, and shall be installed by the Contractor prior to shipping TVMs.

### 3.2.3 Exterior Light Fixture

The TVM shall be equipped with an exterior light fixture and shall:

A. Illuminate the front face of the TVM.

B. Consume less than 15 watts and use nominally white Light Emitting Diode (LED) lighting.

C. Contain a commercially available lamp or lamps and circuits, and be constructed to allow easy replacement of the lamp with access obtained by use of a key.

D. Provide an ambient light sensor to automatically turn on the light fixture when ambient light conditions on the reading surface of the TVM fall below 25 foot-candles. A bypass switch inside the enclosure shall permit the light fixture to be switched on and off manually.

#### ~~3.2.4 Support for Externally-Mounted Magnetic Ticket Validator~~

~~The TVM cabinet shall serve as a mounting location for an externally-mounted Magnetic Ticket Validator (MTV), supplied by others. The MTV weighs no more than 15 pounds, and is expected to be approximately 16 inches high, 8 inches wide, and 8 inches deep.~~

~~Both sides of the TVM cabinet shall accommodate installation of the MTV so that the MTV satisfies ADA height requirements. While most TVMs will have a single MTV, some TVMs may have two MTVs mounted to the cabinet. The TVM cabinet shall accommodate up to two MTVs mounted to the exterior.~~

~~The MTV will utilize 125 VAC power, supplied by an auxiliary GFCI power outlet inside the TVM,~~

~~The MTV may communicate via an Ethernet CAT-6 cable, connected to the State's station LAN.~~

~~The State~~CTDOT ~~will provide detailed drawings for the MTV mounting hardware, including necessary mounting hole sizes and positions, and cabling access hole sizing and position, within 90 days of~~ after the ~~Notice to Proceed~~ is issued. ~~**CT 1**~~

~~The State~~CTDOT ~~will supply all mounting hardware and cover plates (to cover and seal holes for unused MTV mounting locations) for the MTVs no later than 90 days prior to commencement of TVM installation.~~ ~~**CT 2**~~

~~The State~~CTDOT ~~will define the mounting position for each MTV, based on TVM location, no later than 90 days prior to commencement of TVM installation.~~ ~~**CT 3**~~

~~The Contractor shall pre-drill all holes necessary to support installation of the externally-mounted Magnetic Ticket Validators on both sides of the TVM.~~

~~Based on information and installation drawings provided by the State~~CTDOT~~, the Contractor shall install all MTV mounting hardware (supplied by the State~~CTDOT~~).~~

~~Alternatively, the MTV shall not be connected to the TVM in any manner but shall be a free standing device not mounted to a railing or other structure. Such mounting arrangements shall not require the above materials and documentation from the State~~CTDOT ~~to be provided to the Contractor.~~

## 3.3 TVM Security and Access Control

### 3.3.1 TVM Keys and Locks

All TVMs shall have controlled key locks to implement three distinct levels of security:

1. Permit opening of the TVM front door
2. Permit removal of revenue storage modules
3. Permit opening of revenue storage modules when removed from the TVM

All keys for a given security level shall be identical. The keyways for all high security keys shall be registered to the State, and replacements shall be available only to the State-authorized personnel directly from the lock manufacturer, or their authorized representative.

The Contractor shall provide ten sets of keys with each set uniquely numbered. These keys shall be securely shipped under separate cover directly to the State's designated representative. **CDRL 15**

### 3.3.2 Access to TVM Interior

Access to the interior of the TVM for maintenance and servicing shall require the following steps for an individual to gain access to the interior of a TVM for either servicing or maintenance. If the proper access method is not followed, the intrusion alarm shall be activated and the TVM shall notify the CMS of a security breach.

A. Proper opening of the front door of the TVM.

B. Within a prescribed time period (adjustable by the State and initially set to 30 seconds), the individual must enter the individual user ID and password on the service keypad inside the TVM. The TVM shall allow a maximum of three attempts to enter a proper user ID/password combination; failure to enter valid login information within the time limit or three successive failed attempts for the same user ID shall be considered an intrusion.

A display or other indication visible from the inside of the TVM shall indicate valid or invalid input. Audible tones for incorrect data entry shall also be provided.

Sensors shall detect the status of the outer door lock; the TVM door shall be considered open or unsecured whenever the outer door is not in the fully locked and closed position.

A listing of all messages and prompts available with the service interface shall be submitted for ~~the State's~~CTDOT's review and approval at the Preliminary Design Review. **CDRL 16**

Audit and maintenance receipts printed by the TVM shall never include sufficient printed information to allow unauthorized access to the interior of the TVM. Samples shall be provided to ~~the State~~CTDOT for its review and approval, and to ensure full TVMS auditability. **CDRL 17**

## 3.4 Customer Interfaces

### 3.4.1 General Customer Interface Requirements

The customer interface with the TVM shall be at the front of the machine. All customer interface openings shall be designed to prevent unauthorized access to the TVM interior.

It shall be possible for the customer to change any transaction selection up to the moment when the first coin or bill is deposited, or when a bank card has been inserted. Once payment media has been inserted, it shall no longer be possible for new customer selections to be made until the current transaction has been completed or canceled.

### 3.4.2 Customer Selection Controls

The TVM shall provide buttons in the same area as the c~~C~~ustomer d~~D~~isplay screen that shall be variably defined as transactions progress. Using the TVM's selection interface, customers shall be able to select any available transaction type; the TVM shall present customers only those selections that are currently available according to operating status, ticket stock availability, and so on.

The TVM shall incorporate dynamically-defined menus/prompts to accommodate all requirements of the TVMS. When the same function appears in several selections/screens, its location shall be consistent.

Buttons for the entry of numeric information shall also be provided and shall not be designated as function keys. Certain functions shall be implemented in pre-defined pushbuttons that are always functional while the TVM is operating:

A. One VOICE message pushbutton which, when depressed, shall cause message(s) to be annunciated to the customer in the currently selected language as identified in Section 3.4.6. This button, or another control, shall also be used to control the volume.

B. One CANCEL pushbutton which, if activated before fare payment has been completed shall cancel transaction according to the procedures described in Section 3.14.1.

C. One LANGUAGE pushbutton which, when depressed, shall cause the information displayed to the Customers to be displayed in an alternate language as identified in Section 3.4.5.

### 3.4.3 Customer Display Screen

The c~~C~~ustomer d~~D~~isplay screen shall be either a 4-line, 20-character per line LCD display or VGA screen with a diagonal measurement of not less than 10 inches. The c~~C~~ustomer d~~D~~isplay screen shall be vandal resistant and shall be able to withstand direct blows as defined in UL certification testing.

The display shall be mounted at an angle that maximizes the ability of customers to read the screen while at the same time ensuring that the alignment of any line/arrows to adjacent selection buttons leaves no doubt as to what text or graphic on the screen is associated with each button. The display shall have a non-glare finish that can be easily read at all ambient light levels, including direct sunlight.

### 3.4.4 Audible Tones

The TVM shall emit distinctive tones to provide audio feedback to the customer each time a button is pressed and during circumstances where additional customer action is required. The volume of the tones shall be field-adjustable locally for each TVM, and shall be audible in all station environments.

The Contractor shall identify all audible tones and provide digitally recorded samples of each for ~~the State's~~CTDOT's review at the Preliminary Design Review and the State's approval at the Final Design Review. **CDRL 18**

### 3.4.5 Multi-Lingual Capabilities

The TVM shall include one or more selection buttons to toggle the display and the voice message system between English and Spanish. The TVM display and voice message system shall support at least two additional languages.

The alternate language button(s) shall be active at all times while the TVM is in service. Pressing an alternate language button at any time while the TVM is in the idle condition, and at any time during a transaction, shall cause the TVM to switch displayed and audio messages to the selected language.

Whenever a transaction is completed or canceled, the TVM shall return to English. Pressing the CANCEL button while the TVM is displaying the idle screen shall cause the TVM shall return to English.

### 3.4.6 Voice Instructions

The TVM shall provide audible voice instructions. The voice system shall utilize human recorded speech or digitally synthesized speech. If digitally synthesized speech is used, it shall approximate human speech. No additional moving parts shall be required to play back the recorded information.

Operations and functionality of the voice instruction system shall fully comply with the Americans with Disabilities Act (ADA) and the most recently published version of the ADA Accessibilities Guidelines (ADAAG).

The TVM shall contain a vandal resistant speaker mounted inside the TVM, and its output shall be clearly audible from outside and in front of the TVM at all places within the viewing envelope described in Section 3.4.3.

The TVM shall also provide a standard jack for headphone use. Whenever headphones are plugged into the jack, the external speaker shall be disabled, and all audible tones described in Section 3.4.4 and all voice messages shall be directed to the headphone jack.

### 3.4.7 Instructional Graphics

Instructions shall be contained on the front panel of the TVM to clearly indicate each step a customer must follow to choose and purchase a ticket or tickets. The sequence of steps shall be clearly indicated by the use of common, standard graphics and symbols.

All instructions, Braille, and graphics directly applied to the front face of the TVM shall be presented in American English.

## 3.5 Coin Processing System

The TVMs shall accept the following U.S. coins: nickels, dimes, quarters, and post-1978 dollar coins. The Coin Processing System shall also be capable (without hardware modification) of accepting a future token, and be capable of accepting at least one other denomination of coins for future use. The Coin Processing Unit shall consist of:

- A coin acceptor/verifier (Section 3.5.1)
- A coin return cup (Section 3.5.6)
- A coin vault (Section 3.5.5)
- A chassis and its associated wiring and electronic devices

Coin vaults shall be key-locked into the TVM and shall be removable from the TVM without tools. Any module containing coins shall remain secure when removed from the TVM; access to money stored in such modules shall be granted only with keys available in the cash counting facility as described in Section 3.3.1.

The Coin Processing System shall automatically switch to an out-of-service condition if any one coin processing module is not installed or not operating properly.

The Coin Processing System shall be electrically and mechanically constructed to fulfill the requirements of this specification. Complete performance and status information shall be available locally and remotely at the CMS.

### 3.5.1 Coin Acceptor/Verifier

The coin acceptor/verifier shall include a coin insertion mechanism and a verifier to accept U.S. coins of the following denominations: 1-cent, 5-cents, 10-cents, 25-cents and post-1978 dollar coins. The verifier shall reject and return to the Customer rejected, counterfeit, excessively bent, and foreign coins, as well as slugs, and other foreign objects. The coin acceptor/verifier shall accept and properly process not less than 10 different coin types, each with a different profile.

The coin acceptance and verification process shall take less than two seconds per deposited coin, measured from the instant the coin is inserted into the coin slot until the coin acceptor is ready to process another coin.

The coin insertion mechanism shall be designed so that liquids entering through the slot flow out of the TVM to avoid damage to the TVM and its components.

Coins shall be electronically verified based upon their metallic content. Coin verification shall be consistent and repeatable. The criteria for verifying coins shall be State-adjustable for each coin value.

The coin acceptor/verifier shall prevent retrieval of coins by fishing such as with wire or attached thread.

The Contractor shall furnish any equipment necessary to adjust the Coin Processing System and to reconfigure the Coin Processing Unit for other coins at the completion of the Factory Qualification Testing as identified in Section 8.3. **CDRL 19**

### 3.5.2 Coin Acceptance Rate

The coin acceptor/verifier shall meet the following acceptance rates:

- 98% of valid coins shall be accepted upon initial insertion.
- 99% of valid coins shall be accepted upon one reinsertion.
- All known counterfeit coins, common slugs, foreign coins, and coins of denominations not accepted by the TVM shall be rejected upon every insertion.

### 3.5.3 Coin Accuracy

The coin acceptor/verifier shall identify valid acceptable coins upon first insertion with at least 99.99% accuracy.

### 3.5.4 Coin Recirculating System

The State prefers that the TVM issue change by the use of a recirculating coin system. However, change-making is not mandatory for the TVM. If the TVM provides change, the coin system shall function as described herein.

The coin recirculating system shall include a minimum of four self-filling coin recirculating modules, one for each of the following coin types: nickel, dime, quarter, and dollar, with the dollar coin recirculating module reconfigurable as a second quarter recirculating module. Each coin recirculating module shall have a capacity of at least 55 coins. The coin recirculating system shall:

A. Provide correct change with the fewest number of coins when excess payment is made and change is available;

B. Return the value of the inserted coins if a transaction is canceled or aborted;

C. Provide self-replenishing coin storage; and,

D. Deposit coins into the coin vault when the recirculating module for a particular coin is full, as well as when a coin type has no recirculating coin module assigned.

The TVM shall automatically detect the location of each recirculating coin module, continuously monitor the contents of each, and adjust its operation accordingly. If the transaction is cancelled before completion of the transaction, coins equal to the value of inserted coins shall be returned to the ~~Coin Return Cup~~coin return cup.~~.~~

The TVM shall provide authorized revenue service personnel a distinct command to manually initiate the addition of coins to the coin recirculation system. With the TVM outer door open, it shall be possible to randomly insert coins into the coin validator, allowing the TVM to monitor the denominations of inserted coins. The coin recirculating system shall then deposit the coins into the appropriate recirculating modules. At the initiation of recirculating coin replenishment, an audit receipt shall be printed showing the number of coins in each tube; at the conclusion of replenishment, another audit receipt shall be printed showing the new quantities in each recirculating module and the total value of coins added. All necessary TVM data registers shall be updated to reflect the additional coins.

### 3.5.5 Coin Vault

Each TVM shall be equipped with a removable coin vault having a capacity of at least 300 cubic inches. The coin vault shall function as an end collection container for coins. Coins shall enter the coin vault through an opening in the coin vault. Using sensors or other means, the TVM shall confirm the passage of all coins to the coin vault; failure to detect a coin being deposited into the coin vault shall be considered a jam and shall cause the TVM to cease accepting coins.

When properly installed in the TVM, it shall be impossible to access coins in the coin vault without damaging the vault in an obvious manner.

When a full coin vault (containing no less than 250 cubic inches of mixed US coins) is dropped from a height of three feet onto a concrete floor on any corner or side, the vault shall remain fully operational, shall suffer no more than cosmetic damage, shall not open, nor shall its locking mechanism be impaired.

The coin vault shall have a handle or handles placed to avoid injury, which provides adequate gloved-hand clearance for easy insertion, removal and carrying. The maximum weight when full shall not exceed 40 pounds.

TVM shall detect a full coin vault and a nearly full coin vault, which shall cause an event to be recorded and transmitted to the CMS. The determinations of full and nearly full conditions shall be independently software controllable and adjustable by the State. The TVM shall cease to accept coins when the coin vault becomes full, but change shall continue to be dispensed as necessary from the coin recirculating and supplemental change storage systems.

### 3.5.6 Coin Return Cup

The opening for the Coin Return Cup shall be recessed and covered with a clear polycarbonate spring-loaded or weighted door that opens inward, and which does not present a pinching hazard when opened and closed by customers. The door shall be at least 0.25 inches thick and completely cover the opening when closed. The bin and its door shall be robust, scratch-resistant, and visually prominent. The coin return shall be designed to drain any liquids placed in the bin to the outside of the TVM.

## 3.6 Bill Processing System

Each TVM shall be equipped with a Bill Processing System, which shall accept at least 13 different types of bills. The bill processing system shall accept documents inserted in any of the four possible lengthwise orientations. The Bill Processing System shall be capable of accepting multiple varieties of $1, $5, $10 and $20 bills inserted. The Bill Processing System shall include:

- A bill validator
- A bill vault
- A chassis and its associated wiring and electronic devices

Within a TVM, no Bill Processing System shall function unless all bill processing modules are properly installed within the TVM. The Bill Processing System shall automatically switch to an out-of-service condition if any bill processing module is not installed or operating properly.

### 3.6.1 Bill Validator

The bill validator shall accept one bill at a time and shall determine its validity and denomination.

If the bill is acceptable and the fare value has been reached by the processing of that bill, the validator shall forward it to the bill vault.

If the bill is acceptable and the fare value has not been reached by the processing of that bill, the validator shall retain the bill in an internal “escrow” until the next bill is inserted. Upon insertion of a succeeding bill, or completion of payment (with coins), the escrowed bill shall be deposited in the bill vault.

If an inserted bill is rejected, it shall be returned to the Customer and the bill validator shall hold it until the customer removes the document from the bill validator slot.

If a bill is held in the bill validator escrow when a transaction is canceled (by the customer or automatically by the TVM), the bill validator shall return the escrowed bill and hold it until the customer removes the document from the bill validator slot.

The bill validator shall be designed to reject pieces of paper or other foreign material that can be introduced into the bill slot. A mechanical blocking function shall be provided to prevent withdrawal of a bill after acceptance. It shall be possible for maintenance and revenue service personnel to gain ready access to the bill path to clear jams once the TVM door is opened.

The TVM shall be configurable by the State to inhibit the acceptance of any denomination and insertion orientation; as delivered, the TVMs shall accept $1, $5, $10 and $20 bills. As the US Treasury releases new designs of bills, the Bill Processing System shall be capable of being programmed to accept the new designs while continuing to accept the current designs as long as the number of accepted different types of bills has not been exceeded.

The bill validator shall provide easy access (without the use of tools) to the bill processing path to enable authorized technicians to clear jams and inspect the bill validator.

Except when bills are jammed, when the bill validator is removed from the TVM, it shall not be possible to retrieve or fish bills from the bill vault.

### 3.6.2 Bill Acceptance/Rejection Criteria

The bill validator shall determine the denomination and validity of both sides of a document by dimension checks and pattern and color recognition. The bill validator shall be able to detect

counterfeit bills, including copies made in either single or double-sided printing on an electronic copier and those made with color printers.

Document verification shall be consistent and repeatable. The bill validator shall be adjustable to differences in bills in circulation due to bill production and printing variances. The bill validator shall be adaptable to reject fraudulent currency that may be introduced to circulation.

Valid bills to be accepted by the bill acceptor shall include currency in general circulation within the US that are not excessively worn, torn or otherwise defaced.

### 3.6.3 Bill Acceptance Rate

The bill validator shall meet the following acceptance rates for bills:

- 95% of valid bills shall be accepted upon initial insertion.
- 97% of valid bills shall be accepted within two insertions.

All known counterfeit bills, color photocopies of valid bills, duplicates made by other known means, foreign bills, and bills of denominations not accepted by the TVM shall be rejected upon every insertion.

### 3.6.4 Bill Accuracy

The bill validator shall properly identify the denomination of all valid acceptable bills with at least 99.999% accuracy.

### 3.6.5 Bill Vault

The Bill Processing System shall be equipped with a removable bill vault. The bill vault shall have the capacity to securely hold not less than 750 bills, stacked:

A. Bills shall be stored in a neat stack in the bill vault.

B. It shall not be possible to open the bill vault while it is installed in the TVM, nor possible to install an open or unlocked bill vault in the TVM.

C. When properly installed in the TVM, it shall be impossible to access bills in the bill vault without damaging the vault in an obvious manner.

D. The bill vault shall withstand regular removal, replacement and normal handling without deformation that in any way interferes with the insertion and removal process.

E. When dropped from a height of three feet on a concrete floor on any corner or side, the full bill vault shall remain fully operational, shall suffer no more than cosmetic damage, shall not open, nor shall its locking mechanism be impaired.

F. The bill vault shall have a handle or handles placed to avoid injury, and which provide adequate gloved-hand clearance for easy insertion, removal and carrying.

G. When full, the bill vault weight shall not exceed 20 pounds.

Provision shall be made to detect a full bill vault and a nearly full vault, which shall cause an event to be recorded and transmitted to the CMS. The determinations of full and nearly full conditions shall be independently software controllable and adjustable by the State for each TVM. The TVM shall cease to accept bills when the bill vault becomes full.

### 3.6.6 Bill System Security Interlocks

The bill vault shall be locked into the TVM and shall be provided with a security interlock to ensure that bills shall leave the acceptor for transfer into the bill vault only when a bill vault is properly installed. Concealed, tamperproof sensors shall detect when each bill system module has been properly installed.

Each bill vault shall have a visually and electronically readable serial number. The TVM shall automatically read and identify as valid the serial number of each inserted bill vault. Removal of the bill vault shall cause reading the electronically readable serial number to cease. This information shall be stored locally and transferred to the CMS. All appropriate counters shall reset when the bill vault is removed.

### 3.6.7 Bill Jams

In the event a bill becomes jammed inside the Bill Processing System, it shall immediately cease accepting bills and make several attempts to automatically clear the jam. Upon failure to clear the jam, the TVM shall cancel the transaction, return all monies possible, and leave the Bill Processing System out of service.

## 3.7 Bank Card Processing System

The TVM shall include the necessary module(s) to process bank cards (credit and debit) for the purchase of tickets. The following functions shall be provided:

A. All attempts at using non-bank cards (e.g., department store credit cards and gift cards) shall be rejected locally by the TVM or by the CMS (without requesting authorization from the clearing house).

B. Each fare table entry (ticket type selection) shall have an associated the State adjustable parameter that determines whether the selection can be purchased with a bank card. For those fare table entries that are not identified as being available for purchase with bank cards, the bank card reader shall not be enabled when the associated ticket type is selected. Such transactions shall be “Cash Only,” and the TVM shall display an appropriate message whenever the customer selects such tickets.

C. Prior to authorizing a bank card transaction, the customer shall be prompted to choose whether the transaction is to be a credit or debit transaction.

D. Distinct bank card transaction time-outs, modifiable by the State where possible, shall be provided for each required input.

E. The customer shall have the ability to cancel the bank card transaction up until the time authorization is received by the TVM.

F. All bank card transactions shall be screened by the CMS and the bank card authorization clearing house prior to issuing ticket(s). If the CMS is inoperative, or communications to the CMS are disabled, or communications with the bank card authorization clearing house are disabled, bank card transactions shall be unavailable, and all TVMs shall enter “Cash Only” mode.

G. All bank card transactions shall be conducted in full compliance with all portions of the Payment Card Industry Standard, card provider rules and common/standard banking processes.

### 3.7.1 Magnetic Stripe / Contact Bank Card Reader

The Bank Card Reader shall consist of a dip card reader such that the bank card is not captured completely by TVM. The Bank Card Reader shall be capable of simultaneously reading ISO/IEC 7811 tracks 2 and 3. The Bank Card Reader shall be capable of reading contact smart cards that are compliant with ISO/IEC 7816 parts 1 through 3.

The Bank Card Reader hardware shall be certified compliant with relevant EMV standards in effect at the time of contract award, and shall be easily upgraded to be compliant with any updates to the EMV standards that are pending within 5 years after commencement of revenue service.

### 3.7.2 Contactless Bank Card Reader

The Contactless Bank Card Reader antenna shall be flush mounted to the front of the TVM and be protected by a cover that is resistant to vandalism.

The Contactless Bank Card Reader shall be certified compliant with relevant EMV standards in effect at the time of contract award, and shall be easily upgraded to be compliant with any updates to the EMV standards that are pending within 5 years after commencement of revenue service.

### 3.7.3 Bank Card Personal Identification Number (PIN) Keypad

Each TVM shall include a secure keypad for PIN entry when debit cards are used, and whenever EMV transaction procedures so dictate. The PIN keypad shall also be used to enter ZIP codes to satisfy address verification requirements, if so desired by ~~the State~~CTDOT.

The PIN keypad shall be mounted near the bank card reader and constructed of revenue service proven, durable and non-corrosive materials and suitable for outdoor installation.

The PIN keypad shall be capable of operating in both an encrypting and non-encrypting or “clear” mode so that it can be used for data entry and customer selections.

The PIN keypad shall be certified compliant with relevant EMV standards in effect at the time of contract award, and shall be easily upgraded to be compliant with any updates to the EMV standards that are pending within 5 years after commencement of revenue service.

The PIN keypad shall be fully compliant with the relevant PCI Standards in effect at the time of contract award, and shall be easily upgraded to be compliant with any updates to the PCI DSS standards that are pending within 5 years after commencement of revenue service.

The PIN keypad shall employ encryption as required in accordance with banking requirements. The Contractor shall supply all PIN keypads with production encryption keys injected.

## 3.8 Ticket Printer System

Each TVM shall be equipped with a Ticket Printer System to meet the requirements of this Scope of Work. A conceptual description of the TVM Ticket Printer System shall be submitted for ~~the State's~~CTDOT’s review and approval at the Preliminary Design Review. **CDRL 20**

### 3.8.1 Function

The Ticket Printer System shall be able to select, cut, print, and dispense tickets and passes of different types, using one or more ticket/receipt rolls or bundles.

In addition, the TVM shall be equipped to print and issue audit tickets for accounting and registration requirements. Tickets, receipts and audit tickets shall print on the same ticket/receipt stock. **CDRL 21**

The ticket printing system shall sense the progress of the ticket through the printer and detect the completion of the ticket dispensing process. A sensor shall detect when the ticket has left the printer on its way to the coin return/ticket bin. Should a ticket fail to clear this sensor, the TVM shall go out of service and return funds for all unissued tickets.

A State-adjustable sensor shall be provided to detect when each ticket stock is 10% to 25% of capacity. When this sensor is activated, the ECU shall record as an event and transmit to the CMS a ticket stock low condition. When any ticket stock is depleted, the ECU shall record as an event and transmit to the CMS a ticket stock empty condition.

Whenever one or more rolls of identical stock is used for additional capacity, the TVM shall switch from one ticket stock roll to another of identical stock, once the first roll has been depleted.

Replacement of stock shall require only rudimentary knowledge of the TVM. Clearly illustrated instructions showing proper ticket stock orientation and feeding procedures shall be placed inside the TVM adjacent to the ticket stock holders.

When fully stocked, the TVM shall have capacity to print and dispense no less than 2,000 tickets.

### 3.8.2 Ticket Printing

The thermal printer(s) shall utilize print heads that provide no less than 100 dots per inch of resolution. Thermal print heads shall be easily replaceable, and shall produce no fewer than 250,000 tickets without the loss of a single pixel due to wear or electronic failure.

Depending upon ticket type, the ticket printer shall be capable of printing information as required by ~~the State~~CTDOT. Examples of data shall include, but not be limited to, the following:

- TVM Number (eight characters)
- Expiration Date – month, day and the last two digits of the year
- Expiration Time – four digits separated by a colon and followed by two letters “AM” or “PM,” using a 12-hour clock (e.g., 11:45AM, 1:20PM.)
- Station name where purchased – (32 characters)
- Fare type – (32 characters)
- Passenger type – Full Fare, Youth Fare, Reduced Fare
- Purchase price of the ticket – up to $99.99
- A 2-dimensional secure (encrypted) bar code, not less than one inch square
- Other information to be printed on the tickets to provide visual verification of validity

All ticket print data, including any ~~State~~CTDOT-specified graphics, shall be completed and the ticket deposited in the Coin Return Cup within three seconds from start of the print cycle.

Two-dimensional barcodes shall contain sufficient information to enable the ticket type and validity to be machine-readable. The TVM shall print barcode data in a ~~State~~CTDOT-specified industry-standard format, which shall be encrypted with an industry standard algorithm and encryption key defined by ~~the State~~CTDOT. ~~The State~~CTDOT shall provide the barcode format, encryption algorithm, and encryption key within 120 days after the Notice to Proceed is issued. ~~**CT 4**~~ **CT 1**

Ticket print data shall be clearly legible to customers and fare inspectors. Ticket text shall be printed in characters as large and clear as possible, consistent with generally accepted ticket printing formats. Printing shall not degrade the physical condition of the ticket. There shall be no extraneous marks placed on the ticket as a result of the printing operation.

The printing shall not be erasable with chemicals without leaving any traces of erasure, shall be water and fade resistant, and shall not smear, blur, or transfer upon immediate handling by a customer. Character fonts shall not have any missing dots, and all dots shall be complete, closed, aligned, and filled. Contrast shall be uniform throughout the entire print. The Contractor shall submit printing samples on actual ticket stock samples for ~~the State~~CTDOT approval as part of the Preliminary Design Review. **CDRL 22**

The State will require occasional ticket print format modifications, or additional ticket types for sale from the TVMs. Such changes shall be able to be performed by the State employees. Ticket printing format, including information to be printed, print location, orientation, size and font, shall be controlled by programmable software.

### 3.8.3 Ticket Stock Description

The TVM shall dispense tickets from roll stock that is commercially available in the United States. All ticket stock shall be paper-based, non-magnetic, one-ply, thermal receipt paper of approximately 2 inches wide and no less than 0.007 inches (7 mils) thick. Each ticket shall be approximately 4 inches long. Ticket stock shall incorporate security features, such as watermarks, security threads, ultraviolet ink or other similar method to minimize the counterfeit tickets. The security feature selected shall be selected by and approved by ~~the State~~CTDOT, based on alternatives provided by the Contractor.

The ticket stock shall be provided in rolls which shall accommodate a minimum of 1,000 tickets per roll.

The Contractor shall submit specifications for this ticket stock for ~~the State's~~CTDOT's approval as part of the Preliminary Design Review. **CDRL 23**

### 3.8.4 Audit Tickets

On demand of an authorized technician and as required, the TVM shall produce audit tickets. Each audit ticket shall indicate the date, time, TVM number, technician name or number (not security code), and other specific information as required. The Contractor shall supply samples of all audit tickets for ~~the State's~~CTDOT's review and approval as part of the Preliminary Design Review. **CDRL 24**

Where audit tickets provide information that is subject to modification, including coin and bill denominations and ticket types, means shall be provided that permit ~~THE STATE~~the State to easily modify printed text.

### 3.8.5 Transaction Receipts

For single-ticket transactions purchased with a bank card, the TVM shall augment the text printed on the ticket with additional information (such as the truncated bank card number) to satisfy receipt requirements as stipulated in Federal Reserve Regulations E and Z. If necessary to accommodate this additional information, the length of the ticket may be increased.

For multiple-ticket transactions purchased with a bank card, the TVM shall issue a separate receipt (on ticket stock) that includes all information necessary to comply with Federal Reserve

Regulations E and Z, including the total cost of the transaction. This receipt shall include text that clearly indicates it is not a valid ticket.

The Contractor shall supply samples of all receipts for CTDOT's review and approval as part of the Preliminary Design Review. **CDRL 25**

### 3.8.6 Ticket Cutter Mechanism(s)

Each printer in the Ticket Printer System shall be equipped with a self-sharpening cutting mechanism to cut individual tickets and receipts from the roll supply. Each cutter shall perform at least 1,000,000 cuts without requiring replacement or sharpening.

## 3.9 Electronic Control Unit

Each TVM shall be equipped with an Electronic Control Unit (ECU), linked appropriately to the CMS to control, store, coordinate, supervise, and respond as appropriate to the status, operation, security, and accounting of all TVM functions.

Whenever the TVM shuts down due to loss of commercial power, upon restoration of power, the TVM shall automatically resume operations within 4 minutes and shall provide a warning to the CMS.

### 3.9.1 ECU Hardware

The ECU shall be based on a PC-compatible industrial microcomputer system, or other revenue service-proven microprocessor system. The ECU at a minimum shall be equipped with:

A. A microprocessor with adequate processing power to meet all performance and technical requirements.

B. Non-volatile random access memory for operating program(s) and other temporary needs. The ECU shall have sufficient RAM to avoid the use of virtual memory as a means of temporarily supplementing RAM during normal TVM activities.

C. Solid-state non-volatile memory device(s) for operating system and application software. Capacity shall exceed current storage needs by at least 200%. This is the TVM primary memory.

D. Redundant memory to accommodate a copy of all primary memory and physically separate from the primary memory.

E. Ethernet (minimum 100 Mbps) and other communications interfaces as required to support external communications as described in Section 2.20.

F. A "watchdog" timer circuit that automatically initiates an orderly operating system restart (i.e., a system shutdown and reboot) in the event of a software-induced failure such as a total suspension of all activities.

G. Components as necessary to support the Voice Messaging System described in Section 3.4.6.

H. A method to remove a full copy of the secondary data should damage occur to the primary memory

### 3.9.2 Data Memory

A programmable memory shall be provided to contain all station names and designated zones, all types of tickets and passes, and a minimum of two sets of fare tables (one current, one future).

Non-volatile data storage shall be provided for accounting, registration, and event data; the contents of these registers shall be updated with each transaction or event. A second copy of the contents of the non-volatile data registers shall be stored on a physically separate removable Solid State Memory Module (SSMM). All TVM sales, status, and event data shall be successively and safely registered, even if a power failure occurs.

### 3.9.3 ECU Clock

Each ECU shall contain its own real-time electronic clock, which shall be used to generate time signals and maintain an accurate record of year, month, day, date, and time. The clock shall be resynchronized whenever the times between the CMS and the TVM are more than 1 minute different. This shall be a State-settable parameter.

### 3.9.4 Operating System

The ECU shall employ commercially available operating system software. The operating system shall be of the latest version available from the supplier (minimum Microsoft Windows® 7 or State-approved equivalent) and be fully supported by the OEM supplier. The operating system shall be subject to the review and approval of the State at the Preliminary Design Review. **CDRL 26**

## 3.10 Alarm Unit

Each TVM shall be equipped with an alarm unit that shall have the ability to monitor TVM security conditions and report them to the Electronic Control Unit (to be forwarded to the CMS).

## 3.11 Power Supply

The TVM shall have a main power switch that removes all power from all devices within the TVM cabinet.

The TVM power switch shall turn the TVM's power supply on or off; this switch shall be separate from the main circuit breaker that removes all power from the TVM.

### 3.11.1 Commercial Power

For TVMs connected to 125 VAC commercial power, the TVM shall be equipped with a modular, filtered power supply which shall be connected to the incoming grounded electrical service as specified in Section 1.9. The power supply shall be connected to the incoming electrical service and deliver all of the necessary operating voltages for the TVM. Voltages internal to the TVM shall not exceed 125 Volts.

### 3.11.2 Optional Solar Power

If the State exercises the option for solar-powered TVMs, for those TVMs requiring solar power, the TVM shall include a self-contained Solar Power System. The Solar Power System shall:

A. Provide sufficient power to continuously operate the TVM 24 hours per day.

B. Include photovoltaic solar panels, mounted to the TVM top, which shall charge internal batteries or other such power storage modules, to enable the TVM to operate when little or no sunlight is available.

C. Enable the TVM to issue no less than 500 tickets per day using all modes of payment, including the worst-case scenario of several consecutive cloudy days around the Winter solstice. For the purposes of assessing power storage requirements, the Solar Power System shall also provide sufficient power to issue no less than 200 tickets before 9:00 AM local time every day, including the worst-case scenario described above.

D. Include power storage devices that require replacement no more than once every 3 years.

E. Support installation of the TVMs in the downtown Hartford locations identified in Table 1.2.

TVMs operating with solar power shall satisfy all reliability and performance requirements stated herein, including operations in all temperatures and environmental ranges defined in Table 1.8.

The TVM shall monitor the status of the available power and transmit a low-power alarm to the CMS whenever the TVM has less than a State-configurable time of remaining power, initially set to 2 hours.

Subject to ~~the State~~CTDOT review at the Preliminary Design Review and CTDOT approval at the Final Design Review, the Contractor shall provide a comprehensive description of the TVM solar power system, demonstrating that the system satisfies the TVM's power requirements in the downtown Hartford locations identified for solar-powered TVMs. **CDRL 27**

## 3.12 TVM Software

TVM application software shall consist of software code that operates on the ECU for control and supervision of TVM functions. TVM application software shall also provide diagnostic software for testing and troubleshooting of all TVM functions. TVM application software shall include all software packages necessary for real-time TVM diagnostics and accounting and registration communications between the TVMs and the CMS.

The TVM software shall permit the State to control various aspects of the TVM operations by varying the values of parameters. The variable parameters shall be modifiable both locally and remotely by downloading information via the CMS. A complete preliminary listing of all variable operational parameters for the TVM shall be submitted for ~~the State~~CTDOT review and approval at the Preliminary Design Review. **CDRL 28**

The CMS shall be capable of downloading updated application software to the TVM (individually, in groups, or system-wide). With new application software remotely loaded, a remote command from the CMS to reinitialize the TVM shall result in execution of the new application software.

The Contractor shall submit a description of the TVM application software, depicting all Customer transaction flows, for ~~the State's~~CTDOT's review at the Preliminary Design Review and ~~the State's~~CTDOT's approval at the Final Design Review. **CDRL 29**

## 3.13 TVM Screen Flow

The progression of screens presented to the customer during transactions shall be logical and straightforward.

The Contractor shall provide detailed screen flows depicting "snapshots" of each screen layout arranged as a logical flow chart for ~~the State's~~CTDOT's review at the Preliminary Design Review and approval at the Final Design Review. **CDRL 30**

## 3.14 TVM Operation

### 3.14.1 Cancel Functions

In the event that one of the following conditions occurs prior to commencement of ticket/pass issue, the ECU shall initiate a cancel signal, causing all deposited monies to be returned and the transaction canceled. Transactions shall be cancelled for the following instances:

A. Actuation of the CANCEL button shall cancel the transaction.

B. Excessive Coins or Bills Inserted – Insertion of quantities of coins or bills greater than programmable limits shall cause the TVM to cancel the transaction and return all deposited funds.

C. Shutdown – Unless otherwise specified elsewhere in this Scope of Work, any shutdown condition, including AC power failure, shall result in cancellation of the transaction, the return of all deposited funds, and orderly shutdown of the TVM.

D. Power failure

### 3.14.2 Time-Out Operations

As described below, the TVM shall provide State-adjustable time-out periods to return the TVM to the idle state in prescribed times between steps of a transaction and between transactions. Other time-out periods, as applicable to the transaction process, shall also be adjustable by the State. All time-outs shall be identified in the review of the transaction process that shall occur at the Preliminary Design Review, and shall be subject to ~~the State's~~CTDOT's approval at the Final Design Review. **CDRL 31**

A. Intra-Transaction Time-Out - An intra-transaction time-out function shall be provided which shall limit the time between successive steps of any transaction.

B. Inter-Transaction Time-Out - Similar to the intra-transaction time-out described above, TVM operation shall also provide for an inter-transaction time-out. This timer shall limit the amount of time the TVM waits after completion or cancellation of a transaction (except as noted below) before resuming the idle state.

C. Idle Screen Time-Outs - Two distinct time-outs shall apply while the TVM is displaying the idle screen.

- Alternate Language Time-Out. If a customer selects an alternate language while the TVM is displaying the idle screen but takes no further action for a State-adjustable period, the TVM shall revert to English. This time-out shall be adjustable from 1 to at least 120 seconds in increments of 1 second, and shall be initially set to 30 seconds.
- Screen Saver Time-Out. After a State-Transit adjustable period displaying the idle screen, the TVM shall display a screen saver as described in Section D. The screen

saver time-out shall be adjustable from 1 minute to at least 90 minutes in increments of 1 minute, and shall initially be set to 5 minutes.

D. Bank Card Authorization Time-Out - The TVM shall also include a separate time-out parameter to define the time allowed for a response from the CMS for bank card transaction authorization. This parameter shall be initially set to 20 seconds, and shall be adjustable by the State in the range of 1 to at least 90 seconds.

### 3.14.3 Cash Transaction Processing

The TVM shall process cash transactions according to State-configurable operating parameters that shall include, at minimum:

- Maximum change payout (if TVM issues change), initially set to $3.75
- Maximum overpayment value (excess payment for which change will not be issued), initially set to $2.00
- Maximum total transaction value, initially set to $32.50 (equal to 10 day passes)

The bill validator shall also reject otherwise valid bills if the inserted bill would cause the TVM to exceed the maximum allowed change payout or the maximum overpayment value. For example, if the maximum overpayment is set to $2.00, the TVM shall accept a $5 bill for purchase of 3 full-fare single-ride tickets. (Such a transaction would result in an overpayment of $1.10.) For the same transaction, the TVM shall reject a $10 bill, since the overpayment would exceed the maximum allowed. However, if a passenger elects to purchase 3 day passes in a single transaction, the TVM shall accept a $10 bill for the purchase. (Such a transaction would result in an overpayment of 25 cents.)

### 3.14.4 Exact Fare Mode

If the TVM issues change, the TVM shall enter the “Exact Fare Mode” when the coin recirculating system contains insufficient coins to dispense the maximum change payout. While in the “Exact Fare Mode,” the coin processing unit shall continue to accept inserted coins, and shall issue change when possible.

When sufficient coins are inserted and placed into the coin re-circulating system, restoring change-making capabilities, the TVM shall without any intervention upgrade its status to full in-service operation.

In the “Exact Fare Mode,” the TVM shall have a maximum overpayment threshold. This parameter shall be adjustable by the State, either through the CMS or locally at a TVM. ~~The State~~CTDOT will provide the successful Contractor with the definition of the initial overpayment value parameter at the Final Design Review. **CT ~~5~~2**

## 3.15 Supplemental Battery Power

The TVM shall be equipped with a battery operated supplemental power supply integral to the TVM and connected to the primary power supply. The supplemental power supply shall be of sufficient capacity to permit the TVM to perform the following functions in the event of an AC power failure or fault, or other fault that would cause the TVM to shutdown without AC power:

- If the entire fare value has been collected prior to loss of AC power but after ticket printing has commenced, the transaction shall be completed. This includes ticket printing, issuance of all change due, and transfer of inserted money to associated vault(s).

- If loss of AC power occurs before the entire amount has been collected or prior to ticket printing, the transaction shall be canceled and the inserted money shall be returned to the customer.
- Transmit a power loss alarm message to the CMS.
- Record an event in the TVM's non-volatile memory indicating date and time of power loss.
- Conduct an orderly shutdown such that no data loss occurs.

## 3.16 Ticket Purchases

The TVM shall support purchase of tickets using cash and bank cards (credit and debit). Customers shall select the following:

- Customer type (Full Fare, Reduced Fare, Youth, etc.)
- Ticket Type (Single Trip, Round Trip (if applicable), Day Pass (if applicable)
- Number of Tickets (Default 1, Maximum 10)
- Payment Method

The TVM shall include one or more "quick selection" buttons that shall enable Customers to purchase a single ticket with only a single press of a button. Alternatively, the TVM selection process shall include default settings to enable the purchase of any single ticket with only a single button selection.

The TVM shall support payment method selection in two forms:

A. First Payment Method Used, which shall cause the alternate payment method to be automatically disabled. For example, if a coin or bill is inserted first, the bank card reader shall be disabled and all payments shall be completed with cash. If a bank card is inserted before any cash, the TVM shall disable the coin and bill systems and then prompt the customer whether to use credit or debit processing for the inserted card.

B. Selection Before Payment, which shall enable only the selected payment method to be used.

Once the payment method is selected, the Customer shall be prompted to provide payment:

- Bills and coins shall be inserted until the full payment has been reached or exceeded; or
- A credit card shall be inserted and removed in the card reader; or
- A debit card shall be inserted and removed in the card reader and the PIN shall be entered.

Once payment is completed, the TVM shall print and issue the ticket(s) and deposit the ticket(s) into the Coin Return Tray. As necessary, the TVM shall issue receipts for bank card transactions as described in Section 3.8.5.

## 3.17 Data Recording and Storage

The Electronic Control Unit shall process and store all ticket/pass sales, TVM status, event, and diagnostics in the data memory unit and transmit this information upon demand to the CMS. Access to data records at the TVM shall be restricted to authorized personnel on a need to know basis.

All recorded data shall be accessible directly from the TVM. Service personnel shall be able to access and print out all data accessible by them on audit ticket stock. All accounting, registration, event, and diagnostic information shall be sent to the CMS and shall on demand be

transferable to a Solid State Memory Module (SSMM) within the TVM for later manual transfer to the CMS. All accounting and registration information stored by the TVM on the SSMM shall be protected against any unauthorized manipulation.

At a minimum, this data shall include that data as described in Sections 3.17.1 through 3.17.7.

### 3.17.1 Sales and Transaction Data

Each ticket and pass transaction shall be separately recorded by the TVM. Transaction records shall include at minimum:

- Unique transaction identification number
- TVM number
- Date and time
- Ticket or pass type
- Number of tickets or passes in transaction (if applicable)
- Dollar value by payment method (cash, credit card, debit card,)
- Overpayment amount (if applicable)

Sales and transaction data shall be stored in the ECU's memory. The TVM shall continuously retain sales and transaction data records for the current and seven (7) previous days in memory. The TVM shall immediately transmit each transaction record to the CMS upon completion of the transaction, or when polled by the CMS.

When communications with the CMS are disabled, the TVM shall transmit transaction data as soon as communications with the CMS are restored.

### 3.17.2 TVM Configuration

The TVM shall record and update configurations to reflect current status and all changes. Current configuration information shall be available to all personnel authorized to gain entry to the TVM. The TVM shall immediately report to the CMS any change in TVM configuration. On demand, the TVM shall print an audit ticket indicating the configuration and the date and time each configuration item was changed.

### 3.17.3 TVM Revenue Status

On demand, an audit ticket with TVM revenue status information shall be printed as identified in Section 3.8.4. This information shall be restricted to those personnel with proper administrative and revenue access privileges.

The complete list of TVM revenue status properties to be recorded and reported shall be subject to ~~the State~~CTDOT review and approval at the Preliminary and Final Design Reviews.
**CDRL 32**

At a minimum, each TVM shall record and transmit to the CMS the following information about current revenue status.

- Serial number of each cash storage device
- Number and type of coins stored in each coin tube
- Number and type of coins stored in each of the coin hoppers
- Contents of bill vault (total and by denomination)
- Contents of coin vault (total and by denomination)
- Total value of all money currently stored in all devices

### 3.17.4 Current TVM Status

Status of the TVM shall be recorded and updated to reflect changes in the TVM's condition. Current status information shall be available to all personnel authorized to gain entry to the TVM. Any change in TVM status shall be immediately forwarded to the CMS. On demand, the TVM shall print an audit ticket indicating all status conditions and the date and time each condition occurred.

### 3.17.5 Events Data

The TVM shall record an event and report to the CMS whenever one of the data elements in Table 3.17.2 changes state. In addition, at a minimum, the following events shall be recorded by the TVM and reported to the CMS:

- TVM initialized
- TVM polled by CMS
- Data downloaded from CMS
- Anti-virus definitions downloaded from CMS
- Entry authorized by security code
- Entry authorized by alarm keyswitch (if applicable)
- Coin vault removed / installed
- Bill vault removed / installed
- Recirculating coin supply replenished (manually)
- Recirculating coins emptied to vault (manually)
- Power up
- Power down
- TVM clock error (*i.e.,* excessive time difference)
- Failed/interrupted bank card authorization request
- Manual diagnostic test routine initiated
- Supplemental change module removed / installed

Each event record shall contain, as appropriate, the TVM number, date, time, event code, employee identification number, TVM status, component code of inserted or removed component, and cash contents by denomination.

Each event shall be capable of being classified into one of at least three priorities. Event priorities shall be adjustable by the State at the CMS. Each event priority level shall also be the State definable as either an on-line or off-line event. On-line events shall cause the TVM to initiate communications to the CMS and transmit information about the event. Off-line events shall be recorded locally by the TVM and transmitted to the CMS upon the next polling. As delivered to the State, all event priorities shall be classified as on-line events.

The complete list of events to be recorded and the priority and category of each shall be submitted to ~~the State~~CTDOT for review at the Preliminary Design Review, and is subject to ~~the State's~~CTDOT's approval at the Final Design Review. **CDRL 33**

### 3.17.6 Alarm Conditions

Events shall be considered alarm conditions of varying severity. The assigned priority of each alarm shall be configurable by the State. The TVM shall transmit alarm conditions to the CMS as soon as possible. At a minimum, the following events shall be categorized as alarms (priority 3 events shall be categorized as informational events), and as delivered, the alarm priorities shall be assigned as indicated:

For each alarm event, a corresponding event to clear the alarm shall be transmitted by the TVM as soon as the alarm condition is no longer present. For Revenue Service and Maintenance Alarms listed above in Table 3.17.6, the alarm condition shall be cleared either automatically by the TVM or by manual intervention, as is appropriate to the alarm. Security Alarms listed above shall remain in effect until the following actions occur, at which time the TVM shall transmit a corresponding event to clear the alarm.

Table 3.17.6: TVM Alarm Condition Priorities

| Alarm Type | Priority |
|---|---|
| Bill vault full | 3 |
| Coin vault full | 3 |
| Exact fare mode (if applicable) | 3 |
| Ticket stock empty | 3 |
| Bill vault nearly full | 3 |
| Bill vault removed | 3 |
| Coin vault nearly full | 3 |
| Coin vault removed | 3 |
| Ticket stock low | 3 |
| TVM out of service | 2 |
| Bill Processing System out-of-order | 3 |
| Coin Processing Unit out-of-order | 3 |
| Customer Display out-of-order | 2 |
| Bank card system out-of-order | 3 |
| Solar Power Reserve (battery) low (if applicable) | 2 |
| Power loss | 2 |
| Ticket Printer System out-of-order | 2 |
| Solid State Memory Module out-of-order | 3 |
| TVM time-of-day clock error | 3 |
| Intrusion (unauthorized entry) | 1 |
| Intrusion attempt (impact sensor activated) | 1 |
| Unauthorized removal of cash storage device | 1 |
| Outer door unlocked or open | 2 |
| Service entry (authorized entry) | 3 |

### 3.17.7 TVM Test Routines

The TVM shall be capable of conducting a variety of test routines. Each TVM shall automatically perform self-diagnostic tests at regular intervals (at least once per day) and each time the TVM is initialized. Self-diagnostic tests shall at a minimum confirm communications integrity with all major modules and to the extent possible, exercise all electro-mechanical devices. Any failures identified during self-diagnostics shall be recorded in the TVM's internal status registers and shall result in corresponding events being recorded by the TVM and transmitted to the CMS. The TVM shall indicate status using a local display and printout from the TVM upon request by technician.

## 3.18 Fare Tables

The TVM shall have the ability to operate under any of a minimum of two (2) fare tables residing in TVM memory. Each of these fare tables shall be programmable to become the active set at a particular time and date and to expire at a particular time and date as well. They shall provide

for pre-loading new fare tables for new fare levels and to implement short-term, temporary special fares (e.g., special event service or special fares for a day). The Contractor shall provide details on the fare table configuration, set-up, and capacities. **CDRL 34**

# 4 Central Management System

## 4.1 General

The TVMS Central Management System (CMS) is critical to the CT*fastrak* service. As stipulated herein, the Contractor shall provide hosting services for a comprehensive Central Management System that gives the State the ability to control, support, and monitor the Ticket Vending Machines supplied under this ~~contract~~ Agreement and the functions they serve. The CMS shall provide transaction control, event and machine status reporting, a data repository for all event and transaction data, fare table implementation, system security and control of all communications between the devices, the host computer, and other internal and external systems.

All TVMs shall communicate with the Central Management System for transfer of all stored data and transfer of equipment parameters. The CMS shall provide automatic monitoring and control of all devices connected to the network.

Data processing and transmission shall be at a rate suitable for the required task; TVM customers shall perceive no delays due to equipment interaction with the CMS, and CMS users shall not experience unreasonable delays.

The CMS shall provide interface between the TVMs and a State-selected bank card clearing house, via a secure interface that is fully compliant with PCI DSS. The Contractor may suggest bank card clearing houses, although the State will have sole discretion to select the bank card clearing house.

*All* data collected by the TVMs and stored in the CMS shall be the exclusive property of the State, may only be used by its designees, and shall *not* be made available to others (including the Contractor) unless required by law.

The Contractor's CMS services and hosting facilities shall be certified compliant with the Payment Card Industry's Data Security Standard (PCI DSS) and the Payment Application Data Security Standards (PA DSS). The Contractor shall submit documentation verifying PCI DSS and PA DSS certification within 30 days ~~of~~ after the Notice to Proceed is issued. **CDRL 35**

The Contractor's CMS shall be satisfactory to ~~the State~~CTDOT and will, in all respects, be subject to CTDOT's review, comment, and approval. The Contractor will have sole responsibility to address CTDOT's comments in accordance with the times specified in the contract, prior to TVMS start up, and in accordance with CTDOT's on-going operating requirements after TVMS start up.

## 4.2 CMS Hosting Service Requirements

The Contractor shall supply all servers, including the relational database manager server and all other hardware and operating systems required for the CMS, at secure facilities with sufficient communications infrastructure to support the performance requirements stated herein. The Contractor shall provide CMS hosting services for 24 months, commencing with the start of CT*fastrak* revenue service, and for any optional periods exercised by ~~the State~~CTDOT.

At the Preliminary Design Review, the Contractor shall submit for ~~the State~~CTDOT review and approval, performance and configuration requirements for all CMS application servers, as well as the database capacity requirements necessary to satisfy all performance requirements in this Technical Specification. **CDRL 36**

CMS capacity and performance shall meet the following criteria:

A. The system shall have adequate capacity to retain data until redundant copies have been made and verified elsewhere.

B. System shall have at least 100% excess storage and processing capacity, to be demonstrated by actual system operation.

C. Support for a minimum of 100,000 daily data transactions.

D. The hardware shall support and be compatible with all proposed software, and effectively process all events and transactions from the devices that are being furnished and shall provide sufficient capacity to accommodate a 50% increase in the number of devices and transactions.

E. The Contractor shall provide redundant CMS installations at separate locations and provide immediate, automatic fail-over between sites to ensure the CMS remains available whenever unplanned and planned outages of the production CMS occur. The redundant operations shall enable continued operation of critical security and transaction functions without degradation that is obvious to the user.

F. In combination, the two (primary and backup/disaster recovery) CMS sites shall achieve no less than 99.9% Availability measured monthly, and 99.99% measured annually, including scheduled down time. The CMS shall be considered available when at least one CMS site is operational and communicating with the TVMs.

G. CMS hardware configuration shall support the TVMs supplied under the Agreement as initially configured at start of revenue service, and additional stations and TVMs as defined in Section 4.4 without requiring expansion of the CMS hardware.

## 4.3 CMS Migration (Optional)

Upon conclusion of the CMS Hosting Services (including any optional extensions), upon CTDOT's exercise of the relevant option, the Contractor shall migrate the CMS to production and Disaster Recovery facilities of CTDOT's choice. The Contractor shall install, configure, test, and commission the CMS application software and Relational Database Manager software, and replicate all historical data in the CMS database to the migration facilities.

Upon demonstrating the proper functioning of the migrated CMS, the Contractor shall activate the CMS in the new facilities and discontinue all functioning of the hosted CMS. At that time, the Contractor shall remove all data storage modules containing TVMS data, including all backup storage media, from the Contractor's hosted CMS facilities and deliver the modules and media to the State.

## 4.4 Software Requirements

The Contractor shall supply all necessary software applications and shall design and configure all application programs and the database for optimal system performance. The Contractor shall install all software necessary for system operation that successfully provides adherence to the specifications and performance requirements herein.

A. The Contractor shall provide licenses for all third party software and core software in accordance with requirements stated herein without additional charge for the life of the equipment.

B. CMS licenses and software shall permit no less than 15 concurrent users.

C. Any software specifically written for this project shall become the property of the State.

D. All user access to the CMS shall terminate, and users logged out, after a State-adjustable period of inactivity.

E. The CMS shall allow control of designated system operational functions from remote locations.

F. The CMS software shall control and monitor system access, both for the system as a whole and its separate functions. All accesses shall be controlled, recorded, and reported to specific locations as identified within these specifications. Access privileges for individual users shall be settable by the system administrator. High-level security to fare tables, media layout functions and associated files to ensure protection from unauthorized access, tampering, or transmission shall be provided.

G. As delivered and licensed to the State, the software and database structures for the CMS shall have the capacity to support:

- At least 500 TVMs
- At least 10 TVMs per passenger station
- At least 50 passenger stations
- A Maintenance Test Station

## 4.5 System Design

The CMS shall be designed so that it is sufficiently robust that it can automatically isolate and/or recover from errors. It shall run on common, commercially available Operating System. The CMS shall use a commercially-available Relational Database Manager (RDBM) on a database server of sufficient power and capacity to satisfy CTDOT's operating needs for the life of the TVMS. The CMS and its databases shall include redundant designs that support automatic database failover.

Access to all data stored shall be through the use of dedicated passwords with privileges set for each individual user. The CMS shall:

A. Store, back-up and maintain system, data and configuration files.

B. Provide unique version identifiers for all downloadable software, data, and configuration files.

C. Incorporate two locations for storage of data – a main area, (the primary location for the storage of all data received) and the backup area (where data shall be accessed when the primary data storage area fails).

D. Act as the repository of security and access information.

E. Monitor and control the status of TVMs and receive alarms and provide immediate indication of each alarm to appropriate central control facility personnel.

F. Poll all TVMs at user specified times and intervals.

G. Act as the clearinghouse link for all credit and debit card transactions.

H. Provide for the preparation of automatically generated reports based on a user-defined schedule.

I. Communicate with all TVMs supplied under the Agreement via CTDOT's fiber optic network.

J. Provide sufficient storage capacity to store all data in the main area for a period of not less than 18 months. The stored data shall be immediately accessible during that time.

A complete description of the CMS functionality shall be provided for ~~the State's~~CTDOT's review and approval at each stage of the design review with the final document fully describing the operation, capabilities, and functionality of the CMS as described herein. **CDRL 37**

## 4.6 User Interface

The CMS shall enable any authorized user to interact with the system via a standard browser-based interface.

## 4.7 Data Polling

All TVMs shall communicate using a forced polling routine. Data polling shall be configurable to poll at specific intervals. The CMS shall poll each TVM no less than every 5 minutes and allow 10 seconds for each TVM to respond. All TVMs shall provide the status of all components and modules (hardware and software) in real time. If a TVM or component/module inside a device fails to reply within a 10 second window, the equipment shall be displayed as "Offline."

TVMs shall be capable of being force polled at any time selected by the State. Polled data shall be transmitted from each item of equipment for a pre-selected and modifiable time slice and available on demand. Received data shall be automatically processed and populated into all pertinent databases.

## 4.8 System Security

The CMS system security shall provide appropriate access to all CMS functions and system data. Functional access shall, at a minimum, provide for such things as fare table and associated file maintenance, design and access of report queries, system polling, and network configuration.

CMS security functions shall be separated into the following systems:

A. Network security
B. Data Security, which shall, at a minimum, provide for four security levels: read only, update access, create, and delete.
C. Application Security, which shall be incorporated into each application attached to the CMS and controlled at three levels:
    1. Application access
    2. Form access
    3. Function access within form (inquire, add, change, delete)

## 4.9 Security Administration

Appropriate security measures that are continuously active to prevent unauthorized intrusion to the operating system, applications, parameters, and other software modules, fully support PCI requirements and support password protection to levels prescribed by ~~the State~~CTDOT shall be implemented.

The CMS shall support maintenance of access level tables through a security administration function. These tables shall be used to establish employee and employee group access to fare devices and the CMS.

Additional security measures, including password protection to levels prescribed, shall be included to prevent unauthorized access or modification to CMS software and associated tables. When the user has logged out, the User ID shall be cleared from the screen.

Reports shall be available through the security administration function. At a minimum, these reports shall provide information on employee and technician access levels, access logs for logins, critical CMS functions, maintenance activities, and all security violations or attempts.

A different password and user ID shall be required for access to system administrator functions.

## 4.10 Data Redundancy

The CMS shall be designed so that all TVM operation and revenue service data is stored redundantly. Redundant information shall be stored so that no subsystem failure shall compromise copies of the data.

The Contractor shall provide procedures, documentation, and training for restoration of data from any redundant sources in the event of failure in primary data storage. The Contractor shall provide details and information on the data redundancy scheme employed to the State for review at the Preliminary Design Review and for approval at the Final Design Review.
**CDRL 38**

## 4.11 Data Archive, Backup and Restore

The CMS shall have a means for regular automated archive, backup and restore processes for data using separate secure storage media. The backup/archive process shall clearly define the appropriate verification, recovery, and restoration procedures, and clearly demonstrate a successful process without loss or duplication of data. There shall also be defined processes for data restoration.

## 4.12 Relational Database Manager

The CMS shall store all data relating to the operation of the TVMS in one or more relational databases. The database manager shall support standard Structured Query Language (SQL) commands and queries and shall be capable of performing the necessary functions described herein.

The relational database manager (RDBM) software package shall include the necessary tools to customize reports, customize queries, generate reports and integrate with other commonly used software packages.

All data shall be stored in a format that complies with the Open Database Connectivity (ODBC) standard such that data may be exchanged as necessary with other similarly compliant applications.

The Contractor shall utilize the RDBM to configure all database tables, relationships, queries, reports, forms and automated data procedures.

## 4.13 Data Queries and Reports

It shall be possible through the CMS to query any item of TVM data stored within the systems, including transactional information, alarms, status changes, and all other elements stored as transaction records. This shall include historical records as well as current information.

The CMS shall provide the capability to query the system database to produce reports for auditing, revenue, media control, planning, fare management information, maintenance, and other similar requirements. Preprogrammed reports shall be generated by the report generation package as defined herein. The structure of the database shall permit access to the data files with other database programs to produce reports, in addition to those provided by the Contractor.

### 4.13.1 Standard Reports

The following reports shall be designed and delivered when the CMS software is delivered to the State and installed on the CMS:

- TVM Availability: A report providing a snap shot in time with a summary and detail listings of the TVMs in & out of service, and the percentage of the total population in service.
- Fare Sales Summary: A report showing the total number of customer transactions by type of transaction, fare and payment method.
- Fare Transaction Detail: A report listing each transaction, in detail, together with time date, machine number and location.
- Credit and Debit Error Log: A report detailing credit & debit rejection codes and transaction status.
- Credit Card Sales by Type: A report detailing all card transactions (not tickets) by card type for use in auditing the settlement of charges.
- Cash Module Report: A report identifying the location of each bill vault, coin vault and change module and the time and date of its last change-out.
- Component Failure Report: A report listing assembly failures, type of defect, time and date of failure, TVM ID and component ID (if applicable).
- Error Logs: A report of each error that occurs at the various fare devices. This report would depict the specific error code, description, and date and time that this error occurred.
- Close Down Reconciliation: A report for each TVM showing total sales by payment method and sales category, expected vault contents, actual counts, and variance; generated by query and automatically when any unit storing cash is removed.
- Daily Reconciliation: A report for each TVM showing total sales by payment method and ticket type and expected vault contents; generated automatically on a daily basis at a pre-set time (initially set at 3:30 AM).
- Polling: A report showing the status of polling data from each machine to the CMS.

The Contractor will also provide other reports formats that the State may reasonably request.

### 4.13.2 Revenue & Ridership Data Export

The Contractor shall work with the State and NFTS Contractor to develop a process to export TVM revenue and ridership data from the CMS to the NFTS central data system to enable consolidated reporting of system-wide revenue and ridership.

### 4.13.3 Query and Report Design Services

In addition to the reports listed in Section 4.13.1 (or their functional equivalent), the Contractor shall supply query and report design services for no less than 10 additional reports to be defined by ~~the State~~CTDOT no less than 6 months before completion of the Software Warranty. The

Contractor shall supply all such requested additional queries and reports before conclusion of the Software Warranty.

#### 4.13.4 Ad Hoc Reporting and Queries

The CMS shall provide a mechanism for authorized the State users to extract information directly from the system through a Report Writer facility compatible with the CMS Relational Database Manager.

Menus and screens to support the generation of reports, as well as the timing and location of the resulting output shall be provided. Once a report is defined, the system shall have the ability to display the output before printing, and store the definition for reuse.

The Contractor shall supply a commercially available database report generation tool such as Microsoft Sequel Report Writer, Crystal Reports, or ~~State~~CTDOT-approved equivalent. The report generation software shall enable authorized users with a minimum of programming knowledge to prepare new or modified queries and reports. Such customized queries and reports shall be capable of being executed as they are created, and shall be capable of being added to the menu of prepared queries and reports. When added to the prepared query and report menu, customized queries and reports shall be treated by the CMS the same as any Contractor-supplied query or report. Authorized users shall also be able to edit and delete any prepared query or report on the selection menu.

A complete description of the report writing capability shall be submitted for ~~the State's~~CTDOT's review at the Preliminary Design Review and the State's approval at the Final Design Review. **CDRL 39**

## 4.14 Network System Monitoring & Control

In addition to monitoring the TVMs, the CMS shall monitor the communications networks that connect and support the TVMs. The system shall monitor the following aspects of the TVMS:

- All losses of network communications, including line drops
- Simple Network Management Protocol (SNMP) or equivalent diagnostics
- Station networking hardware, such as managed hubs and switches
- Status of all CMS servers and hardware

A functional description of all monitoring functions shall be provided at the Preliminary Design Review for review by ~~the State~~CTDOT and for approval by ~~the State~~CTDOT at the Final Design Review. This information shall include the design or the operational flows, screens, functions and other similar information and shall include~~d~~ increasing detail with each design review step. **CDRL 40**

## 4.15 Communications with TVMs

The CMS ~~shall~~ will be able to designate what will be downloaded, and to which units: All units of a particular type, sets of fare devices (e.g., defined by station, type of transit service or district), or individual devices (defined by port address).

The system shall track failed transmissions and provide diagnostic messages that include the SNMP message(s), the number of times transmission was attempted, and the assembly(s) affected. This information shall be retained for reporting, statistical analysis, audit, problem resolution, unit, and network "mean time between failures" rates.

## 4.16 Network Security Functions

The CMS design shall include appropriate security measures that are continuously active to prevent unauthorized intrusion to the operating system, applications, parameters, and other software modules, fully support PCI DSS requirements and support password protection to levels prescribed by the State.

All components of the system shall operate in a virus-free protected environment. The CMS shall have sufficient measures (software and hardware) in place and active at all times to ensure that all operating systems, applications and other software operates in a virus-free environment. The Contractor shall provide, install, and maintain a fully licensed, upgradeable commercially available anti-virus software application.

The CMS shall also contain controls to prevent unauthorized access to the operating system, applications, and other software modules.

## 4.17 Software Applications

Using the following software applications or a State approved equivalent, the CMS shall provide the following functionality.

### 4.17.1 Voice Message Manager

The CMS shall provide software tools to manage the assignment of all voice messages to each step of all TVM transactions. Management of voice messages shall permit assigning updated voice messages to existing ticket types, assigning new voice messages to additional ticket types created by the State, and deletion of voice message assignments for ticket types that are discontinued by the State.

The Contractor shall submit a description of procedures to track, modify and download files (if the TVM employs digitally recorded voice messages) for ~~the State~~CTDOT review and approval at the Final Design Review. **CDRL 41**

### 4.17.2 Fare Table Manager

The CMS shall include an application to manage all aspects of the fare table. The Fare Table Manager shall provide menu-driven selections for parameters and other configurable settings for each entry, and shall provide safeguards to prevent erroneous entries.

When a new fare table is created, ~~the State~~CTDOT shall be able to download the new table to the Maintenance and Test Facility described in Section 6.6 for testing and evaluation. Subsequent to test approval, ~~the State~~CTDOT shall download the new table to all TVMs and designate a date and time when the new fare table shall become active. All TVMs shall operate using the same fare table at all times, although TVM configurations may differ.

The Contractor shall submit a description of the Fare Table Manager for ~~the State~~CTDOT review at the Preliminary Design Review and the State approval at the Final Design Review. **CDRL 42**

### 4.17.3 TVM Device Controller

The TVM Device Controller shall be provided to control and manage all TVMs. Through this application, authorized users shall be able to define and change configuration and other operating parameters. The TVM Device Controller shall also interact with the CTDOT's existing

equipment maintenance and inventory control applications to support tracking of devices at a location.

From the TVM Device Controller, authorized users shall have the capability to remotely control any on-line TVM. Functions that can be remotely performed by an authorized user shall include:

- Place a TVM in service or out of service
- Perform diagnostics at both the device and component levels
- Enable and disable any payment mode or module
- Transfer any information or data
- Reset the TVM (*i.e.*, cause the TVM to restart all programs without affecting data registers)

All modifications to the equipment functionality shall be recorded in the CMS database and reported immediately to CTDOT's equipment maintenance and inventory control application.

#### 4.17.4 TVM Configuration Manager

All configuration files and operational parameters of the TVMs shall be managed by the CMS. No change to these files or parameters shall be transmitted without a record of the change being stored on the CMS. The CMS shall store all changes made to files and parameters and allow for review of no less than the previous 100 changes made. Records of each change shall include the user, the date and time of change, the equipment to which change(s) was (were) transmitted and date and time of transmission. Contents of these files shall be protected by additional password privilege. Methods to alter configuration files and operational parameters shall utilize preformatted input forms supported by the relational database manager.

The TVM Configuration Manager shall enable TVM-specific configurations as necessary. For example, only a subset of TVMs may have the ability to sell certain tickets in the fare table; such Availability may be periodic, requiring the ability to routinely enable and disable ticket types.

The configuration files and operational parameters to be managed shall include at minimum the following information:

- Station and other TVM location names
- TVM locations, identifiers and types
- Fare tables (one active, two inactive)
- Ticket and transaction types to be available for sale
- Ticket print format
- Customer Display screen configuration and messages
- Operational parameters including timeouts, vault full levels, accepted bill denominations.
- Event and alarm descriptions, categories and priorities
- Cash handling device serial numbers in system
- Voice messages
- Technician identification and access codes

The Contractor shall submit a comprehensive listing of system parameters for ~~the State's~~CTDOT's review and approval at the Final Design Review. **CDRL 43**

### 4.17.5 TVM Status Monitor

TVM equipment status shall be updated and automatically maintained by the system through the TVM Status Monitor application. The TVM Status Monitor application shall monitor the status of all on-line TVMs, TVM Data networks, and all data transfers.

The TVM Status Monitor shall display status in three levels of detail:

- All TVMs
- All TVMs at a selected station
- Individually selected TVM

When displaying the status of all TVMs, the TVM Status Monitor application shall provide a graphical representation of the system via a system map showing all stations where TVMs are installed under this contract. The icon for each station shall indicate (via color) a summary of the status of all TVMs at the station. When a station has more than one alarm in effect, the station icon shall be shown in the color of the highest priority alarm.

When displaying the status of all TVMs at a selected station, the TVM Status Monitor shall display a station map, showing the status of each TVM at the selected station. The icon for each TVM shall indicate (via color) a summary of the status of all alarms for that TVM. When a TVM has more than one alarm in effect, the TVM icon shall be shown in the color of the highest priority alarm.

When displaying the status of an individually selected TVM, the TVM Status Monitor shall display a graphical or picture representation of the TVM, indicating via color icons or text, the status of all major modules within the TVM. When a module has more than one alarm in effect, the module icon shall be shown in the color of the highest priority alarm.

Those alarms that ~~the State~~CTDOT designates as high priority shall require the State interaction at a CMS workstation to clear. All other alarm conditions shall clear automatically when the alarm condition is resolved.

## 4.18 Bank Card Transactions

### 4.18.1 General

When required by State-configurable thresholds, bank card transactions at the TVMs shall be processed, authorized, settled, and accounted through the CMS, via a communications interface with CTDOT's bank card clearing institution.

Bank card transactions shall be verified by the CMS prior to being sent to the financial clearing institution (also known as the "clearing house"). All CMS-verified requests for bank card transaction authorization shall be sent to CTDOT's bank card clearing house.

The authorization process shall be capable of multiple simultaneous transactions; it shall not be required that one transaction is received and processed prior to the next transaction request being processed.

Assignment of the Merchant Identification shall be State-configurable. The CMS shall support assignment of a single Merchant ID for all TVMs, and the assignment of an individual Merchant ID to each TVM.

The Contractor shall be responsible for establishing the connection between the CMS and CTDOT's selected bank card clearing house, and providing all associated CMS software for

purposes of determining validity of and approving (or rejecting) bank card transactions initiated at the TVM.

The Contractor shall be responsible for coordinating all agreements and technical interfaces necessary with CTDOT's clearing house for handling bank card transactions.

### 4.18.2 Bank Cards to be Accepted

The TVM shall accept the following credit cards: VISA, MasterCard, American Express, and Discover. Acceptance of other types of credit cards shall require modification of a State-adjustable table, resident on the CMS, containing ranges of Bank Identification Numbers (BINs) corresponding to the accepted credit card types.

All debit cards with ABA-compliant encoding shall be accepted by the TVM and forwarded to the CMS for further processing. The clearing house will determine if the card is to be accepted for the transaction.

### 4.18.3 Bank Card Usage Limits (Velocity Controls)

For purposes of controlling potential losses through bank card fraud, the CMS shall maintain a database of all bank card sales. This database and the CMS usage of the data stored there shall be in full compliance with PCI DSS requirements. The database shall impose checks of transactions requests; if such checks are not passed, the transaction shall be denied:

The database shall be updated automatically for each completed bank card sale.

The database shall limit the number and value of transactions in total and by type for individual credit cards for given durations. Such limits shall be software definable and modifiable by the State. For example, it shall be possible to deny a bank card transaction request for the same card when a third transaction is requested within a 10-day period and when the total value of card transactions exceeds a specified dollar amount in a given week.

The Contractor shall submit a description of the bank card usage limits process, including all configurable parameters, for the ~~State's~~ CTDOT's review at the Preliminary Design Review and the ~~State's~~ CTDOT's approval at the Final Design Review. **CDRL 44**

### 4.18.4 Local Bank Card Hotlist

The CMS shall include a State-maintained Local Bank Card Hotlist, a list of bank cards that are known to be unacceptable or have been denied for prior transactions. When a bank card is used in a TVM which is on the Local Bank Card Hotlist, depending on data in the hotlist, the CMS shall either notify the requesting TVM that the card is invalid, or request authorization from CTDOT's payment processor.

The description of the Local Bank Card Hotlist that follows represents the high-level functionality required for the TVMS. Subject to CTDOT approval, the Contractor may provide alternative solutions for this feature, provided that the overall CMS functionality for bank card processing satisfies CTDOT's requirements.

Entries on the Local Bank Card Hotlist may occur automatically (as described in Section 4.18.5) and manually. Only authorized users, under strict compliance with PCI DSS requirements, shall have the ability to manually add, delete, modify, and review entries on the Local Bank Card Hotlist.

The Local Bank Card Hotlist shall have a capacity of no less than 10,000 cards. Each entry on the Local Bank Card Hotlist shall contain at minimum:

- The complete bank card number
- The date and time the entry was made or modified
- The authorized user who made or modified the entry (if applicable)
- The reason for the entry
- Consecutive denials since the last approval
- Authorization processing status ("permanently deny" or "attempt authorization")
- The most recent date, time, and location (TVM number) of attempted use

The CMS shall automatically change a card's Authorization Processing Status to "permanently deny" if the card is rejected for a State-configurable number of consecutive authorization requests.

The CMS shall automatically remove entries for cards that are in the "attempt authorization" state if the card is authorized by a subsequent request to the payment processor.

The Contractor shall submit a description of the Local Bank Card Hotlist and processing, including all configurable parameters, for State review at the Preliminary Design Review and State approval at the Final Design Review. **CDRL 45**

### 4.18.5 Authorization Threshold and Consolidation

To reduce bank card authorization transaction fees, the CMS shall provide State-configurable threshold that shall govern whether the CMS individually submits a bank card transaction for authorization.

The description of Authorization Threshold and Consolidation that follows represents the high-level functionality required for the TVMS. Subject to ~~State~~ CTDOT approval, the Contractor may provide alternative solutions for this feature, provided that the overall CMS functionality for bank card processing satisfies CTDOT's requirements.

When a bank card transaction value falls below the authorization threshold (initially set to $5), the CMS shall:

- Verify that the bank card is not on the Local Bank Card Hotlist described in Section 4.18.4. If the card is on the hotlist and in the "permanently reject" state, the CMS shall notify the requesting TVM that the card is not valid for payment. If the card is on the hotlist and in the "attempt authorization" state, the CMS shall process the card as described in Section 4.18.6.
- Otherwise, verify that the transaction value is permitted according to the velocity controls described in Section 4.18.3. If the transaction violates the velocity controls, the CMS shall notify the requesting TVM that the card is not valid for payment.
- Otherwise, automatically notify the requesting TVM to proceed with the transaction.
- Record the bank card information for velocity control purposes and later processing as part of a consolidated authorization request.

At a state-configurable interval and no less than once per day, the CMS shall consolidate all records of bank card transactions that were approved but below the authorization threshold. The CMS shall then submit the consolidated authorization request to CTDOT's payment processor. The CMS shall also automatically conduct a consolidated authorization whenever

the number of unauthorized approvals exceeds a State-configurable number, and whenever the total value of such transaction exceeds a State-configurable value.

The CMS shall automatically add bank cards that fail authorization as part of a consolidated authorization request to the Local Bank Card Hotlist described in Section 4.18.4.

The Contractor shall submit a description of the bank card authorization threshold and consolidation process, including all configurable parameters, for the State's review at the Preliminary Design Review and the State's approval at the Final Design Review. **CDRL 46**

### 4.18.6 Bank Card Transaction Authorizations

The description of Bank Card Transaction Authorization that follows represents the high-level functionality required for the TVMS. Subject to the State's approval, the Contractor may provide alternative solutions for this feature, provided that the overall CMS functionality for bank card processing satisfies CTDOT's requirements.

The CMS shall request authorization for all bank card transactions that exceed the low-value threshold and those which otherwise require authorization.

Where bank card authorizations are required, the CMS shall:

- Verify that the bank card is not on the Local Bank Card Hotlist described in Section 4.18.4. If the card is on the hotlist and in the "permanently reject" state, the CMS shall notify the requesting TVM that the card is not valid for payment. If the card is on the hotlist and in the "attempt authorization" state, the transaction shall continue.
- Verify that the transaction value is permitted according to the velocity controls described in Section 4.18.3. If the transaction violates the velocity controls, the CMS shall notify the requesting TVM that the card is not valid for payment.
- If the payment method is a credit card, where allowed or required by card brand operating regulations and configured by the State, the CMS shall incorporate Address Verification Service (AVS); in such cases, the CMS shall instruct the requesting TVM to prompt the user to enter the billing address ZIP code on the TVM's encrypting PIN pad, and shall be capable of being prompted, or not prompted, by, at minimum:
    - Card brand
    - Card type (e.g. credit, prepaid, signature debit, pre-tax transit benefit)
    - Bank card country of issuance (e.g. US or non-US)
    - Transaction purchase amount.
- As initially deployed, the incorporate Address Verification Service (AVS) for the TVMS shall prompt only for US-issued credit cards for transactions over $5, or as defined by the State during FDR.
- If the payment method is a debit card, the CMS shall instruct the requesting TVM to prompt the user to enter the PIN on the TVM's PIN pad.
- Upon acquisition of all necessary data, the CMS shall submit the authorization to CTDOT's payment processor.
- Upon receipt of the authorization results, the CMS shall inform the requesting TVM; the TVM shall act accordingly.

### 4.18.7 Reversals

The CMS shall automatically reverse credit and debit card authorizations whenever necessary as a result of a timeout, failure to issue a ticket, or other transaction failure after authorization has already been requested and provided. When the CMS receives an authorization for a transaction but does not receive confirmation from the TVM that the transaction completed successfully within a State-adjustable time period, the CMS shall assume that the transaction failed and automatically reverse the authorization.

### 4.18.8 Funds Settlement

The CMS shall generate an electronic settlement report and transmission with the appropriate financial institution. Once the settlement report has been successfully transmitted, a hard copy report shall be scheduled for printing. The settlement report shall be incremental in nature, containing transactions that have successfully occurred since the most previous transmittal of a settlement report.

# 5 Management

## 5.1 Program Management

The Contractor's program management ~~shall~~ will be sufficiently comprehensive to enable ~~the State~~CTDOT to ascertain that the Contractor will meet the requirements of the Contract Documents, and to enable the State to monitor the contractual effort.

The Contractor shall designate a responsible individual, subject to approval by ~~the State~~CTDOT, to serve as program manager ("Program Manager") for the entire term of the Agreement. This individual shall have prior experience in management of TVMS procurements and be familiar with design, subcontractor equipment procurements, construction, test, and inspection of TVMs.

The Contractor shall establish an organization to properly manage this TVMS procurement program. The organization shall be highly responsive to the needs of the State as required in the Agreement.

### 5.1.1 Management Plan

Within 30 days after the ~~of~~ NTP is issued, the Contractor shall submit a Management Plan to ~~the State~~CTDOT for approval. **CDRL 47** The Management Plan shall be updated as necessary to incorporate changes in the project or its schedule. The plan shall include:

A. An organization chart including a definition of the authority, responsibilities, and qualifications of all personnel therein.

B. The methods and communications to be used to control the program schedule, design reviews, technical performance, program changes, subcontracts, purchase orders, material procurement, in-service support, warranty, systems assurance analysis, tests, and demonstrations.

C. A description of the process to track and control project correspondence.

D. A Submittal List and Schedule listing drawings, documents, and data to be submitted for review and approval during the design review phase of the program and a schedule for the submittal of this information.

E. A ~~Contract Deliverables Requirement List (CDRL~~CDRL~~)~~ based on the information in this contract. The CDRL shall contain the specific format of the deliverable, quantity, frequency, and contract paragraph reference as required. The CDRL shall be in accordance with the following column headings:

- Item Number
- Deliverable Description
- Reference Section (*i.e.* location of requirement within the Contract Documents)
- Scheduled Delivery Date(s)
- Current State acceptance status (*i.e.,* pending, approved, conditionally approved, disapproved)
- Quantity: Number of documents, units, or copies required.

### 5.1.2 Master Program Schedule

The Contractor shall develop and use the approved Master Program Schedule for executing the work for this Project. The Master Program Schedule shall be generated using a currently

supported version of Primavera Project Planner for Windows, Microsoft Project, or other similar program approved by ~~the State~~CTDOT. The Master Program Schedule shall conform to this Scope of Work and to schedule and delivery requirements set forth in the Agreement; only Contract Change Orders may modify such portions of the Master Program Schedule. In addition to printed copies, all submittals of the Master Program Schedule shall be provided on ~~State~~CTDOT-approved electronic media.

The Master Program Schedule shall include the following:

- Work item descriptions that convey the scope of work indicated.
- The sequence, successor, and predecessor interrelationships among work items shall be considered in developing the schedule and shall be so indicated.
- Work item descriptions shall be accompanied by narrative explanation of what the work item comprises and the basis for the estimated work duration.
- Sufficient detail shall be provided to indicate the manufacturing, testing, shipment, storage, and installation status of each TVM.
- Testing and installation activities for the CMS.

The Contractor shall submit to CTDOT the Preliminary Master Program Schedule showing key milestones and events, including those identified in the Agreement within 30 days ~~of~~ after the NTP is issued. **CDRL 48**

~~The State~~CTDOT shall review the preliminary schedule and provide comments within 30 days of receipt.

The Contractor shall submit the Final Master Program Schedule to ~~the State~~CTDOT within 90 days ~~from~~ after the NTP is issued. **CDRL 49**

### 5.1.3 Monthly Progress Reports

The Contractor shall submit to ~~the State~~CTDOT a monthly progress report by the fifth day of each month that covers activities for the previous month. **CDRL 50** Monthly progress reports shall include:

- Updated Master Program Schedule
- Existing or anticipated problems or issues.
- Updated CDRL, including current status of all deliverables.
- Updated Submittal List and Schedule, including current status of all submittals.
- Updated action item log showing current status of all action items.

The Contractor shall also provide a narrative that lists the work actually completed and reflects the progress in terms of days ahead of or behind the specified dates for each of the work items, as well as percent completed.

### 5.1.4 Action Item Log

The Contractor shall maintain a log of all identified action items. These action items shall be identified at design review meetings, monthly Progress Review Meetings, and through correspondence. All action items shall have a responsible party assigned. No action item shall be assigned to the State without ~~the State's~~CTDOT's knowledge and concurrence. Each action item in the log shall contain:

- Item Number
- Description
- Requesting Party
- Assigned Party
- Status (open / closed / in progress / deferred / etc.)
- Date Opened
- Date Closed
- Progress Notes

### 5.1.5 Correspondence Log

The Contractor shall maintain a log of all project correspondence with the State. For each letter between the parties, the Contractor shall record:

- Letter Number
- Date Issued
- Issuing Party
- Topic
- Keywords
- Author
- References to other Contract Documents
- References to other Contract Correspondence

### 5.1.6 Contract Start-up Meeting

Within 30 days after the issuance of the NTP, a Project start-up meeting shall be held in the offices of CTDOT. In attendance shall be ~~the State~~CTDOT, the Contractor's program manager, and other appropriate Project and Contractor personnel. ~~The State~~CTDOT shall prepare an agenda and meeting minutes for distribution. The start-up meeting shall permit all parties to the contract to understand the overall schedule, terms and conditions, scope of work, and responsibilities. In addition, the parties shall discuss and identify the items to be submitted for the design reviews.

The start-up meeting shall allow the Contractor and ~~the State~~CTDOT to coordinate their activities. At the meeting, the Contractor shall also present its intended design and identify interface requirements.

The start-up meeting shall also cover the following topics.

- ~~The State~~CTDOT and Contractor to review and confirm the procedural requirements of the Agreement
- Contractor to provide conceptual information on proposed equipment design, configuration and layout
- ~~The State~~CTDOT and Contractor to review intended operations and maintenance requirements
- ~~The State~~CTDOT and Contractor to identify interface requirements between ~~the State~~CTDOT and Contractor, especially regarding communications and installation interfaces
- Contractor to identify information and decisions required by ~~the State~~CTDOT, subject to the approval of CTDOT
- Contractor to identify CDRL submittals for which waivers will be requested

### 5.1.7 Progress Review Meetings

The TVMS project is vital to the successful introduction of service on CT*fastrak*. As such, ~~the State~~CTDOT and the Contractor shall maintain frequent formal communication to ensure the project remains on schedule. Progress Review Meetings (PRMs) shall be held at least weekly, via telephone and monthly at the offices of CTDOT or the Contractor as ~~a~~ agreed between the Contractor and ~~the State~~CTDOT. The Contractor shall prepare an agenda two days prior to the scheduled meeting date. **CDRL 51** The Contractor's program manager and other appropriate Contractor and sub-contractor personnel, based upon anticipated agenda, shall attend either in person or via telephone conference call. The topics to be discussed and reviewed shall include items appropriate to the phase of the project, for example:

- Work accomplished since previous meeting, including: design status, fabrication problems, product delivery problems, schedule slippages, problems arising from proposed changes, and other circumstances which might affect progress of the work
- Sequence of critical work and schedule of manufacturing using the Master Program Schedule and Monthly Progress Reports
- Engineering, manufacturing, and quality control
- Any needed corrective measures to maintain Program Schedule
- Any other issues related to the project
- Updated Submittal List and Schedule
- Updated action item log
- Installation elements and issues

The Contractor shall prepare meeting minutes for each PRM, subject to ~~the State's~~CTDOT's comment and approval. The Contractor shall submit meeting minutes no later than two days after the meeting date. **CDRL 52**

## 5.2 Contractor's Quality Assurance Program

### 5.2.1 General

The Contractor shall plan, establish, and maintain a Quality Assurance (QA) program. The Contractor's QA program shall be imposed upon all entities within the Contractor's organization and on all subcontractors whenever Project work is performed. The Contractor shall prepare and submit for approval by CTDOT a Quality Assurance Program Plan that addresses control of the quality of the Contractor's design, equipment furnished, testing, training, and documentation.

### 5.2.2 Quality Assurance Program Plan

~~A~~ The Contractor shall submit a~~A~~ Quality Assurance Program Plan (QA Program Plan) ~~shall be submitted~~ to ~~the State~~CTDOT within 30 days after the issuance of the NTP for review and approval. **CDRL 53** The Contractor shall use and abide by the QA Program Plan to execute the work for the Agreement. The QA Program Plan ~~shall~~ will describe the methods for planning, implementing, and maintaining quality, schedules, and cost. The QA Program Plan ~~shall~~ will contain a company policy statement that clearly defines the responsibilities of QA personnel. An organization chart ~~shall~~ will be included to show the reporting relationships of all QA staff, and ~~shall~~ will indicate the Contractor's QA~~/QC~~ representative, who ~~shall~~ will be a full-time employee of the Contractor.

The QA Program Plan ~~shall~~ will also contain a collection of all forms to be used for the documentation of quality control activities, which assure compliance of materials, processes, personnel, and products to the applicable specifications.

## 5.3 Quality Assurance

~~The State~~CTDOT may, at its discretion, perform its own QA monitoring of work done under the Agreement, including monitoring of the Contractor's or subcontractor's QA activities. Such activities ~~shall~~ will not reduce or alter the Contractor's QA responsibilities, nor reduce or alter the Contractor's obligation to meet the requirements of this document.

After the issuance of the NTP, ~~the State~~CTDOT or his designee shall have the right of free access to facilities of the Contractor and subcontractors. This right shall permit ~~the State~~CTDOT to inspect, examine, and test items during manufacture and prior to shipment. On demand, the Contractor's Quality Assurance Plan, procedures, and records shall be made available to the State for inspection and audit. In addition, copies of all drawings, diagrams, schedules, changes, and deviations shall be made available promptly upon request.

## 5.4 Version Control and Configuration Management

The Contractor shall maintain strict control and records of all hardware and software design changes throughout the development, testing, production, and warranty periods.

### 5.4.1 Hardware Versions

Subsequent to FACI approval, the Contractor shall make no changes to the hardware design of any TVM component or subcomponent without written approval of ~~the State~~CTDOT. ~~The State~~CTDOT reserves the right to require the Contractor to repeat any portion of the testing program described in Section 8 when the Contractor requests a post-FACI change to the hardware design.

When post-FACI hardware changes are required and approved, the Contractor shall submit a hardware update plan for ~~the State~~CTDOT review and approval. **CDRL 54** The Contractor shall then implement the approved hardware change according to the approved hardware update plan.

### 5.4.2 Software Versions and Configurations

Throughout the performance of the Project, the Contractor shall adhere to the software quality and version control procedures submitted and approved as part of the QA plan described in Sections 5.2.2.

# 6 Systems Services and Support

## 6.1 Manuals

The Contractor shall supply to CTDOT the manuals more particularly outlined in this Section 6.1. Manuals provided by the Contractor will~~shall~~ be written in clear and concise English and to a level of detail as determined by CTDOT.~~shall will assume pre-suppose the reader has sufficient education and technical experience to understand and to perform the job function for which the manual is required.~~ Care shall be taken to provide easily understood directions and explanations and step-by-step instructions with cross-references to all drawings, diagrams, and photos, with no extraneous material such as advertisements or irrelevant information.

The Contractor shall provide a complete documentation plan, identifying all manuals and the development and delivery schedule for each, for ~~the State's~~CTDOT's review and approval at the Preliminary Design Review. **CDRL 55**

~~All~~ The Contractor shall supply all~~All~~ manuals ~~shall be supplied~~ in hardcopy and electronic form. Electronic file formats ~~shall~~ will be compatible with Microsoft® Office® 2007. Provided media ~~shall~~ will not be copy protected or encrypted in any way.

For the repair and maintenance support of third party standard products, the Contractor shall supply manuals, special tools, test and diagnostic equipment commercially available from the product manufacturer and to the extent reasonable and possible, consistent with the overall TVMS maintenance and level of repair concept.

The Contractor shall submit manuals in progressive steps as follows:

A. The general outline of manual contents shall be submitted to ~~the State~~CTDOT for review and approval as part of the Preliminary Design Review. **CDRL 56**
B. Final drafts of the manuals shall be submitted to ~~the State~~CTDOT for review and approval as part of the Final Design Review. **CDRL 57**
C. All copies of complete manuals, including both hardcopy and electronic formats, ~~(hardcopy and electronic media)~~ in final form. **CDRL 58**
D. Updates to all manuals, reflecting changes incorporated during ~~the~~ any warranty period, shall be submitted upon completion of the warranty period. **CDRL 59**

### 6.1.1 General Requirements

All manuals supplied as part of this ~~contract~~ Agreement shall meet the following general conditions.

A. ~~All~~ Contractor shall provide all~~All~~ manuals and documentation ~~shall be provided~~ in English.

B. Manuals ~~shall~~ will be bound in hard or flexible covers. Illustrations ~~shall~~ will be clear, and printed matter, including dimensions and lettering on drawings, ~~shall~~ will be easily legible. If reduced drawings are incorporated into manuals, original lines and letters ~~shall~~ will be emboldened as necessary to retain their legibility after reduction. Larger drawings may be folded into manuals to page size. Any reproduction ~~shall~~ will be of near-perfect quality. No blotched or poorly readable areas on any reproduction are allowed.

C. All manuals ~~shall~~ will use nomenclature, symbols and designations common to the USA work place. References to supplemental information shall be included where necessary.

D. All information judged to be of a sensitive nature by ~~the State~~CTDOT or the Contractor ~~shall~~ will be identified by the C~~c~~ontractor no later than the Final Design Review and shall be handled in a manner to be determined by ~~the State~~CTDOT. **CDRL 60**

E. Maintenance manuals ~~shall~~ will be designed for continuous, long-term service in a maintenance shop environment.

F. Manuals ~~shall~~ will lie flat when opened and ~~shall~~ will permit adding and replacing pages. Contents ~~shall~~ will be divided by section.

G. Manuals ~~shall~~ will be identified on both the front and spine of each binder.

H. Margins ~~shall~~ will be of sufficient size so that all printing avoids punched holes.

I. Manual pages ~~shall~~ will be nominally 8½ inches by 11 inches (excluding Quick Reference Guides, which ~~shall~~ will be pocket-sized foldouts or soft-cover bound).

J. Manuals ~~shall~~ will not exceed 3 inches in thickness. If necessary, manuals ~~shall~~ will be split into multiple volumes to keep binder size at most 3 inches.

### 6.1.2 Ticket Vending Machine Manuals

A. TVM Operating Instruction Manual - ~~These manuals~~This manual ~~shall~~ will contain information needed to obtain an understanding of how the TVM functions. This manual is intended for use by operations, revenue servicing and supervisory personnel.

B. TVM Preventive Maintenance Manual - The Preventive Maintenance Manual ~~shall~~ will contain all information needed to enable maintenance technicians to perform all periodic inspection and preventive maintenance tasks including lubrication, inspection and replacement of consumable items. The manual ~~shall~~ will contain recommended PM schedules.

C. TVM Corrective Maintenance Manual - This manual ~~shall~~ will contain all information needed to diagnose problems and make adjustments and repairs to TVMs to restore the system to a normal operational condition in an efficient and timely manner. The manual ~~shall~~ will include, at a minimum: a general description of each subsystem, component and subassembly; functional block diagrams; detailed schematics; and wiring diagrams.

This manual ~~shall~~ will also provide information needed for in-shop repair and trouble diagnosis of the lowest replaceable component on the Lowest Level Replaceable Unit (LLRU). The manual ~~shall~~ will contain detailed flow charts or approved equivalents, exploded parts diagrams and schematic drawings, and detailed analyses related to each LLRU so that CTDOT maintenance personnel will be able to effectively service, inspect, maintain, adjust, troubleshoot, and repair the LLRU.

D. TVM Illustrated Parts Manual - This manual ~~shall~~ will describe and identify each module, sub-assembly and part within each piece of equipment with its related supplier identification number and Contractor identification number. Exploded drawings ~~shall~~ will be provided to permit identification of all parts not readily identified by description. A complete Bill of Materials giving a unique part number, description, generic name and generic part number for each and every component shall be provided. Diagrams and drawings ~~shall~~ will identify each and every component in the TVM and call out each component with the unique part number as referenced in the Bill-of-Materials. The Contractor shall provide a parts layout for every printed circuit board, specifically calling out each component, be it mechanical or electrical in nature, and showing its exact location.

### 6.1.3 Central Management System Manuals

For each element of the CMS, a comprehensive set of manuals ~~shall~~ will document the system, networking interfaces, software design, database structures, and so on. These manuals are summarized as follows:

A. CMS OEM Manuals – The Contractor shall provide Hardware Manuals, to include drawings which identify the various parts and assemblies of the computer system. The manuals ~~shall~~ will contain start-up procedures, operating modes, interconnection diagrams, preventive maintenance procedures and program; diagnostic procedures and wiring diagrams with board and cable identification.

B. CMS Administrator's Manual – The Contractor shall provide a user manual containing detailed operating instructions and procedures to be used by maintenance and other CTDOT operating personnel. Information in the manual ~~shall~~ will be presented in terms that are meaningful to users. The manual ~~shall~~ will include a system operation description (hardware and software) as it relates to the user's tasks. Sensitive information that is not to be distributed to all departments ~~shall~~ will be contained in a separate document marked "Confidential". ~~.~~ The nature of this information will be mutually agreed upon between the Contractor and ~~the the State~~CTDOT.

   This manual ~~shall~~ will not be written as a programmers' document. Procedures shall be explained step-by-step with an explanation of how each step is performed, what parameters can be adjusted, and the effects obtained by varying each parameter. All user guidance and error messages ~~shall~~ will be described, along with the steps necessary for recovery from error and troubleshooting guidance.

C. Database Management Manual - The Contractor shall provide a complete manual on all aspects of operation of the database on the system. This will include a Contractor prepared manual that describes how to use the system, its databases and all available reports, macros, menus and other elements of the Contractor provided programs.

D. CMS Design and Database Structure Manual – This manual will~~shall~~ describe the design of the CMS network architecture and the communications protocols used between the computer system, its dependent components (such as TVMs) and external interfaces (such as the bank card clearing house). The manual ~~shall~~ will provide a complete description of the database structure, including definitions, parameters, and relations for all database fields, records, and tables,

### 6.1.4 Other Manuals

A. Special Tools and Equipment Manuals – All special tools and test equipment defined in Section 6.7 ~~shall~~ will be accompanied with operation and maintenance manuals to the same level of detail as that supplied for the TVMs. The manuals ~~shall~~ will be designed to permit the State to operate, maintain, and repair all test equipment without assistance from the Contractor.

B. Revenue Service Manual - This manual ~~shall~~ will be provided in two volumes. The first volume of this manual ~~shall~~ will include all necessary information to perform revenue service of the fare collection equipment, including cashbox removal and reinsertion, processing and control of revenues, and data exchange for both fixed and portable equipment.

The second volume of this manual ~~shall~~ will provide an understanding and instructions for balancing the collected revenues against sales. This ~~shall~~ will include instructions on understanding the revenue container reports issued by the fare collection fare media sales equipment, balancing all monies, credit card usages and debit card usages, and settlement of accounts. As with the revenue reconciliation training materials, this volume of the revenue servicing manual ~~shall~~ will be identified as "CONFIDENTIAL" and treated accordingly.

### 6.1.5 Quantities of Manuals

The Contractor shall provide one high-quality reproducible master, one electronic copy, and the following quantities of each of the manuals described in Section 6.1:

Table 6.1.5: Quantities of Manuals to be Supplied

| Manual | Quantity |
|---|---|
| TVM Operating Instruction Manual | 3 |
| TVM Preventive Maintenance Manual | 5 |
| TVM Corrective Maintenance Manual | 5 |
| TVM Illustrated Parts Manual | 3 |
| CMS OEM Manuals | 1 |
| CMS Administrator's Manual | 3 |
| CMS User's Manual | 10 |
| CMS Design and Database Structure Manual | 3 |
| Special Tools and Equipment Manuals | 3 |
| Revenue Service Manual | 5 |

## 6.2 Training Services

The Contractor shall provide the training services more particularly described in this Section 6.2.

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### 6.2.1 General Requirements

The Contractor shall ensure that instructors teaching the training courses are not only familiar with technical information and all hardware and software functions, but are able to utilize proper methods of instruction, training aids, audiovisuals, etc. to provide effective instruction, tailored to the presumed skill level of the students.

Training courses ~~shall~~ will provide the scope of instruction as specified below. The Contractor shall define the time required to provide the specified training in the preliminary training plan, which ~~shall~~ will identify all courses to be taught, location for each, estimated training hours, class sizes, presumed student prerequisite skills, and the development and delivery schedule for each. The Contractor will provide the~~The~~ preliminary training plan ~~shall be provided~~to CTDOT at the Preliminary Design Review. **CDRL 61**

The Contractor shall develop and provide all training aids, student workbooks, guides, audiovisual equipment and visual aids necessary to conduct these courses.

All training materials developed or used by the Contractor to conduct these instructional sessions ~~shall~~ will become the property of the State at the conclusion of training. **CDRL 62**

Training ~~shall~~ will be conducted at a location approved by ~~the State~~CTDOT. Hours for training shall be between 7:00 AM and 7:00 PM, Monday through Friday, unless otherwise specifically

permitted or required by ~~the State~~CTDOT. Training ~~shall~~ will be limited to a maximum of eight hours ~~per training session~~ per day. At ~~the State's~~CTDOT's request and expense, the Contractor shall, during the warranty period, provide additional repeated sessions of any of the courses provided under this ~~contract~~Agreement.

### 6.2.2 Training Curricula

The Contractor shall submit for ~~the State's~~CTDOT's review and approval training curricula as part of the Final Design Review. **CDRL 63** The curricula ~~shall~~ will indicate course content, training time requirements, and who should attend.

Contractor shall submit lesson plans and an outline of each training session, as well as demonstrate any training aids involved. **CDRL 64** Contractor shall also present to CTDOT Instructional Training Materials ~~shall also be presented~~ for approval. Upon approval, t~~T~~he Contractor shall ~~later~~ provide such materials to CTDOT ~~and provided later in~~at a ratio of one per student.

Contractor shall submit to CTDOT Instructor's Guides for each course, which will contain all the information and direction necessary for instructors to make an effective presentation, ~~shall be submitted~~ at least 60 days prior to the scheduled date of the commencement of training. **CDRL 65** ~~It shall~~Such guides will include adequate guidelines to conduct a comprehensive training program. Individual lessons within the course ~~shall~~ will be organized as separate blocks (or modules), which may be taught as a unit. In some instances, the same module could be used in more than one course. The Instructor's Guide ~~should~~ will contain, at a minimum:

- Student prerequisite knowledge and/or experience
- Program overview
- A statement of overall program goals
- Lesson plans (a session-by-session outline containing the following):
  - Student learning objectives, stated in measurable terms
  - Overview of each lesson
  - Suggested instructional methods/learning activities
  - Required equipment and/or resources. This should include graphics or charts as needed to make effective presentations.

Written and/or hands-on practical tests designed to measure the extent to which students have met the learning objectives, with an answer key for each of the tests developed.

Contractor shall submit to CTDOT Student Instructional Materials, to include all materials for the student to interact in the learning situation, ~~shall be submitted~~ at least 30 days prior to the scheduled date for the commencement of training. **CDRL 66** ~~It~~ Such materials will~~shall~~ contain, at a minimum:

- Program overview and introduction
- Statement of overall program goals
- Learning objectives, stated in measurable terms, the knowledge to be gained
- A fully developed prose treatment (not outline format) of content presentation, developed in the same modular format as the Instructor's Guide
- Illustrations, charts, or graphics, as needed to enhance content presentation
- Problems and questions related to lesson content, as appropriate.

The Contractor shall outline specific objectives for each of the courses to be presented. A training course or session ~~shall~~ will be provided for each equipment item, including each element of the CMS and all communication interfaces.

Each course ~~shall~~ will include sessions in safety, equipment operation, and a comprehensive seminar on learning basic skills/knowledge of each operation. Courses ~~shall~~ will include both classroom and practical exercise sessions and shall provide the student with the basic knowledge necessary to utilize all training materials. The Contractor shall provide a detailed schedule outlining the length and content of each of these sessions in accordance with the guidelines established.

The training program ~~shall~~ will include familiarization with equipment operation and performance and detailed instruction in operation, troubleshooting, maintenance, repair, and test procedures.

### 6.2.3 Types of Training

The Contractor shall supply the following training courses:

### 6.2.4 Ticket Vending Machine Training

A. TVM Revenue Servicing – All TVM revenue service personnel ~~shall~~ will receive training to adequately instruct them in the routine service functions necessary for accessing the TVM, collecting revenue monies, replenishing ticket stock and change, clearing jams for ticket stock, bills or coins, printing and retrieving audit tickets, and securing the TVM. ~~Training shall be conducted for~~The Contractor shall train up to 5 State-designated personnel

B. TVM Field Maintenance and Servicing – All State maintenance personnel who may be required to perform scheduled maintenance and support activities will attend a training course. This course ~~shall~~ will provide the employees~~employee~~ all knowledge necessary for operation, troubleshooting, maintenance, repair, component change-out, and scheduled maintenance of Ticket Vending Machines. The Contractor shall train up to 15 State-designated personnel.

C. TVM Bench Repair – Contractor shall give s~~S~~elected mechanics and electricians, who will perform the periodic overhaul, remedial repair, and adjustment of TVM components, ~~shall be given~~ a comprehensive instruction course in the operation, troubleshooting, maintenance, repair and overhaul of the equipment. This course ~~shall~~ will also train State personnel in the use of all special tools and test equipment described in Section 6.7. ~~Training~~ Contractor shall train ~~shall be conducted for~~ up to 5 State-designated personnel.

D. TVM Operation, Configuration, and Administration – Contractor shall give s~~S~~upervisory personnel who will manage the TVMs and the service technicians ~~shall receive~~ specialized training in the operation, configuration, and administration of the TVMs. This class ~~shall~~ will provide instruction on those activities that are limited to administrative logins on the TVM, as well as those infrequent activities governing the configuration of the TVM. The class ~~shall~~ will focus on those activities that may occur at the TVM. ~~Up to~~Contractor shall train up 5 State-designated personnel ~~shall attend the class~~.

### 6.2.5 Central Management System Training

A. CMS User Training – ~~Personnel~~ Contractor shall train personnel who will use the CMS ~~shall be trained~~ in the use of all application programs and functions provided by the system. The Contractor shall structure this training as a series of logically arranged topics so that individual users may attend only those portions of the course that are of interest. ~~Up~~ Contractor shall train up~~Up~~ to 20 State-designated personnel ~~shall attend this course~~.

B. CMS Accounting – ~~Those~~ Contractor shall train those management personnel who will generate and use revenue and ridership reports from the CMS shall receive ~~specialized training~~ to be familiar with revenue and ridership report contents and uses. Using sample data created from testing intervals or other sources, reports ~~shall~~ will be generated from the CMS and used to explain the resulting data output. ~~Up~~ Contractor shall train up~~Up~~ to 10 State-designated personnel ~~shall attend this course~~.

C. CMS Administration – ~~Systems~~ Contractor shall train systems personnel who will be responsible for administration and systems maintenance ~~shall be trained~~ in all aspects of CMS administration and to ensure optimal performance as well as correcting minor system problems. ~~Up~~ Contractor shall train up~~Up~~ to 5 State-designated personnel ~~shall attend this course~~.

D. Report and Query Generation and Customization – The Contractor shall instruct CMS users and administrators in report and query generation and customization, including use of the Report Writer tool described in Section 4.13.4. ~~Up~~ Contractor shall train up~~Up~~ to 25 State-designated personnel ~~shall attend this course~~.

## 6.3 Installation Services

The Contractor ~~will be responsible for installation of~~shall install all TVM's and all other TVMS components in locations including, but not limited to, stations and existing facilities provided by others. The Contractor ~~will be responsible for providing~~shall provide all materials and work required to complete all installations, such that the TVM's and other TVMS components are ready for testing and revenue service. In all locations (including those provided for the ~~the~~ CT***fastrak*** project and other locations), the Contractor ~~will be responsible for determining~~shall determine and ~~verifying~~ verify available power and other utility sources and ~~for making~~make the complete connections to those services that will allow the TVMS to function as required and as designed. The Contractor will ~~be responsible for designing~~design (including Contractor obtaining all approvals and permits necessary), the TVMs located off of the CT***fastrak*** guideway, including but not limited to downtown Hartford (State House Square, Trumbull Street, High Street / Union Station), UCONN Health Center, Westfarms, and the Maintenance Test Facility. The Contractor's TVMS installations must comply with all local, state, and federal codes and building requirements. Additionally, the Contractor ~~will~~ shall comply with all CT-DOT requirements relating to construction on the CT***fastrak*** project and all requirements to meet the building and facility owner requirements for the "off guideway" TVMS installations. ~~All~~ Contractor shall provide to CTDOT all installation requirements, including installation procedures and instructions for on CT***fastrak*** guideway locations and designs for the off CT***fastrak*** locations, ~~will be provided to the State~~ within 120 days ~~of~~ after the NTP is issued.

### 6.3.1 Installation and Interface Plan

As part of the Preliminary Design Review, the Contractor shall submit to ~~the State~~CTDOT for review and approval an installation and interface plan. Such plan ~~shall~~ will indicate the method of installation and connections, the installation schedule, mounting details, method and materials for sealing the base, and any support required of ~~the State~~CTDOT. **CDRL 67**

Not less than 60 days prior to delivery of the first TVM, the Contractor shall submit for ~~the State's~~CTDOT's review and approval, drawings of the equipment installation, indicating details on all equipment installation, location, orientation, and electrical and communications

connections based on the drawings provided by ~~the State~~CTDOT and on the off-guideway designs developed by the Contractor. In addition, the installation and removal procedures ~~shall~~ will be sufficiently detailed such that the State could perform TVM installation and removal. **CDRL 68**

### 6.3.2 TVM Mounting

TVM mounting ~~shall~~ will be in a secure, robust manner that resists vandalism and burglary, and can withstand the environmental conditions encountered in Southern New England, especially wind loading. The TVM ~~shall~~ will be installed over any and all stubbed conduits or junction boxes such that no wiring or cabling is exposed outside the TVM cabinet or base. The TVM cabinet ~~shall~~ will include a mounting pedestal with suitable means for leveling the machines upon installation to accommodate the platform slope.

Each TVM ~~shall~~ will be aligned, positioned, and installed in accordance with State requirements as identified in the station drawings. The Contractor shall provide all foundations, grouting, anchor bolts, and other attachment mechanisms beyond those provisions indicated on the station drawings. For non-station locations, the Contractor shall be responsible for ascertaining the existing conditions and for providing suitable installations that meet the facility owners' requirements and the requirements of the Agreement. ~~The State~~CTDOT shall provide such requirements not later than 120 days prior to the ~~first delivered~~date when the first TVM is planned to be delivered as per the program master schedule.~~.~~ **CT ~~6~~3**

### 6.3.3 Station and Other TVM Location Wiring

Station power, data, and communications system wiring in conduits, will be installed in accordance with the station drawings as follows:

The Contractor shall:

- Make electrical-power connections between Ticket Vending Machine to the power panel indicated in the relevant station drawing; and
- Make data connections between the Ticket Vending Machine and the Ethernet switch in the communication~~.~~ cabinet indicated in the relevant station drawing.

~~Other State contractors will install:~~The State will provide:

- conduits, appropriately routed, to carry power and Ethernet cables from the Ticket Vending Machine;
- a communications cabinet, including a rack-mounted Ethernet switch that will connect the Ticket Vending Machine to other devices on the CTfastrak network.

Subsequent to completing wiring connections at each TVM, the Contractor shall conduct continuity and other qualitative tests to verify power and communications connections.

## 6.4 Technical Support Services

### 6.4.1 On-site Support

The Contractor shall provide technical support on-site for at least 60 days both prior to and after the start of CT*fastrak* revenue service, with this on-site support being provided after the State's

approval of start date(s). The Contractor's support personnel shall assist in installation and troubleshooting and shall act as field instructors for State personnel who maintain, service, and use the TVMS. On-site Contractor personnel are subject to the approval of ~~the State~~CTDOT.

### 6.4.2 Remote On-call Support

The Contractor shall provide remote on-call (*i.e.*, factory) technical support during installation and through the initial 24 months of revenue service.

The Contractor shall provide telephone-based technical support, Monday through Friday during normal business hours (8:00 AM through 5:00 PM Eastern Time) with an average two hour response time. The Contractor shall provide telephone-based support at all other times, including weekends, holidays, and non-business hours with an average four hour response time.

## 6.5 Spare and Replacement Parts

The Contractor shall supply the quantities of spare and replacement parts as identified within the Agreement. ~~All~~ Contractor shall deliver all~~All~~ spare parts ~~shall be delivered~~ to the State prior to placing the equipment into revenue service. **CDRL 69**

## 6.6 Maintenance and Test Facility

~~The State will~~CTDOT shall allocate at least one spare TVM complete with necessary cables for use in the TVMS m~~M~~aintenance and t~~T~~est f~~F~~acility (the "Maintenance and Test Facility"),~~,~~ the location of which will be specified by ~~the State~~CTDOT.

In addition, the Contractor shall supply the necessary computer hardware and software to provide a test version of the CMS. The test CMS shall provide all functionality of the production (hosted) CMS environments.

For the Maintenance and Test Facility, the Contractor shall install and configure the test TVM, and ~~all~~ install all hardware and software for the test CMS (including operating system software, application software, and relational database software).

Once ~~the system i~~CT***fastrak*** begins~~s in~~ revenue service, the Contractor shall test all TVMS software and hardware updates ~~supplied by the Contractor shall be tested~~ first in the Maintenance and Test Facility before being propagated to the in-service equipment.

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The Contractor shall install and configure the Maintenance and Test Facility prior to commencing the Pilot Test described in Section 8.6. As necessary, the Contractor may utilize the Maintenance and Test Facility for the training program.

## 6.7 Special Tools and Test Equipment

The Contractor shall supply the State with all special tools, gauges, and test equipment necessary for the proper maintenance, repair, and adjustment of all supplied TVMs. Special tools, gauges, and test equipment shall be supplied prior to the commencement of Training. These shall include but not be limited to:

- TVM Coin Validator Programmer – To reprogram the coin validator to accept new or different coins

- Bill System Test System – As necessary to diagnose, maintain, and configure the new Bill Processing module, the Contractor shall supply a diagnostic test system to permit detailed analysis of the operation of the bill system's mechanisms, sensors, data recording, and communications interface. This system ~~shall~~ will be able to perform all authentication and bill processing functions, as well as providing access to and utilizing all diagnostic capabilities inherent in the bill system.

The Contractor shall submit a description of all required special tools for ~~the State~~CTDOT review at the Preliminary Design Review and ~~State~~ CTDOT approval at the Final Design Review. **CDRL 70**

## 6.8 Software Source Code and Documentation

~~The State has no plans to modify supplied software without the Contractor's knowledge and consent. The State~~CTDOT requires software source code and documentation to be provided either to CTDOT or to~~in~~ an escrow account to ensure that should the need arise after expiration of the warranty and the Contractor is unable or unwilling to provide technical support, the State or a software consultant will have the capability to perform any needed software modifications.

### 6.8.1 Time and Scope of Submittals

Within 30 days following final acceptance of the ~~equipment~~TVMS, the Contractor shall supply to CTDOT software source code and documentation, in both electronic and hardcopy forms, for all software developed by the Contractor for the TVMS purchased under this ~~contract~~Agreement. **CDRL 71**

Contractor-produced software source code and documentation to be provided shall include all application software for the TVMs and the CMS as well as any software developed for embedded microprocessors that are integrated into any modules for the TVMs.

Software documentation ~~shall~~ will ~~provide~~ include the following:

- General description and operation.
- Software architecture and basic program functions.
- Data flow information.
- Annotated source code listing, with comments and descriptions pertaining to each module sufficient allow an experienced programmer to understand the program.
- Detailed memory map and listing.
- Input/output port map.
- A licensed copy of all software tools such as debuggers, assemblers, and compilers, needed to convert the supplied source code into executable form used by the target processors.
- Hardware devices, such as EPROM programmers, with their accompanying software tools, necessary to transfer the executable programs onto the storage device used by any embedded microprocessor.
- Documentation that describes the procedures necessary to convert the supplied source code into executable format.

During the term of this contract, the Contractor shall:

- Retain technical support and software development personnel who are familiar with the TVMS equipment and software, and who are qualified to perform the tasks described herein.
- Retain all software source codes and development and testing environments necessary to support and modify software for the State's TVMS.

### 6.8.2 Alternative Delivery to Escrow Agent

Should the Contractor prefer, all deliverables described in Paragraph 6.8.1 may, within 30 days following final acceptance of the TVMS, be put in escrow with a third party. ~~The State~~CTDOT shall select the escrow agent and pay for the escrow services. **CT ~~7~~4**

If an escrow agent is used, a complete inventory of the items deposited shall be supplied to ~~the State~~CTDOT at the inception of the escrow. **CDRL 72**

At the conclusion of the Software Warranty, the Contractor shall update all software source code and other deliverable items in escrow to reflect the software and systems in place at that time. **CDRL 73**

# 7 Design Reviews

## 7.1 General

A comprehensive program of submittals by the Contractor and reviews by CTDOT shall be conducted for all aspects of the Fare Collection project. Two design reviews shall be held: Preliminary and Final. For each of these reviews, a series of documentation, samples, and demonstrations shall be submitted to ~~the State~~CTDOT for review and approval.

## 7.2 Design Submittal Requirements

The Contractor shall submit to CTDOT drawings, documents, procedures, and data in accordance with the approved Submittal List and Schedule documents. The Contractor shall submit for review and approval by CTDOT all documents, data, assembly and installation drawings required to convey concept, design, dimensions, maintenance, operation, and overall assembly aspects and interfaces. Drawings ~~shall~~ will be accompanied by material specifications, process specifications, and test data required to permit review and approval of the drawings. Detailed parts drawings need not be submitted unless requested by ~~the State~~CTDOT to permit review of another drawing.

The Contractor shall maintain a record of ~~Contractor and Subcontractor~~ submittal status. This shall include drawing and document numbers, revision letter, drawing title, date submitted, transmittal document, disposition, and the document number identifying the disposition. This status shall be updated not less than monthly and submitted to ~~the State~~CTDOT as part of the Monthly Progress Report.

### 7.2.1 Requirements for Drawings, Documents and Data

All dimensions ~~shall~~ will be expressed in the English or metric system; all wording ~~shall~~ will be in the American English language. Text in other languages is permitted on the drawings, but all information ~~shall~~ will be translated into American English. All terminology used ~~shall~~ will be conventional to the U.S. transit industry.

All drawings submitted by the Contractor ~~shall~~ will be CADD generated and ~~shall~~ will be formatted based on general industry standards. Hand-drawn sketches will not be accepted unless specifically requested by ~~the State~~CTDOT. Schematics ~~shall~~ will be comprehensive in nature and thoroughly detailed to permit use by the State maintenance and service personnel to troubleshoot and repair the equipment.

All submitted reports, manuals, and other documents furnished to ~~the State shall~~CTDOT will be sized to print on 8½" × 11" bond paper, or when a larger size is necessary, 11" × 17". All submittals ~~shall~~ will be in electronic form, either Adobe® PDF or in the current Microsoft® Office® format.

### 7.2.2 Submittals Requiring Approval

Documents, drawings and data to be furnished by the Contractor for approval by ~~the State shall~~CTDOT will include all information required, including completed, final form and all other submittals described in the Agreement. ~~The State~~CTDOT reserves the right to request additional documents and/or drawings as required to clarify and amplify the intent or meaning of documents and/or drawings furnished.

### 7.2.3 Approval of Contractor Submittals

~~The State's~~CTDOT's approval or disapproval will be provided in one of the three following categories:

- Approved as submitted.
- Conditionally approved. The Contractor may proceed in accordance with changes indicated and shall revise and resubmit the document, drawing, and data for the ~~State's~~ CTDOT's approval.
- Disapproved. The Contractor shall revise and resubmit the document, drawing, and data for ~~the State's~~CTDOT's approval prior to commencing the affected portion of the work.

Approval of any submittal does not relieve the Contractor of the obligation to meet all of the requirements of the Agreement. Approval of a document, drawing, or data that contains deviations from, or violation of, the Scope of Work does not constitute ~~the State's~~CTDOT's approval for that deviation or violation. Such deviations must be specifically requested and granted via the formal change procedure.

## 7.3 Design Review Requirements

Design review meetings ~~shall~~ will provide for the discussions between ~~the State~~CTDOT and the Contractor to review design submittals and finalize all design details. During these design review meetings, action items ~~shall~~ will be identified, with each action item assigned to an individual for disposition by a pre-determined response date. All action items identified during the design reviews ~~shall~~ will be recorded in the project action item log as described in Section 5.1.4.

At least 14 calendar days prior to each design review meeting, the Contractor shall submit the agenda and a data package covering information to be addressed in the meeting. **CDRL 74** ~~Design~~ Contractor shall prepare design review meeting minutes ~~shall be prepared by the Contractor~~ and ~~submitted~~ submit them to ~~the State~~CTDOT for review and approval within 2 weeks after each meeting. **CDRL 75**

Attendance at design review meetings ~~shall~~ will include representatives of the Contractor and appropriate ~~Subcontractors~~ subcontractors and ~~the State~~CTDOT or its representative.

### 7.3.1 Preliminary Design Review

The Contractor shall prepare preliminary design drawings, documentation, and data for review and approval by ~~the State~~CTDOT. Upon receipt and initial review of preliminary design review submittals, a Preliminary Design Review Meeting (PDR), shall be held at CTDOT offices or, at ~~the State's~~CTDOT's option, at the offices of the Contractor in the United States or via teleconference calls. The PDR shall be held as identified within the schedule stipulated in the Agreement and ~~the State's~~CTDOT's requirements.

### 7.3.2 Final Design Review

The Final Design Review (FDR) ~~shall~~ will take place when the design is essentially complete. The FDR is to provide the opportunity to review, revise, and agree on the details of the final design prior to release of the designs for manufacture. ~~The State~~CTDOT shall notify the Contractor within 30 calendar days after the PDR those submittals from the PDR that ~~shall~~ must be resubmitted in greater detail for the FDR. Upon receipt and initial review of final design

review submittals, a FDR Meeting ~~shall~~ will be held at CTDOT offices. The FDR ~~shall~~ will be held as identified within the schedule stipulated in the Agreement and ~~the State's~~CTDOT's requirements.

# 8 Inspection and Testing

## 8.1 General

The Contractor shall plan for, perform, monitor, and document all tests required to prove the design and acceptability of the TVMS, including all elements, subsystems, and the system as a whole, furnished under the Agreement. The Contractor shall furnish TVMs that meet~~s~~ the criteria specified for all tests. Testing ~~shall~~ will not commence until all designs affecting the respective equipment and all related testing procedures have been approved by ~~the State~~CTDOT.

The Contractor shall begin no portion of the inspection and testing regimen unless all prerequisite tests have been successfully completed and approved by ~~the State~~CTDOT, or ~~the State~~CTDOT provides written authorization.

~~The State~~CTDOT may require the Contractor to submit proof of acceptability of any item at any time during the duration of the Agreement. A statement by the C~~c~~ontractor, manufacturer, or supplier of any item, without appropriate substantiating evidence, ~~shall~~ will not constitute adequate proof of acceptability, unless approved by ~~the State~~CTDOT. Appropriate substantiating evidence shall include one or more of the following:

- Testing witnessed by ~~the State~~CTDOT or a designated representative.
- Testing performed by an independent testing facility, approved by ~~the State~~CTDOT.
- Testing performed in accordance with the CTDOT ~~State~~-approved test procedures.
- Testing performed on same hardware equipment or components with substantial revenue service experience under similar operating environments and functions, if approved by ~~the State~~CTDOT.

The Contractor shall furnish all test instruments and other equipment and materials necessary for performing all tests required.

### 8.1.1 Testing Plan

The Contractor shall prepare and submit an overall Testing Plan that supports the Project schedule requirements to ~~the State~~CTDOT for approval within 60 days after the NTP is issued. **CDRL 76** The Testing Plan ~~shall~~ will include descriptions, approximate scheduling, sequencing, and dependencies of all inspections, qualification tests, and revenue service acceptance tests to be performed. These inspections and tests ~~shall~~ will demonstrate that the equipment produced is in compliance with the Agreement. The Testing Plan ~~shall~~ will include the format for test results documentation.

### 8.1.2 Test Schedule

The Contractor shall submit a test schedule for all tests to ~~the State~~CTDOT for approval 60 days prior to the start of any testing. **CDRL 77** The test schedule ~~shall~~ will meet all Project requirements and include, as a minimum, the following requirements:

- Scheduled test dates
- Dates that the test procedures ~~shall~~ will be submitted to ~~the CM~~CTDOT
- Dates that the test procedures approval from CTDOT is required
- Hierarchy of tests~~.~~

The schedule ~~shall~~ will accommodate the fact that ~~the State~~CTDOT may witness all such activities and, as such, the Contractor shall not schedule concurrent tests or inspections without prior approval by ~~the State~~CTDOT.

### 8.1.3 Test Procedures

Contractor shall submit all t~~T~~est procedures ~~for each shall be submitted~~ to ~~the State~~CTDOT for approval at least 60 days prior to the start of each test. **CDRL 78** The test procedures ~~shall~~ will include, as a minimum, the following requirements:

- Objective of test
- Test environmental conditions
- Detailed description of test units including drawings, part numbers, inspection and earlier test records, maintenance records and calibration records
- Detail of test procedure
- Sequence of test with other tests
- Test equipment to be utilized during the test and the calibration of such equipment
- Pass/fail criteria
- Re-test procedure, if appropriate
- Level and schedule of preventive maintenance during the test
- Test data sheet format
- Test report format

### 8.1.4 Test Results Reports

~~Test~~ Contractor shall prepare test~~Test~~ reports ~~shall be prepared~~ in accordance with the test procedure and signed by all responsible witnessing parties. ~~The~~ Contractor shall submit the~~The~~ results of the tests ~~shall be submitted~~ to ~~the State~~CTDOT for approval within 5 days ~~of~~ after test completion. **CDRL 79** ~~The State~~CTDOT shall either accept or reject, with reasons, within 30 days after receipt of test results. **CDRL 80** If ~~the State~~CTDOT determines not to witness a test or tests, test reports shall nevertheless be submitted to ~~the State~~CTDOT for approval.

Inspection reports, test certifications, and test reports shall be signed and certified by the Contractor's authorized Quality Assurance/Quality Control representative. The QA/QC representative shall submit all relevant inspection reports, identifying participating personnel, equipment, material tests, results, and defects. Such reports shall be signed and certified by the Contractor's authorized QA/QC representative.

### 8.1.5 Test Waivers

At ~~the State's~~CTDOT's sole discretion, qualification or other tests may be waived upon written request from the Contractor and sufficient written proof that the equipment has previously passed similar tests. Requests for waivers and accompanying evidence of previous results must be submitted at least 60 calendar days prior to the scheduled start of the test.

## 8.2 First Article Configuration Inspection

A First Article Configuration Inspections (FACI) shall be performed on the first production TVM. At the Contractor's risk, additional production units may be produced as part of the FACI test to expedite subsequent testing. However, should any problems arise during FACI or qualification tests, the Contractor is responsible for making corrections to all TVMs produced as a part of the FACI ~~units~~.

~~The~~ A FACI ~~shall~~ will be used to establish the baseline of the quality of workmanship that ~~shall~~ will be maintained in the balance of the production, and to confirm that the TVM cabinet and assembly satisfies all physical requirements of the Agreement. ~~The State~~CTDOT and the Contractor shall establish this quality baseline jointly.

No equipment ~~shall~~ will be shipped from the point of manufacture until ~~the~~ a FACI has been successfully completed. The Contractor shall provide a minimum of 30 days notification to the State before the commencement of any FACI.

Although ~~the~~ a FACI ~~shall~~ will be a static (non-functional) inspection of the equipment, the Contractor is encouraged to provide working demonstrations of the equipment to facilitate future qualification testing and to foster better understanding of the equipment. The following requirements to be met by the Contractor ~~shall~~ will apply to the FACI:

A. A complete set of approved drawings for the item to be inspected ~~shall~~ will be available.
B. Inspection forms that controlled the in-process work and documented the inspections performed on the item to be inspected ~~shall~~ will be available.
C. Tools, including special tools, and labor required for mechanical or electrical measurements to confirm Project and drawing/documentation compliance ~~shall~~ will be provided.
D. Tools, including special tools, and labor to do limited disassembly and removal of covers, as required for proper inspection, ~~shall~~ will be provided.
E. The configuration of the equipment ~~shall~~ will be verified ~~that it complies~~as in compliance with the approved drawing and design configuration. Drawings, documents, and data necessary to establish that the production equipment complies with the design ~~shall~~ will be submitted to ~~the State~~CTDOT.

During ~~the~~ a FACI, the Contractor shall install the TVM to a concrete floor in a manner identical to that proposed for field installations. Upon completion of the test installation, the TVM cabinet shall be tested for compliance with the vandalism resistance and other physical requirements defined in Sections 2.19 and 3.2.1.

These inspections ~~shall~~ will be conducted far enough in advance of production units to permit resolution of any problems identified during inspection and allow incorporation of any changes necessary prior to the beginning of production.

Upon completion of ~~the~~ a ~~First Article Configuration Inspection~~FACI, the design shall not be changed, nor any drawings or documentation changed, without ~~State~~ CTDOT approval.

## 8.3 Factory Qualification Testing

The Contractor shall perform the Factory Qualification Tests (FQTs) set forth below to demonstrate that the TVMS meets the requirements of the Contract Documents. Such demonstration of compliance ~~shall~~ will be performed through testing, analysis, or certification that equipment is proven operational, reliable, and maintainable in similar transit applications under the same conditions, and for the same specification requirements.

For each test, records ~~shall~~ will be maintained of the versions of all software modules installed on the equipment. These records ~~shall~~ will include the date and time the software was created, size of each file, and version number.

### 8.3.1 Ticket Vending Machine

All qualification tests for the TVM ~~shall~~ will utilize ticket stock that will be used in revenue service.

#### *8.3.1.1 TVM Functional Test*

This test ~~shall~~ will prove the proper functioning of all TVM features, performance criteria, and capabilities. This comprehensive test ~~shall~~ will be performed using the FACI-approved TVM and shall utilize TVM application software that is complete and ready to enter revenue service. T~~-~~his test ~~shall~~ will be performed concurrently with the CMS Functional Test as identified in Section 8.3.2 below.

Within 10 days of test completion, the Contractor shall submit to ~~the State~~CTDOT the list of identified open issues. **CDRL 81** ~~The State~~CTDOT shall notify the Contractor within 5 days of receipt of this list which, if any, open items must be resolved prior to the occurrence ~~successful completion~~ of the Functional Test.

#### *8.3.1.2 Cycle Test*

After the TVM and CMS have passed their Functional Tests, a Cycle Test ~~shall~~ will be performed on a single TVM using combinations of all fare categories, transaction types, payment methods, and representative mixtures of bills and coins for each cash transaction. Fare levels for the tests shall be selected by ~~the State~~CTDOT to represent a sampling of both the projected fare levels for 2014.

The TVM cycling test ~~shall~~ will consist of 2,000 completed transactions. Payment media to be used for this test ~~shall~~ will be “street” money acquired from a local US bank. The Contractor shall be responsible for acquiring the cash, test bank cards, and other media necessary to conduct the test.

The test ~~shall~~ will measure those performance criteria specified for TVMs which require large quantities of transactions, including coin and bill acceptance rates, reliability, and accuracy. The CMS used for the CMS Functional Test ~~shall~~ will be provided to monitor all events triggered during and to permit bank card transactions.

If the TVM dispenses change, the TVM ~~shall~~ will be ~~initiated~~ supplied with a known quantity of coins in the recirculating tubes. The coin and bill vaults ~~shall~~ will be empty. During each set of 800 transactions:

- Each selection ~~shall~~ will be purchased at least 25 times
- Change dispensing ~~shall~~ will be made to occur from all coin sources (if applicable)
- Coins of each denomination ~~shall~~ will be diverted to the coin vault (if applicable)
- Change supplies ~~shall~~ will be depleted to cause the TVM to enter “Exact Fare Only” mode (if applicable)
- At least 10% of the transactions ~~shall~~ will occur while the TVM is in “Exact Fare Only” mode (if applicable)
- Sufficient coins ~~shall~~ will be inserted to cause the TVM to clear “Exact Fare Only” mode (if applicable)
- Sufficient quantities of bills ~~shall~~ will be inserted to cause the bill vault to fill and the TVM to enter “No Bills Accepted” mode

- At least 10% of all transactions ~~shall~~ will occur with the voice system activated
- At least 50 transactions ~~shall~~ will be ~~purchased~~ processed using with a bank card, 50% by credit card, 50% by debit card
- The TVM outer door ~~shall~~ will remain closed

At the conclusion of each set of 800 transactions, the TVM ~~shall~~ will be subjected to a complete audit; all coins and bills shall be counted and compared to reported quantities. All events reported by the TVM during the Cycle Test ~~shall~~ will be fully explainable by the activities of the test.

Each subsequent set of transactions ~~shall~~ will utilize a different fare structure, representative of projected fare increases over the next 10 years. Successful completion of the Cycle Test requires:

- No more than two relevant failures.
- Overall audit accuracy to be within ±0.1%
- Coin and bill acceptance rates met.
- All events to be accurately recorded and reported by the TVM.

All failures (relevant and non-relevant) ~~shall~~ will be documented and explained in the Cycle Test report. The Cycle Test report shall also describe plans to rectify any relevant failures.

#### *8.3.1.3 Environmental Test*

Subsequent to the successful completion of the Functional Test, the TVM ~~shall~~ will be subjected to the environmental extremes specified in Table 8.3.1.3 and a portion of the cycling test run to demonstrate the capability of the equipment to operate successfully under these conditions. Note that if hardware modifications are required to resolve any issues identified with the TVM during Factory Qualification Tests conducted during or after the Environmental Test, ~~the State~~CTDOT may, at its sole discretion, require the Contractor to repeat the Environmental Test with the modified TVM hardware.

The TVM ~~shall~~ will be subjected to the following environmental test. Before conducting test transactions, the equipment ~~shall~~ will sit idle (operating) for a period of three hours at each given environmental condition setting. Thereafter, the number of transactions to be processed ~~shall~~ will be as indicated in Table 8.3.1.3 and the equipment cycled as per procedures established for Cycling Tests described in Section 8.3.1.2.

Table 8.3.1.3: TVM Environmental Test Conditions

| Run No. | Exterior Temperature | Exterior RH (%) | Solar Loading | Input Voltage | # Trans-actions |
|---|---|---|---|---|---|
| 1 | Minimum per Table 1.8 | Minimum per Table 1.8 | | 125 | 50 |
| 2 | Maximum per Table 1.8 | 50 | Maximum per Table 1.8 | 125 | 50 |
| 3 | 80° F | 95 | | Maximum per Section 1.9 | 50 |
| 4 | 80° F | Maximum per Table 1.8 | | Minimum per Section 1.9 | 50 |
| 5 | 32° F | 80 | | 125 | 50 |
| RH = Relative Humidity (non-condensing) | | | | | |

During the solar loading test in Table 8.3.1.3, the maximum solar flux loading ~~shall~~ will be applied to the front face of the TVM.

Successful completion of the Environmental Test requires no relevant failure as defined in Section 1.5.

#### *8.3.1.4 Water Ingress Test*

In addition, a water ingress test ~~shall~~ will be conducted, simulating rain, fog, and wind conditions of 25% of the worst-case conditions as specified in Section 1.8. Simulated wind-driven rain ~~shall~~ will be applied to all four sides and the top of the Ticket Vending Machine for 15 minutes per surface. After each 15-minute period, the TVM interior ~~shall~~ will be inspected for water ingress. Any water inside the TVM ~~shall~~ will be minimal and shall not result in hazardous conditions or potential component failure.

### 8.3.2 Central Management System

The Central Management System (CMS) ~~shall~~ will pass a separate battery of functional tests prior to installation of the software updates. ~~This test shall~~These tests will be performed concurrently with the TVM Functional Test as identified in Section 8.3.1.1 above. These tests ~~shall~~ will be designed to confirm that all functions required are provided, operate in a clear and concise manner, and that the CMS can perform its intended tasks accurately and with satisfactory responsiveness and ease of use.

#### *8.3.2.1 CMS Functional Test*

The CMS Functional Test ~~shall~~ will demonstrate, exercise, and verify all functions of all user-accessible screens and commands. These tests ~~shall~~ will include verification of the following functions and verify the associated changes, as a minimum:

- Verification of all screen flows, screen layouts and wording, selections and messages
- Data transfer between the CMS and TVMs
- Configuration changes for the TVMs
- All CMS applications
- Design and modifications of queries and reports and processing one of each report type to verify format and data content
- Fare table changes, download to devices and web sites and verify all changes
- Bankcard processing using a simulated payment entity interface
- Backup of data – automatic and manual
- Verification of passwords and their security provisions and settings
- Device management

Successful completion of the CMS Functional Test requires no discrepancies in function to those as agreed at the Final Design Review and further included in the design based on Change orders executed.

#### *8.3.2.2 Data Export Test*

Using transaction records generated during the TVM Cycling Test, the CMS Data Export Test ~~shall~~ will demonstrate, exercise, and verify revenue and ridership data to be exported to the NFTS central data system.

Successful conclusion of the Test requires 100% accuracy of all data exchanges.

#### *8.3.2.3 Report Generation Test*

Data from the TVM Cycling Test ~~shall~~ will be used for the Report Generation Test. In addition, transaction records created or modified to simulate Project installation (at least 25 TVMs in 12 stations) containing all data, event, transaction, and record types, ~~shall~~ will be used to augment the records from the TVM Cycling Test. In total, the simulated data shall contain at least 5,000 transaction records using all payment methods, and no less than 500 events, randomly distributed over all TVMs, and representing a period of 2 years.

The CMS ~~shall~~ will generate samples of all reports available. Format, layout, page and column headers, etc. ~~shall~~ will be reviewed to confirm compliance with the designs approved at the Final Design Review. Contents of the reports ~~shall~~ will be compared with the known contents of the data.

Successful completion of the Report Generation Test requires no discrepancies between report contents and known data.

### 8.3.3 FQT Software Release for Revenue Service

With successful completion of the FQT, all software and configuration files ~~shall~~ will be "frozen" and the Contractor shall make no changes without authorization ~~of the State~~from CTDOT. The Contractor shall record version information for all software modules and configuration files installed on the equipment. These records ~~shall~~ will include the date and time the software or file was created, size of each file, and version number. Unless ~~the State~~CTDOT authorizes changes, software released for revenue service ~~shall~~ will match that which was used to pass the FQT. The Contractor shall provide the "as-tested" software documentation to ~~the State~~CTDOT at the conclusion of the FQT. **CDRL 82**

## 8.4 Production Testing

The Contractor shall conduct production testing at its US manufacturing facility to verify each item of equipment is consistently manufactured and fully complies with final functional requirements and hardware configuration requirements. Successful completion of the Production Testing is a prerequisite to delivery of equipment to the State's sites for installation, and Installation Verification Testing.

Once this test is successfully completed, the equipment ~~shall~~ will be available for shipment. The Contractor shall provide to ~~the State~~CTDOT certification in writing, in addition to providing the actual test results for review, when the Functional Test has been passed. ~~The State~~CTDOT will identify, when necessary, required modifications to be made and demonstrated before approving release for shipment. ~~The State~~CTDOT shall have, at ~~their~~ its discretion, the right to provide on-site oversight of the Production Testing.

## 8.5 Installation Verification Testing

The Contractor shall install all TVMs (excluding operational spares). Successful completion of all Factory Qualification Tests is a prerequisite to commencement of TVM installation.

After installation, the Contractor shall perform a test on each TVM to confirm that the equipment is properly installed, interfaces properly with the CMS and performs as required by the Agreement. ~~The State~~CTDOT may witness all Installation Verification Tests at its discretion which shall consist of the following.

- All installed equipment shall undergo as a minimum inspections for:
  - Completeness and quality of installation
  - Damage to equipment
  - Missing components and parts
  - Correct power and communication connections
  - Correct positioning and mounting
- All installed equipment ~~shall~~ will be energized and exercised, and tested for function and operation.
- All TVMs ~~shall~~ will be subject to communications testing that shall confirm proper data exchange between the TVMs and the CMS.

Within two business days of performing the Installation Verification Test on each TVM, the Contractor shall submit a record of the test and its results for the State's review and approval. **CDRL 83**

## 8.6 Pilot Station Test

At least 30 days before Pilot Test Station ~~Test~~ installation is to begin, ~~the State~~CTDOT shall identify a station (the "Pilot Test Station") to be designated as the ~~pilot~~ test station for a test to evaluate the station equipment, data network, and CMS. ~~This station~~The Pilot Test Station shall include at least 2 TVMs, and shall have a working Ethernet communications system in the communications enclosure.

The ~~pilot station~~Pilot Test Station test ~~shall~~ will utilize final "revenue service-ready" versions of all software, fare tables, and configuration parameters, and ~~shall~~ will begin at least 30 days prior to commencement of system-wide installation. ~~The State's~~CTDOT's personnel ~~shall~~ may participate in this test, which shall involve no c~~C~~ustomer interaction. The Contractor shall provide on-site personnel for the duration of the test. Once installation at the Pilot ~~Test station~~Test Station is complete, the CTDOT ~~State will identify~~shall identify the date for the Pilot Station Test.

During the test period, the following activities ~~shall~~ will occur:

- 100 transactions on each TVM involving all ticket and transaction types
- Two revenue servicings (one servicing for each 50 transactions) of all coin and bill storage devices on each TVM
- Two clock synchronizations for the TVM ~~shall~~ will be performed by downloading new date/time information from the CMS
- New fare structures and a variety of parameters downloaded from the CMS two times, once per 50 transactions. Tickets of each type available ~~shall~~ will be purchased from each TVM for each new fare structure.
- At least 20 alarm conditions (on-line events) ~~shall~~ will be triggered at least once for each TVM

The Contractor shall maintain careful records of all transactions, events, and revenue servicing. CMS reports ~~shall~~ will be generated to compare the reported results with the manual records.

Successful completion of the Pilot Test Station t~~T~~est requires:

- No more than one relevant failure with the equipment
- Revenue discrepancies between vault contents, TVM audit receipts, and CMS reports are less than 0.05%
- All fare structure changes, operating parameters, and clock synchronizations are accurately received
- All events and alarms are successfully transmitted, recorded, and reported at the CMS

## 8.7 Revenue Service Acceptance Testing

When CT*fastrak* begins revenue service, the Contractor shall commence the Revenue Service Acceptance Test (RSAT), which ~~shall~~ will verify that the TVMS and all equipment satisfy ~~the State's~~CTDOT's requirements for reliability, maintainability, system accuracy, and Availability.

The Contractor shall submit the procedures to be followed for the resolution of test problems, failure recurrence control and general test rules at least 30 days prior to commencement of TVMS revenue service. **CDRL 84** Procedures ~~shall~~ will be subject to approval by ~~the State~~CTDOT.

~~The State~~CTDOT shall give system acceptance only after all work is complete and the ~~system~~ TVMS has been tested, as described within the Contract Documents.

If the reliability, maintainability, system accuracy, and Availability requirements specified herein are not attained during the RSAT, the Contractor shall design and provide retrofit kits and furnish labor to correct or change the equipment at no additional cost to the State. The corrective action and the resolution of the problem(s) shall be subject to ~~the State's~~CTDOT's approval.

~~The State~~CTDOT shall have the option to require all or part of the RSAT to be repeated to prove out the equipment performance.

### 8.7.1 Failure Review Board

During RSAT, Contractor shall ensure that all normal operations for revenue service shall be carried out with reliability, maintainability, system accuracy, and availability data being recorded and documented; a joint State-Contractor Failure Review Board (FRB) shall be established. The FRB ~~shall~~ will consist of two representatives chosen by ~~the State~~CTDOT and one representative from the Contractor. In concert with terms and definitions included in this contract, the FRB shall ascertain what constitutes a failure and what satisfactory corrective actions can be made to prevent recurrence. Failures shall be established in conformance with guidelines specified in Paragraph 8.7.2.

The first four weeks of TVMS revenue service ~~shall~~ will serve as a settling period during which the FRB shall review all reliability, maintainability, accuracy, and Availability data and set procedures and ground rules for the Revenue Service Acceptance Test (RSAT). The RSAT ~~shall~~ will then begin and ~~shall~~ will be conducted over the next 8 weeks.

The FRB shall convene weekly during the RSAT to review incident reports, classify failures, assess system accuracy and maintainability, and calculate Availability. (The Contractor's representative may attend the meetings via telephone.) ~~The State~~CTDOT shall document results of each meeting. **CT ~~8~~5**

At the end of the 8-week RSAT period, the FRB shall make a recommendation to accept the test results or to extend the RSAT as necessary.

If the FRB opts to extend the RSAT, all reliability, maintainability, accuracy, and Availability calculations shall ~~consider~~ include only data from the most recent 8-week period. That is, all calculations shall be on a "floating 8-week" basis. The RSAT ~~shall~~ will continue until the FRB recommends accepting the test results, based on the results of the previous 8-week period.

Once the RSAT is successfully completed, the FRB shall continue to meet on a monthly or quarterly basis for the remainder of the Hardware and Software Warranty P~~p~~eriods. During this time, the FRB shall be responsible for monitoring adherence to system reliability, maintainability, accuracy, and Availability requirements.

### 8.7.2 Failure Severity Definitions

The FRB shall be the sole arbiter of failures and their severity. For incidents declared failures, the FRB shall assign severities according to the following general guidelines, subject to modification by the FRB.

1. Level 1 – Critical: A widespread incident that produces a major business impact, including significant loss of revenue or expense impact; extremely negative customer / passenger impact; multiple end users are unable to run a production application; the Ticket Vending Machine System is operating at a seriously degraded level such that normal business operations cannot be conducted.
2. Level 2 – Urgent: Incident produces substantial business impact or normal business operations are severely impeded; non-trivial loss of revenue or expense impact; negative customer / passenger impact; the TVMS is operating at a degraded level such that application or system functionality is severely limited for multiple end users; application or system experiences continual or repeated incidents.
3. Level 3 – Important: Incident produces limited business impact and negligible loss of revenue or expense impact; the TVMS is operating at a degraded level such that normal business operations are minimally impeded; little negative customer / passenger impact.
4. Level 4 – Low: The TVMS is operating at a degraded level such that normal business operations are barely affected; the State is losing little or no revenue; little or no negative customer / passenger impact.

### 8.7.3 Fleet Defects

In its review of incidents and classification of failures, the FRB shall also monitor hardware failure patterns. The FRB shall declare a "fleet defect" when the same hardware failure is observed in a given component or device in 25% of TVMs in service within the first 12 months of revenue service.

Contractor obligations for remedying fleet defects are defined in Section 10.1.2.

### 8.7.4 Revenue Service Reliability Monitoring

~~The State~~CTDOT shall measure reliability on a continuous basis for the duration of the warranty for each piece of fare collection equipment. All incidents ~~shall~~ will be recorded and the machine cycles ~~shall~~ will be recorded on a regular basis so that a continuous measure of relevant failures versus machine cycles and time can be made (MCBF/MTBF). As set forth in section 8.7.1, the Failure Review Board shall make classification of failures as relevant or non-relevant.

In the event that the average measured relevant failure rate for any 8-week period during the warranty exceeds the limits set forth in the Agreement, the Contractor shall take corrective action. This corrective action ~~shall~~ will be subject to ~~State~~ CTDOT approval.

Reliability of the Fare Collection Equipment system ~~shall~~ will be evaluated in terms of Mean Cycles Between Relevant Failures (MCBF) or Mean Time Between Relevant Failures (MTBF), whichever condition is satisfied first. Definitions for MCBF and MTBF are provided in Section 9.1.1.

### 8.7.5 Availability Monitoring

During the RSAT, the FRB shall monitor the Availability of the CMS to assess its compliance with Availability requirements defined in Section 9.1.2. The FRB shall thoroughly investigate any incident that causes the CMS to fail to meet availability requirements. The Contractor shall provide a detailed assessment of each incident, including its cause, severity, and likelihood of recurrence.

The FRB shall determine whether any incident affecting system availability warrants extending the RSAT, modifying the impacted system, or accepting the system without modification. Additionally, the Failure Review Board shall investigate each failure leading to a loss of ~~system~~ TVMS availability to validate the correct disposition of the failure as well as the calculations for ~~system~~ TVMS unavailability.

### 8.7.6 Maintainability Monitoring

During the RSAT, the FRB shall review the maintenance activities required to sustain TVMS operations, to assess compliance with maintainability requirements defined in Section 9.2.

### 8.7.7 Revenue Service System Accuracy Monitoring

During the course of the RSAT period, the overall accuracy of the fare collection system ~~shall~~ will be evaluated by CTDOT.

#### *8.7.7.1 Cash Accounting*

Weekly totals of the cash receipts collected from the TVMs shall be tabulated by ~~the State~~CTDOT. These totals ~~shall~~ will be compared against the revenue totals as reported by the CMS during the service period in question and assessed against the requirements defined in Section 9.3.1.~~.~~

#### *8.7.7.2 Electronic Funds Transfer Accounting*

The value of all bankcard transactions as shown by CMS reports ~~shall~~ will be compared to account reconciliation reports provided by the State's clearing house service provider. The FRB shall assess these results for compliance with requirements set forth in Section 9.3.2.

### 8.7.8 Revenue Service Event Audits

Periodically during the RSAT, ~~the State~~CTDOT may ~~shall~~ audit reports generated by the data system to confirm the accuracy and completeness of information presented.

# 9 System Performance Requirements

## 9.1 Reliability Requirements

### 9.1.1 Ticket Vending Machine

TVMs ~~shall~~ will meet either the MCBF or MTBF criteria listed below, whichever occurs first:

- MCBF of 8,000 transactions, calculated as an average of all machines in service over a period of 8 weeks
- MTBF of one failure per TVM per 60 days, calculated as an average of all machines in service over a period of 8 weeks.

### 9.1.2 Central Management System

Central Management System software ~~shall~~ will be designed to meet industry standards for reliability, availability, and accuracy. ~~Minor~~ Contractor shall repair minor software errors that affect only an isolated portion of a given computer system application ~~shall be repaired~~ during the warranty period via incremental software update releases. Major software failures, as determined by the FRB, which cause the computer system to be inoperative, affect data integrity, or those software errors which in the judgment of the FRB are considered in need of immediate repair, shall be corrected by Contractor as quickly as possible, with the Contractor providing an action plan for repair within two hours of the major failure.

The CMS ~~shall~~ will achieve A~~a~~vailability as defined in Section 4.2F.

## 9.2 Maintainability Requirements

TVMs ~~shall~~ will be easily maintained, repaired, and restored to service. TVMs ~~shall~~ will require preventive maintenance no more than once per month or 10,000 transactions, whichever occurs first. Each preventive maintenance visit ~~shall~~ will be capable of being performed by one technician in less than 30 minutes.

During the RSAT, the start and end times for performing maintenance ~~shall~~ will be identified on the maintenance report. The start time ~~shall~~ will be measured from the time that the maintenance technician is dispatched and the end time ~~shall~~ will be the time the device is placed back into service. Throughout the RSAT, the maintenance times ~~hall~~ will be calculated and at the end of the testing, a single number ~~shall~~ will be generated identifying the average repair time. This must be less than the maintainability requirements as identified in Section 2.23.

## 9.3 Accuracy Requirements

During the course of the acceptance test period, the overall accuracy of the TVMS ~~shall~~ will be evaluated by CTDOT.

### 9.3.1 Cash Accounting

Weekly totals of the cash receipts collected from the TVMs ~~shall~~ will be tabulated by ~~the State~~CTDOT. These totals ~~shall~~ will be compared against the revenue totals as reported by the CMS during the service period in question.

The physically counted revenues, when compared to the CMS-reported totals, ~~shall~~ will be within ±0.1%. Failure to meet this requirement for any week shall be fully investigated, reported by the Contractor, and repaired at the Contractor's expense.

For the TVMS to be accepted, the system accuracy of the reported cash receipts ~~shall~~ will be within ±0.1% of the physically counted revenues during the previous 8 weeks of revenue service.

If discrepancies in the system accuracy of the TVMS for any 8-week period during the warranty period exceed ±0.1%, the Contractor shall take corrective action. This corrective action ~~shall~~ will be subject to ~~State~~ CTDOT approval. After corrective action has been taken and system accuracy records indicate that the action taken was successful for a minimum period of 4 weeks (even if the system accuracy monitoring period has ended), the fix ~~shall~~ will be deemed satisfactory. If not, the Contractor shall take further action until system accuracy is equal to or better than the specified requirements.

### 9.3.2 Electronic Funds Transfer Accounting

The value of all bank card transactions as shown by CMS reports ~~shall~~ will be compared to account reconciliation reports provided by the State's clearing house service provider. Discrepancies between the values of the CMS-reported totals and the clearing house-reported totals ~~shall~~ will not exceed ±0.01%. If discrepancies in the accuracy of bank card transactions for any 8-week period during the warranty period exceed ±0.01%, the Contractor shall take corrective action as approved by the State. After corrective action has been taken and approved by ~~the State~~CTDOT, the RSAT ~~shall~~ will be run for an additional minimum period of 4 weeks. Accuracy ~~shall~~ will be measured in the same manner and if it is within the specified range the fix is approved. If not, the Contractor shall take further action until system accuracy is equal to or better than the specified requirements.

### 9.3.3 Revenue Service Event Audits

On at least a weekly basis, the Contractor (and ~~the State~~CTDOT, if it so chooses), shall audit reports generated by the CMS to verify the TVMS accuracy. All event records ~~shall~~ will be reviewed and compared to known events such as door openings for revenue service or maintenance, alarms, power outages, etc. All such known events ~~shall~~ will be correctly represented in the CMS reports.

# 10 Warranty Services

During the Hardware and Software Warranty Periods (defined in Contract Documents), the Contractor shall provide remedial repair services for defective TVMS equipment, and corrections for defective Contractor-supplied software, according to the terms of the Warranty defined in the Contract Documents.

During the Warranty periods, the Failure Review Board (FRB) as described in Section 8.7 shall meet regularly (at least monthly) to review system performance and to classify failures. When the FRB determines that a failure is systemic and is caused by a design or manufacturing flaw, the Contractor shall provide suitable corrections in a timely manner.

The FRB shall review all failures and determine whether any failure is systemic and is caused by a design, workmanship, or manufacturing flaw. All software failures ~~shall~~ will be considered "systemic" to any device type because all devices of a given type ~~shall~~ will have identical software. In addition, the FRB may designate hardware failures as systemic "fleet defects" according to definitions provided herein.

The Contractor shall provide corrections or ~~State~~CTDOT-approved workarounds for all systemic flaws within time periods defined herein or established by the FRB, whichever is greater.

Unless deferred by the FRB, if a resolution to a systemic flaw is not identified within the time specified, the Contractor shall dispatch a qualified technician or engineer on-site to CT***fastrak*** ~~to the State~~ until a resolution is found and implemented.

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## 10.1 Hardware Warranty Services

### 10.1.1 Maintenance Responsibilities

During the Hardware Warranty Period, the Contractor shall perform TVMS maintenance services as described below:

#### *10.1.1.1 Level 1 (Field) Maintenance*

Level 1 (Field) Maintenance is performed on-site and does not require workshop facilities, specialized test equipment or tools. Only basic technical knowledge is required as per the training, and work is performed according to set procedures.

Typical field maintenance activities include:

- Periodic and preventative maintenance, *e.g.,* cleaning, lubricating, replacement of consumables
- Removal and installation of devices
- Periodic monitoring, recording and reporting of equipment performance data;
- Commissioning of equipment
- Identification and assessment of fault and damage indications and the preparation of fault reports

The Contractor shall perform all Level 1 Maintenance activities according to the Contractor-supplied procedures as reviewed and approved by ~~the State~~CTDOT. The Contractor shall perform all Level 1 Maintenance activities described herein.

#### *10.1.1.2 Level 2 Maintenance*

Level 2 Maintenance is defined as any action necessary to diagnose and restore any out of service equipment where Level 1 Maintenance was not appropriate, or was unsuccessful in resolving the problem.

Typical Level 2 Maintenance activities include:

- Identifying problems and faulty modules
- Removal and installation of simple interchangeable sub-assemblies using standard tools and methods
- Testing of equipment, including adjustments, calibrations and the use of software diagnostic tools
- Commissioning and re-loading of software

The Contractor shall perform all Level 2 Maintenance activities according to the Contractor-supplied procedures as reviewed and approved by ~~the State~~CTDOT. The Contractor shall perform all Level 2 Maintenance activities described herein.

#### *10.1.1.3 Level 3 (Workshop) Maintenance*

Maintenance activities of this category are normally performed in workshop facilities. They require a degree of technical knowledge and may require the use of some specialized tools. Value judgment and decisions as to the usability and serviceability of equipment may be required.

Typical Level 3 (Workshop) Maintenance activities include:

- Periodic and preventive maintenance including the dismantling and re-assembly (including refurbishment) of subassemblies, soldering, crimping and assembly of connectors
- Faultfinding to functional block level, using electronic test equipment and standard fault-finding methods
- Identification and exchange of faulty printed circuit boards
- Functional testing and certification of equipment
- Adjustments and calibrations
- Monitoring, recording and reporting of equipment performance

During the Hardware Warranty Period, the Contractor or its assigned subcontractor shall perform all Level 3 Maintenance activities.

### 10.1.2 Hardware Repair Services

For any warranted hardware malfunctions or failures, which may include software defects within the subject Hardware, excluding “Fleet Defect” failures, ~~the State~~CTDOT shall remove and replace the defective devices and components. ~~The State~~CTDOT shall follow all reasonable Contractor-defined procedures to verify the malfunction or failure, and comply with all reasonable Contractor-defined procedures to return defective components to the Contractor's designated repair facility.

During the Hardware Warranty Period, the Contractor shall pay all costs to ship defective components from the State to the Contractor’s facility, and to return repaired or replacement components to the State. For those items the Contractor deems fragile, the Contractor shall supply shipping containers in sufficient quantity to support anticipated need.

The Hardware Warranty ~~shall~~ will cover all parts and Contractor labor associated with the factory repair or replacement of the equipment during the Hardware Warranty Period, and as required for Level 3 Maintenance activities as described herein.

For each defective TVMS component returned to the Contractor's facility, the Contractor shall, at its discretion, repair or replace the defective component and return the functioning unit to the State within an average of 30 calendar days, not to exceed 45 calendar days of receipt of the defective component.

For "Fleet Defect" failures, defined in Section 8.7.3, the Contractor shall commence a modification program to repair or replace all such components affected by the fleet defect within 10 days after receiving notification from the State. To correct fleet defects, the Contractor shall provide all necessary personnel, tools, and materials at its own expense, and provide such additional components and devices for the State's use while the repairs are taking place to minimize the effects on normal State operations. The Contractor shall meet with ~~the State~~CTDOT to determine the schedule of fleet defect repairs; all repair schedules and procedures ~~shall~~ will minimize impacts on State operations. The Contractor may, at its option, perform the required repairs at the State's garages, but only if the State is able to accommodate the request without unduly affecting operations; ~~the State~~CTDOT retains the right to reject such requests.

## 10.2 Software Warranty Services

During the Software Warranty Period, the Contractor shall provide the services described below.

### 10.2.1 Software Corrections

The Failure Review Board, described in Section 8.7.1, shall define software defect severities.

Corrections for software Defects ~~shall~~ will be made available to ~~the State~~CTDOT for evaluation (at the TVMS Maintenance and Test Facility) according to the schedule shown in Table 10.2.1 below. For Critical and Urgent defects, the Contractor may deliver temporary workarounds, which may be deployed at ~~the State's~~CTDOT's discretion, to alleviate the effects of the defect; in such cases, the Contractor shall continue working toward a final solution to be made available as soon as possible.

All corrections and workarounds for software d~~D~~efects ~~shall~~ will be accompanied by software release documentation that describes the defect and proposed solution, identifies software modules affected and new version control numbers, defines means to confirm the effectiveness of the fix, and provides installation and removal procedures.

Corrections and workarounds for warranted software Defects ~~shall~~ will be considered delivered on time if the software correction or workaround and accompanying software release documentation are delivered to ~~the State~~CTDOT in the time allotted in Table 10.2.1, and the correction or workaround is verified by ~~the State~~CTDOT in its TVMS Maintenance and Test Facility. If ~~the State~~CTDOT determines that the proposed solution fails to resolve the reported Defect, or if the proposed solution exposes or introduces one or more previously unknown software Defects of equal or greater severity, the proposed solution will be declared ineffective. If the proposed fix is declared ineffective, the original correction due date ~~shall~~ will be extended only by the time elapsed between initial delivery and ~~the State's~~CTDOT's declaration of ineffectiveness.

Table 10.2.1: Software Defect Resolution Delivery Requirements

| Defect Severity | Resolution Due |
|---|---|
| 1 – Critical | Temporary Workaround in 48 Hours<br>Final Solution As Mutually Agreed |
| 2 – Urgent | Temporary Workaround in 5 Calendar Days<br>Final Solution As Mutually Agreed |
| 3 – Important | Final Solution in 120 Calendar Days<br>or<br>As Mutually Agreed |
| 4 – Low | Next Scheduled Software Release<br>or<br>As Mutually Agreed |

Deployment of verified software corrections ~~shall~~ will be at the ~~State's~~ CTDOT's discretion. ~~The State~~CTDOT may elect to defer deployment of software corrections and to bundle multiple software corrections into a single deployment. At ~~the State's~~CTDOT's request, the Contractor shall prepare the necessary procedures to enable the deployment of any such bundled corrections, which may include Software Updates provided as described in Section 10.2.2.

### 10.2.2 Software Updates

During the Software Warranty Period, the Contractor shall make available updates to all software supplied as part of the TVMS. These updates ~~shall~~ will include all routine "service packages" provided by Contractor-supplied Commercial Off-the-Shelf (COTS) software suppliers, as well as all relevant updates to TVMS Software developed by the Contractor during the course of servicing the TVMS and other customers with similar systems. Unless the Contractor notifies ~~the State~~CTDOT that the software update is required, ~~the State~~CTDOT shall determine whether to apply the software update to the TVMS Software. For each update the Contractor mandates or ~~the State~~CTDOT elects to apply, the Contractor shall develop the procedures to do so and provide all labor required to install the updated software.

All software updates ~~shall~~ will be accompanied by software release documentation that describes the fixes, enhancements or changes in the software as well as any known problems/caveats or potential problems/caveats, identifies software modules affected and new version control numbers, defines means to confirm the effectiveness of the fix, and provides installation and removal procedures.

All software warranties ~~shall~~ will remain in effect after any software update is applied, and if ~~the State~~CTDOT elects not to apply a non-mandatory software update.

# 11 Hardware Maintenance Services (Optional)

If ~~the State~~CTDOT ~~exercises an option~~procures the optional services, as designated in writing in the form of a letter or purchase order, the Contractor shall provide on-site TVM hardware maintenance services as described herein. Hardware Maintenance Services ~~shall~~ will include both preventive and corrective maintenance activities defined as Levels 1, 2, and 3 in Section 10.1.1, for an initial period commencing with installation of the TMVS and continuing for 3 years from the start of CT***fastrak*** revenue service, with additional options, exercisable by the State, for additional years of services as defined in the Contract Documents.

## 11.1 Definitions

For the purposes of these optional hardware maintenance services, the following definitions shall apply.

Available – A TVM ~~shall~~ will be considered "available for revenue service" when all user interfaces are functional, all ticket types are available, and all payment modules are functional. Exclusions include when a ticket type or payment method is unavailable due to issues related to revenue servicing (which will be supplied by others), when data communications or other issues beyond the Contractor's control preclude the acceptance of bank cards, failures due to vandalism, or when *force majeure* is in effect. Because availability of the CMS will also affect acceptance of bank cards, and CMS availability is separately monitored and specified, failures due to CMS unavailability are also excluded.

Availability – Availability ~~shall~~ will be calculated as the percent total time TVMs in the population are available for revenue service, calculated at a per-minute granularity. For example, if the population includes 10 TVMs, for each hour, there are 600 "TVM-minutes" of possible revenue service. If during an hour, one of the 10 TVMs was out of service for 10 minutes, the availability for the hour would be calculated as:

$$\frac{(9 \text{ TVMs} * 60 \text{ Minutes}) + (1 \text{ TVM} * 50 \text{ Minutes})}{10 \text{ TVMs} * 60 \text{ Minutes}} = 98.33\%$$

For purposes of these optional services, availability ~~shall~~ will be calculated and compliance assessed once per week.

Weekday Morning Service – ~~Shall~~ Will be from 6:00 AM to 10:00 AM Monday through Friday, excluding recognized holidays

Weekday Afternoon Service – ~~Shall~~ Will be from 3:00 PM to 7:00 PM Monday through Friday, excluding recognized holidays

## 11.2 Service Levels

During the Hardware Maintenance Services period of performance, the Contractor shall provide preventive and remedial repair services such that the TVMS achieves the following levels ("Service Levels") of performance:

A. For weekday morning service, TVMs from Downtown New Britain to Union Station (inclusive) ~~shall~~ will achieve an average availability of 98%

B. For weekday afternoon service, TVMs north of Parkville (Sigourney Street and all stations north) ~~shall~~ will achieve an average availability of 98%

C. For all other times, all TVMs ~~shall~~ will achieve an average availability of 95%

## 11.3 Maintenance Services

The Contractor shall perform all preventive and remedial maintenance services, including routine refurbishments, necessary to satisfy the Service Levels defined in Section 11.2.

### 11.3.1 Warranty Services

During the Hardware Warranty period, the Contractor shall perform all preventive maintenance, all warrantable hardware repairs, and all routine refurbishments for the fixed monthly fee stipulated for the optional Hardware Maintenance Services. The Contractor shall invoice the State for the Hardware Maintenance Services, and for the cost of non-warrantable repairs or replacements, on a monthly basis according to the terms and conditions set forth in this Agreement. The costs for non-warranty repairs and replacements ~~shall~~ will be based on the TVM Parts and Repair Pricing Manifest.

The Contractor shall submit the TVM Parts and Repair Pricing Manifest for ~~the State's~~CTDOT's review and approval no more than 90 days after ~~the State~~CTDOT exercises the option for Hardware Maintenance Services, or 90 days after the Final Design Review, whichever is later. **CDRL 85**

### 11.3.2 Post-Warranty Services

Upon expiration of the Hardware Warranty (and the expiration of extended warranties for any repaired or replaced parts as stipulated herein), the Contractor shall repair or replace broken and defective parts at prices defined in the TVM Parts and Repair Pricing Manifest. The Contractor shall continue to provide all preventive maintenance and routine refurbishments, necessary to maintain the required Service Levels, for the fixed monthly fee stipulated for the optional Hardware Maintenance Services.

The Contractor shall invoice the State for the Hardware Maintenance Services, including the cost of all repairs or replacements, on a monthly basis according to the terms and conditions set forth in this Agreement.

## 11.4 Services Management

During the Hardware Maintenance Services period of performance, the Contractor shall submit a weekly report to ~~the State~~CTDOT indicating the service levels achieved during the prior week, and the prior 12 months. At ~~the State's~~CTDOT's request, the Contractor shall submit comprehensive documentation in support of the calculated Service Levels, including incident reports, repair histories, operating status logs, CMS data reports, etc.

When the ~~service levels~~Service Levels ~~fail to achieve the levels~~ required in Section 11.2 are not achieved for the previous week, the Contractor shall provide written explanation describing the incidents or reasons for the shortcoming, and any steps being taken to prevent further occurrence.

If the Contractor fails to meet the required Service Levels for three consecutive weeks, or if achieved ~~Service Levels~~levels for one week are more than 5 percentage points below the ~~levels~~ Service Levels required in Section 11.2, the Contractor shall undertake immediate steps to rectify the problems. Failure to correct such serious performance shortcomings within the next weekly reporting period may, at ~~the State's~~CTDOT's sole discretion, result in payment penalties or constitute breach of the Agreement.

# 12 Extended Software Support Services (Optional)

~~The State~~CTDOT may exercise an option for the Contractor to supply Extended Software Systems Support, commencing at the conclusion of the Software Warranty. If ~~the State~~CTDOT exercises this option, the Contractor shall provide on-site and remote technical support, system configuration and administration assistance, software development, and other services as described herein for a period of two years, with three additional two-year options. These options are exercisable at ~~the State's~~CTDOT's sole discretion at any time prior to the conclusion of this ~~contract~~ Agreement and any previously exercised option. Procurement of this option by CTDOT would be exercised in writing, by letter or purchase order to the Contractor.

During the initial three-year period of Extended Software Systems Support, the Contractor shall make available fare collection system software development, system administration, database administration, and other technical staff as necessary, for a total of 1,000 hours of direct labor. ~~The State~~CTDOT shall use this "bank" of labor hours on a task-order basis. If, prior to the conclusion of the three-year service period, tasks performed by the Contractor exhaust the 1,000-hour labor bank, ~~the State~~CTDOT may request additional hours of services, to be priced on a pro-rated hourly basis, up to a maximum of 1,500 total hours. Should ~~the State~~CTDOT request services beyond the maximum hours, the Contractor may ~~do so~~provide such services at its discretion.

Any hours remaining in the labor bank at the conclusion of the Extended Software Systems Support ~~services agreement~~initial period (or for the duration of any exercised option), shall remain available for ~~the State~~CTDOT use as described herein. For every month beyond the conclusion of the services agreement that labor bank hours remain unused, hours equal in value to the pro-rated fixed monthly fee for facilities maintenance shall be deducted from the labor bank.

## 12.1 Support Services to be Provided

The Contractor shall perform five basic categories of tasks as part of Extended Software Systems Support:

- Remote technical support
- On-site technical support
- Software development
- Upgrades and updates to Contractor-supplied application software
- System conversion to new computer Operating Systems and Relational Database Managers

### 12.1.1 Remote Technical Support

The Contractor shall provide telephone-based technical support, Monday through Friday during normal business hours (8:00 AM through 5:00 PM Eastern Time) with an average one hour response time. The Contractor shall provide telephone-based support at all other times, including weekends, holidays, and non-business hours with an average two hour response time. Any support services initiated by the State outside of normal business hours shall consume the labor bank at 1.5 times the number of hours actually expended.

### 12.1.2 On-Site Technical Support

At ~~the State~~CTDOT request, the Contractor shall supply technical support on-site at any CTDOT office or maintenance facility, or where any Contractor-supplied equipment is installed.

Qualified Ceontractor staff shall be available to provide on-site support within five business days of the a CTDOT authorizedauthorization of the task order. The StateCTDOT shall compensate the Contractor for direct travel and living expenses incurred by Contractor's staff while performing authorized task orders.

### 12.1.3 Software Development

Upon acceptance of a task order requiring modification of Contractor-developed software, the Contractor shall commence development of the requested software. The Contractor shall provide regular status updates, shall test the completed software, and shall assist the State as directed in the installation of the software change. All software development work performed under a task order issued by this contract Agreement shall be warranted by the Contractor against defects for a period of one year after installation of the software. Labor required to correct defects in software developed under this contract Agreement shall not count against the labor bank.

### 12.1.4 Upgrades and Updates to Contractor-Supplied Application Software

If the Contractor releases major upgrades to Contractor-supplied application software for the TVMS devices, GDS, or CMS while the Extended Software Support Services agreement period is in effect, the StateCTDOT may opt to upgrade its software. (It is understood that the price of the software upgrade may be separately negotiated.) If the StateCTDOT opts to upgrade software, the StateCTDOT may request an estimate of the Contractor labor required to test, configure, and install the upgrade on the State'sCTDOT's equipment. If the StateCTDOT accepts the proposal, the StateCTDOT will issue a task order to satisfy the agreed-upon scope of work.

During the term of the Extended Software Support Services agreement, the Contractor shall provide all applicable modifications, corrections, and enhancements (scheduled and unscheduled) for installed versions of Contractor-developed application software for TVMS equipment, the GDS, and the CMS. At its discretion, the StateCTDOT may install the software update, after independently testing such updates. No hours shall will be deducted from the labor bank for these software updates.

### 12.1.5 System Conversion

Within approximately two years of each major release of the OEM original equipment manufacture ("OEM") operating system and relational database managers used as part of the CMS, the StateCTDOT may request the Contractor to convert the respective portions of the CMS to the new OEM releases. At such times, the StateCTDOT shall request a quote from the Contractor for the labor required to modify, test, deploy, and document the conversion of the CMS application software or database to the new OEM release. Upon acceptance of the ensuing task order, the Contractor shall perform the conversion work, test the results, and deploy the upgraded CMS in a controlled fashion as approved by the StateCTDOT. All system conversion work performed under a task order issued by this contract Agreement shall will be warranted by the Contractor against defects for a period of one year after installation of the software. Labor required to correct defects in system conversion under this contract shall will not count against the labor bank.

## 12.2 Contractor Personnel and Support Facilities

During the term of this ~~contract~~Agreement, the Contractor shall:

A. Retain technical support and software development personnel who are familiar with the fare collection system equipment and software, and who are qualified to perform the tasks described herein.

B. Retain all software source codes and development and testing environments necessary to support and modify software for the State's fare collection system.

## 12.3 Task Order Procedures

Within 10 days of executing an option for Extended Software Support Services, the State shall notify the Contractor in writing the identity of those individuals authorized to call for remote technical support, and those individuals authorized to initiate task orders. **CT ~~9~~6**

When an authorized individual initiates a call for technical support, one half hour (30 minutes) of the labor bank shall be deducted as soon as the Contractor's technical support staff commences work on the request. If the request cannot be satisfied within 30 minutes, the Contractor shall only continue working on the issue under the direction of an individual authorized by ~~the State~~CTDOT to initiate task orders, and the formal task order procedure ~~shall~~ will take effect.

Formal task order requests ~~shall~~ will be initiated by ~~the State~~CTDOT in writing, by email, facsimile, or other written correspondence. Upon receipt of the formal request, the Contractor shall provide a good faith estimate of the number of labor hours required to satisfy the request, the proposed start date/time for the effort, the individuals assigned to the task, and other relevant information; the Contractor shall provide the information in written form to the individual making the request. Upon acceptance of the estimate by ~~the State~~CTDOT, the Contractor shall commence work and notify ~~the State~~CTDOT upon successful conclusion of the task and the number of hours consumed.

Expended labor hours in excess of 50% over the approved task estimate ~~shall~~ will not count against the labor bank; in such cases, the Contractor shall continue working until the task is completed. If the Contractor cannot or chooses not to complete the task, all hours expended on the task ~~shall~~ will be "refunded" to the bank.

## 12.4 Labor Bank Accounting

Upon commencement of the Extended Software Systems Support Services and each month thereafter, the remaining hours in the labor bank ~~shall~~ will be decremented by the number of authorized hours expended (net of any "refunds").

## 12.5 Compensation

The Contractor shall invoice the State on a monthly basis for the contracted fixed monthly fee for maintaining the necessary facilities described in Paragraph 12.2, and the actual authorized labor hours expended (net of any "refunds"). Each monthly invoice ~~shall~~ will document the number of hours remaining in the labor bank, and provide an accounting by task order and technical support request of the hours consumed, including the date, time, and individual authorizing the work.

Monthly invoices ~~shall~~ will also include travel and living costs for authorized on-site support tasks. All such travel and living costs ~~shall~~ will be documented to the satisfaction of ~~the State~~CTDOT, and shall be in compliance with the State policies for such expenses.

~~The State~~CTDOT shall make payment for invoices according to the terms of the Agreement.

## 12.6 Early Exhaustion of the Labor Bank

If the labor bank is exhausted before the term of this contract expires, ~~the State~~CTDOT shall have the sole right to terminate the Extended Software Support Services option, or to continue this support agreement in effect on a month-by-month basis until the option term is complete, or until the maximum hours have been used, whichever occurs first. If the maximum hours in this option are consumed before the term of the option expires, the State shall have the sole right to exercise an additional option to extend the software support services provided herein.

## 12.7 Software Modification Procedures

While the Extended Software Support Services agreement is in effect:

A. The Contractor shall test and document all software modifications prior to delivery to the State. Documentation accompanying each software modification shall include comprehensive Software Release Notes. ~~The State shall~~CTDOT may review all software modifications and documentation.
B. When authorized by ~~the State~~CTDOT, the Contractor shall install software modifications according to ~~State~~CTDOT-approved installation procedures. At its discretion, ~~the State~~CTDOT may independently test and verify these modifications prior to authorizing the Contractor to install the modification.
C. The Contractor shall supply software modifications to correct all defects in the fare collection system software arising from installation of any modification provided under the terms of the Extended Software Support Services option. No hours shall be deducted from the labor bank for these software modifications.

## 12.8 Source Code Documentation Updates

Within 30 days of each anniversary of the commencement of the Extended Software Support Services agreement, the Contractor shall deliver updates to all source code documentation, reflecting all changes incorporated to the TVMS device, GDS, and CMS software. The Contractor shall deliver these updates either directly to ~~the State~~CTDOT or the Escrow Agent as described in Paragraph 6.8. If the Contractor delivers the source code updates to an Escrow Agent, the Contractor shall at the same time deliver an updated inventory of the escrow deposit to ~~the State~~CTDOT. **CDRL 86**

## 12.9 Options

If ~~the State~~CTDOT exercises an option for additional Extended Software Systems Support services, all terms and conditions shall of the Agreement remain in effect, and unused hours in the labor bank shall be retained. For each option exercised:

24 months shall be added to the term of the ~~contract~~Agreement
1,000 hours shall be added to any unused hours in the labor bank
1,500 hours shall be added to the maximum hours available

# 13 Revenue Services (Optional)

CTDOT may exercise an option~~The Contractor shall provide an option~~ for the Contractor to provide ~~for the~~ complete revenue servicing of the TVMs included as part of the TVMS. Procurement of this option by CTDOT would be exercised in writing, by letter or purchase order to the Contractor. This revenue servicing shall include the following as a minimum:

- Exchange of full/partially full bill vaults with empty bill vaults
- Exchange of full/partially full coin vaults with empty coin vaults
- Exchange of empty/almost empty hoppers with full coin hoppers
- Replenishment of ticket/POP receipt stock
- Counting and depositing the revenues collected
- Filling the change hoppers and readying them for reinsertion in the TVMs
- Maintaining an inventory of hoppers, coin vaults, and bill vaults

Ticket stock will be provided by ~~the State~~CTDOT to the Contractor.

Revenue servicing ~~shall~~ will be performed on at least a twice weekly basis or more frequently as required to meet the operational needs. Contractor shall provide a revenue servicing plan within 30 days of CTDOT exercising this option ~~to describe~~which describes how the revenue servicing will be performed. The term for the revenue servicing option ~~shall~~ will be for an initial two year period with renewable one year options.

# 14 On-Site Technical Support

In addition to the initial on-site technical support provided at the start of revenue service, additional 60-day periods for this on-site technical support from the Contractor shall also be available as options to be exercised by ~~the State~~CTDOT. Procurement of this option by CTDOT would be exercised in writing, by letter or purchase order to the Contractor.

Up to ten (10) such periods shall be provided, individually exercisable by ~~the~~ CTDOT State, over a two year period. This on-site support shall be provided after ~~the State's~~CTDOT's approval of start date. The support personnel shall assist in troubleshooting and correction and shall act as field instructors for ~~State~~ CTDOT personnel who maintain, service, and use the TVMS. On-site Contractor personnel are subject to the approval of ~~the State~~CTDOT.

# 15 Maintenance Services - by Operator

Options shall be provided for the performance of Level 1, Level 2 and Level 3 maintenance of all Contractor supplied devices which are presently defined as the responsibility of the operator. The options shall be available for the operator for both during and after the warranty services are provided. Duration of the support shall be as follows:

A. For those services that are provided during the warranty, they shall be provided through the completion of the hardware warranty

B. For those services that are provided after the warranty, they shall be provided for a period of two (2) years.

If the State exercises the option to extend these maintenance services, the Contractor shall continue to provide these services for a period of an additional 2 years, commencing at the conclusion of the period of performance for the base contract. The option shall be reviewed again every 2 years to determine if the State wishes to exercise the subsequent 2 year option and this shall continue until either the State or the Contractor no longer wishes the option to be exercisable. Costs for any 2 year option exercised shall be negotiated at that time with escalations not exceeding 5% per annum, unless justified by the Contractor based on additional services being provided or another external factor. Procurement of these options by CTDOT would be exercised in writing, by letter or purchase order to the Contractor.