



Advertise Date: Friday, January 18, 2019

Lee County Board of County Commissioners
DIVISION OF PROCUREMENT MANAGEMENT

Request for Proposal (RFP) NON-CCNA

Solicitation No.: RFP180573LAC

Solicitation Name: LeeTran Fare Point of Sale Solutions System

Open Date/Time: Thursday, February 21, 2019 Time: 2:30 PM

Location: Lee County Procurement Management
1500 Monroe Street 4th Floor
Fort Myers, FL 33901

Procurement Contact: Lindsay Cepero Title Procurement Grants Supervisor

Phone: (239) 533-8881 Email: [LCepero @leegov.com](mailto:LCepero@leegov.com)

Requesting Dept. LeeTran

Pre-Solicitation Meeting:

Type: NON-Mandatory

Date/Time: 1/31/2019 9:00 AM

Location: LeeTran: 3401 Metro Pkwy, Fort Myers, FL 33901 – Public Meeting Room

All solicitation documents are available for download at
www.leegov.com/procurement

Electronic bidding is coming! Visit www.leegov.com/bid to stay informed

FUNDED IN PART OR IN WHOLE BY:
Federal Transit Administration (FTA)

Friday, January 18, 2019



**Notice to Contractor / Vendor / Proposer(s)
RFP#180573LAC, LeeTran Fare Solutions System**

REQUEST FOR PROPOSAL (RFP)

Lee County, Florida, is requesting proposals from qualified individuals/firms for
RFP180573LAC, LeeTran Fare Point of Sale Solutions System

Then and there to be publicly opened and read aloud for the purpose of selecting a vendor to furnish; all necessary labor, services, materials, equipment, tools, consumables, transportation, skills and incidentals required for Lee County, Florida, in conformance with proposal documents, which include technical specifications and/or a scope of work.

Those individuals/firms interested in being considered for (RFP) are instructed to submit, in accordance with specifications, their proposals, pertinent to this project prior to

2:30 PM Thursday, February 21, 2019

to the office of the **Procurement Management Director, 1500 Monroe Street, 4th Floor, Fort Myers, Florida 33901**. The Request for Proposal shall be received in a sealed envelope, prior to the time scheduled to receive proposals, and shall be clearly marked with the solicitation name, solicitation number, proposer name, and contact information as identified in these solicitation documents.

The Scope of Services for this RFP is available from www.leegov.com/procurement. Vendors who obtain scope of services from sources other than www.Leegov.com/procurement are cautioned that the solicitation package may be incomplete. The County's official bidders list, addendum(s) and information must be obtained from www.Leegov.com/procurement. It is the proposer's responsibility to check for posted information. The County may not accept incomplete proposals.

**A Non-Mandatory Pre-proposal Conference has been scheduled for the following time and location:
9:00 AM Thursday, January 31, 2019 LeeTran: 3401 Metro Pkwy, Fort Myers, FL 33901 – Public Meeting Room**

for the purpose of discussing the proposed project. Prospective proposers are encouraged to attend. All prospective proposers are encouraged to obtain and review plans, specifications, and scope of work for this proposal before the pre-proposal so that they may be prepared to discuss any question or concerns they have concerning this project. A site visit may follow the pre-proposal conference. Questions regarding this Request for Proposal are to be directed, in writing, to the individual listed below using the email address list below or faxed to (239) 485 8383 during normal working hours.

Lindsay Cepero LCepero@LeeGov.com

Sincerely,


Nicole Turner on behalf of

Lindsay Cepero, CPPB
Interim Procurement Manager

*WWW.LeeGov.Com/Procurement is the County's official posting site

Terms and Conditions

Request for Proposal

1. DEFINITIONS

- 1.1. **Addendum/Addenda:** A written change, addition, alteration, correction or revision to a bid, proposal or contract agreement. Addendum/Addenda may be issued following a pre-bid/pre-proposal conference or as a result of a specification or work scope change to the solicitation.
- 1.2. **Approved Alternate:** Solicitation documents may make reference of specific manufacturer(s) or product(s). These references serve only as a recommendation and a guide to minimum quality and performance. The references are not intended to exclude approved alternatives of other manufacturer(s) or product(s).
- 1.3. **Bid/Proposal Package:** A bid/proposal is a document submitted by a vendor in response to some type of solicitation to be used as a basis for negotiations or for entering into a contract.
- 1.4. **Bidder/Responder/Proposer:** One who submits a response to a solicitation.
- 1.5. **County:** Refers to Lee County Board of County Commissioners.
- 1.6. **Due Date and Time/Opening:** Is defined as the date and time upon which a bid or proposal shall be submitted to the Lee County Procurement Management Division. Only bids or proposals received prior to the established date and time will be considered.
- 1.7. **Liquidated Damages:** Damages paid usually in the form of monetary payment, agreed by the parties to a contract which are due and payable as damages by the party who breaches all or part of the contract. May be applied on a daily basis for as long as the breach is in effect.
- 1.8. **Procurement Management:** shall mean the Director of Lee County's Procurement Management Department or designee.
- 1.9. **Responsible:** A vendor, business entity or individual who is fully capable to meet all of the requirements of the bid/proposal solicitation documents and subsequent contract. Must possess the full capability including financial and technical, to perform as contractually required. Must be able to fully document the ability to provide good faith performance.
- 1.10. **Responsive:** A vendor, business entity or individual who has submitted a bid or request for proposal that fully conforms in all material respects to the bid/proposal solicitation documents and all of its requirements, including all form and substance.
- 1.11. **Solicitation:** An invitation to bid, a request for proposal, invitation to negotiate or any document used to obtain bids or proposals for the purpose of entering into a contract.

2. ORDER OF PRECEDENCE

- 2.1. If a conflict exists between the "Terms and Conditions" the following order of precedents will apply:
 - 2.1.1. Florida State Law as applied to Municipal Purchasing in accordance with Title XIX, "Public Business", Chapter 287 "Procurement of Personal Property and Services."
 - 2.1.2. Lee County Procurement Management Division Policy and Ordinances
 - 2.1.3. Special Conditions and Supplemental Instructions
 - 2.1.4. Detailed Scope of Work
 - 2.1.5. These Terms and Conditions

3. RULES, REGULATIONS, LAWS, ORDINANCES AND LICENSES

- 3.1. It shall be the responsibility of the proposer to assure compliance with all other federal, state, or county codes, rules, regulations or other requirements, as each may apply. Any involvement with the Lee County shall be in accordance with but not limited to:
 - 3.1.1. Lee County Procurement Policy Manual
 - 3.1.2. Pursuant to FL § Section 119.071, Public Records, General exemptions from inspection or copying of public records, sealed bids or proposals received by the County. Pursuant to this, solicitation are exempt from public records request (s. 119.07(1) and s. 24(a), Art. I, of the Florida Constitution) until such time as the agency provides notice of a decision or intended decision (pursuant to s. 119.071(2)) or within 30 days after bid or proposal opening, whichever is earlier.

- 3.1.3. Florida Statute 218 Public Bid Disclosure Act.
 - 3.1.4. Florida Statute 337.168 Confidentiality of official estimates, identities of potential bidders, and bid analysis and monitoring.
 - 3.1.5. FL § Section 607.1501(1) states: A foreign corporation may not transact business in the State of Florida until it obtains a certificate of authority from the Department of State.
 - 3.2. **Local Business Tax:** If applicable, provide with proposal.
 - 3.3. **License(s):** Proposer should provide, at the time of the opening of the proposal, all necessary permits and/or licenses required for this product and/or service.
4. RFP – PREPARATION OF PROPOSAL
- 4.1. Proposals must be sealed in an envelope, and the outside of the envelope must be affixed with the label included in the forms section.
 - 4.2. **Submission Format:**
 - 4.2.1. Required Forms: complete and return **all** required forms. If the form is not applicable, please return with “Not Applicable” or “N/A” in large letters across the form.
 - 4.2.2. Execution of Proposal: All documents must be properly signed by corporate authorized representative, witnessed, and where applicable corporate and/or notary seals affixed. All proposals shall be typed or printed in ink. The proposer may not use erasable ink. All corrections made to the proposal shall be initialed.
 - 4.2.3. Should not contain links to other Web pages.
 - 4.3. **Preparation Cost:**
 - 4.3.1. The Proposer is solely responsible for any and all costs associated with responding to this solicitation. No reimbursement will be made for any costs associated with the preparation and submittal of any proposal, or for any travel and per diem costs that are incurred by any Proposer.
5. RESPONSES RECEIVED LATE
- 5.1. It shall be the proposer’s sole responsibility to deliver the proposal submission to the Lee County Procurement Management Division prior to or on the time and date stated.
 - 5.2. Any proposals received after the stated time and date will not be considered. The proposal shall not be opened at the public opening. Arrangements may be made for the unopened proposal to be returned at the proposer’s request and expense.
 - 5.3. The Lee County Procurement Management Division shall not be responsible for delays caused by the method of delivery such as, but not limited to; Internet, United States Postal Service, overnight express mail service(s), or delays caused by any other occurrence.
6. PROPOSER REQUIREMENTS (unless otherwise noted)
- 6.1. **Responsive and Responsible:** Only proposals received from responsive and responsible proposers will be considered. The County reserves the right before recommending any award to inspect the facilities and organization; or to take any other necessary action, such as background checks, to determine ability to perform is satisfactory, and reserves the right to reject submission packages where evidence submitted or investigation and evaluation indicates an inability for the proposer to perform.
 - 6.1.1. Proposals may be declared “non-responsive” due to omissions of “Negligence or Breach of Contract” on the disclosure form. Additionally, proposals may be declared “not responsible” due to past or pending lawsuits that are relevant to the subject procurement such that they call into question the ability of the proposer to assure good faith performance. This determination may be made by the Procurement Management Director, after consulting with the County Attorney.
 - 6.1.2. Additional sources may be utilized to determine credit worthiness and ability to perform.
 - 6.1.3. Any proposer or sub-proposer that will have access to County facilities or property may be required to be screened to a level that may include, but is not limited to; fingerprints, statewide criminal. There may be fees associated with these procedures. These costs are the responsibility of the proposer or sub-proposer.

- 6.2. **Past Performance:** All vendors will be evaluated on their past performance and prior dealings with Lee County (i.e., failure to meet specifications, poor workmanship, late delivery, etc.) Poor or unacceptable past performance may result in proposer disqualification.

7. PRE-SOLICITATION CONFERENCE

- 7.1. A pre-solicitation conference will be held in the location, date, and time specified on the cover of this solicitation. The cover will also note if the pre-solicitation conference is Non-Mandatory or Mandatory. All questions and answers are considered informal. All prospective proposers are encouraged to obtain and review the solicitation documents prior to the pre-proposal so they may be prepared to discuss any questions or concerns they have concerning this project. All questions must be submitted formally in writing to the procurement staff noted on the first page of the solicitation document. A formal response will be provided in the form of an addendum (see “County Interpretation/Addendums” for additional information.) A site visit may follow the pre-proposal conference, if applicable.
- 7.2. **Non-Mandatory:** Pre-solicitation conferences are generally non-mandatory, but it is highly recommended that prospective proposers participate.
- 7.3. **Mandatory:** Failure to attend a mandatory pre-solicitation conference will result in the proposal being considered **non-responsive**.

8. COUNTY INTERPRETATION/ADDENDUMS

- 8.1. Each Proposer shall examine the solicitation documents and shall judge all matters relating to the adequacy and accuracy of such documents. Any inquiries, suggestions or requests concerning interpretation, clarification or additional information pertaining to the solicitation shall be **submitted in writing prior to 5:00 PM at least eight (8) calendar days prior to the date when the submission is due.**
- 8.2. Response(s) will be in the form of an Addendum posted on www.lee.gov/procurement. It is solely the proposer’s responsibility to check the website for information. No notifications will be sent by Lee County Procurement Management Division.
- 8.3. All Addenda shall become part of the Contract Documents.
- 8.4. The County shall not be responsible for oral interpretations given by any County employee, representative, or others. Interpretation of the meaning of the plans, specifications or any other contract document, or for correction of any apparent ambiguity, inconsistency or error there in, shall be in writing. Issuance of a written addendum by the County’s Procurement Management Division is the only official method whereby interpretation, clarification or additional information can be given.

9. QUALITY GUARANTEE/WARRANTY (as applicable)

- 9.1. Proposer will guarantee their work without disclaimers, unless otherwise specifically approved by the County, for a minimum of twelve (12) months from final completion.
- 9.2. Unless otherwise specifically provided in the specifications, all equipment and materials and articles incorporated in the work covered by this contract shall be new, unused and of the most suitable grade for the purpose intended. Refurbished parts or equipment are not acceptable unless otherwise specified in the specifications. All warranties will begin from the date of final completion.
- 9.3. Unless otherwise specifically provided in the specifications, the equipment must be warranted for twelve (12) months, shipping, parts and labor. Should the equipment be taken out of service for more than forty-eight (48) hours to have warranty work performed, a loaner machine of equal capability or better shall be provided for use until the repaired equipment is returned to service at no additional charge to the County.
- 9.4. If any product does not meet performance representation or other quality assurance representations as published by manufacturers, producers or distributors of such products or the specifications listed, the vendor shall pick up the product from the County at no expense to the County. The County reserves the right to reject any or all materials, if in its judgment the item reflects unsatisfactory workmanship or manufacturing or shipping damage. The vendor shall refund, to the County, any money which has been paid for same.

10. SUBSTITUTION(S)/APPROVED ALTERNATE(S)

- 10.1. Unless otherwise specifically provided in the specifications, reference to any equipment, material, article or patented process, by trade name, brand name, make or catalog number, shall be regarded as establishing a standard of quality and shall not be construed as limiting competition. If a proposer wishes to make a substitution in the specifications, the bidder shall furnish to the County, **no later than ten (10) business days prior to the solicitation opening date**, the name of the manufacturer, the model number, and other identifying data and information necessary to aid the County in evaluating the substitution. Such information is submitted through the Procurement Management Division. Any such substitution shall be subject to County approval through the issuance of a written addendum by the County's Procurement Management Division. Substitutions shall be approved only if determined by the County to be an **Approved Alternate** to the prescribed specifications.
- 10.2. A proposal containing a substitution is subject to disqualification if the substitution is not approved by the County. Items bid must be identified by brand name, number, manufacturer and model, and shall include full descriptive information, brochures, and appropriate attachments. Brand names are used for descriptive purposes only. An **Approved Alternate** product or service may be used.
11. ADDITIONS, REVISIONS AND DELETIONS
- 11.1. Additions, revisions, or deletions to the Terms and Conditions, specifications that change the intent of the solicitation will cause the solicitation to be non-responsive and the proposal will not be considered. The Procurement Management Director shall be the sole judge as to whether or not any addition, revision, or deletion changes the intent of the solicitation.
12. NEGOTIATED ITEMS
- 12.1. Any item not outlined in the Scope of Services may be subject to negotiations between the County and the successful Proposer.
- 12.2. After award of this proposal the County reserves the right to add or delete items/services at prices to be negotiated at the time of addition or deletion.
- 12.3. At contract renewal time(s) or in the event of significant industry wide market changes, the County may negotiate justified adjustments such as price, terms, etc., to this contract with the County, in its sole judgment, considers such adjustments to be in the best interest of the County.
13. ERRORS, OMISSIONS, CALCULATION ERRORS (as applicable)
- 13.1. **Errors/Omissions:** Approval by County of the successful proposer's work product for the project shall not constitute nor be deemed a release of the responsibility and liability of the successful proposer for the accuracy and competency of the successful proposer's designs, drawings, specifications or other documents and work pertaining to the project. Additionally, approval by the County of the successful proposer's work product shall not be deemed to be an assumption of drawings, specifications or other documents prepared by the successful proposer for the project. After acceptance of the final plans by the County, the successful proposer agrees, prior to and during the construction of the project, to perform such successful proposer services, at no additional cost to the County, as may be required by the County to correct errors or omissions on the plans prepared by the successful proposer pertaining to the project.
- 13.2. **Calculation Errors:** In the event of multiplication/addition error(s), the unit price shall prevail. Written prices shall prevail over figures where applicable. All proposals shall be reviewed mathematically and corrected, if necessary, using these standards, prior to additional evaluation.
14. CONFIDENTIALITY
- 14.1. Proposers should be aware that all proposals provided are subject to public disclosure and will **not** be afforded confidentiality, unless provided by Chapter 119 Florida Statute.
- 14.2. If information is submitted with a proposal that is deemed "Confidential" the proposer must stamp those pages of the proposal that are considered confidential. The proposer must provide documentation as to validate why these documents should be declared confidential in accordance with Chapter 119, "Public Records," exemptions.
- 14.3. Lee County **will not reveal engineering estimates or budget amounts for a project** unless required by grant funding or unless it is in the best interest of the County. According to Florida State Statute 337.168:

A document or electronic file revealing the official cost estimate of the department of a project is confidential and exempt from the provisions of s. 119.07(1) until the contract for the project has been executed or until the project is no longer under active consideration.

15. CONFLICT OF INTEREST

15.1. All proposers are hereby placed on formal notice that per Section 3 of Lee County Ordinance No. 92-22: The County is prohibited from solicitation of a professional services firm to perform project design and/or construction services if the firm has or had been retained to perform the project feasibility or study analysis.

And:

15.2. A professional services firm who has performed or participated in the project feasibility planning, study analysis, development of a program for future implementation or drafting of solicitation documents directly related to this County project, as the primary vendor/consulting team, cannot be selected or retained, as the primary consultant/vendor or named a member of the consulting/contracting team, to perform project design, engineering or construction services for subsequent phase(s) or scope of work for this project. Pursuant to FS. S287.057 (17) the firm will be deemed to have a prohibited conflict of interest that creates an unfair competitive advantage.

15.3. Should your proposal be found in violation of the above stated provisions; the County will consider this previous involvement in the project to be a conflict of interest, which will be cause for immediate disqualification of the proposal from consideration for this project.

15.4. **Business Relationship Disclosure Requirement:** The award hereunder is subject to the provisions of Chapter 112, Public Officers and Employees: General Provisions, Florida Statutes. All proposers must disclose with their proposal the name of any officer, director or agent who is also an employee of the Lee County or any of its agencies. Further, all proposers must disclose the name of any County employee who owns directly or indirectly, an interest of five percent (5%) or more in the proposer's firm or any of its branches.

16. ANTI-LOBBYING CLAUSE (Cone of Silence)

16.1. Following Florida Statute Section 287.057(23), Upon the issuance of the solicitation, prospective proposers or any agent, representative or person acting at the request of such proposer shall not have any contact, communicate with or discuss any matter relating in any way to the solicitation with any Commissioner, Evaluation Review Committee, agent or employee of the County other than the Procurement Management Director or their designee. This prohibition begins with the issuance of any solicitation, and ends upon execution of the final contract or when the solicitation has been cancelled. **If it is determined that improper communications were conducted, the Proposer maybe declared non- responsible.**

17. DRUG FREE WORKPLACE

17.1. Lee County Board of County Commissioners encourages Drug Free Workplace programs.

18. DISADVANTAGED BUSINESS ENTERPRISE (DBE's)

18.1. The County encourages the use of Disadvantaged Business Enterprise Proposer(s) as defined and certified by the State of Florida Office of Supplier Diversity.

18.2. Bidder/Proposer is required to indicate whether the Firm and/or any proposed sub-consultants are Disadvantaged Business Enterprises (DBE). Lee County encourages the utilization and participation of DBEs in procurements, and evaluation proceedings will be conducted within the established guidelines regarding equal employment opportunity and nondiscriminatory action based upon the grounds of race, color, sex or national origin. Interested certified Disadvantaged Business Enterprise (DBE) firms as well as other minority-owned and women-owned firms are encouraged to respond.

19. ANTI-DISCRIMINATION/EQUAL EMPLOYMENT OPPORTUNITY

19.1. The proposer agrees to comply, in accordance with Florida Statute 287.134, 504 of the Rehabilitation Act of 1973 as amended, the Americans with Disabilities Act of 1990 (ADA), the ADA Amendments Act of 2008 (ADAAA) that furnishing goods or services to the County hereunder, no person on the grounds of

race, religion, color, age, sex, national origin, disability or marital status shall be excluded from participation in, denied the benefits of, or otherwise be subjected to discrimination.

- 19.2. The proposer will not discriminate against any employee or applicant for employment because of race, religion, color, age, sex, national origin, disability or marital status. The proposer will make affirmative efforts to ensure that applicants are employed and that employees are treated during employment without regard to their race, religion, color, age, sex, national origin, disability or marital status.
- 19.3. The proposer will include the provisions of this section in every sub-contract under this contract to ensure its provisions will be binding upon each sub-contractor. The proposer will take such actions in respect to any sub-contractor, as the contracting agency may direct, as a means of enforcing such provisions, including sanctions for non-compliance.
- 19.4. An entity or affiliate who has been placed on the State of Florida's Discriminatory Vendor List (This list may be viewed by going to the Department of Management Services website at <http://www.dms.myflorida.com>) may not submit a bid on a contract to provide goods or services to a public entity, may not submit a bid on a contract with a public entity for the construction or repair of a public building or public work, may not submit bids on leases of real property to a public entity, may not award or perform work as a vendor, supplier, sub-contractor, or consultant under contract with any public entity, and may not transact business with any public entity.
20. PROPOSER/SUB-PROPOSER/CONSULTANT/CONTRACTOR RELATIONSHIP
- 20.1. The prime proposer on a solicitation may not also be listed as a sub-proposer/consultant/contractor to another firm submitting a proposal for the same solicitation. Should this occur, all responses from the involved/named firms will be considered non-compliant and rejected for award. Sub-proposers/consultant/contractor may be listed on multiple proposals for the same solicitation.
21. SUB-PROPOSER/CONSULTANT
- 21.1. The use of sub-proposer/consultant under this solicitation is not allowed without prior written authorization from the County representative.
22. RFP - PROJECT GUIDELINES
- 22.1. The County has established the following Guidelines, Criteria, Goals, Objectives, Constraints, Schedule, Budget and or Requirements which shall service as a guide to the proposer(s) in conforming the professional services and work to provide pursuant to this Agreement/Contract:
- 22.1.1. No amount of work is guaranteed upon the execution of an agreement/contract.
- 22.1.2. Hourly rates and all other negotiated expenses will remain in effect throughout the duration of the agreement/contract period.
- 22.1.3. This contract does not entitle any firm to exclusive rights to County agreements/contracts. The County reserves the right to perform any and all available required work in-house or by any other means it so desires.
- 22.1.4. In reference to vehicle travel, mileage and man-hours spent in travel time, is considered incidental to the work and not an extra compensable expense.
- 22.1.5. Lee County reserves the right to add or delete, at any time, and or all tasks or services associated with this agreement.
- 22.1.6. Any Single Large Project: The County, in its sole discretion, reserves the right to separately solicit any project that is outside the scope of this solicitation, whether through size, complexity or the dollar value.
23. RFP – EVALUATION
- 23.1. **Ranking Method:** Lee County uses the Dense Ranking (1223” ranking). In Dense Ranking, items that compare equal, receive the same ranking number, and the next item(s) receive the immediately following ranking number. This ranking method is used for each individual committee member’s scores. Thus if A ranks ahead of B and C (which compare equal) which are both ranked ahead of D, then A is ranked number 1 (“first”), B is ranked number 2 (“joint second”), C is also ranked number 2 (“joint second”) and D is ranked number 3 (“third”).

- 23.1.1. Each Ranking is derived by the individual committee member's scores being totaled and then ranked with the highest "score" being "ranked" first with each following in the same manner. For example: a score of 100 would rank 1, a score of 75 would rank 2, and continue until all proposals have been ranked.
- 23.1.2. Upon completion of this method for each individual committee member the individual rankings are then totaled for an "Over-all Ranking." During the Over-all Ranking process the lowest total would be deemed the highest ranked (1). Example: Proposer A individual rankings totaled 5 and Proposer B individual rankings totaled 7 making "Over-all Ranking" order as Proposer A ranked 1, Proposer B ranked 2.
- 23.1.3. In the event of a tie, please refer to the tiebreaker section of this solicitation.)
- 23.2. **Evaluation Meeting(s):**
 - 23.2.1. Evaluation 1: The first evaluation will rank Proposers based on the scores from the selection criteria point values.
 - 23.2.2. Evaluation 2: Following the initial evaluation process, the short-listed proposer(s) will be required to provide an on-site interview/presentation.
 - 23.2.2.1. Such subsequent evaluations will be accomplished by simply ranking the proposers. Proposers will be ranked in sequential order with one (1) being the highest ranking. Proposers' rankings will then be totaled with the total lowest scores receiving final rank order starting with one (1) - the highest ranking.
 - 23.2.3. Proposed short-list and final selection meeting dates are posted on the Procurement Management web page: www.leegov.com/procurement (Projects, Award Pending.)

24. RFP – SELECTION PROCEDURE

- 24.1. The selection will be made in accordance with Lee County Procurement Policy. Some or all of the responding proposer(s) may be requested to provide interviews and/or presentations of their proposal, for the ranking process.
- 24.2. The recommendation to award, negotiated rates and agreement/contract(s) will be submitted to the Board of County Commissioners for approval.
- 24.3. If a satisfactory agreement/contract(s) cannot be negotiated, in a reasonable amount of time, the County, in its sole discretion, may terminate negotiations with the selected proposer(s) and begin agreement/contract negotiations with the next finalist.
- 24.4. The Procurement Management Director reserves the right to exercise their discretion to:
 - 24.4.1. Make award(s) to one or multiple proposers.
 - 24.4.2. Waive minor informalities in any response;
 - 24.4.3. Reject any and all proposals with or without cause;
 - 24.4.4. Accept the response that in its judgment will be in the best interest of Lee County

25. RFP – TIEBREAKER

- 25.1. In the event of a tie, two or more proposers that have the same ranking, the following steps will be taken to determine the highest ranked proposer. This method shall be used for all (RFP) ties.
 - 25.1.1. Step 1: The proposer that has the highest number of 1st place rankings shall be deemed the first ranked proposer. In the event a tie still exists the proposer with the highest number of 2nd, place rankings shall be the first ranked proposer. Should a tie still remain the method used above will continue with each ranking level, 3rd, then 4th, then 5th, etc. rank, will be counted until the tie is broken.
 - 25.1.2. Step 2: At the conclusion of step 1, if all is equal, the proposer having a drug-free work place program, shall be deemed the first ranked proposer.
 - 25.1.3. Step 3: In the event the tie exists then the highest ranked proposer from the first evaluation committee meeting, in which point values were applied, will win the award. One being the highest.
 - 25.1.4. Step 4: At the conclusion of steps 1, 2, 3, if all are equal, the 1st place proposer shall be determined by the flip of a coin.
- 25.2. When the tiebreaker is determined the highest ranked proposer shall be awarded the contract or receive the first opportunity to negotiate, as applicable.

- 25.3. If an award or negotiation is unsuccessful with the highest ranked proposer, award or negotiations may commence with the next highest ranked proposer.
26. RFP – EVALUATION/ SELECTION COMMITTEE
- 26.1. The selection shall be by a Selection Committee consisting of staff representatives from the appropriate County Departments as approved by the Procurement Management Director or designee.
- 26.2. The Selection Committee will receive and review written proposals in response to this Request for Proposal (RFP). Responses will be evaluated against a set of criteria to determine those Proposers/Firms most qualified and suited for this project. If applicable, the Selection Committee may choose to short-list Proposers/Firms to be interviewed to determine final selection.
27. WITHDRAWAL OF PROPOSAL
- 27.1. No proposal may be withdrawn for a period of **180 calendar days** after the scheduled time for receiving proposals. A proposal may be withdrawn prior to the proposal opening date and time. Withdrawal requests must be made in writing to the Procurement Management Director, who will approve or disapprove the request.
- 27.2. A proposer may withdraw a proposal any time prior to the opening of the solicitation.
- 27.3. After proposals are opened, but prior to award of the contract by the County Commission, the Procurement Management Director may allow the withdrawal of a proposal because of the mistake of the proposer in the preparation of the proposal document. In such circumstance, the decision of the Procurement Management Director to allow the proposal withdrawal, although discretionary, shall be based upon a finding that the proposer, by clear and convincing evidence, has met each of the following four tests:
- 27.3.1. The proposer acted in good faith in submitting the proposal,
- 27.3.2. The mistake in proposal preparation that was of such magnitude that to enforce compliance by the proposer would cause a severe hardship on the proposer,
- 27.3.3. The mistake was not the result of gross negligence or willful inattention by the proposer; and
- 27.3.4. The mistake was discovered and was communicated to the County prior to the County Commission having formally awarded the contract/agreement.
28. PROTEST RIGHTS
- 28.1. Any proposer that has submitted a formal response to Lee County, and who is adversely affected by an intended decision with respect to the award, has the right to protest an intended decision posted by the County as part of the solicitation process.
- 28.2. “Decisions” are posted on the Lee County Procurement Management Division website. Proposers are solely responsible to check for information regarding the solicitation. (www.leegov.com/procurement)
- 28.3. Refer to the “Bid/Proposal Protest Procedure” section of the Lee County “Contracts Manual” for the complete protest process and requirements. The Manual is posted on the Lee County website or you may contact the Procurement Management Director.
- 28.4. In order to preserve your right to protest, you must file a written **“Notice Of Intent To File A Protest”** with **the Lee County Procurement Management Director by 4:00 PM on the 3rd working day after the decision** affecting your rights is posted on the Lee County website.
- 28.4.1. The notice must clearly state the basis and reasons for the protest.
- 28.4.2. The notice must be physically received by the Procurement Management Director within the required time frame. No additional time is granted for mailing.
- 28.5. To secure your right to protest you will also be required to post a **“Protest Bond”** and **file a written “Formal Protest”** document **within 10 calendar days** after the date of **“Notice of Intent to File a Protest”** is received by the Procurement Management Director.
- 28.6. **Failure to follow the protest procedures requirement within the timeframes as prescribed herein and established by the Lee County Board of County Commissioners, Florida, shall constitute a waiver of your protest and any resulting claims.**
29. AUTHORITY TO UTILIZE BY OTHER GOVERNMENT ENTITIES

- 29.1. This opportunity is also made available to any government entity. Pursuant to their own governing laws, and subject to the agreement of the vendor, other entities may be permitted to make purchases at the terms and conditions contained herein. Lee County Board of County Commissioners will not be financially responsible for the purchases of other entities from this solicitation.

30. CONTRACT ADMINISTRATION

30.1. **Designated Contact:**

- 30.1.1. The awarded proposer shall appoint a person(s) to act as a primary contact for all County departments. This person or back-up shall be readily available during normal working hours by phone or in person, and shall be knowledgeable of the terms and procedures involved.
- 30.1.2. Lee County requires that the awarded proposer to provide the name of a contact person(s) and phone number(s) which will afford Lee County access 24 hours per day, 365 days per year, of this service in the event of major breakdowns or natural disasters.

30.2. **RFP – Term:** (unless otherwise stated in the Scope of Work or Detailed Specifications)

- 30.2.1. Unless otherwise stated in the scope of work, specifications, or special conditions the default **contract term shall be one (1) year with three (3), one (1) year renewals for a total of four (4) years upon mutual written agreement of both parties.**
- 30.2.2. The County reserves the right to renew this contract, or any portion thereof, and to negotiate pricing as a condition for each.
- 30.2.3. The County’s performance and obligation to pay under this contract, and any applicable renewal options, is contingent upon annual appropriation of funds.

30.3. **RFP – Basis of Award:**

- 30.3.1. Award will be made to the most responsible and responsive proposer based on the evaluation criteria.

30.4. **Agreement/Contract:**

- 30.4.1. The awarded proposer will be required to execute an Agreement/Contract as a condition of award. A sample of this document may be viewed on-line at <http://www.lee.gov/procurement/forms>.

30.5. **Records:**

- 30.5.1. **Retention:** The proposer shall maintain such financial records and other records as may be prescribed by Lee County or by applicable federal and state laws, rules and regulations. Unless otherwise stated in the specifications, the proposer shall retain these records for a period of five years after final payment, or until they are audited by Lee County, whichever event occurs first.
- 30.5.2. **Right to Audit/Disclosure:** These records shall be made available during the term of the contract as well as the retention period. These records shall be made readily available to County personnel with reasonable notice and other persons in accordance with the Florida General Records Schedule. Awarded Bidder/Proposer(s) are hereby informed of their requirement to comply with FL §119 specifically to:
 - 30.5.2.1. Keep and maintain public records required by the County to perform the service.
 - 30.5.2.2. Upon request from the County’s custodian of public records, provide the County with a copy of the requested records or allow the records to be inspected or copied within a reasonable time at a cost that does not exceed the cost provided or as otherwise provided by law.
 - 30.5.2.3. Ensure that public records that are exempt or confidential and exempt from public records disclosure requirements are not disclosed except as authorized by law for the duration of the contract term and following completion of the contract if the contractor does not transfer the records to the County.
 - 30.5.2.4. Upon completion of the contract, transfer, at no cost, to the County all public records in possession of the contractor or keep and maintain public records required by the County to perform the service. If the contractor transfers all public records to the County upon completion of the contract, the contractor shall destroy any duplicate public records that are exempt or confidential and exempt from public records disclosure requirements. If the contractor keeps and maintains public records upon completion of the contract, the contractor shall meet all applicable requirements for retaining public records. All records

stored electronically must be provided to the County, upon request from the County's custodian of public records, in a format that is compatible with the information technology systems of the County.

30.5.3. Public Record: **IF THE VENDOR HAS QUESTIONS REGARDING THE APPLICATION OF CHAPTER 119, FL § , TO THE VENDOR'S DUTY TO PROVIDE PUBLIC RECORDS RELATING TO THE CONTRACT, CONTACT THE CUSTODIAN OF PUBLIC RECORDS AT 239-533-2221, 2115 SECOND STREET, FORT MYERS, FL 33901, <http://www.lee.gov/publicrecords>.**

30.5.4. Ownership: It is understood and agreed that all documents, including detailed reports, plans, original tracings, specifications and all data prepared or obtained by the successful proposer in connection with its services hereunder, include all documents bearing the professional seal of the successful proposer, and shall be delivered to and become the property of Lee County, prior to final payment to the successful proposer or the termination of the agreement. This includes any electronic versions, such as CAD or other computer aided drafting programs.

30.6. Termination:

30.6.1. Any agreement as a result of this solicitation may be terminated by either party giving **thirty (30) calendar days' advance written notice**. The County reserves the right to accept or not accept a termination notice submitted by the proposer, and no such termination notice submitted by the vendor shall become effective unless and until the vendor is notified in writing by the County of its acceptance.

30.6.2. The Procurement Management Director may immediately terminate any agreement as a result of this solicitation for emergency purposes, as defined by the Lee County Purchasing and Payment Procedures Manual (Purchasing Manual), (also known as Appendix "D", "AC-4-1.pdf".)

30.6.3. Any proposer who has voluntarily withdrawn from a solicitation without the County's mutual consent during the contract period shall be barred from further County procurement for a **period of 180 days**. The vendor may apply to the Board for a waiver of this debarment. Such application for waiver of debarment must be coordinated with and processed by the Procurement Management Department.

30.6.4. The County reserves the right to terminate award or contract following any of the below for goods or services over \$1,000,000:

30.6.4.1. Contractor is found to have submitted a false certification as provided under FL § 287.135 (5);

30.6.4.2. Contractor has been placed on the Scrutinized Companies with Activities in Sudan List or the Scrutinized Companies with Activities in the Iran Petroleum Energy Sector List;

30.6.4.3. Contractor has engaged in business operations in Cuba or Syria;

30.6.4.4. Contractor has been placed on the Scrutinized Companies that Boycott Israel List, or is engaged in a boycott of Israel – beginning October 1, 2016.

31. WAIVER OF CLAIMS

31.1. Once this contract expires, or final payment has been requested and made, the awarded vendor shall have no more than **thirty (30) calendar days** to present or file any claims against the County concerning this contract. After that period, the County will consider the vendor to have waived any right to claims against the County concerning this agreement.

32. LEE COUNTY PAYMENT PROCEDURES

32.1. All vendors are requested to mail an original invoice to:

**Lee County Finance Department
Post Office Box 2238
Fort Myers, FL 33902-2238**

32.2. All invoices will be paid as directed by the Lee County payment procedure unless otherwise stated in the detailed specification portion of this project.

- 32.3. Lee County will not be liable for requests for payment deriving from aid, assistance, or help by any individual, vendor, proposer, or bidder for the preparation of these specifications.
- 32.4. Lee County is generally a tax exempt entity subject to the provisions of the 1987 legislation regarding sales tax on services. Lee County will pay those taxes for which it is obligated, or it will provide a Certificate of Exemption furnished by the Department of Revenue. All proposers should include in their proposal, all sales or use taxes, which they will pay when making purchases of material or sub-contractor's services.
- 33. MATERIAL SAFETY DATA SHEETS (MSDS/SDS) (if applicable)
 - 33.1. In accordance with Chapter 443 of the FL §, it is the vendor's responsibility to provide Lee County with Material Safety Data Sheets on bid materials, as may apply to this procurement.
- 34. DEBRIS DISPOSAL (if applicable)
 - 34.1. Unless otherwise stated, the Proposer shall be fully responsible for the lawful removal and disposal of any materials, debris, garbage, vehicles or other such items which would interfere with the undertaking and completion of the project. There shall not be an increase in time or price associated with such removal.
- 35. SHIPPING (if applicable)
 - 35.1. Cost of all shipping to the site, including any inside delivery charges and all unusual storage requirements shall be borne by the proposer unless otherwise agreed upon in writing prior to service. It shall be the proposer's responsibility to make appropriate arrangements, and to coordinate with authorized personnel at the site, for proper acceptance, handling, protection and storage (if available) of equipment and material delivered. All pricing to be F.O. B. destination.
 - 35.2. The materials and/or services delivered under the proposal shall remain the property of the seller until a physical inspection and actual usage of these materials and/or services is accepted by the County and is deemed to be in compliance with the terms herein, fully in accord with the specifications and of the highest quality.
- 36. INSURANCE (AS APPLICABLE)
 - 36.1. Insurance shall be provided by the awarded proposer. Upon request, a certificate of insurance (COI) complying with the attached guide shall be provided by the proposer.

Insurance Guide

Major Insurance Requirements

Minimum Insurance Requirements: *Risk Management in no way represents that the insurance required is sufficient or adequate to protect the Vendor's interest or liabilities. The following are the required minimums the Vendor must maintain throughout the duration of this Contract. The County reserves the right to request additional documentation regarding insurance provided.*

- a. **Commercial General Liability** - Coverage shall apply to premises and/or operations, products and completed operations, independent contractors, and contractual liability exposures with minimum limits of:
 - \$1,000,000 per occurrence
 - \$2,000,000 general aggregate
 - \$1,000,000 products and completed operations
 - \$1,000,000 personal and advertising injury

- b. **Business Auto Liability** - The following Automobile Liability will be required and coverage shall apply to all owned, hired and non-owned vehicles use with minimum limits of:
 - \$1,000,000 combined single limit (CSL) or
 - \$500,000 bodily injury per person
 - \$1,000,000 bodily injury per accident
 - \$500,000 property damage per accident

- c. **Workers' Compensation** - Statutory benefits as defined by Chapter 440, Florida Statutes, encompassing all operations contemplated by this Contract or Agreement to apply to all owners, officers, and employees regardless of the number of employees. Workers' Compensation exemptions may be accepted with written proof of the State of Florida's approval of such exemption. Employers' liability will have minimum limits of:
 - \$500,000 per accident
 - \$500,000 disease limit
 - \$500,000 disease – policy limit

*The required minimum limit of liability shown in a. and b. may be provided in the form of "Excess Insurance" or "Commercial Umbrella Policies," in which case, a "Following Form Endorsement" will be required on the "Excess Insurance Policy" or "Commercial Umbrella Policy."

Verification of Coverage:

1. Coverage shall be in place prior to the commencement of any work and throughout the duration of the Contract. A certificate of insurance will be provided to the Risk Manager for review and approval. The certificate shall provide for the following:
 - a. The certificate holder shall read as follows:
 - Lee County Board of County Commissioners
 - P.O. Box 398
 - Fort Myers, Florida 33902

 - b. "Lee County, a political subdivision and Charter County of the State of Florida, its agents, employees, and public officials" will be named as an "Additional Insured" on the General Liability policy, including Products and Completed Operations coverage.

Special Requirements:

1. An appropriate "Indemnification" clause shall be made a provision of the Contract.
2. If applicable, it is the responsibility of the general contractor to ensure that all subcontractors comply with all insurance requirements.
3. Place the project name and number in the Description of Operations box.
4. Insurance carriers providing coverage required herein shall be licensed to conduct business in the State of Florida and shall possess a current A.M. Best's Financial Strength Rating of B+ Class VII or better.

End of Insurance Guide section

SPECIAL CONDITIONS

These are conditions that are in relation to this solicitation only and have not been included in the County's standard Terms and Conditions or the Scope of Work.

1. PROJECT TERM

1.1. The duration of this Agreement, which includes system design, installation, activation, and factory testing is anticipated to be for a period of 10 Months. The Agreement for this work shall commence on the date agreed upon through negotiations and as set forth in the subsequent and associated Agreement Documents. The Agreement is to remain in effect for one year following the final completion of the system installation work associated with this project.

2. PRE-SOLICITATION MEETING & SITE VISIT:

2.1. A Pre-Solicitation meeting is scheduled to be held as indicated herein. This pre-solicitation meeting will be followed by a site visit to review current LeeTran vehicles as well as the collection facilities. Additional site visits are not expected to be scheduled and it is highly encourage that interested Vendors attended the currently scheduled pre-solicitation meeting.

3. PROJECT FUNDING NOTICE

3.1. As notice to all Vendors, this project is funded in whole or in part with Federal Funds through the Federal Transit Administration (FTA). The Vendor agrees to abide by and comply with all Federal terms, conditions, provisions, certifications, affidavits, or otherwise as applicable and stated within this solicitation package.

4. BOND/SURETY:

4.1. PROPOSAL BOND

4.1.1. Vendor must submit with their proposal a Letter of Bondability from a Surety Company (not the surety agent) that indicates their bonding capacity. The Vendor's bonding capacity shall not be less than \$2,500,000.00. Any issuer of a Letter of Bondability must be licensed to transact a fidelity and surety business in the State of Florida, with an A.M. Best rating of B+ (Good) or better.

4.2. PERFORMANCE AND PAYMENT BOND

4.2.1. The Vendor shall furnish within seven calendar days after notification by Lee County of the approval to award the Agreement, at its own expense, a Performance and Payment Bond in a sum equal to one hundred (100%) percent of the not to exceed Agreement amount, by a surety company considered satisfactory by the County and otherwise authorized to transact business in the State of Florida. The bond shall cover all of the Vendor's obligations under the Agreement, protect the County from lawsuits for non-payment of debts incurred, and shall remain in force until said obligations have been fulfilled.

4.2.2. A **Clean Irrevocable Letter of Credit or Cash Bond** may be accepted by the County in lieu of the Public Payment and Performance Bond.

4.2.3. Only Lee County form(s) may be accepted. Forms are available at <https://www.leegov.com/procurement/forms>.

4.2.4. **Personal Checks are not acceptable to Lee County as a Bid Security.**

4.2.5. **Surety:** In order to be acceptable to the County, a Surety Company issuing Evidence of Bondability, Bid Guaranty Bonds or 100% Public Payment and Performance Bonds or Letters of Credit called for herein shall meet and comply with the minimum standards set forth in as part of the Agreement Documents. The surety company shall be authorized to do business and in good standing with the Florida Department of State. All such bonds shall be issued or countersigned by a local producing agent who is a Florida resident with satisfactory evidence of its authority to execute the bond being submitted.

5. LOCAL VENDOR PREFERENCE EXCLUSION

5.1. Local Vendor Preference Ordinance has been waived for this solicitation and any and all references contain herein are non-applicable to this solicitation and subsequent Agreement and/or purchase order(s).

6. COST OR PRICE ANALYSIS

- 6.1. Upon commencement of negotiations, Vendor will be expected to provide a man hour estimate, proposal, fee or combination thereof that includes a detailed cost breakdown including General and Administrative Expenses, Overhead, and Profit rates. Vendor must advise if audited rates are available and shall provide such rates and documentation for use in negotiation and Cost or Price Analysis preparation. Vendor shall provide fee and cost breakdown supporting documentation where and as requested by the County. Failure to comply with the needs associated with completing a Cost or Price Analysis may result in revocation of award.

7. SELECTION PROCESS DETAILS - BAFO

- 7.1. Proposals will be evaluated, negotiated, selected, and any award made in accordance with the criteria and procedures described herein. The approach and procedures are those applicable to a competitive negotiated procurement whereby Proposals are evaluated to determine which Proposals are within a Competitive Range. Discussions and negotiations may then be carried out with Proposers within the Competitive Range, after which Best and Final Offers (BAFOs) may be requested.
- 7.2. For purposes of this solicitation the Competitive Range shall be proposers who have received an overall total score of between 85-100 at the conclusion of the initial evaluation meeting or where a natural and clear break in Vendor's final scoring occurs at either the initial or subsequent evaluation meetings as decided by the sole discretion of the Evaluation Committee.
- 7.3. The Vendors whose Proposals are found by the County to be within the Competitive Range, or that may be reasonably made to be within the Competitive Range, will be notified and any questions or requests for clarifications provided to them in writing. Each such Vendor may be invited for an interview and discussions with the County to discuss answers to written or oral questions, clarifications and any facet of its Proposal.
- 7.4. Best and final offers (BAFOs): Vendors considered in the Competitive Range may be afforded the opportunity to amend their Proposals and make their BAFOs. The request for BAFOs may include the following:
- 7.5. A common date and time for submission of written BAFOs, allowing a reasonable opportunity for preparation of the written BAFOs.
- 7.6. Notice that if any modification to a BAFO is submitted, it must be received by the date and time specified for the receipt of BAFOs.
- 7.7. Notice to Vendors that do not submit a notice of withdrawal or a BAFO that their immediately previous Proposal will be construed as their BAFO.
- 7.8. Any modification to the initial Proposal made by a Vendor in its BAFO shall be clearly identified in its BAFO. BAFOs will be evaluated by the County according to the same requirements, process, and criteria as the initial Proposals. The County will make appropriate adjustments to the initial scores for any criteria and criteria that have been affected by any Proposal modifications made by the BAFOs. The County reserves the right, dependent on the requested BAFO material to evaluate BAFOs in a 1, 2, 3 ranking process and award to the top ranked BAFO proposal rather than adjust initial scores. Such process change notice will be provided to BAFO participating Vendors with BAFO notice.
- 7.9. The County will then choose the Proposal that it finds to be most advantageous to the County, based upon the evaluation criteria. The results of the evaluations and the selection of a Proposal for any award will be documented.
- 7.10. The County reserves the right to select a Proposal for award without any discussions or negotiations or request for any BAFOs following any evaluation meeting and scoring. The Proposer whose Proposal is found to be most advantageous to the County may be selected, based upon consideration of the criteria of described herein (Best Value).**

7.11. If only one Proposal is received in response to this RFP and it is found by the County to be acceptable, then a price or cost analysis, or both, possibly including an audit, may be performed by or for the County. The Proposer has agreed to such analysis by submitting a Proposal in response to this RFP. The County reserves the right to evaluate and award in the event of only one Proposal received as is in the best interest of the County.

End of Special Conditions

DETAILED SPECIFICATIONS

1. GENERAL SCOPE OF PROJECT

- 1.1. Lee County Board of County Commissioners on behalf of Lee County Transit, also known as LeeTran, is requesting proposals in order to contract with a skilled and qualified Vendor to provide design, materials, installation, activation, and factory testing of a functional Fare Collection (FC)/Point of Sales (POS) system that addresses LeeTran's needs to the greatest extent possible.

- 1.2. The Vendor shall provide a functional Fare Collection (FC)/Point of Sales (POS) system, installation, general services, maintenance and support that meet or exceed the requirements of the specifications package and support services as described herein as well as within the attached *Attachment A - LeeTran Fare System Functional Specifications*.

End of Detailed Specifications

SUBMITTAL REQUIREMENTS & EVALUATION CRITERIA

1. SUBMITTAL REQUIREMENTS & EVALUATION CRITERIA

- 1.1 Interested firms shall include the following information in their submittal responses to this solicitation. The following format and sequence should be followed in order to provide consistency in the firm's responses and to ensure each proposal receives full consideration. Use 8 ½ x 11 sheet pages only with minimum font size of 10 points and with tabs or section dividers to separate sections as defined below. More than one section is permitted on one page unless otherwise indicated below. Undesignated information shall be inserted at the rear of each package. Place page numbers at the bottom of every page, excluding dividers. Proposal documents should not contain links to other web pages; such links will not be reviewed for evaluation purposes.
- 1.2 Submittal package may not exceed **25 pages** printed single-sided; **page restriction excludes required forms found herein and dividers**. **PLEASE INCLUDE PAGE TABS/SECTION DIVIDERS** so that those evaluating your submittal can easily compare each section with others that are submitted. If any of the information provided by the Proposer is found to be, in the sole opinion of the Evaluation Committee and Procurement Management Director, substantially unreliable their proposal may be rejected.
- 1.3 Proposers shall submit one (1) original hard copy (clearly marked as such) and six (6) electronic version(s) on a USB flash drive set(s) containing the proposal submittal in an unlocked PDF format. The County may request specific files be submitted in specialty format (IE: Provide a Project Timeline in Excel format.) Vendor shall accommodate such specialty requests as stated within the submittal requirements describe herein. Should files not be provided in the format or quantity as requested Vendor may be deemed Non-Responsive and therefore ineligible for award. In case of any discrepancies, the original will be considered by the County in evaluating the Proposal, and the electronic version is provided for the County's administrative convenience only. Limit the color and number of images to avoid unmanageable file sizes.

Introduction

- Project RFP Number & Name
- Firm's Name & Address
- Firm's Contact Person & Information (phone, fax and email address)
- How many years has Proposer been in business under present name?
- Under what other former names has your organization operated?

TAB 1: Qualifications of Company

- Provide a description of your Company; experience, and underlying philosophy in providing the services as described and requested herein. Description should include details such as: abilities, capacity, skill, strengths, number of years, etc...
- Provide Letter of Bondability from a Surety Company (not the surety agent) that indicates their bonding capacity. The Vendor's bonding capacity shall not be less than \$2,500,000.00. Any issuer of a Letter of Bondability must be licensed to transact a fidelity and surety business in the State of Florida, with an A.M. Best rating of B+ (Good) or better.

TAB 2: Company Relevant Experience & Reference

- Provide details of a minimum of three (3) projects similar in scope and size to that being requested through this solicitation that your Company has completed recently. Details for each project example provided should include:
 - Project Name
 - Project Address

- Customer Name
 - Customer Contact Information
 - Point of contact Name, Phone, and Email
 - Brief description of work provided.
 - Initial costs of work
 - Final costs of work
 - Number of change orders
 - Total completion time (From Notice to Proceed to Final Invoice payment)
- Provide a statement of understanding that your Company recognizes the County reserves the right to evaluate the proposing Company on their past performance and prior dealings with Lee County (i.e., failure to meet specifications, poor workmanship, late delivery, etc.) as part of their experience criteria.

TAB 3: Plan of Approach

- Provide a detailed Plan of Approach that explains how your firm intends to comply with and meet the anticipated deliverables as detailed within this solicitation.
- Provide a projected project timeline, keeping the expected completion date of not more than ten (10) months in mind. The timeline should reference major milestones and/or deliverable dates.

TAB 4: Personnel

- Provide a detailed description of the firm's **specific** project management team that will be assigned to the Lee County Agreement. Identify the roles and responsibilities of the primary team members as they pertain/apply to the Project Approach and include details that demonstrate individual's knowledge and understanding of the types of services to be performed as well as previous experience in similar or related work.
- Firm must identify staff member that will serve as Project Director that shall be authorized and responsible to act on behalf of the Consultant with respect to directing, coordinating and administering all aspects of the services to be provided and performed.
- Provide a statement acknowledging your firm's understanding that the project management team/key team members assigned to the Lee County Agreement, as described above, shall not be substituted without the expressed permission of Lee County.
- Provide resumes of proposed **specific** project management team to be assigned to the Lee County Agreement.
Resumes are not included within page restrictions, but should be limited to one (1) page per person.

TAB 5: Price Scoring:

- The Proposer with the lowest Price Proposal (*Total Project Amount*) will be awarded the maximum score as listed in the scoring criteria section. All other proposals will be scored according to the following formula: (Lowest Price Proposal/ Proposer's Price Proposal) x Maximum points. Score For example, the maximum score available for price is 25. If the lowest proposed Price Proposal is \$150,000.00 that Proposer will receive the full 25 points. Another Proposer with a Price Proposal of \$160,000.00 will receive points calculated as follows: $\$ 150,000.00 / \$160,000.00 = .9375 * 25 = 23.44$ points
- Proposers must provide pricing for all line items listed on the Bid/Proposal Form. Failure to provide pricing for any line item will result in Proposing Firm being deemed Non-Responsive and therefore ineligible for award.

- **Proposal form is not included within page restrictions and is requested to be provided with both the hardcopy and the digital file submission.*

TAB 6: System Compliance

- Provide a fully complete Compliance Matrix (Separate Excel) in order to indicate the level of compliance of your Firm’s proposed system.
**Matrix is not included within page restrictions and must be provided with the digital file submission.*

TAB 7: Required Forms

- Forms 1- 9
- FTA Forms

2. SCORING CRITERIA & WEIGHT

CRITERIA	CRITERIA DESCRIPTION	MAX. POINTS AVAILABLE
1	QUALIFICATIONS OF COMPANY (TAB 1)	20
2	COMPANY RELEVANT EXPERIENCE & REFERENCE (TAB 2)	20
3	PLAN OF APPROACH (TAB 3)	15
4	PERSONNEL (TAB 4)	15
5	PRICE SCORING (TAB 5)	10
6	SYSTEM COMPLIANCE (TAB 6)	20
TOTAL POINTS		100
<p><i>*Additional details and documents found within submittal package, although not located within tabs as listed above, may be reviewed and considered by evaluation committee when scoring Proposers.</i></p>		

3. RFP SUBMISSION SCHEDULE

Submission Description	Date(s)	Time
Advertise Request for Proposal (RFP)	Friday, January 18, 2019	N/A
Pre-Proposal Meeting	Thursday, January 31, 2019	9:00 AM
Proposal Question Deadline	8 Calendar days prior to submission deadline	Prior to 5:00 PM
Submission Deadline	Thursday, February 21, 2019	Prior to 2:30 PM
First Committee Meeting Short list discussion	Tuesday, March 26, 2019	9:00 AM
Notify Shortlist Selection via e-mail	Monday, April 1, 2019	N/A
Final Scoring/Selection Meeting	Tuesday, April 23, 2019	9:00 AM
Commission Meeting	Tuesday, July 16, 2019	
<p><i>Submission Schedule is provided as a guideline only and is subject to change at the discretion of Lee County authorized personnel.</i></p> <p><i>Changes in closing date or other parameters may occur and will be posted to the Lee County Procurement website. It shall be the responsibility of Contractor to verify all dates through County website.</i></p> <p><i>Unless otherwise stated, location of all openings and meetings will take place at 1500 Monroe Street, Fort Myers, FL 33901 – 4th Floor Procurement Management.</i></p>		

End of Section

LEE COUNTY DOCUMENT MANAGEMENT FORM
For
RFP180573LAC, LeeTran Fare Point of Sale Solutions System

These forms are required as indicated below and all required forms should be submitted with all submissions. If it is determined that forms in this selection are not applicable to your company or solicitation they should be marked “N/A or Not Applicable” across the form in large letters and returned with your submission package. The original must be a manually signed. Include additional copies, if specified, in the Solicitation documents.

FORM #	TITLE / DESCRIPTION	REQUIRED STATUS (Required, Not Required, If Applicable)	VENDOR CHECK-OFF
1	Solicitation Response Form	Required	
1a	Bid/Proposal Form (Provided as separate excel document)	Required	
N/A	Business Relationship Disclosure Requirement	If Applicable	
2	Affidavit Certification Immigration Laws	Required	
3	Reference Survey	Required	
4	Negligence or Breach of Contract Disclosure Form	Required	
5	Affidavit Principal Place of Business	Required	
6	Sub-Contractor List	Required	
7	Public Entity Crime Form	Required	
*	Compliance Matrix	Required	
*	Letter of Bondability	Required	
*	Proposal Label	Required	
*	Inclusion of any licenses of certifications requested.	If Applicable	
GRANT FUND – REQUIRED DOCUMENTS			
1	Lobbying	Required	
2	Debarment and Suspension	Required	
3	E-Verify	Required	
*	Evidence of Enrollment in the E-Verify Program (Profile or MOU)	Required	
*	Form LLL – Disclosure of Lobbying Activity	If Applicable	

It is the Proposer’s responsibility to review the submittal request in its entirety and ensure that all submittal requirements are included within you submission package.

FORMS DESCRIPTION & INSTRUCTIONS

REQUEST FOR PROPOSAL (NON-CCNA)

This table provides a brief list, description, and instructions regarding the standard requested forms that should be submitted with all bids or proposals. This is not intended to be an all-inclusive list of forms required for your submission, but rather a guide to assist in completion of the County's standard forms. Bidders/Proposers should utilize the Lee County Document Management Form for a complete list of all forms required for project submission.

<u>Form #</u>	<u>Title/Description</u>
---------------	--------------------------

<i>1</i>	<i>Solicitation Response Form</i>
----------	--

All signatures must be by a corporate authorized representative, witnessed, and corporate and/or notary seal (if applicable.) The corporate or mailing address must match the company information as it is listed on the Florida Department of State Division of Corporations. Attach a copy of the web-page(s) from <http://www.sunbiz.org> as certification of this required information. Sample attached for your reference.

Verify that all addenda and tax identification number have been provided.

<i>1a</i>	<i>Proposal Form</i>
-----------	-----------------------------

This form is used to provide itemization of project cost. A more detailed "schedule of values" may be requested by the County

*	<i>Business Relationship Disclosure Requirement (if Applicable)</i>
---	--

Sections 112.313(3) and 112.313(7), F.S., prohibit certain business relationships on the part of public officers and employees, their spouses, and their children. If this **disclosure is applicable, the Bidder must request the form entitled "INTEREST IN COMPETITIVE BID FOR PUBLIC BUSINESS"** (Required by § 112.313(12)(b), F.S.) to be completed and **returned with the Solicitation Response. It is the Bidder's responsibility to request the form and disclose this relationship; failure to do so may result in being declared non-responsive.**

NOTICE: UNDER THE PROVISIONS OF § 112.317, F.S., A FAILURE TO MAKE ANY REQUIRED DISCLOSURE CONSTITUTES GROUNDS FOR, AND MAY BE PUNISHED BY, ONE OR MORE OF THE FOLLOWING: IMPEACHMENT, REMOVAL OR SUSPENSION FROM OFFICE OR EMPLOYMENT, DEMOTION, REDUCTION IN SALARY, REPRIMAND, OR A CIVIL PENALTY NOT TO EXCEED \$10,000.00.

<i>2</i>	<i>Affidavit Certification Immigration Laws</i>
----------	--

Form is acknowledgement that the proposer is in compliance in regard to Immigration Laws.

<i>3</i>	Provide this form to reference respondents. This form will be turned in with the proposal package.
----------	---

1. **Section 1:** Bidder/Proposer to complete with reference respondent's information prior to providing to them for their response. (This is **not** the Bidder/Proposer's information.)
2. **Section 2:** Enter the name of the Bidder/Proposer; provide the project information in which the reference respondent is to provide a response.
3. The reference respondent should complete "**Section 3.**"
4. **Section 4:** The reference respondent to print and sign name
5. **Three (3) Reference responses** are to be **returned with the proposal package.**
6. Failure to obtain reference surveys may make your company non-responsive.

4 *Negligence or Breach of Contract Disclosure Form*

The form may be used to disclose negligence or breach of contract litigation that your company may be a part of over the past ten years. You may need to duplicate this form to list all history. If the proposer has more than 10 lawsuits, you may narrow them to litigation of the company or subsidiary submitting the solicitation response. Include, at a minimum, litigation for similar projects completed in the State of Florida. Final outcome should include in whose favor the litigation was settled and was a monetary amount awarded. The settlement amount may remain anonymous.

If you have **no litigation**, enter **“None”** in the first **“type of incident”** block of the form. Please do not write N/A on this form.

5 *Affidavit Principal Place of Business*

Certifies proposer’s location information.

6 *Sub-Contractor List* (if applicable)

To be completed and returned when sub-contractors are to be utilized and are known at the time of the submission.

7 *Public Entity Crimes Form (Required form)*

Any person or affiliate as defined by statute who has been placed on the convicted vendor list following a conviction for a public entity crime may not submit a bid or a contract to provide any goods or services to the County; may not submit a bid on a contract with the County for the construction or repair of a public building or public work; may not submit bids or leases of real property to the County; may not be awarded or perform works as a contractor, supplier, subcontractor, or consultant under a contract with the County, and may not transact business with the County in excess of \$25,000.00 for a period of 36 months from the date of being placed on the convicted vendor list.

* *Proposal Label* (Required)

Self-explanatory. Please affix to the outside of the sealed submission documents.

* *Federal Funding Forms*

See Document Management form for list of funding source required documentation.

Include any licenses or certifications requested

Local Business Tax Account (as applicable) issued by City and/or County entity. This is necessary for all Florida vendors.

It is the Proposer’s responsibility to insure the Solicitation Response is mailed or delivered in time to be received no later than the specified opening date and time. (If solicitation is not received prior to deadline it cannot be considered or accepted.)

Form 1 – Solicitation Response Form



LEE COUNTY PROCUREMENT MANAGEMENT
SOLICITATION RESPONSE FORM

Date Submitted: _____ Deadline Date: 2/21/2019

SOLICITATION IDENTIFICATION: RFP180573LAC

SOLICITATION NAME: LeeTran Fare Point of Sale Solutions System

COMPANY NAME: _____

NAME & TITLE: (TYPED OR PRINTED) _____

BUSINESS ADDRESS: (PHYSICAL CORPORATE OR MAILING ADDRESS: _____

[] SAME AS PHYSICAL

ADDRESS MUST MATCH SUNBIZ.ORG

E-MAIL ADDRESS: _____

PHONE NUMBER: _____ FAX NUMBER: _____

NOTE REQUIREMENT: IT IS THE SOLE RESPONSIBILITY OF THE VENDOR TO CHECK LEE COUNTY PROCUREMENT MANAGEMENT WEB SITE FOR ANY ADDENDA ISSUED FOR THIS PROJECT. THE COUNTY WILL POST ADDENDA TO THIS WEB PAGE, BUT WILL NOT NOTIFY.

In submitting this proposal, Proposer makes all representations required by the instructions to Proposer and further warrants and represents that: Proposer has examined copies of all the solicitation documents and the following addenda:

No. _____ Dated: _____ No. _____ Dated: _____ No. _____ Dated: _____
No. _____ Dated: _____ No. _____ Dated: _____ No. _____ Dated: _____

Tax Payer Identification Number: _____

(1) Employer Identification Number -OR- (2) Social Security Number:

** Lee County collects your social security number for tax reporting purposes only

Please submit a copy of your registration from the website www.sunbiz.org establishing the Proposer/firm as authorized (including authorized representatives) to conduct business in the State of Florida, as provided by the Florida Department of State, Division of Corporations.

1 Collusion Statement: Lee County, Florida The undersigned, as Proposer, hereby declares that no person or other persons, other than the undersigned, are interested in this solicitation as Principal, and that this solicitation is submitted without collusion with others; and that we have carefully read and examined the specifications or scope of work, and with full knowledge of all conditions under which the services herein is contemplated must be furnished, hereby propose and agree to furnish this service according to the requirements set out in the solicitation documents, specifications or scope of work for said service for the prices as listed on the county provided price sheet or (CCNA) agree to negotiate prices in good faith if a contract is awarded.

2 Scrutinized Companies Certification: Section 287.135, FL § , prohibits agencies from contracting with companies, for goods or services over \$1,000,000, that are on either the Scrutinized Companies with Activities in Sudan List or the Scrutinized Companies with Activities in the Iran Petroleum Energy Sector List. Both lists are created pursuant to section 215.473, FL§. As the person authorized to sign on behalf of Respondent, I hereby certify that the company identified above not listed on either the Scrutinized Companies with Activities in Sudan List or the Scrutinized Companies with Activities in the Iran Petroleum Energy Sector List. I understand that pursuant to section 287.135, FL§, the submission of a false certification may subject company to civil penalties, attorney’s fees, and/or costs.

Form#1 – Solicitation Form, Page 2

3 Business Relationship Disclosure Requirement: Sections 112.313(3) and 112.313(7), FL§, prohibit certain business relationships on the part of public officers and employees, their spouses, and their children. See Part III, Chapter 112, FL § and/or the brochure entitled "A Guide to the Sunshine Amendment and Code of Ethics for Public Officers, Candidates and Employees" for more details on these prohibitions. However, Section 112.313(12), FL § (1983), provides certain limited exemptions to the above-referenced prohibitions, including one where the business is awarded under a system of sealed, competitive bidding; the public official has exerted no influence on bid negotiations or specifications; and where disclosure is made, prior to or at the time of the submission of the bid, of the official's or his spouse's or child's interest and the nature of the intended business. The Commission on Ethics has promulgated this form for such disclosure, if and when applicable to a public officer or employee.

If this disclosure is applicable request form "INTEREST IN COMPETITIVE BID FOR PUBLIC BUSINESS" (Required by 112.313(12)(b), Florida Statute (1983)) to be completed and returned with solicitation response. It is the proposer's responsibility to disclose this relationship, failure to do so could result in being declared non-responsive.

Business Relationship Applicable (request form) **Business Relationship NOT Applicable**

4 Disadvantaged Business Enterprise (DBE) proposer? If yes, please attach a current certificate. **Yes** **No**

ALL PROPOSALS MUST BE EXECUTED BY AN AUTHORIZED AUTHORITY OF THE PROPOSER. WITNESSED AND SEALED (IF APPLICABLE)

 Company Name (Name printed or typed)



(Affix Corporate Seal, if applicable)

 Authorized Representative Name (printed or typed)

 Authorized Representative's Title (printed or typed)

 Witnessed/Attested by: (Witness/Secretary name and title printed or typed)

 Authorized Representative's Signature

 Witness/Secretary Signature

Any blank spaces on the form(s), qualifying notes or exceptions, counter offers, lack of required submittals, or signatures, on County's Form may result in the submission being declared non-responsive by the County.

Detail by Entity Name

Florida Profit Corporation

Bill's Widget Corporation

Filing Information

Document Number 655555
 FEI/EIN Number 5111111111
 Date Filed 09/22/1980
 State FL
 Status ACTIVE
 Last Event AMENDED AND RESTATED ARTICLES
 Event Date Filed 07/25/2006
 Event Effective Date NONE

Principal Address

555 N Main Street
 Your Town, USA 99999
 Changed 02/11/2012

Verify either Principal or Mailing address is on Form 1

Mailing Address

555 N Main Street
 MYour Town, USA 99999
 Changed 02/11/2012

Registered Agent Name & Address

My Registered Agent
 111 Registration Road
 Registration, USA 99999
 Name Changed: 12/14/2006
 Address Changed: 12/14/2006

Officer/Director Detail

Name & Address

Title P
 President, First
 555 AVENUE
 Anytown, USA 99999
 Title V
 President, Second
 555 AVENUE
 Anytown, USA 99999

IMPORTANT:

For corporations, ALL documents must be signed by the president of the company or an authorized individual. For any individual other than the president, we will need one of the following to confirm their authority to sign:

1. a corporate resolution by the Board of Directors, or
2. an extract of minutes, or
3. an extract of Vote by the Board of Directors

If the company's articles of incorporation identify additional positions that have the power to bind the corporation, we will accept the articles of incorporation with verification from the president that a certain individual serves in that role (e.g., the president confirms that John Doe is the CEO, and the articles of incorporation provide that the CEO has the power to bind the company).

With respect to an LLC, the authority to bind a limited liability company is controlled by Florida statutes. Managers or managing members have inherent authority to bind an LLC.

If the president of a corporation or a manager/managing member of an LLC delegates their authority, such delegation must be sent to us on company letterhead with the President's or manager's/managing member's original, wet signature.

v01/03/2018

Form 1a – Proposal Form



Lee County Procurement Management
PROPOSAL FORM

Company Name: _____

Solicitation # RFP180573LAC Solicitation Name LeeTran Fare Point of Sale Solutions System

Having carefully examined the “Terms and Conditions”, and the “Detailed Specifications”, all of which are contained herein, propose to furnish the following which meet these specifications.

This page serves as a header/placeholder only. Please refer to the Excel document provided with the solicitation for the complete Bid/Proposal Form. The Excel document contains formulas for convenience, however it is the Proposer’s responsibility to verify all pricing and calculations are CORRECT. Lee County is not responsible for errors in formulas or calculations contained within Excel document(s).

REMINDER: In the event there is a discrepancy between the total quoted amount or the extended amounts and the unit prices quoted, the unit prices will prevail and the corrected sum will be considered the quoted price. Pricing shall be provided to the whole penny.

The County will only accept proposals submitted on proposal forms provided by the County. Proposals submitted on other forms, other than those provided by the County, will deem Proposer as non-responsive and ineligible for award.

Proposers may not adjust or modify data provided within the Proposal Form. Proposals received with modified data may deem the Proposer as non-responsive and ineligible for award.

Proposers must provide pricing for all line items listed on the Bid/Proposal Form. Failure to provide pricing for any line item will result in Proposing Firm being deemed Non-Responsive and therefore ineligible for award.

PLEASE ENSURE you have provided a printed copy of the Bid/Proposal Form with your hard copy submission packages and provided the excel version with your digital submission package.



LEE COUNTY
S O U T H W E S T F L O R I D A

AFFIDAVIT CERTIFICATION IMMIGRATION LAWS

SOLICITATION NO.: RFP180573LAC SOLICITATION NAME: LeeTran Fare Solutions System

LEE COUNTY WILL NOT INTENTIONALLY AWARD COUNTY CONTRACTS TO ANY CONTRACTOR WHO KNOWINGLY EMPLOYS UNAUTHORIZED ALIEN WORKERS, CONSTITUTING A VIOLATION OF THE EMPLOYMENT PROVISIONS CONTAINED IN 8 U.S.C. SECTION 1324 a(e) {SECTION 274A(e) OF THE IMMIGRATION AND NATIONALITY ACT (“INA”).

LEE COUNTY MAY CONSIDER THE EMPLOYMENT BY ANY CONTRACTOR OF UNAUTHORIZED ALIENS A VIOLATION OF SECTION 274A(e) OF THE INA. **SUCH VIOLATION BY THE RECIPIENT OF THE EMPLOYMENT PROVISIONS CONTAINED IN SECTION 274A(e) OF THE INA SHALL BE GROUNDS FOR UNILATERAL CANCELLATION OF THE CONTRACT BY LEE COUNTY.**

PROPOSER ATTESTS THAT THEY ARE FULLY COMPLIANT WITH ALL APPLICABLE IMMIGRATION LAWS (SPECIFICALLY TO THE 1986 IMMIGRATION ACT AND SUBSEQUENT AMENDMENTS).

Company Name: _____

Signature Title Date

STATE OF _____

COUNTY OF _____

The foregoing instrument was signed and acknowledged before me this _____ day of _____
20____, by _____ who has produced

(Print or Type Name)

_____ as identification.

(Type of Identification and Number)

Notary Public Signature

Printed Name of Notary Public

Notary Commission Number/Expiration

The signee of this Affidavit guarantee, as evidenced by the sworn affidavit required herein, the truth and accuracy of this affidavit to interrogatories hereinafter made. **LEE COUNTY RESERVES THE RIGHT TO REQUEST SUPPORTING DOCUMENTATION, AS EVIDENCE OF SERVICES PROVIDED, AT ANY TIME.**



Lee County Procurement Management

REFERENCE SURVEY

Solicitation # RFP180573LAC

LeeTran Fare Point of Sale Solutions System

Section 1	Reference Respondent Information	Please return completed form to:	
FROM:	_____	Bidder/Proposer:	
COMPANY:	_____	Due Date:	
PHONE #:	_____	Total # Pages:	1
FAX #:	_____	Phone #:	Fax #:
EMAIL:	_____	Bidder/Proposer E-Mail:	

Section 2	Enter Bidder/Proposer Information , if applicable Similar Performed Project (Bidder/Proposer to enter details of a project performed for above reference respondent)		
Proposer Name:	_____		
Reference Project Name:	Project Address:	Project Cost:	
Summarize Scope:			

You as an individual or your company has been given as a reference on the project identified above. Please provide your responses in section 3 below.

Section 3		Indicate: "Yes" or "No"
1. Did this company have the proper resources and personnel by which to get the job done?		
2. Were any problems encountered with the company's work performance?		
3. Were any change orders or contract amendments issued, other than owner initiated?		
4. Was the job completed on time?		
5. Was the job completed within budget?		
6. On a scale of one to ten, ten being best, how would you rate the overall work performance, considering professionalism; final product; personnel; resources. Rate from 1 to 10. (10 being highest)		
7. If the opportunity were to present itself, would you rehire this company?		
8. Please provide any additional comments pertinent to this company and the work performed for you:		

Section 4

Reference Name (Print) _____

Reference Signature _____

Please submit non-Lee County employees as references



**ALLEGED NEGLIGENCE OR BREACH OF CONTRACT
DISCLOSURE FORM**

Please fill in the form below. Provide each incident in regard to alleged negligence or breach of contract that has occurred over the past 10 years. Please compete in chronological order with the most recent incident on starting on page 1. Please do not modify this form (expansion of spacing allowed) or submit your own variation.

Company Name: _____

Type of Incident <i>Alleged Negligence or Breach of Contract</i>	Incident Date And Date Filed	Plaintiff <i>(Who took action against your company)</i>	Case Number	Court <i>County/State</i>	Project	Claim Reason <i>(initial circumstances)</i>	Final Outcome <i>(who prevailed)</i>

Make as many copies of this sheet as necessary in order to **provide a 10-year history** of the requested information. If there is no action pending or action taken in the last 10 years, complete the **company name and write "NONE" in the first "Type of Incident" box** of this page and return with your proposal package. This form should also include the primary partners listed in your proposal. Do not include litigation with your company as the plaintiff. Final outcome should include who prevailed and what method of settlement was made. If a monetary settlement was made the amount may remain anonymous.

Page Number: _____ Of _____ Total pages

Update the page number to reflect the current page and the total number of pages. Example: Page 3, of 5 total submitted pages of this form.

Proposals may be declared "non-responsive" due to omissions of "Negligence or Breach of Contract" on this disclosure form. Additionally, proposals may be declared "not responsible" due to past or pending lawsuits that are relevant to the subject procurement such that they call into question the ability of the proposer to assure good faith performance. This determination may be made by the Procurement Management Director, after consulting with the County Attorney.



LEE COUNTY

S O U T H W E S T F L O R I D A

AFFIDAVIT PRINCIPAL PLACE OF BUSINESS

Instructions: Please complete all information that is applicable to your firm

Company Name: _____

Printed name of authorized signer _____

Title _____

⇒
Authorized Signature _____

_____ Date

The signee of this Affidavit guarantee, as evidenced by the sworn affidavit required herein, the truth and accuracy of this affidavit to interrogatories hereinafter made. **LEE COUNTY RESERVES THE RIGHT TO REQUEST SUPPORTING DOCUMENTATION, AS EVIDENCE OF SERVICES PROVIDED, AT ANY TIME.**

Notary:

State of _____

County of _____

The foregoing instrument was signed and acknowledged before me this _____ day of _____

20 _____, _____ who has produced

_____ as identification (or personally known)

_____ Type of ID and number

⇒
Notary Public Signature _____

_____ Notary Commission Number and expiration

1. Principal place of business is located within the boundaries of: _____ Lee County
_____ Collier County
_____ Non-Local

Local Business Tax License # _____

2. Address of Principal Place of Business: _____

3. Number of years at this location _____ years

4. Have you provided goods or services to Lee County on a regular basis within the past 3 consecutive years
_____ Yes* _____ No *If yes, attach contractual history for past 3 consecutive years

5. Number of available employees for this contract _____

6. Does your company have a Drug Free Workplace Policy _____ Yes _____ No

This form must be signed and sworn to in the presence of a notary public or other officer authorized to administer oaths.

1. This sworn statement is submitted to _____
(Print name of the public entity)

by _____
(Print individual's name and title)

for _____
(Print name of entity submitting sworn statement)

whose business address is _____

(If applicable) its Federal Employer Identification Number (FEIN) is _____

(If the entity has no FEIN, include the Social Security Number of the individual signing this sworn statement: On the attached sheet.) Required as per IRS Form W-9.

2. I understand that a "public entity crime" as defined in Paragraph 287.133(1) (g), Florida Statutes, means a violation of any state or federal law by a person with respect to and directly related to the transaction of business with any public entity or with an agency or political subdivision of any other state or with the United States, including but not limited to, and bid or contract for goods or services to be provided to any public entity or agency or political subdivision or any other state or of the United States, and involving antitrust, fraud, theft, bribery, collusion, racketeering, conspiracy, or material misrepresentation.

3. I understand that "convicted" or "conviction" as defined in Paragraph 287.133(1) (b), Florida Statutes, means a finding of guilt or a conviction of a public entity crime, with or without an adjudication of guilt, in any federal or state trial court of record relating to charges brought by indictment or information after July 1, 1989, as a result of a jury verdict, nonjury trial, or entry of a plea of guilty or nolo contendere.

4. I understand that "affiliate" as defined in Paragraph 287.133(1)(a), Florida Statutes, means:
1. A predecessor or successor of a person convicted of a public entity crime:
or:
2. An entity under the control of any natural person who is active in the management of the entity and who has been convicted of a public entity crime. The term "affiliate" includes those offices, directors, executives, partners, shareholders, employees, members and agents who are active in the management of the affiliate. The ownership by one person of shares constituting a controlling interest in another person, or a pooling of equipment or income among persons when not fair market value under an arm's length agreement, shall be a facie case that one person controls another person. A person who knowingly enters into a joint venture with a person who has been convicted of a public entity crime in Florida during the preceding 36 months shall be considered an affiliate.

5. I understand that a "person" as defined in Paragraph 287.133(1) (c), Florida Statutes, means any natural person or entity organized under the laws of any state or of the United States with the legal power to enter a binding contract and which bids or applies to bid on contracts for the provision of goods or services let by a public entity, or which otherwise transacts or applies to transact business with a public entity. The term "person" includes those officers, directors, executives, partners, shareholders, employees, members, and agents who are active in management of the entity.

6. Based on information and belief, the statement which I have marked below is true in relation to the entity submitting those sworn statement. (Please indicate which statement applies.)

_____ Neither the entity submitted this sworn statement, nor any officers, directors, executives, partners, shareholders, employees, members, and agents who are active in management of an entity nor affiliate of the entity have been charged with and convicted of a public entity crime subsequent to July 1, 1989.

_____ The entity submitting this sworn statement, or one or more of the officers, directors, executives, partners, shareholders, employees, member, or agents who are active in management of the entity, or an affiliate of the entity have been charged with and convicted of a public entity crime subsequent to July 1, 1989.

_____ The entity submitting this sworn statement, or one or more of its officers, directors, executives, partners, shareholders, employees, member, or agents who are active in management of the entity, or an affiliate of the entity has been charged with and convicted of a public entity crime subsequent to July 1, 1989. However, there has been subsequent proceeding before a Hearing Officer of the State of Florida, Division of Administrative Hearing and the Final Order entered by the Hearing Officer determined that it was not in the public interest to place the entity submitting this sworn statement on the convicted vendor list. (Attach a copy of the final order)

I UNDERSTAND THAT THE SUBMISSION OF THIS FORM TO THE CONTRACTING OFFICER FOR THE PUBLIC ENTITY IDENTIFIED IN PARAGRAPH 1 (ONE) ABOVE IS FOR THAT PUBLIC ENTITY ONLY AND, THAT THIS FORM IS VALID THROUGH DECEMBER 31 OF THE CALENDAR YEAR IN WHICH IS FILED. I ALSO UNDERSTAND THAT I AM REQUIRED TO INFORM THE PUBLIC ENTITY PRIOR TO ENTERING INTO A CONTRACT IN EXCESS OF THE THRESHOLD AMOUNT PROVIDED IN SECTION 287.017, FLORIDA STATUTES, FOR CATEGORY TWO OR ANY CHANGE IN THE INFORMATION CONTAINED IN THIS FORM.

(Signature)

(Date)

STATE OF _____
COUNTY OF _____

PERSONALLY APPEARED BEFORE ME, the undersigned authority, _____
(Name of individual signing)

who, after first being sworn by me, affixed his/her signature in the space provided above on this _____ day of _____, 2____.

(NOTARY PUBLIC)

My Commission Expires: _____

Cut along the outer border and affix this label to your sealed solicitation envelope to identify it as a “Sealed Submission/Proposal”.

PROPOSAL DOCUMENTS • DO NOT OPEN	
SOLICITATION NO.:	RFP180573LAC
SOLICITATION TITLE:	LeeTran Fare Point of Sale Solutions System
DATE DUE:	Thursday, February 21, 2019
TIME DUE:	Prior to: 2:30 PM
SUBMITTED BY:	_____
	(Name of Company)
e-mail address	Telephone
DELIVER TO:	Lee County Procurement Management 1500 Monroe 4 th Floor Fort Myers FL 33901
<i>Note: proposals received after the time and date above will not be accepted.</i>	



Lee County Procurement Management
1500 Monroe Street, 4th Floor
Fort Myers, FL 33901
(239) 533-8881
www.leegov.com/procurement

PLEASE PRINT CLEARLY

**LEETRAN
FTA CERTIFICATIONS**

Federally Required Certifications

1. Lobbying* (over \$100,000)
2. Debarment and Suspension* (over \$25,000)
3. E-Verify (all with the exception of commodity purchase)

*** Please sign and return the applicable FTA Certification**

LOBBYING

For contracts over \$100,000

31 U.S.C. 1352

49 CFR Part 19

49 CFR Part 20

The Lobbying requirements apply to Construction/Architectural and Engineering/Acquisition of Rolling Stock/Professional Service Contract/Operational Service Contract/Turnkey contracts.

The Lobbying requirements mandate the maximum flow down, pursuant to Byrd Anti-Lobbying Amendment, 31 U.S.C. § 1352(b)(5) and 49 C.F.R. Part 19, Appendix A, Section 7.

This certification is a material representation of fact upon which reliance was placed when this transaction was made or entered into. Submission of this certification is a prerequisite for making or entering into this transaction imposed by 31, U.S.C. § 1352 (as amended by the Lobbying Disclosure Act of 1995). Any person who fails to file the required certification shall be subject to a civil penalty of not less than \$10,000 and not more than \$100,000 for each such failure.

[Note: Pursuant to 31 U.S.C. § 1352(c)(1)-(2)(A), any person who makes a prohibited expenditure or fails to file or amend a required certification or disclosure form shall be subject to a civil penalty of not less than \$10,000 and not more than \$100,000 for each such expenditure or failure.]

The Contractor, _____, certifies or affirms the truthfulness and accuracy of each statement of its certification and disclosure, if any. In addition, the Contractor understands and agrees that the provisions of 31 U.S.C. A 3801, *et seq.*, apply to this certification and disclosure, if any.

Date _____

Print Name of Authorized Official _____

Title _____

Signature of Authorized Official _____

Company Name _____

Company Address _____

DEBARMENT, SUSPENSION, INELIGIBILITY, AND VOLUNTARY EXCLUSION REQUIREMENTS
for Contracts over \$25,000

This contract is a covered transaction for purposes of 49 CFR Part 29. As such, the contractor is required to verify that none of the contractor, its principals, as defined at 49 CFR 29.995, or affiliates, as defined at 49 CFR 29.905, are excluded or disqualified as defined at 49 CFR 29.940 and 29.945.

The contractor is required to comply with 49 CFR 29, Subpart C and must include the requirement to comply with 49 CFR 29, Subpart C in any lower tier covered transaction it enters into.

The bidder or proposer certifies as follows:

1. The certification in this clause is a material representation of fact upon which reliance was placed when this transaction was entered into. If it is later determined that the prospective lower tier participant knowingly rendered an erroneous certification, in addition to other remedies available to the Federal Government, Lee County may pursue available remedies, including suspension and/or debarment.
2. The prospective lower tier participant shall provide immediate written notice to Lee County if at any time the prospective lower tier participant learns that its certification was erroneous when submitted or has become erroneous by reason of changed circumstances.
3. The terms "covered transaction," "debarred," "suspended," "ineligible," "lower tier covered transaction," "participant," "persons," "lower tier covered transaction," "principal," "proposal," and "voluntarily excluded," as used in this clause, have the meanings set out in the Definitions and Coverage sections of rules implementing Executive Order 12549 [49 CFR Part 29]. You may contact Lee County for assistance in obtaining a copy of those regulations.
4. The prospective lower tier participant agrees by submitting this proposal that, should the proposed covered transaction be entered into, it shall not knowingly enter into any lower tier covered transaction with a person who is debarred, suspended, declared ineligible, or voluntarily excluded from participation in this covered transaction, unless authorized in writing by Lee County.
5. The prospective lower tier participant further agrees by submitting this proposal that it will include the clause titled "Certification Regarding Debarment, Suspension, Ineligibility and Voluntary Exclusion - Lower Tier Covered Transaction", without modification, in all lower tier covered transactions and in all solicitations for lower tier covered transactions.
6. A participant in a covered transaction may rely upon a certification of a prospective participant in a lower tier covered transaction that it is not debarred, suspended, ineligible, or voluntarily excluded from the covered transaction, unless it knows that the certification is erroneous. A participant may decide the method and frequency by which it determines the eligibility of its principals. Each participant may, but is not required to, check the Nonprocurement List issued by U.S. General Service Administration.
7. Nothing contained in the foregoing shall be construed to require establishment of system of records in order to render in good faith the certification required by this clause. The knowledge and information of a participant is not required to exceed that which is normally possessed by a prudent person in the ordinary course of business dealings.
8. Except for transactions authorized under Paragraph 5 of these instructions, if a participant in a covered transaction knowingly enters into a lower tier covered transaction with a person who is suspended, debarred, ineligible, or voluntarily excluded from participation in this transaction, in addition to all remedies available to the Federal Government, Lee County may pursue available remedies including suspension and/or debarment.

Certification Regarding Debarment, Suspension, and Other Responsibility Matters

(Contracts over \$25,000).

The contractor certifies, that neither it nor its “principals” as defined in CFR 29.995, or affiliates, as defined at 49 CFR 29.905, are presently debarred, suspended, proposed for debarment, declared ineligible, or voluntarily excluded from participation in this transaction by any governmental department or agency.

Date _____

Print Name of Authorized Official _____

Title _____

Signature of Authorized Official _____

Company Name _____

Company Address _____

Immigration Law Affidavit Certification

Statutes and executive orders require employers to abide by the immigration laws of the United States and to employ only individuals who are eligible to work in the United States. The Employment Eligibility Verification System (E-Verify) operated by the Department of Homeland Security (DHS) in partnership with the Social Security Administration (SSA), provides an Internet-based means of verifying employment eligibility of workers in the United States; it is not a substitute for any other employment eligibility verification requirements. The program will be used for Lee County formal Invitations to Bid (ITB) and Request for Proposals (RFP) including professional services and construction services.

Exceptions to the program:

- Commodity based procurement where no services are provided.

Vendors / Bidders are required to enroll in the E-Verify program, and provide acceptable evidence of their enrollment, at the time of the submission of the vendor's/bidder's proposal. Acceptable evidence consists of a copy of the properly completed E-Verify Company Profile page or a copy of the fully executed E-Verify Memorandum of Understanding for the company. Vendors are also required to provide the Lee County Purchasing Department an executed affidavit certifying they shall comply with the E-Verify Program. The affidavit is attached to the solicitation documents. **If the Bidder/Vendor does not comply with providing both the acceptable E-Verify evidence and the executed affidavit the bidder's / vendor's proposal may be deemed non-responsive.**

Additionally, vendors shall require all subcontracted vendors to use the E-Verify system for all purchases not covered under the "Exceptions to the program" clause above.

For additional information regarding the Employment Eligibility Verification System (E-Verify) program visit the following website: <http://www.dhs.gov/E-Verify>. It shall be the vendor's responsibility to familiarize themselves with all rules and regulations governing this program.

Vendor acknowledges, and without exception or stipulation, any firm(s) receiving an award shall be fully responsible for complying with the provisions of the Immigration Reform and Control Act of 1986 as located at 8 U.S.C. 1324, et seq. and regulations relating thereto, as either may be amended and with the provisions contained within this affidavit. Failure by the awarded firm(s) to comply with the laws referenced herein or the provisions of this affidavit shall constitute a breach of the award agreement and the County shall have the discretion to unilaterally terminate said agreement immediately.

Required submittals:

Contractors shall be required to provide the County a copy of the memorandum of Understanding required by Department of Homeland Security (DHS) when signing up for the program and an executed affidavit vowing they will comply with the E-Verify program for each service/project. An affidavit must be executed each time a proposer submits a proposal.

Attachment: Immigration Law Affidavit Certification

Solicitation # and Title :

This Affidavit is required and should be signed, notarized by an authorized principal of the firm and submitted with formal Invitations to Bid (ITB's) and Request for Proposals (RFP) submittals. Further, Vendors / Bidders are required to enroll in the E-Verify program, and provide acceptable evidence of their enrollment, at the time of the submission of the vendor's/bidder's proposal. Acceptable evidence consists of a copy of the properly completed E-Verify Company Profile page or a copy of the fully executed E-Verify Memorandum of Understanding for the company. **Failure to include this Affidavit and acceptable evidence of enrollment in the E-Verify program, may deem the Vendor / Bidder's proposal as non-responsive.**

Lee County will not intentionally award County contracts to any vendor who knowingly employs unauthorized alien workers, constituting a violation of the employment provision contained in 8 U.S.C. Section 1324 a(e) Section 274A(e) of the Immigration and Nationality Act ("INA").

Lee County may consider the employment by any vendor of unauthorized aliens a violation of Section 274A (e) of the INA. Such Violation by the recipient of the Employment Provisions contained in Section 274A (e) of the INA shall be grounds for unilateral termination of the contract by Lee County.

Vendor attests that they are fully compliant with all applicable immigration laws (specifically to the 1986 Immigration Act and subsequent Amendment(s)) and agrees to comply with the provisions of the Memorandum of Understanding with E-Verify and to provide proof of enrollment in The Employment Eligibility Verification System (E-Verify), operated by the Department of Homeland Security in partnership with the Social Security Administration at the time of submission of the Vendor's / Bidder's proposal.

Company Name _____

Print Name _____ Title _____

Signature _____ Date _____

State of _____

County of _____

The foregoing instrument was signed and acknowledged before me this _____ day of _____, 20____, by

_____ who has produced _____ as identification.
(Print or Type Name) (Type of Identification and Number)

Notary Public Signature

Printed Name of Notary Public

Notary Commission Number/Expiration

The signee of these Affidavit guarantees, as evidenced by the sworn affidavit required herein, the truth and accuracy of this affidavit to interrogatories hereinafter made.

**LEE COUNTY TRANSIT POLICIES
AND
PROCEDURES**

**GRANT-FUNDED PROCUREMENTS (500-11)
GENERAL PROVISIONS**



**3401 Metro Parkway
Fort Myers, FL 33901**

Revision Date: December 19, 2016

TABLE OF CONTENTS

I.	PROVISIONS APPLICABLE TO ALL CONTRACTS.....	1
A.	Americans with Disabilities Act.....	1
B.	Application of Federal Laws Clause.....	1
C.	Access to Records and Reports	1
D.	Civil Rights Requirements	1
E.	Contracts Involving Federal Privacy Act Requirements	2
F.	Disadvantaged Business Enterprise (DBE)	2
G.	Energy Conservation	2
H.	False or Fraudulent Statements or Claims – Civil and Criminal Fraud.....	2
I.	Federal Assistance and Incorporation of FTA Terms	3
J.	Federal Changes.....	3
k.	Fly America Requirements	3
L.	No Government Obligation to the Third Parties.....	4
M.	Termination.....	4
N.	Conformance with Intelligent Transportation System (ITS) National Architecture.....	5
O.	Cargo Preference (Required for Transport of materials by Ocean Vessels)	5
P.	Recycled Products	6
Q.	Program Funding.....	6
R.	Immigration Law Affidavit Certification (E-Verify Requirement).....	6
II.	PROVISIONS APPLICABLE TO CONTRACTS EXCEEDING TWENTY FIVE THOUSAND DOLLARS.....	6
A.	Suspension and Debarment.....	6
III.	PROVISIONS APPLICABLE TO CONTRACTS EXCEEDING ONE HUNDRED THOUSAND DOLLARS BY STATUTE (\$100,000).....	7
A.	Byrd Anti-Lobbying Amendment	7
B.	Clean Air	7
C.	Clean Water	7
D.	Contract Work Hours and Safety Standards	7
E.	Resolution of Disputes, Breaches, or Other Litigation.....	8

IV.	PROVISIONS APPLICABLE TO CONTRACTS EXCEEDING THE SIMPLIFIED ACQUISITION THRESHOLD – ONE HUNDRED FIFTY THOUSAND DOLLARS (\$150,000).....	9
A.	Buy America	9
B.	Bonding Requirements (Non-Construction)	9
V.	PROVISIONS APPLICABLE TO ROLLING STOCK PURCHASE CONTRACTS	10
A.	Bus Testing	10
B.	Pre-award and Post Delivery Audit Requirements	11
VI.	PROVISIONS APPLICABLE TO CONSTRUCTION PROJECTS.....	11
A.	Davis-Bacon Act and Copeland Anti-Kickback Acts.....	11
B.	Bonding Requirements for Construction Contracts Exceeding One Hundred FIFTY Thousand (\$150,000).....	16
C.	Seismic Safety Requirements for the Construction of New Buildings or Addition to Existing Buildings.....	18
VII.	PROVISIONS APPLICABLE TO OPERATIONS/MANAGEMENT CONTRACTS.....	18
A.	Charter Service Operations.....	18
B.	School Bus Requirements	18
C.	Transit Employee Protective Agreements Provisions	18
D.	Drug and Alcohol Testing	19
VIII.	PROVISIONS APPLICABLE TO RESEARCH AND DEVELOPMENT CONTRACTS	20
A.	Patent and Rights in Data.....	20
	Required Federal Contract Clauses.....	23

LEE COUNTY TRANSIT GRANT-FUNDED PROCUREMENT GENERAL PROVISIONS

I. PROVISIONS APPLICABLE TO ALL CONTRACTS

A. Americans with Disabilities Act

All design and construction must be accessible to individuals with disabilities pursuant to Titles II and III of the Americans with Disabilities Act.

B. Application of Federal Laws Clause

Contractor understands that Federal, state and local laws, regulations, policies, and related administrative practices ("Laws") applicable to the Contract on the date the Contract was executed (the "Execution Date") may be modified from time to time, or new Laws may be established after the Execution Date. Contractor agrees that the most recent of such Laws will govern the administration of the Contract at any particular time, unless there is sufficient evidence in the Contract of a contrary intent. Such contrary intent might be evidenced by express language in the Contract, or a letter signed by the Federal Transit Administrator, the language of which modifies or otherwise conditions the text of a particular provision of the Contract.

C. Access to Records and Reports

The Contractor shall maintain books, records, documents, and other evidence directly pertinent to performance of the Work under the Contract in accordance with generally accepted accounting principles and practices consistently applied and Federal Acquisition Regulation Parts 30 and 31 (48 C.F.R. 30 and 31). The Contractor shall also maintain the financial information and data used by the Contractor in the preparation or support of the cost submissions required for the Contract, or any Change Order or claim, and a copy of the cost summary submitted to LEE COUNTY BOARD OF COUNTY COMMISSIONERS (LCBOCC). LCBOCC, the U.S. Government, and the State Government or their authorized representatives shall have access, at all times during normal business hours, to such books, records, documents, and other evidence for the purpose of inspection, audit, and copying. The Contractor will provide proper facilities for such access and inspection. The rights granted LCBOCC, and the government under this provision shall remain in full force and effect for the longer of: (a) three (3) years after termination of the Contract for whatever reason, or (b) the date on which all litigation, appeals, claims or exceptions related to any litigation or settlement of claims arising from the performance of the Contract are resolved or otherwise terminated. The foregoing record keeping obligations shall extend to any subcontractor performing Work valued in excess of ten thousand dollars (\$10,000.00). In addition, with respect to major capital projects, Contractor agrees to provide access to 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 or 5311.

D. Civil Rights Requirements

The Contractor agrees that it will not discriminate against any employee or applicant for employment because of race, color, creed, national origin, sex, age or disability, in accordance with the following Federal statutes and regulations, and any other implementing regulations issued pursuant to the: Civil Rights Act as amended, Titles VI (42 U.S.C. Sec. 2000d) and VII (42 U.S.C. Sec. 2000e); Age Discrimination

Act of 1975, as amended, Sec. 303 (42 U.S.C. 6102); Age Discrimination Action of 1967 as amended, Sec. 4 (29 U.S.C. Sec 623); Americans with Disabilities Act of 1990, as amended, Sec. 202 (42 U.S.C. 12132), and Sec. 102 (42 U.S.C. Sec. 12112) and implementing regulations (29 C.F.R. Part 1630), Federal transit law (49 U.S.C. Sec. 5332); Executive Order 11246, as amended by Executive Order 11375 42 U.S.C. Sec. 2000e note) and implementing regulations (41 C.F.R. Parts 60 et seq.). The Contractor also agrees to include these requirements in each subcontract financed in whole or in part with Federal assistance provided by the Federal Transit Administration (FTA).

E. Contracts Involving Federal Privacy Act Requirements

The following requirements apply to the Contractor and its employees that administer any system of records on behalf of the Federal Government under any Contract:

1. 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, U.S.C. § 552a. 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 Contract.
2. The Contractor also agrees to include these requirements in each 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.

F. Disadvantaged Business Enterprise (DBE)

Contractor will conform to 49 C.F.R. Part 26. Lee County Transit, has established goals for the use of DBE subcontractors, and encourages the use of small business and veterans.

G. Energy Conservation

Contractor agrees to comply with mandatory standards and policies relating to energy efficiency which are contained in the Florida energy conservation plan issued in compliance with the Energy Policy and Conservation Act, as amended, 42 USC § 6321 *et seq.*, and perform an energy assessment for any building constructed, reconstructed, or modified with FTA funds required under FTA regulations, "Requirements for Energy Assessment," 49 CFR part 622, subpart C.

H. False or Fraudulent Statements or Claims – Civil and Criminal Fraud

1. The Contractor acknowledges that the provisions of the Program Fraud Civil Remedies Act of 1986, as amended, 31 U.S.C. Sec. 3801 *et seq.* and U.S. DOT regulations, "Program Fraud Civil Remedies," 49 C.F.R. Part 31 apply to its actions pertaining to the Contract. Upon execution of the underlying Contract, the Contractor certifies or affirms the truthfulness and accuracy of any statement it makes, it may make, or causes to be made, pertaining to the underlying Contract or the FTA assisted project for which the Contract 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, statement, 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.

2. 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 a Contract 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.
3. The Contractor agrees to include the above two clauses in each subcontract financed in which 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 subcontractor who will be subject to the provisions.

I. Federal Assistance and Incorporation of FTA Terms

The procurements under the Contract may be supported in part by Federal assistance under grants made by the Department of Transportation, Federal Transit Administration, pursuant to the Federal Transit Laws, and then current or applicable FTA Master Agreement. When so funded, the Contract shall be subject to all rules and regulations promulgated pursuant thereto, as they may be amended from time to time during the course of the Contract. The preceding provisions include, in part, certain Standard Terms and Conditions required by the U.S. Department of Transportation (DOT), whether or not expressly set forth in the Contract. All contractual provisions required by DOT, as set forth in FTA Circular 4220.1F, Third Party Contracting Guidance and 2 CFR Part 200, Uniform Administrative Requirements, Cost principals, and Audit Requirements for Federal awards, as the same may be amended or superseded from time to time, 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 the Contract. The Contractor shall not perform any act, fail to perform any act, or refuse to comply with any LCBOCC requests which would cause LCBOCC to be in violation of the FTA terms and conditions.

J. Federal Changes

Contractor shall all times comply with all applicable FTA regulations, policies, procedures and directives, including without limitation those listed directly or by reference in the current FTA Master Agreement (which may be obtained at: <http://www.fta.dot.gov/grants/15072.html>) between Lee County Board of County Commissioners and FTA, as they may be amended or promulgated from time to time during the term of the Contract. Contractor's failure to so comply shall constitute a material breach of the Contract.

k. Fly America Requirements

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 C.F.R. Part 301-10, which provide 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 America requirements. The Contractor agrees to include the requirements of this section in all subcontracts that may involve international air transportation.

L. No Government Obligation to the Third Parties

1. Contractor 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 of the Federal Government, the Federal Government is not a party to the Contract and shall not be subject to any obligations or liabilities to the Contractor or any other party pertaining to any matter resulting from the underlying Contract.
2. The Contractor agrees to include the above clause in each 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 subcontractor who will be subject to its provisions.

M. Termination

1. **Termination for Convenience.** LCBOCC may terminate the Contract, in whole or in part, at any time and for any reason by written notice to the Contractor when it is in the best interest of LCBOCC, A POLITICAL SUBDIVISION OF THE STATE OF FLORIDA . The Contractor shall be paid its costs, including Contract close-out costs, and profit on Work performed up to the time of termination. The Contractor shall promptly submit its termination claim to LCBOCC to be paid to the Contractor. If the Contractor has any property in its possession belonging to LCBOCC, the Contractor will account for the same, and dispose of it in the manner LCBOCC directs.
2. **Termination for Default.** If the Contractor fails to make delivery of the goods or to perform the services within the time specified herein or any extension thereof; or if the Contractor fails to perform any of the other provisions of the Contract, or so fails to make progress as to endanger performance of the Contract in accordance with its terms and, in either of these two circumstances, does not cure such failure within a period of ten (10) days after receiving such notice from LCBOCC , thereafter, LCBOCC may terminate the Contract for default and have the Work completed and the Contractor shall be liable for any resulting cost to LCBOCC . In the event of termination for default, the Contractor will only be paid the Contract price for supplies delivered and accepted, or services performed in accordance with the manner of performance set forth in the Contract. If, after termination for failure to fulfill Contract obligations, it is determined that the Contractor was not in default, the rights and obligations of the parties shall be the same as if the termination had been issued for the convenience of LCBOCC.
3. **Termination Due to Insufficient Funds.** If at any time during the term of the Contract the LCBOCC Governing Board makes a determination that LCBOCC has insufficient funds with which to carry out its performance and obligations under the Contract, then

LCBOCC may terminate the Contract by delivering a notice of termination to the Contractor. The effective date of any termination shall be the date which is thirty (30) days following the delivery of the notice of termination or such later date, if any, specified in the notice of termination. The Contractor shall be paid its costs, including Contract closeout costs, and profit on Work performed up to the time of termination. The Contractor shall promptly submit its claim for final payment to LCBOCC.

4. **Termination Due to Failure to Receive a Grant or other Funding Device.** If at any time during the term of the Contract LCBOCC ceases to receive a grant or other funding device from a third party with which it intended to pay for the goods or services Contracted for, then, unless otherwise directed by the LCBOCC Governing Board, LCBOCC may terminate the Contract by delivering a notice of termination to the Contractor. The effective date of any termination shall be the date which is thirty (30) days following the delivery of the notice of termination or such later date, if any, specified in the notice of termination. The Contractor shall be paid its costs, including Contract closeout costs, and profit on Work performed up to the time of termination. The Contractor shall promptly submit its claim for final payment to LCBOCC.
5. **Damages upon Termination.** Any damages to be assessed to the Contractor as a result of a default termination or any claim by Contractor for costs resulting from a termination for convenience by LCBOCC , a termination due to insufficient funds by LCBOCC , or a termination due to a failure to receive a grant or other funding device by LCBOCC will be computed and allowable in accordance with federal regulations in effect at the time of termination.

N. Conformance with Intelligent Transportation System (ITS) National Architecture

For all respect to all Contracts involving the provision of Intelligent Transportation Systems ITS property and services the Contractor agrees to comply with all applicable standards, orders or regulations issued pursuant to the National ITS Architecture and Standards to the extent required by 23 USC Section 517 (d) and 23 CFR Part 655 and 940.

O. Cargo Preference (Required for Transport of materials by Ocean Vessels)

The Cargo Preference requirements apply to all contracts involving equipment, materials, or commodities which may be transported by ocean vessels.

Use of United States – Flag Vessels:

- a. The Contractor agrees to use privately owned United States- Flag commercial vessels to ship at least 50 percent of the gross tonnage (computed separately for dry bulk carriers, dry cargo liners, and tankers) involved, whenever shipping any equipment, material, or commodities pursuant to the underlying Contract to the extent such vessels are available at fair and reasonable rates for United States- Flag commercial vessels
- b. Furnish within twenty (20) business days following the date of loading for shipments originating within the United States or within thirty (30) business days following the date of leading for shipments 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 the preceding

paragraph to the Division of National Cargo, Office of Market Development, Maritime Administration, Washington, DC 20590 and to LCBOCC (through the Contractor in the case of a subcontractor's bill-of-lading.)

- c. Include these requirements in all subcontracts issued pursuant to the Contract when the subcontract may involve the transport of equipment, material, or commodities by ocean vessel.

P. Recycled Products

With respect to contracts for items designated by the Environmental Protection Agency, when LCBOCC procures at least Ten Thousand Dollars (\$10,000) of such materials per year, 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 C.F.R. Part 247.

Q. Program Funding

LCBOCC's performance and obligations to pay under the Contract are contingent upon the availability of various Federal, State and local funding.

R Immigration Law Affidavit Certification (E-Verify Requirement)

Statutes and Executive Orders require employers to abide by the Immigration laws of the United States and to employ only individuals who are eligible to work in the United States. The Employment Eligibility Verification System (E-Verify) operated by the U.S. Department of Homeland Security (DHS) in partnership with the Social Security Administration (SSA) to provides an internet-based means of verifying employment eligibility of workers in the united States; it is not a substitute for any other employment eligibility verification requirements. Vendors/bidders are required to enroll in the E-Verify program and provide acceptable evidence of their enrollment, at the time of the submission of the vendor's/bidder's proposal. Exceptions to the program: Commodity based procurement where no services are provided.

II. PROVISIONS APPLICABLE TO CONTRACTS EXCEEDING TWENTY FIVE THOUSAND DOLLARS

A. Suspension and Debarment

The Contract is a "covered transaction" for purposes of 49 C.F.R. Part 29. As such, Contractor is required to verify that none of the Contractor, its principals, as defined at 49 C.F.R. 29.995, or affiliates, as defined at 49 C.F.R. 29.905, are excluded or disqualified as defined at 49 C.F.R. 29.940 and 29.945. Contractor is required to comply with 49 C.F.R. 29, Subpart C and must include the requirement to comply with 49 C.F.R. 29, Subpart C in any lower tier covered transaction it enters into. Contractor certifies as follows:

1. The certification in this clause is a material representation of fact relied upon by LCBOCC.

2. If it is later determined that the Contractor knowingly rendered an erroneous certification, in addition to remedies available to LCBOCC, the Federal Government may pursue available remedies, including but not limited to suspension and/or debarment.
3. The Contractor agrees to comply with the requirements of 49 C.F.R. 29, Subpart C while its offer is valid and throughout the period of any contract that may arise from its offer.
4. The Contractor further agrees to include a provision requiring such compliance in its lower tier covered transactions.

III. PROVISIONS APPLICABLE TO CONTRACTS EXCEEDING ONE HUNDRED THOUSAND DOLLARS BY STATUTE (\$100,000)

A. Byrd Anti-Lobbying Amendment

Contractors who apply or bid for an award of \$100,000 or more shall file the certification required by the U.S. DOT regulations, "New Restrictions on Lobbying," 49 C.F.R. part 20 to the extent consistent with 31 U.S.C. §1352, as amended, and other applicable federal laws, regulations, and guidance prohibiting the use of 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, as amended. 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 LCBOCC.

B. 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 LCBOCC and understands and agrees that LCBOCC 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 subcontract exceeding \$100,000 financed in whole or in part with Federal assistance provided by FTA.

C. Clean Water

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 LCBOCC and understands and agrees that LCBOCC 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 subcontract exceeding \$100,000 financed in whole or in part with Federal assistance provided by FTA.

D. Contract Work Hours and Safety Standards

The following provisions shall apply with respect to all U.S. federal government financed contracts and subcontracts in excess of \$100,000, involving employment of laborers or mechanics, including watchmen and guards, provided, however, that these provisions shall not apply to contracts for

transportation by land, air, or water, or for the transmission of intelligence, or for the purchase of supplies or materials or articles ordinarily available in the open market.

1. **Overtime requirements** - No Contractor or subcontractor contracting for any part of the Contract Work which may require or involve the employment of laborers or mechanics shall require or 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 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 hours in such workweek.
2. **Violation; liability for unpaid wages; liquidated damages** - In the event of any violation of the clause set forth in paragraph (a) of this section the Contractor and any subcontractor responsible therefore shall be liable for the unpaid wages. In addition, such Contractor and subcontractor 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 (1) of this section, in the sum of \$10 for each calendar day on which such individual was required or permitted to work in excess of the standard workweek of forty hours without payment of the overtime wages required by the clause set forth in paragraph (1) of this section.
3. **Withholding for unpaid wages and liquidated damages** - LCBOCC 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 any moneys payable on account of Work performed by the Contractor or subcontractor under any such Contract or any other 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 (2) of this section.
4. **Subcontracts** - The Contractor or subcontractor shall insert in any subcontracts the clauses set forth in paragraphs (1) through (3) of this section 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 (1) through (4) of this section.

E. Resolution of Disputes, Breaches, or Other Litigation

Disputes – Disputes arising in the Performance of the Contract which are not resolved by agreement of the parties shall be decided in writing by the Procurement Director of LCBOCC. This decision shall be final and conclusive unless within ten (10) days from the date of receipt of its copy, the Contractor mails or otherwise furnished a written appeal to the Procurement Director. In connection with any such appeal, the Contractor shall be afforded an opportunity to be heard and to offer evidence of its position. The decision of the Procurement Director of LCBOCC shall be binding upon the Contractor and the Contractor shall abide by the decision.

Performance During Dispute - Unless otherwise directed by LCBOCC, Contractor shall continue performance under the Contract while matters in dispute are being resolved.

Claims for Damages - Should either party to the Contract suffer injury or damage to person or property because of any act or omission of the party or of any of his employees, agents or

others for whose acts he is legally liable, a claim for damages therefore shall be made in writing to such other party within a reasonable time after the first observance of such injury or damage.

Remedies - Unless the Contract provides otherwise, all claims, counterclaims, disputes and other matters in question between LCBOCC and the Contractor arising out of or relating to this agreement or its breach will be decided by arbitration if the parties mutually agree, or in a court of competent jurisdiction within Lee County, Florida.

Rights and Remedies - The duties and obligations imposed by the Contract Documents and the rights and remedies available hereunder shall be in addition to and not a limitation of any duties, obligations, rights and remedies otherwise imposed or available by law. No action or failure to act by LCBOCC or Contractor shall constitute a waiver of any right or duty afforded any of them under the Contract, nor shall any such action or failure to act constitute an approval of or acquiescence in any breach hereunder, except as may be specifically agreed in writing.

IV. PROVISIONS APPLICABLE TO CONTRACTS EXCEEDING THE SIMPLIFIED ACQUISITION THRESHOLD – ONE HUNDRED FIFTY THOUSAND DOLLARS (\$150,000)

A. 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, microcomputer equipment, software, and small purchases (currently less than \$150,000). Separate requirements for rolling stock are set out at U.S.C. 5323(j) (C) and 49 CFR 661.11. Rolling stock must be assembled in the United States and have a 60 percent domestic content. Contractor must submit to LCBOCC a Buy America certification with respect to all FTA funded contracts, except those subject to a general waiver. This requirement does not apply to lower tier subcontractors.

B. Bonding Requirements (Non-Construction)

Contractor may be required to obtain performance and payment bonds when necessary to protect LCBOCC's interest.

1. The following situation may warrant a performance bond:
 - a. LCBOCC property or funds are to be provided to the Contractor for use in performing the contract or as partial compensation (as in retention of salvaged material).
 - b. Contractor sells assets to or merges with another concern, and LCBOCC, after recognizing the later concern as the successor in interest, desires assurance that it is financially capable.
 - c. Substantial progress payments are made before delivery of end items starts.
 - d. Contracts are for dismantling, demolition, or removal of improvements.

2. When determined that a performance bond is required, the Contractor shall be required to obtain performance bonds as follows:
 - a. The penal amount of performance bonds shall be 100 percent of the original contract price, unless LCBOCC determines that a lesser amount would be adequate for the protection of LCBOCC.
 - b. LCBOCC may require additional performance bond protection when a contract price is increased. The increase in protection shall generally equal 100 percent of the increased contract price. LCBOCC may secure additional protection by directing the Contractor to increase the penal amount of the existing bond or to obtain an additional bond.
3. A payment bond is required only when performance bond is required, and if the use of payment bond is in the interest of LCBOCC.
4. When it is determined that a payment bond is required, the Contractor shall be required to obtain payment bond as follows:
 - a. The penal amount of the payment bonds shall equal:
 - i. Fifty percent of the contract price if the contract price is not more than \$1 million.
 - ii. Forty percent of the contract price if the contract price is more than \$1 million but not more than \$5 million; or
 - iii. Two and half million if the contract price is more than \$5 million.

V. PROVISIONS APPLICABLE TO ROLLING STOCK PURCHASE CONTRACTS

A. Bus Testing

Contractor agrees to comply with 49 U.S.C. 5323(c) and FTA's implementing regulation at 49 C.F.R. Part 665 and shall perform the following:

1. A manufacturer of a new bus model or a bus produced with a major change in components or configuration shall provide a copy of the final test report to LCBOCC at a point in the procurement process specified by LCBOCC, which will be before LCBOCC's final acceptance of the first vehicle.
2. A manufacturer who releases a report under paragraph (a) above shall provide notice to the operator of the testing facility that the report is available to the public.
3. If the manufacturer represents that the vehicle was previously tested, the vehicle being sold should have the identical configuration and major components as the vehicle in the test report. This must be provided to LCBOCC before LCBOCC, and A POLITICAL SUBDIVISION OF THE STATE OF FLORIDA's final acceptance of the first vehicle. If the configuration or components are not identical, the manufacturer shall provide a description of the change and the manufacturer's basis for concluding that it is not a major change requiring additional testing.
4. If the manufacturer represents that the vehicle is "grandfathered" (used in mass transit service in the United States before October 1, 1988, and is currently being produced without a major change in configuration or components), the manufacturer shall provide the name and address of the recipient of such a vehicle and the details of that vehicle's configuration and major components.

5. Contractor shall provide a certification of compliance with FTA bus testing requirements on such form as may be required by LCBOCC.

B. Pre-award and Post Delivery Audit Requirements

Contractor agrees to comply with 49 U.S.C. 5323(1) and FTA's implementation regulation at 49 C.F.R. Part 663 and to submit the following certifications: **

1. **Buy America Requirements** - The Contractor shall complete and submit a declaration certifying either compliance or noncompliance with the Buy America requirements. If the Contractor certifies compliance with the Buy America requirements, it shall submit documentation which lists (i) component and subcomponent parts of the rolling stock to be purchased, identified by manufacturer of the parts, their country of origin and costs; and (ii) the location of the final assembly point for the rolling stock, including a description of the activities that will take place at the final assembly point and the cost of final assembly.
2. **Solicitation Specification Requirements** - The Contractor shall submit evidence that it will be capable of meeting the bid specifications.
3. **Federal Motor Vehicle Safety Standards ("FMVSS")** - The Contractor shall submit (i) manufacturer's FMVSS self certification sticker information that the vehicle complies with relevant FMVSS or (ii) manufacturer's certified statement that the Contracted buses will not be subject to FMVSS regulations.

** Buy America requirements are applicable to rolling stock procurements exceeding \$150,000.

VI. PROVISIONS APPLICABLE TO CONSTRUCTION PROJECTS

A. Davis-Bacon Act and Copeland Anti-Kickback Acts

With respect to all construction contracts and subcontracts over two thousand dollars (\$2,000) at least partly financed by a loan or grant from the Federal Government, and including contracts for actual construction, alteration and/or repair, including painting and decorating, the following provisions shall apply.

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 C.F.R. 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 C.F.R. 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 (a)(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 C.F.R. 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 C.F.R. 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) (ii) (B) or (C) of this section, shall be paid to all workers performing Work in the classification under the Contract from the first day on which Work is performed in the classification.

2. Withholding - LCBOCC 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 the 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, LCBOCC 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 - 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 C.F.R. 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 LCBOCC 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 C.F.R. 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 C.F.R. 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 C.F.R. 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 (c) (i) (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 C.F.R. 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 C.F.R. 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 C.F.R. 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 the Contract.
6. **Subcontracts.** The Contractor or subcontractor shall insert in any subcontracts the clauses contained in 29 C.F.R. 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 C.F.R. 5.5.

7. **Contract termination: debarment.** A breach of the Contract clauses in 29 C.F.R. 5.5 may be grounds for termination of the Contract, and for debarment as a Contractor and a subcontractor as provided in 29 C.F.R. 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 C.F.R. parts 1, 3, and 5 are herein incorporated by reference in the Contract.
9. **Disputes concerning labor standards.** Disputes arising out of the labor standards provisions of the Contract shall not be subject to the general disputes clause of the Contract. Such disputes shall be resolved in accordance with the procedures of the Department of Labor set forth in 29 C.F.R. 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 the 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 C.F.R. 5.12(a)(1).

(ii) No part of the 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 C.F.R. 5.12(a)(1).

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

B. Bonding Requirements for Construction Contracts Exceeding One Hundred FIFTY Thousand (\$150,000)

Bid Bond Requirements (Construction).

1. Bid security - A Bid Bond must be issued by a fully qualified surety company acceptable to LCBOCC and listed as a company currently authorized under 31 CFR Part 223 as possessing a Certificate of Authority as described thereunder.
2. Rights Reserved – In submitting the Bid, it is understood and agreed by bidder that the right is reserved by LCBOCC to reject any and all bids, or part of any bid, and it is agreed that the Bid may not be withdrawn for a period of ninety (90) days subsequent to the opening of bids, without the written consent of LCBOCC. It is also understood and agreed that if the undersigned bidder should withdraw any part or all of his bid within ninety (90) days after the bid opening without the written consent of LCBOCC, shall refuse or be unable to enter into the contract, as LCBOCC provided above, or refuse or be unable to furnish adequate and acceptable Performance Bond and labor and Material Payments Bonds, as provided above, or refuse or be unable to furnish adequate and acceptable insurance, as provided above, bidder shall forfeit the bid security to the extent of LCBOCC's damages occasioned by such withdrawal, or inability to enter into an agreement, or provide adequate security therefor.

It is further understood and agreed that to extent the defaulting bidder's Bid Bond, Certified Check, Cashier's Check, Treasurer's Check, and/or Official Bank Check shall prove inadequate to

fully recompense LCBOCC for the damages occasioned by default, then such bidder agrees to indemnify LCBOCC and pay over to LCBOCC the difference between the bid security and LCBOCC's total damages, so as to make LCBOCC whole.

Performance and Payment Bonding Requirements (Construction).

The Contractor shall be required to obtain performance and payment bonds as follows:

1. Performance bonds
 - a. The penal amount of performance bonds shall be 100 percent of the original Contract price, unless LCBOCC determines that a lesser amount would be adequate for the protection of LCBOCC.
 - b. LCBOCC may require additional performance bond protection when a Contract price is increased. The increase in protection shall generally equal 100 percent of the increase in Contract price. LCBOCC may secure additional protection by directing the Contractor to increase the penal amount of the existing bond or to obtain an additional bond.
2. Payment bonds
 - a. The penal amount of the payment bonds shall equal:
 - i. Fifty percent of the contract price if the contract price is not more than \$1 million.
 - ii. Forty percent of the contract price if the contract price is more than \$1 million but not more than \$5 million; or
 - iii. Two and half million if the contract price is more than \$5 million.
 - b. If the original contract price is \$5 million or less, LCBOCC may require additional protection as required by subparagraph 1 of the contract price is increased.

Advance Payment Bonding Requirements

The Contractor may be required to obtain an advance payment bond if the contract contains an advance payment provision and a performance bond is not furnished. LCBOCC shall determine the amount of the advance payment bond necessary to protect LCBOCC.

Warranty of the Work

1. The Contractor warrants to LCBOCC, the Architect and/or Engineer that all materials and equipment furnished under the Contract will be of highest quality and new unless otherwise specified by LCBOCC, free from faults and defects and in conformance with the Contract Documents. All Work not so conforming to these standards shall be considered defective. If required by the Project Manager, the Contractor shall furnish satisfactory evidence as to the kind and quality of materials and equipment.
2. The Work furnished must be of first quality and the workmanship must be the best obtainable in the various trades. The Work must be of safe, substantial and durable construction in all respects. The Contractor hereby guarantees the Work against defective materials or faulty workmanship for a minimum period of one (1) year after Final Payment by LCBOCC and shall replace or repair any defective materials or equipment or faulty workmanship during the period of the guarantee at no cost to LCBOCC.

C. Seismic Safety Requirements for the Construction of New Buildings or Addition to Existing Buildings

Contractor agrees that any new building or addition to an existing building will be designed and constructed in accordance with the standards for Seismic Safety required in Department of Transportation Seismic Safety Regulations 49 C.F.R. Part 41 and will certify to compliance to the extent required by the regulation. The Contractor also agrees to ensure that all Work performed under the Contract including Work performed by a subcontractor is in compliance with the standards required by the Seismic Safety Regulations and the certification of compliance issued on the project.

VII. PROVISIONS APPLICABLE TO OPERATIONS/MANAGEMENT CONTRACTS

A. Charter Service Operations

The Contractor agrees to comply with 49 U.S.C. 5323(d) and 49 C.F.R. Part 604, which provides that recipients and subrecipients of FTA assistance are prohibited from providing charter service using federally funded equipment or facilities if there is at least one private charter operator willing and able to provide the service, except under one of the exceptions at 49 C.F.R. 604.9. Any charter service provided under one of the exceptions must be "incidental," i.e., it must not interfere with or detract from the provision of mass transportation. Contractor agrees to include provisions to this effect in to include these requirements in all subcontracts issued pursuant to the Contract when the subcontract may involve charter service operations.

B. School Bus Requirements

Contractor agrees to comply with 69 U.S.C. 5323(f) and 49 C.F.R. Part 605, which provide that recipients and subrecipients of FTA assistance may not engage in school bus operations exclusively for the transportation of students and school personnel in competition with private school bus operators unless qualified under specified exemptions. When operating exclusive school bus service under an allowable exemption, Contractor agrees not to use federally funded equipment, vehicles, or facilities. Contractor agrees to include provisions to this effect in to include these requirements in all subcontracts issued pursuant to the Contract when the subcontract may involve school bus operations.

C. Transit Employee Protective Agreements Provisions

With respect to Contracts for "transit operations" as classified by the FTA, and performed by employees of a Contractor recognized by FTA to be a transit operator, the Contractor agrees to the comply with applicable transit employee protective requirements as follows:

- 1. General Transit Employee Protective Requirements** - To the extent that FTA determines that transit operations are involved, the Contractor agrees to carry out the transit operations Work on the underlying Contract in compliance with terms and conditions determined by the U.S. Secretary of Labor to be fair and equitable to protect the interests of employees employed under the Contract and to meet the employee protective requirements of 49 U.S.C. A 5333(b), and U.S. Department of Labor guidelines at 29 C.F.R. Part 215, and any amendments thereto. These terms and conditions are identified in the letter of certification from the U.S. Department Of Labor to FTA applicable to LCBOCC's project from which Federal assistance is provided to support Work on the underlying Contract. The Contractor agrees to carry out that Work in compliance with the conditions stated in that U.S. Department Of Labor letter. The

requirements of this subsection (a), however, do not apply to any contract financed with Federal assistance provided by FTA either for projects for elderly individuals and individuals with disabilities authorized by 49 U.S.C. § 5310(a)(2), or for projects for nonurbanized areas authorized by 49 U.S.C. § 5311. Alternate provisions for those projects are set forth in subsections (2) and (3) of this Section.

2. **Transit Employee Protective Requirements for Projects Authorized by 49 U.S.C. § 5310(a) (2) for Elderly Individuals and Individuals with Disabilities** - If the Contract involves transit operations financed in whole or in part with Federal assistance authorized by 49 U.S.C. § 5310(a)(2), and if the U.S. Secretary of Transportation has determined or determines in the future that the employee protective requirements of 49 U.S.C. § 5333(b) are necessary or appropriate for LCBOCC , the Contractor agrees to carry out the Work in compliance with the terms and conditions determined by the U.S. Secretary of Labor to meet the requirements of 49 U.S.C. § 5333(b), U.S. Department of Labor guidelines at 29 C.F.R. Part 215, and any amendments thereto. These terms and conditions are identified in the U.S. Department of Labor's letter of certification to FTA, the date of which is set forth in the Grant Agreement or Cooperative Agreement with LCBOCC. The Contractor agrees to perform transit operations in connection with the underlying Contract in compliance with the conditions stated in that U.S. Department of Labor letter.
3. **Transit Employee Protective Requirements for Projects Authorized by 49 U.S.C. § 5311 in Nonurbanized Areas** - If the Contract involves transit operations financed in whole or in part with Federal assistance authorized by 49 U.S.C. § 5311, the Contractor agrees to comply with the terms and conditions of the Special Warranty for the Nonurbanized Area Program agreed to by the U.S. Secretaries of Transportation and Labor, dated May 31, 1979, and the procedures implemented by U.S. Department of Labor or any revision thereto.
4. **Requirements Apply to Subcontracts.** The Contractor agrees to include any applicable requirements in each subcontract involving transit operations financed in whole or in part with assistance provided by FTA.

D. Drug and Alcohol Testing

The Contractor agrees to establish and implement a drug and alcohol testing program that complies with 49 C.F.R. Parts 653 and 654, produce any documentation necessary to establish its compliance with Parts 40 and 655, and permit any authorized representative of the United States Department of Transportation or its operating administrations, the State Oversight Agency of Florida, or LCBOCC , to inspect the facilities and records associated with the implementation of the drug and alcohol testing program as required under 49 C.F.R. Parts 653 and 654 and review the testing process. The Contractor agrees further to certify annually its compliance with Parts 653 and 654 before March 15th of each year and to submit the Management Information System (MIS) reports before December 31st of each year to LEE COUNTY, LEE COUNTY TRANSIT DIRECTOR, 3401 Metro Parkway, Fort Myers, FL 33901. 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.

VIII. PROVISIONS APPLICABLE TO RESEARCH AND DEVELOPMENT CONTRACTS

A. Patent and Rights in Data

The following requirements apply to each Contract involving experimental, developmental or research work:

1. Patent Rights

- a. General – If any invention, improvement, or discovery is conceived or first actually reduced to practice in the course of or under the Contract to which this section applies and that inventions, improvement, or discovery is patentable under the laws of the United States of America or any foreign county, LCBOCC and Contractor agree to take action necessary to provide immediate notice and a detailed report to the party at a higher tier until FTA is ultimately notified.
- b. Unless the Federal Government later make a contrary determination in writing, irrespective of the Contractor's status (a large business, small business, state government or state instrumentality, local government, nonprofit organization, institution of higher education, individually), LCBOCC and the Contractor agree to take the necessary actions to provide, through FTA, those rights in that invention due the Federal Government as described in U.S. Department of Commerce regulations, "Rights to Inventions Made by Nonprofit Organizations and Small Business Firms Under Government grants, Contracts and Cooperative Agreements," 37 CFR Part 401.
- c. The Contractor also agrees to include the requirements of this clause in each subcontract for experimental, developmental, or research Work financed in whole or in part with Federal assistance provided by FTA.

2. Rights in Data

- a. The term "subject data" used in this clause means recorded information, whether or not copyrighted, that is delivered or specified to be delivered under the Contract. The term includes graphic or pictorial delineation in media such as drawings or photographs; text in specifications or related performance or design-type documents; machine forms such as punched cards, magnetic tape, or computer memory printouts; and information retained in computer memory. Examples include, but are not limited to: computer software, engineering drawings and associated lists, specifications, standards, process sheets, manuals, technical reports, catalog item identifications, and related information. The term "subject data" does not include financial reports, cost analyses, and similar information incidental to contract administration.
- b. The following restrictions apply to all subject data first produced in the performance of the Contract to which this Section applies:
 - i. Except for its own internal use, LCBOCC or Contractor may not publish or reproduce subject data in whole or in part, or in any manner or form, nor may LCBOCC or Contractor authorize others to do so, without the written consent of the Federal Government, until such time as the Federal Government may have either released or approved the release of such data to the public; this

restriction on publication, however, does not apply to any contract with an academic institution.

- ii. In accordance with 49 CFR § 18.34 and 49 C.F.R. § 19.36, the Federal Government reserves a royalty-free, non-exclusive and irrevocable license to reproduce, publish, or otherwise use, and to authorize others to use, for "Federal Government purposes," any subject data or copyright described in subsections (b)(ii)(A) and (b)(ii)(B) of this clause below. As used in the previous sentence, "for Federal Government purposes," means use only for the direct purposes of the Federal Government. Without the copyright owner's consent, the Federal Government may not extend its Federal license to any other party.
 - Any subject data developed under that contract, whether or not a copyright has been obtained; and
 - Any rights of copyright purchased by the Purchaser or Contractor using Federal assistance in whole or in part provided by FTA.
- iii. When FTA awards Federal assistance for experimental, developmental, or research work, it is FTA's general intention to increase transportation knowledge available to the public, rather than to restrict the benefits resulting from the Work to participants in that work. Therefore, unless FTA determines otherwise, LCBOCC and the Contractor performing experimental, developmental, or research Work required by the underlying Contract to which this Attachment is added agrees to permit FTA to make available to the public, either FTA's license in the copyright to any subject data developed in the course of that Contract, or a copy of the subject data first produced under the Contract for which a copyright has not been obtained. If the experimental, developmental, or research work, which is the subject of the underlying Contract, is not completed for any reason whatsoever, all data developed under that Contract shall become subject data as defined in subsection (i) of this clause and shall be delivered as the Federal Government may direct. This subsection (iii), however, does not apply to adaptations of automatic data processing equipment or programs for LCBOCC or Contractor's use whose costs are financed in whole or in part with Federal assistance provided by FTA for transportation capital projects.
- iv. Unless prohibited by state law, upon request by the Federal Government, LCBOCC, and the Contractor agree to indemnify, save, and hold harmless the Federal Government, its officers, agents, and employees acting within the scope of their official duties against any liability, including costs and expenses, resulting from any willful or intentional violation by LCBOCC or Contractor of proprietary rights, copyrights, or right of privacy, arising out of the publication, translation, reproduction, delivery, use, or disposition of any data furnished under that Contract. Neither LCBOCC nor the Contractor shall be required to indemnify the Federal Government for any such liability arising out of the wrongful act of any employee, official, or agents of the Federal Government.
- v. Nothing contained in this clause on rights in data shall imply a license to the Federal Government under any patent or be construed as affecting the scope of

any license or other right otherwise granted to the Federal Government under any patent.

- vi. Data developed by LCBOCC or Contractor and financed entirely without using Federal assistance provided by the Federal Government that has been incorporated into Work required by the underlying Contract to which this Section applies is exempt from the requirements of subsections (ii), (iii), and (iv) of this clause , provided that LCBOCC or Contractor identifies that data in writing at the time of delivery of the Contract work.
 - vii. Unless FTA determines otherwise, the Contractor agrees to include these requirements in each subcontract for experimental, developmental, or research Work financed in whole or in part with Federal assistance provided by FTA.
- c. Unless the Federal Government later makes a contrary determination in writing, irrespective of the Contractor's status (i.e., a large business, small business, state government or state instrumentality, local government, nonprofit organization, institution of higher education, individual, etc.), LCBOCC and the Contractor agree to take the necessary actions to provide, through FTA, those rights in that invention due the Federal Government as described in U.S. Department of Commerce regulations, "Rights to Inventions Made by Nonprofit Organizations and Small Business Firms Under Government Grants, Contracts and Cooperative Agreements," 37 C.F.R. Part 401.
- d. The Contractor also agrees to include these requirements in each subcontract for experimental, developmental, or research Work financed in whole or in part with Federal assistance provided by FTA.

Required Federal Contract Clauses

Required Federal Contract Clauses	Rolling Stock	Operating	Construction	Consultant Services	Research	Goods	Professional Services
Fly America	x	x	x	x	x	x	x
ADA	x	x	x	x	x	x	x
Buy America	>\$150,000		>\$150,000			>\$150,000	
Charter Bus and School Bus		x					
Cargo Preference - Required for transport of materials by ocean vessels	x		x			x	
Seismic Safety			New Bldg/additions				
Energy Conservation	x	x	x	x	x	x	x
Clean Water	>\$100,000	>\$100,000	>\$100,000	>\$100,000	>\$100,000	>\$100,000	>\$100,000
Clean Air	>\$100,000	>\$100,000	>\$100,000	>\$100,000	>\$100,000	>\$100,000	>\$100,000
Bus Testing	x	Turnkey					
Pre-Award and Post delivery Audit	x	Turnkey					
Lobbying	>\$100,000	>\$100,000	>\$100,000	>\$100,000	>\$100,000	>\$100,000	>\$100,000
Access to Records and Reports	x	x	x	x	x	x	x
Federal Changes	x	x	x	x	x	x	x
Bonding			>\$150,000				
Recycled products		>\$10,000	>\$10,000				
Davis-Bacon & Copeland Anti-Kickback Act			>\$2,000				
Contract Work hours and Safety Standards Act	>\$100,000		>\$100,000	>\$100,000	>\$100,000	>\$100,000	>\$100,000
No Federal Government Obligation to Third parties	x	x	x	x	x	x	x
Program Fraud and False or Fraudulent Statements and Related Acts	x	x	x	x	x	x	x
Termination	>\$10,000	>\$10,000	>\$10,000	>\$10,000	>\$10,000	>\$10,000	>\$10,000
Government-wide Debarment and Suspension	>\$25,000	>\$25,000	>\$25,000	>\$25,000	>\$25,000	>\$25,000	>\$25,000
Privacy Act	x	x	x	x	x	x	x
Civil Rights	x	x	x	x	x	x	x
Breach and Dispute Resolution	>\$100,000	>\$100,000	>\$100,000	>\$100,000	>\$100,000	>\$100,000	>\$100,000
Patent and Rights in Data					x		
Transit Employee protective Agreements		x					
Disadvantaged Business Enterprise (DBE)	x	x	x	x	x	x	x
Intelligent Transportation Systems - National Architecture	x	x	x	x	x	x	x
Incorporation of Federal Transit Administration Terms	x	x	x	x	x	x	x
Drug and Alcohol Testing		x					

ATTACHMENT A

LeeTran Fare System Functional Specifications

1 Introduction

1.1 LeeTran Description

LeeTran is a department of Lee County government, responsible for operating the public transit system that serves the County. It operates 24 bus routes, a paratransit service for persons with disabilities and other qualifying persons called Passport, and an employer vanpool program.

LeeTran's annual ridership in Fiscal Year (FY) 2017 was: fixed route – 3,126,846 and demand response – 119,593.

LeeTran employs approximately 240 people and has a fleet of 50 full-size buses, 10 trolleys and 42 paratransit vans. Half of its full-size fleet is hybrid, greatly reducing carbon emissions and increasing fuel efficiency.

Its headquarters is located at 3401 Metro Parkway in Fort Myers, and it owns three transfer stations: Rosa Parks Transportation Center, 2250 Widman Way, Fort Myers; Cape Coral Transfer Center, SE 47th Terrace at SE 8th Court, Cape Coral; and Edison Mall Station at 4125 Cleveland Avenue, Fort Myers.

Other transfer stations are located at Coralwood Shopping Center in Cape Coral, Bell Tower Shops in Fort Myers, Merchants Crossing in North Fort Myers, Coconut Point Mall in Estero, and the agency's Beach Park & Ride in south Fort Myers.

1.2 Project Timeline

The duration of the resulting contract, which includes all activities described in this specification, is anticipated to be for a period of no more than ten (10) months. The contract for this work shall commence on the date agreed upon through negotiations and as set forth in the subsequent and associated Contract Documents. The contract is to remain in effect for one year following the final completion of the work described in this specification.

Please note that the Proposer shall provide a projected project timeline, keeping the expected completion date of not more than ten (10) months in mind. The timeline should reference major milestone and/or deliverable dates.

1.3 Existing Fare System Summary

The following is a brief description of the current fare collection system:

- Current farebox type is GFI CentsaBill electronic registering fareboxes
- The total current number of fareboxes is 62 (no spares currently)
- Data that LeeTran currently obtains from the fare collection system and uses for various purposes is as follows:
 - Fiscal Department pulls Daily Summary reports and Daily Route Summary reports, which capture the number of buses probed, current revenues, fares and ridership
 - Planning Department retrieves ridership and revenue numbers for reporting and analysis using the following filters: date, routes, runs, faresets, trips, period of day, day of week, and bus number.

1.4 Lee County Information Technology (IT) Hardware and Software Standards

Please note that the Vendor shall be required to work with the Lee County IT Group (ITG) to implement any equipment and upgrades, as well as to upload any software.

The following subsections describe Lee County’s IT hardware and software standards. These should be taken into consideration by each Proposer in meeting any requirements in this specification that necessitate the implementation of new hardware and software.

1.4.1 Hardware Standards

If physical server hardware is required, the County standard is Dell PowerEdge servers:

- Rack mount, two socket, R640 or R740 based on need
- The County can provide a standard build; it obviously changes from time to time to follow Dell's lifecycle
- ProSupport (prefer to include 5 years upfront)

The following are the current County IT hardware standards.

Desktop Standard	
OptiPlex 7050 Small Form Factor	Intel Core I5-7500 Processor (Quad Core, 6MB, 4T, 3.4GHz, 65W)
Memory	8GB (1x8G) 2400MHz DDR4 Memory
Video Adapter Cable	Display Port to Dual-Link DVI-D Active Adapter (M/F)
Video Card	Intel Integrated Graphics
Internal Boot Hard Drives	512GB 2.5inch SATA Class 20 Solid State Drive
Removable Media Storage Devices	DVD+/-RW Bezel
Keyboard and Mouse	Dell KM717 Premier Wireless Keyboard and Mouse Combo
Speakers	Internal Dell Business Audio Speaker
Hardware Support Services	ProSupport: Next Business Day Onsite 5 Years
Laptop Standard	
Dell Latitude 5590	8th Gen Intel Core i7-8650U (8M Cache, Quad Core, 1.9GHz), vPro
Memory	16GB, 1x16GB, 2400Mhz DDR4 Memory
Internal Keyboard	Dual Pointing English Qwerty Keyboard with Backlit
Graphics and Express Card	NVIDA(R) GeForce 930MX Discrete Graphics
Primary Storage	512G M.2 2280 SATA SSD
LCD	15.6" HD (1366 x 768) Non-Touch LCD
AC Adapter	90W AC Adapter, 3-pin
Primary Optical Device	None

Wireless LAN (802.11)	Intel Dual Band Wireless AC 8265 (802.11ac) 2x2 + Bluetooth 4.2
Systems Management	Intel vPro Technology Enable
Batteries	Primary 3-cell 51W/HR Battery
Hardware Support Services	ProSupport Plus: Next Business Day Onsite, 3 Years ProSupport Plus: Accidental Damage Service, 4 Years

Semi Rugged Laptop Standard

Latitude 14 Rugged 5414	Intel Core i5-6300U Processor (Dual Core, 3M Cache, 2.40 GHz)
Memory	16GB (1x16G) 2133MHz DDR4 Memory
Display	14.0" HD (1366x768)Non-Touch, with Camera with Privacy Shutter and Microphone
Hard Drive	512GB Solid State Drive
Wireless LAN Option	Intel Dual Band Wireless 8260 (802.11ac) W/ Bluetooth
Modem	None
Module Bay Devices	Tray load DVD Drive (Reads and Writes to DVD/CD)
AC Adapter	E5 90W AC Adapter, 3-pin
Batteries	9-cell (97Wh) Lithium Ion Battery With ExpressCharge
Carrying Case	No Carrying Case
Hardware Support Services	ProSupport Plus: Next Business Day Onsite, 4 Years
Graphics and Expansion Slot	AMD Radeon R7 M360
Bluetooth	Intel Dual Band Wireless 8260 (802.11ac) W/ Bluetooth
Camera/Microphone	14.0" HD (1366x768)Non-Touch, with Camera with Privacy Shutter and Microphone
Internal Keyboard	Sealed Internal Non-Backlit Keyboard

All-In-One Standard

OptiPlex 9010 AIO Desktop	3rd Gen Intel® Core™ i5-3570S Processor 3.10GHz, 6MB, w/HD2500 Graphics
Memory	8GB, NON-ECC, 1600MHZ DDR3,2DIMM
Touch Screen	Yes, 20inch wide
Internal Boot Hard Drives	500GB 3.5" SATA 6Gb/s with 16MB DataBurst Cache™

Removable Media Storage Devices	8X Slimline DVD+/-RW (not needed for public workstations)
Keyboards	Dell KB212-B USB 104 Quiet Key Keyboard, English
Mouse	Dell MS111 USB Optical Mouse
Speakers	No Speaker Option
Resource DVD	Resource DVD - contains Diagnostics and Drivers
Hardware Support Services	Next Business Day Onsite Service After Remote Diagnosis 4 Year Extended

Engineering Workstation Standard

Dell Precision Workstation 5820	Intel Xeon W-2102 2.9GHz, 4C, 8.25M Cache, No Turbo, No HT, (120W) DDR4-2400
Memory	32GB (4x8GB) 2666MHz DDR4 RDIMM ECC
Hard Drive Configuration	SATA/SAS Hard Drive/Solid State Drive
Boot Hard Drive	2.5 512GB SATA Class 20 Solid State Drive
Graphics Card	NVIDIA Quadro P4000, 8GB, 4 DP (5820T)
Sound	None
Speaker	Internal Speaker
CD ROM/ DVD	16x Half Height DVD-/+RW
Keyboard	Wireless Keyboard and Mouse Combo
Mouse	Dell Mouse-KM717
Hardware Support Services	ProSupport: Next Business Day Onsite 5 Years ProSupport: 7x24 Technical Support, 5 Years

WORKSTATION FOR VIDEO EDITING: same as the Engineering Workstation configuration PLUS a second hard drive for mirroring.

Conference Room PC Standard

Optiplex 7040 Mini Form Factor	Intel Core i5-6500T Processor (Quad Core, 6MB, 4T, 2.5GHz, 35W)
Memory	8GB (1x8G) 2133MHz DDR4 Memory
Video Card	Intel Integrated Graphics
Internal Boot Hard Drives	500GB 2.5inch Serial ATA (7,200 RPM) Hard Drive

Removable Media Storage Devices	No removable media storage
Keyboard/Mouse	GYRATION Air Mouse GO Plus with Full Keyboard
Hardware Support Services	Next Business Day Onsite 5 Years

Internet Tablet

Apple iPad Air 2	iPad Air 2
Operating System	Apple iOS 8
Display	9.7-inch (diagonal) LED-backlit widescreen Multi-Touch display with IPS technology
Flash Memory	Integrated 64GB
Wireless LAN Option	Wi-Fi (802.11a/b/g/n/ac); dual channel (2.4GHz and 5GHz) Internet Tablet
Latitude 7390	8th Gen Intel Core i7-8650U (8M Cache, Quad Core, 1.9GHz), vPro
Memory	16GB 2133MHz LPDDR3
Hard Drive	512GB PCIe NVMe Class 40 Solid State Drive
Wireless LAN Option	Intel(R) Dual-Band Wireless-AC 8265 Wi-Fi + BT 4.2 Wireless Card (2x2) driver
Hardware Support Services	Next Business Day Onsite 3 Years

Peripherals

	Approved Standard
Printers	<p>HP is the standard to be purchased. Since models are constantly changing and departments have specific needs, please contact ITG for assistance and pricing.</p> <p>The following models have been tested successfully for AirPrint compatibility (needed for iPad printing*) if such functionality is required:</p> <ul style="list-style-type: none"> • HP LaserJet M401dne • HP LaserJet M476dw** • HP LaserJet M651dn <p>* - Please contact ITG to validate the network at your location is also able to accommodate this need.</p> <p>** - w suffix does denote wireless but that should not be required for iPad printing however that had been the</p>

	specific model tested (please check with ITG if it is believed that the option may be required).
Scanners	HP is the standard to be purchased. Since models are constantly changing and departments have specific needs, please contact ITG for assistance and pricing.
Monitors	Dell is the standard to be purchased (minimum monitor size of 19"). Since models are constantly changing and departments have specific needs, please contact ITG for assistance and pricing.

Uninterruptable Power Supplies (UPS) and Surge Protection

It is recommended that all computers have adequate UPS protection. Laser printers are to only be plugged into the surge protection socket on the UPS.

Type	Recommended UPS
Desktop or Laptop computer	APC Power-Saving Back-UPS Pro 1000. For anything larger, please consult with ITG.
Data communications equipment (including, but not limited to: CSU/DSU, router, hubs and switches)	APC Smart-UPS 1500 <i>Please consult with ITG before ordering so that the UPS may be properly configured.</i> <i>It is recommended that appropriate data-line surge protection be installed.</i>

1.4.2 Software Standards

The County has a strong preference to virtualize whenever possible. Our current platform is VMware vSphere 6 Enterprise Plus. Our VM hosts are all Intel-based, mainly on Dell servers and EMC iSCSI SAN storage. We do have some Cisco UCS hosts, mainly for CallManager and VSOM guests.

For Windows Server, the County prefers to deploy on the latest Server OS supported by the application.

For SQL Server, AlwaysOn is the County's preferred high availability (HA) method, and the latest version is supported by the application.

For McAfee ePO VirusScan Enterprise, any exclusions or best practice configuration settings.

It is anticipated that all PC-related standards would be reviewed every six months.

The justification for the site licensure of software involves several logistical efficiencies. First is the reduction in cost of acquisition. The actual price per copy should be less, and the costs in department and purchasing staff time spent acquiring individual copies would be eliminated. Second, upgrades could be more effectively provided so that all users would be upgraded simultaneously rather than the current piecemeal approach. Lastly, training and diagnostics would be more straight-forward and universal among all departments.

In general, all PC software must be designed to operate on the **Microsoft Windows 7 64-bit** operating system. In certain cases where it is deemed necessary, an approval is required and an exception can be made to use **Microsoft Windows 7 32-bit**. The following table provides the specific software recommendations:

TYPE OF PC SOFTWARE	Software Standard
Operating System	Microsoft Windows 10 Enterprise Build 1607
Office Suite	Microsoft Office 2016 Pro Plus 32 bit
	Corel WordPerfect X4 Standard (only for departments currently using WordPerfect)
E-mail Client	Microsoft Outlook 2016
Internet Browser	Microsoft Internet Explorer 11
Web Publishing	Microsoft SharePoint 2013
Anti-virus	McAfee 8.8
Database Connectivity Clients	Oracle 10.2
	SQL Server Client 2016 (or latest supported by software vendor)
Other Software	Adobe Photoshop CS6
	Adobe Illustrator CS6
	Adobe Acrobat DC Pro

All upgrades to PC software shall be required to go through the following procedure prior to department use. ITG must acquire, evaluate, and approve the use of the software upgrade. ITG evaluation shall include any impact the software upgrade shall have on existing network, hardware, or software systems. ITG evaluation shall also include testing new features included in the software upgrade.

1.4.3 Anti-Virus and Anti-Malware Requirements

Where such protection is needed/appropriate in each software element of the fare system, the Vendor shall supply, install, and configure client versions of anti-virus and anti-malware software. Each software element shall automatically install updates to the anti-virus and anti-malware software upon receipt from the Central Data System (CDS).

1.5 Project Goals and Business Requirements

LeeTran currently utilizes electronic registering fareboxes to collect fares on board its fixed-route vehicles. The equipment is very old and, as a result, is breaking down frequently and having negative impacts on the patrons’ boarding process as well as the efficient operation of service due to increased dwell time at bus stops and more roadcalls. It also is becoming increasingly more difficult for LeeTran’s maintenance staff to find appropriate parts to repair the equipment. Other issues are also occurring with the collection of fares on paratransit vehicles and the vending of fare media at outlet locations. Hence, the ultimate product from this effort shall be a functional fare/point of sale (POS) solution that shall address LeeTran’s identified needs to the greatest extent possible.

There are several key components/functions that shall be in place upon completion of the effort, as summarized below.

- New farebox equipment in all fixed-route buses that meet LeeTran’s current and future identified needs related to fare collection and media.
- Corresponding cash drop and probe equipment to accommodate the new farebox equipment’s vaults/technology.
- Appropriate fare solution for Passport that may involve different equipment, technology, and/or media from that implemented on fixed-route buses.
- Data reporting functionality to meet planning, finance, and other organizational data needs related to farebox-collected information.
- POS solution that meets LeeTran’s needs regarding both fare media vending and inventory tracking.

2 System Architecture

The new LeeTran fare collection system (FCS) shall be an open architecture, account-based system with key system interfaces built using Application Programming Interfaces (APIs) published by the Vendor, and fully owned or licensed by LeeTran.

In the event that requirements in these specifications include computer hardware, Proposers’ proposals must include complete hardware specifications and proposed cost (as indicated on the Price Proposal Form) so that LeeTran and Lee County can determine whether or not existing hardware may be used instead of purchasing new hardware. (Please note that if the proposed solution shall be hosted onsite, complete server specifications must be provided in the proposal so the County can determine equipment cost.)

Further, Proposers’ proposals must identify whether or not required software shall be hosted offsite by the successful Vendor or installed locally at LeeTran. In the event that hosting is being proposed, Proposers must include a hosting cost for each hosted software item as specified on the Price Proposal Form.

Please note that the Vendor shall be required to work with Lee County’s Information Technology (IT) group throughout this project, particularly for the development, installation and operation of required computer hardware and software.

2.1 Account-Based System

The Vendor shall design, develop, and implement an account-based electronic FCS. An account-based back office that supports the system shall manage closed-loop transit accounts that store fare value and/or products loaded by customers, and enable use of that value and/or products for the payment of transit fares and transit-related services.

The account-based back office shall process all transactions generated by the system devices, including loading transit accounts upon request from fare distribution devices, and performing fare calculation and account balance updates at the time of fare payment.

All fare processing and updating of accounts shall be performed in real-time, which is defined as less than one (1) second under normal network conditions.

Transit accounts shall be accessed by the customer when loading value or paying fares through the use of LeeTran- and third-party-issued contactless fare media (e.g., smart cards).

The fare media shall serve as a token for accessing transit accounts, and no data shall be written to the media when loading or using fare value, with the exception of data required to support risk mitigation techniques (see Section 2.4: Risk Mitigation Techniques).

The system shall be sized such that the total number of possible accounts, and total concurrent use of accounts, shall, at a minimum, support 200% of the current ridership figures presented in Section 1.1: LeeTran Description.

The account-based system may become a regional fare system in the future in which regional agencies and other stakeholders can join the system to install, administer, and configure their own equipment and components. Such additions shall not require replacement of the core back office components or require additional software development. The system core design shall support regional participants.

2.2 Real-Time Communications

All fare distribution, payment, and validation devices deployed as part of the system shall be equipped with real-time communications to the back office. Real-time is defined as less than one (1) second under normal network conditions.

The communication interfaces shall support the real-time loading of fare value through all distribution channels, processing of closed-loop fare payments onboard vehicles, and fare inspection and validation by inspection staff, should LeeTran decide to employ inspection staff in the future.

The lowest-latency network connections possible shall be employed, using hardwired, cellular, and Wi-Fi connections, as appropriate for each device.

All hardwired network connections shall be provided by LeeTran. The Vendor shall identify all communication requirements at bus sites (e.g., Rosa Parks Transit Center), including a description of all networking equipment necessary to connect the Vendor devices to the LeeTran-provided network backbone.

Any devices using cellular communications shall operate at minimum on a 4G/ Long Term Evolution (LTE) data network (or whatever faster alternative is available at time of implementation) where available. LeeTran shall contract directly with cellular carriers for cellular data service.

The system shall support the offline operation of field devices to perform essential functions where appropriate. In offline operation, devices shall operate according to defined business rules, and transmit stored transaction information as soon as communications are re-established.

2.3 Open Architecture

The FCS shall be designed and implemented using an open architecture to provide flexibility as technology and LeeTran needs change. The open architecture shall apply to all fare media, system interfaces, and transaction formats used for the management, distribution, payment, and inspection of fares. There is a general preference for the use of open standards and cloud-based applications.

2.3.1 Application Programming Interfaces (APIs)

2.3.1.1 General

The Vendor shall develop Hypertext Transfer Protocol Secure (HTTPS) based functional (e.g., not device- or system-specific) APIs that support core system functions and enable access to those functions for any device or system that requires use of them. Devices and systems may make use of more than one (1) API to support required functionality.

Each API shall be developed using modern architecture and formats (e.g., Representational State Transfer [REST], JavaScript Object Notation [JSON], or modern equivalent). The specific architecture and format to be used shall be identified and agreed upon during the design review process.

The Vendor shall implement strong security features to prevent fraudulent use of the APIs and authenticate all users based on industry-accepted best practices.

The Vendor shall publish full API specifications that document all API calls and the process for making those calls, including:

- Detailed call descriptions
- Use cases
- Call structure
- Data elements and format
- Error handling
- Timing requirements
- Use of required security protocols
- Sample code

The Vendor shall be responsible for providing the following APIs at a minimum:

- Fare Distribution API
- Fare Payment API
- Fare Inspection API
- Transit Account Management API
- Customer Account Management API
- Device Management API
- Computer-Aided Dispatch (CAD)/Automatic Vehicle Location (AVL)/Automatic Passenger Counting (APC) Integration API

Alternative categorization of APIs may be permitted, as long as the functional requirements set forth in these specifications are met.

The Vendor shall demonstrate the use of the APIs as part of system implementation and testing. The Vendor shall perform API-specific testing, which shall be witnessed and validated by LeeTran representatives prior to Final Acceptance. Any changes to the APIs as a result of testing shall result in the API specifications being updated by the Vendor.

The Vendor shall take the lead role in working collaboratively with third-parties to use and adapt the APIs to integrate legacy systems as necessary to support the requirements in these specifications.

The full range of APIs provided by the Vendor shall support all interfaces within the FCS, and is not limited to the specific APIs described in this section. Any additional APIs that are required shall be identified during the design review process. The Vendor shall provide Interface Control Documents (ICDs) for each system interface that describes the interface and APIs used to support it.

The APIs and ICDs shall be fully owned by or licensed to LeeTran with the right to use and distribute the specifications without further approval, license, or payment.

The Vendor shall update the API and ICD specifications as necessary throughout the warranty and operations and maintenance period (see Section 19: Operations and Maintenance Agreement).

2.3.1.2 Fare Distribution API

The fare distribution API shall support the sale of all available fare media and fare products, and shall be utilized by all fare distribution devices and systems, including but not limited to:

- Ticket Vending Machines (TVMs)
- Ticket Office Terminals (TOTs)
- Customer Relationship Management (CRM) System
- Customer and Institutional Websites
- Third party systems (e.g., retail sales network or mobile ticketing system)

Additional sales devices or modules may utilize the fare distribution API.

The fare distribution API shall support the following functionality at a minimum:

- Retrieval of available fare media and fare products, and associated pricing
- Sale of all fare media types, and creation or activation of an associated transit account
- Sale of all available fare products (e.g., stored value and passes), and update of an associated transit account

The fare media and products available for sale, and the associated pricing, shall be configured and maintained in the back office. The fare distribution API shall return this information upon request from a fare distribution device/system. The results provided shall be configurable to be specific to the sales channel, device/system location, or individual device/system making the API call.

The fare distribution API shall include API calls for the passing of data between the fare distribution devices/systems and the back office to initiate a sale transaction, which shall result in the creation, activation, or updating of a closed-loop transit account.

Unique fare media and/or transit account identifiers shall be securely captured by the distribution devices/systems and passed to the back office to create or activate a new transit account (e.g., in support of new media issuance), or initiate the loading of value to an existing transit account. All fare media and product sales shall be processed by the back office in real-time to enable immediate use by the customer.

The fare distribution API shall support the generation of sale and payment transactions within the back office by capturing all information required to appropriately record the sale, including at a minimum:

- Date/time
- Sales organization (e.g., LeeTran, library name, supermarket name)
- Sales channel ID
- Employee ID (if applicable)
- Device/system ID
- Device/system location
- Fare media ID
- Transit account token
- Product(s) sold
- Payment amount(s)
- Payment type(s)

The fare payment API shall support the sale of multiple products (e.g., fare media and value) in a single transaction with a single payment, and the use of multiple payments (e.g., split payments) in a single sales transaction.

The fare distribution API shall return a confirmation of the actions taken by the back office to complete a sale. If the sale was unsuccessful, a denial and associated reason code shall be provided. All response types and error handling shall be described in detail in the fare distribution API specification.

2.3.1.3 Fare Payment API

The fare payment API shall support the processing of fare payments by all fare payment devices.

The fare payment API shall support the processing of closed-loop fare payments across all agencies and modes using all supported fare media and fare products, and shall be utilized by all fare payment devices, including but not limited to:

- Stand-alone Processors (SAPs)
- TVMs
- TOTs
- Mobile Fare Inspection/Validation Device Application
- Mobile Sales Devices

The fare payment API shall include API calls for the passing of data between the fare payment devices and back office to initiate a fare payment transaction, which shall result in a fare calculation being performed and processing of a payment against a closed-loop transit account.

Unique fare media and/or transit account identifiers shall be securely captured by the fare payment devices and passed to the back office to perform a fare payment. All fare payment processing shall be performed by the back office in real-time.

The fare payment API shall support the generation of fare payment transactions within the back office by capturing all information required to calculate and appropriately record the payment, including at a minimum:

- Date/time
- Sales organization (e.g., LeeTran, library name, supermarket name)
- Vehicle/station ID
- Operator ID (bus and mobile only)
- Device ID
- Stop ID (bus and mobile only)
- Geolocation information (bus and mobile only)
- Block (bus and mobile only)
- Route (bus and mobile only)
- Run (bus and mobile only)
- Direction
- Fare media ID
- Transit account token
- Other data encoded to the media (e.g., rider classification)
- Authorization mode (e.g., online or offline)

In the future, the fare payment API shall support the passing of a pre-calculated fare to support third-party programs (e.g., parking and bike share), where third-party devices or systems shall calculate the amount due. The back office shall process pre-calculated fare transactions based on the fare structure configured for the associated mode or participant.

The fare payment API shall return a confirmation of the actions taken by the back office to complete a payment and account status information, including at a minimum:

- Payment status (e.g., success or failure)
- Account rider classification
- Fare product used
- Fare charged
- Remaining balance
- Transfer time remaining (if applicable)

If the payment was unsuccessful, an associated reason code shall be provided. All response types and error handling shall be described in detail in the fare payment API specification.

2.3.1.4 Fare Inspection API (Optional)

The fare inspection API shall support the inspection of fares (i.e., confirmation of fare payment) by fare inspectors using the mobile fare inspection/validation device application.

The fare inspection API shall query closed-loop transit accounts to support the inspection of fares paid across all modes using all supported fare media and fare products, and shall be utilized by the mobile fare inspection/validation device application.

The fare inspection API shall include API calls for passing data between the mobile fare inspection application and back office to initiate a fare inspection transaction, which shall result in confirmation or denial of payment made using a closed-loop transit account.

Unique fare media and/or transit account identifiers shall be securely captured by the mobile fare inspection/validation device application and passed to the back office to perform a fare inspection. The back office shall query transit account ride history and use LeeTran-defined business rules to determine fare payment status in real-time.

All fare inspections shall result in a recorded transaction. The fare payment API shall support the generation of transactions by capturing all information required to determine the status of a fare payment and appropriately record the inspection, including at a minimum:

- Date/time
- Agency name (e.g., LeeTran or other regional transit provider)
- Vehicle/station ID
- Device ID
- Stop ID
- Geolocation information
- Block
- Route
- Run
- Direction
- Fare media ID
- Transit account token
- Other data encoded to the media (e.g., rider classification)

The fare inspection API shall return fare inspection status information, including at a minimum:

- Inspection status (e.g., valid or invalid)
- Account rider classification
- Fare product used (if valid)
- Fare charged (if valid tap)
- Transfer time remaining (if applicable)
- Account balance
- Fare payment transaction history

If the inspection is determined to be invalid, an associated reason code shall be provided (e.g., no tap, blocked card). All response types and error handling shall be described in detail in the fare inspection API specification.

2.3.1.5 Transit Account Management API

The transit account management API shall support the querying and management of fare-related data maintained within closed-loop transit accounts.

The transit account management API shall support the querying and management of data maintained within back office transit accounts, and shall be utilized by all devices and systems that require access to those functions, including but not limited to:

- SAPs
- TVMs
- TOTs
- CRM System
- Public and Institutional Websites
- Third-party systems (i.e., retail sales network or mobile ticketing system)

Additional devices or modules may utilize the transit account management API. Not all devices/systems shall require or be granted access to all transit account management API functions.

The transit account management API shall support the following functionality at a minimum:

- Query transit account status (e.g., associated rider classification, active/inactive, blocked/unblocked)
- Query fare payment transaction history
- Query sales transaction history
- Query adjustment transaction history
- Enable fare product for autoload
- Generation of fare payment reversal (e.g., cancellation)
- Generation of sales reversal (e.g., refund)
- Generation of an account adjustment (e.g., credit or debit)
- Transfer of balance between two (2) accounts
- Block/unblock card, account, or individual fare product
- Lost, stolen, or damaged card replacement (e.g., associate new card with existing account)
- Generation of an opt-out refund (e.g., close account and issue refund)

The final list of transit account management APIs shall be finalized during the design review process.

The transit account management API shall include API calls for the passing of data between the devices/systems and the back office to perform all functions.

The transit account management API shall allow devices/systems to query a transit account status and return the sales, fare payment, and adjustment transactions that were conducted over a specified timeframe, or a specified number of past transactions.

The transit account management API shall allow devices/systems to setup autoloading for an existing fare product. Enabling autoloading shall require a valid funding source to be stored in an associated customer account, and may be performed using the customer account management API instead.

The transit account management API shall allow authorized personnel to perform adjustment, reversal, transfer, and refund transactions to modify transit account balances.

The transit account management API shall allow authorized personnel to generate blocking (and unblocking) and replacement transactions to close or prevent use of transit accounts, fare media, and fare products.

Unique fare media and/or transit account identifiers shall be securely captured by the devices/systems and passed to the back office to perform all functions. The back office shall perform all functions in real-time.

The transit account management API shall capture all required information to generate a detailed transaction within the back office for all functions performed, including at a minimum:

- Date/time
- Sales organization (e.g., LeeTran, library name, supermarket name)
- Sales/customer service channel ID
- Employee ID (if applicable)
- Device/system ID
- Device/system location
- Operator/administrator ID
- Fare media ID
- Transit account token
- Details of action performed

The transit account management API shall return a confirmation of the actions taken by the back office. If any action is unsuccessful, a denial and associated reason code shall be provided. All response types and error handling shall be described in detail in the transit account management API specification.

2.3.1.6 Customer Account Management API

The customer account management API shall support the querying and management of individual and institutional customer data maintained within the customer database.

The customer account management API shall support the querying and management of data maintained within the customer database, and shall be utilized by all devices and systems that require access to those functions, including but not limited to:

- TOTS
- CRM System
- Public and Institutional Websites
- Third-party systems (i.e., retail sales network or mobile ticketing system)

Additional devices or modules may utilize the customer account management API. Not all devices/systems shall require or be granted access to all customer account management API functions.

The customer account management API shall support the following functionality at a minimum:

- Create new individual customer account
- Create new institutional customer account
- Query customer account status and data
- Modify customer account data
- Register (e.g., link) a transit account to an individual or institutional customer account
- Unregister (e.g., unlink) a transit account from an individual or institutional customer account
- Add a funding source to an individual or institutional customer account
- Close an individual or institutional customer account

The customer account management API shall include API calls for the passing of data between the devices/systems and the back office to perform all functions.

The API shall allow devices/systems to create individual and institutional customer accounts within the customer database, and associate or disassociate existing transit accounts with those customer accounts.

The customer account management API shall allow devices/systems to query and modify all individual and institutional customer account data, including but not limited to name, address, date of birth, phone number, e-mail address, institution and administrator contact information, username, password, security questions/answers, account access Personal Identification Number (PIN), and funding sources.

The API shall support the individual and bulk import of data for institutional customers and customers applying for a reduced fare classification, including scans of applications and supporting documentation, eligibility parameters, and card personalization information, such as a customer photograph, to be stored in the customer database. Imported documents shall include spreadsheets (i.e. Excel, CSV) and other files types determined during design review.

The customer account management API shall allow authorized personnel to close customer accounts. Closing of a customer account shall not affect the associated transit accounts.

The customer account management API shall capture all required information to generate a detailed transaction within the back office for all functions performed, including at a minimum:

- Date/time
- Sales organization (e.g., LeeTran, library name, supermarket name)
- Sales/customer service channel ID
- Device/system ID
- Device/system location
- Operator/administrator ID
- Fare media ID (if associated with a customer account)
- Transit account token (if associated with a customer account)
- Customer account number
- Customer account data
- Details of action performed

The customer account management API shall return a confirmation of the actions taken by the back office. If any action was unsuccessful, a denial and associated reason code shall be provided. All response types and error handling shall be described in detail in the customer account management API specification.

2.3.1.7 Device Management API

The device management API shall support the monitoring and management of all devices deployed within the system.

The device management API shall support the reporting of device events and alarms, and the distribution of new software, configuration parameters, and positive/negative list updates as required, and shall be utilized by all devices deployed within the system, including but not limited to:

- SAPs
- TVMs
- Driver Control Units (DCUs)
- TOTs
- Mobile Fare Inspection/Validation Device Application
- Mobile Sales Devices

The device management API shall support the passing of data between the devices and the monitoring management tool (see Section 7.4: Monitoring Management) to enable the monitoring of system performance in real-time. The device events and alarms reported via the device management API shall provide enough detail to support proactive device maintenance at the module-level, and support accurate reporting on all system performance requirements.

The device management API shall support the passing of data between the monitoring management tool (see Section 7.4: Monitoring Management) and devices to enable remote control and issuance all commands supported for each device type. All commands shall be issuable and executable in real-time.

The device management API shall support the real-time distribution of device software and configuration parameter updates. Device configuration shall include real-time updates to any positive and negative lists maintained locally at the devices. Updates shall be distributed on an increment-basis so that only updates since that last timestamp/version received by an individual device are transmitted. This differential or incremental update (or functional equivalent) shall reduce bandwidth and data transmission requirements across the system.

A universal device management API shall be created and used wherever possible; however, the Vendor may create device-specific device management APIs or calls as necessary.

2.3.1.8 CAD/AVL/APC Integration API

The CAD/AVL/APC integration API shall support the integration of on-board devices (including SAPs and DCUs) with the existing CAD/AVL/APC system onboard vehicles. The Vendor shall be fully responsible for integration of these systems as part of the FCS implementation (see Section 10: Integration Requirements).

The CAD/AVL/APC integration API shall be utilized by fare devices (including SAPs and DCUs) to exchange information with the CAD/AVL/APC system and support single-point logon and the capture of ride information (including operator, route, run, stop ID, direction, and geolocation).

The CAD/AVL/APC integration API shall support the capture of operator login and route data from the CAD/AVL/APC system, including but not limited to:

- Operator ID
- Block
- Route
- Stop ID
- Run

- Direction
- Geolocation (from the Global Positioning System [GPS])

The SAP shall append this information to all fare payment transactions generated by the device.

The CAD/AVL/APC integration API shall support the capture of geolocation data from the CAD/AVL/APC system geolocation data, including but not limited to:

- Raw GPS coordinates
- Stop ID
- Other location information

The SAP shall append this information to all fare payment transactions generated by the device.

The CAD/AVL/APC integration API shall be designed such that it is vendor agnostic. However, the Vendor shall partner with LeeTran’s CAD/AVL/APC supplier, Clever Devices, to ensure that all system-specific requirements are met.

2.3.2 Transaction Formats

The Vendor shall publish specifications for all transactions generated and used within the system that are not already covered by the required APIs.

Transaction specifications shall include detailed descriptions of the transaction structure, data elements, and data formats, and identify all devices and systems that generate and consume the described transactions.

Transaction formats shall be based on published standards wherever possible, including those used to interface with commercial software packages, such as the Vendor-provided CRM, revenue management, and reporting systems.

The transaction formats shall be fully owned by or licensed to LeeTran, including the right to distribute the specifications to third-parties without further approval, license, or payment.

2.4 Risk Mitigation Techniques

The account-based architecture depends on reliable and responsive communication between every field device and the back office. To account for intermittent or unreliable communications, the system shall support risk mitigation techniques used to limit fraud, provide accurate and timely account information, and control risk.

The system shall support the limited writing of data to closed-loop fare media for the purposes of fraud mitigation, displaying accurate and timely account information, and risk management. Risk mitigation data shall not include detailed fare information or other data that supersedes the account-based back office. The information written to the fare media may include:

- Recent transaction meta data or associated information (e.g., transaction timestamps)
- Transit account balance states (e.g., low balance or successful load indicators)
- Transit account status information (e.g., rider classification, institutional program, or blocking indicators)

Data to be written to the media shall be determined during design review and subject to LeeTran approval.

Any data written to the closed-loop fare media shall be used to supplement back office account data, and shall be limited in nature. The data shall be interpreted by the devices with minimal or no business rules logic (e.g., knowledge of fare polices and products).

Data may be written to the closed-loop fare media at time of manufacture, loading, and/or use. All data shall be secured for both reading and writing using strong cryptography.

The system shall support the distribution of positive and negative lists to be maintained locally at the devices and used for fare validation and inspection. Positive and negative lists shall be managed within the back office and distributed to the devices via the device management API.

If used, positive and negative list updates shall be distributed to devices no less than every five (5) minutes and include version control to ensure timely and accurate synchronization. The list update frequency shall be configurable.

All processes governing the use of risk mitigation techniques shall be fully documented in the software specifications for the devices and may be shared to enable the same functionality on third-party devices.

2.5 System Security

The Vendor shall be responsible for ensuring that the system as delivered is compliant with all applicable Payment Card Industry (PCI) standards at the time of Final Acceptance, and with all LeeTran, state, and local policies for the handling of Personally Identifiable Information (PII).

All equipment provided or purchased by the Vendor that shall capture, store, transmit, or process bank card data shall be certified, by the original equipment manufacturer (OEM) or Vendor, as compliant with all applicable PCI standards at the time of Final Acceptance.

The approach to system security shall include avoiding the storage of bank card data and PII on field devices whenever possible, and only storing and transmitting such data in a tokenized or encrypted form.

The connection between the frontend devices and back office shall be over an Internet Protocol (IP) network. Where required, the connections shall be secured using Transport Layer Security (TLS 1.2) and strong encryption, such as Triple Data Encryption Algorithm (3DES) or Advanced Encryption Standard (AES). All data sent via the internet shall be TLS 1.2 encrypted using the HTTPS protocol.

All payment data shall be secured from the point when it is captured to when it is received by the processor. When communications are over public networks, Virtual Private Networks (VPNs) or Access Point Name (APN) shall be used to increase security and data control.

Hardware firewalls shall be established around all system-specific servers, in addition to the use of software firewalls and other traffic filtering security measures where required.

Physical and logical access to system components that contain PII and/or financial data shall be restricted. Physical and logical security shall be sufficient for compliance with the PCI standards in effect at the time of Final Acceptance.

Logical access to all supplied systems shall require two-factor authentication and be centrally managed using a Vendor-provided user authentication and access control platform based on a vendor-neutral, industry standard protocol, such as Lightweight Directory Access Protocol (LDAP) or equivalent.

The Vendor shall be responsible for providing a PCI compliance plan during design review, and for obtaining certification for the entire system. The Vendor shall employ a certified Qualified Security Assessor (QSA), and shall be responsible for conducting all testing required to achieve certification prior to Final Acceptance.

System security features shall be maintained and security issues shall be addressed as they arise throughout the term of the warranty and operations and maintenance agreement (see Section 19: Operations and Maintenance

Agreement). Operating system updates, software patches, bug fixes, and system enhancements to address identified security issues shall be provided.

Security-sensitive information shall be submitted separately, in accordance with procedures to be jointly developed between the Vendor and LeeTran. Security-sensitive information shall include:

- Information that would allow an individual to create, duplicate, skim, or counterfeit fare media
- Information that would allow an individual to overcome security features or interlocks intended to prevent access to sensitive information
- Information that would allow an individual to divert revenue, whether electronic or cash revenue, from the system

2.6 Required Submittals

The following table displays items that must be submitted in advance of one or more design reviews.

Description	Submittal Due		
	Conceptual Design Review (CDR)	Preliminary Design Review (PDR)	Final Design Review (FDR)
System Architecture Design	X	X	X
System Interface and API Specifications		X	X
Transaction Format Specifications		X	X
Risk Mitigation Techniques	X	X	X
Security and PCI Compliance Plan	X	X	X

3 Fare Media

3.1 Contactless Fare Media

3.1.1 General Requirements

Contactless fare media provided as part of the system shall meet all applicable common design requirements in Section 17: Design Requirements in addition to the requirements in this section.

Contactless fare media shall be based on International Organization for Standardization (ISO)/ International Electrotechnical Commission (IEC) 14443 and ISO/IEC 18092 (Near Field Communication [NFC]) compliant formats.

Additional LeeTran-defined formats may be defined during system design that conform to the design principles in this section.

All sales channels and fare distribution devices shall issue or reload extended-use (EU) smart cards. The system shall also support limited-use (LU) smart cards, which may be used to support specific markets and special fare programs. Rider classifications and fare products associated with each media type shall be based on fare structure configuration (see Section 4: Fare Structure).

Contactless fare media (i.e., EU and LU) shall be designed for use in an account-based system and serve as a unique token for accessing closed-loop transit accounts maintained within the back office. No data shall be written to the media when loading or using fare value, with the exception of data required to support risk mitigation techniques (see Section 2.4: Risk Mitigation Techniques).

Contactless fare media shall be designed to support revenue reconciliation and transaction records within the back office.

Each customer account may be linked to multiple contactless fare media. The system shall support fare media replacement in the event that a card is lost, stolen, or damaged, which shall link a new piece of fare media to an existing account and block use of the old fare media.

The transit account token stored on the media shall not be the media serial number (i.e., unique identification number [UID]) or transit account number used within the account-based system, and shall not be printed on the media or otherwise accessible using a commercial card reading device.

The format of the transit account token and transit account number used within the account-based system shall be subject to LeeTran review and approval during design review.

Contactless fare media shall be produced based on branding developed by LeeTran and a design developed jointly with the Vendor. The media shall also be produced with one (1) or both sides left blank for custom printing following manufacture.

In addition to the contactless interface, contactless fare media may be produced with barcodes and/or magnetic stripes to allow interaction with third-party systems outside the scope of the new FCS (see Section 10: Integration Requirements). If required, the format and data content of any barcodes or magnetic stripes shall be defined during design review.

The Vendor shall design, develop, manufacture, and deliver all fare media required for the initial deployment of the new FCS. The Vendor shall deliver all graphics files and related materials required for manufacture of the fare media to LeeTran for review and approval no less than 90 days prior to the start of fare media production.

3.1.2 Physical Characteristics

All contactless fare media shall comply with ISO/IEC 14443-1 for physical characteristics and ISO/IEC 7810 ID1 for physical dimensions. Thickness and other physical characteristics not defined by these standards shall be finalized during design review.

Extended-use fare media shall be constructed of appropriate durable materials for a minimum useful life of 10 years. The media shall comply with the most recent versions of ISO/IEC 10373 and American National Standards Institute (ANSI) InterNational Committee for Information Technology Standards (INCITS) 322 for durability.

Limited-use fare media shall be constructed of appropriate durable materials for a minimum useful life of one (1) year. The media shall comply with the most recent versions of ISO/IEC 10373 and ANSI INCITS 322 for durability.

The contactless fare media shall have read/write performance of not less than 200,000 read/write cycles.

All contactless fare media shall include an etched, unique non-sequential serial number for the purposes of traceability that is separate from the encoded and encrypted token, and smart card UID.

The contactless fare media shall be printed using a four-color process, front and back, and support edge to edge printing.

All pre-printed graphics shall be protected by a clear coat that covers the entire surface of the card.

Prior to commencing full production, and within 30 calendar days of approved graphic designs, the Vendor shall supply at least 20 proof samples of each contactless media type for review and approval by LeeTran, if not already provided as system test cards (see Section 3.4: Initial Fare Media Supply).

3.1.3 Fare Media Format

The contactless fare media shall use a MIFARE-compatible format with an account-based transit payment application developed by the Vendor. An alternative contactless fare media format, such as an open payment format, ISO/IEC 24747, may be proposed by the Vendor so long as it meets all of the requirements in these specifications and is approved by LeeTran.

The contactless fare media format shall support a minimum of a 7-byte smart card UID.

The contactless fare media format shall support strong cryptography, such as 3DES and AES to protect access to and modification of all data encoded to the media (see Section 3.3: Media Security and Fraud Prevention).

If possible, the same fare media format shall be used for both the EU and LU media.

3.1.4 Transit Payment Application

The contactless fare media shall use a MIFARE-compatible transit payment application, developed by the Vendor, to support account-based, closed-loop fare payments in both single- and multi-application smart card environments.

The transit payment application shall be compatible with all modern MIFARE formats, including but not limited to: NXP MIFARE® Classic, MIFARE® Plus, MIFARE® Ultralight®, MIFARE® Ultralight® C, and DESFire® smart card media. The specific platform to be used for LeeTran-issued contactless fare media shall be specifically designed for an account-based system, with limited memory capacity and strong security. The platform proposed by the Vendor shall be finalized during design review.

The transit application shall support the secure storage of a unique token used to access a transit account maintained within the back office. The secure token shall not be the smart card UID or transit account number used within the back office, and shall not be printed on the media or otherwise accessible using a non-system device.

The transit application shall support the encoding of additional data at the time of manufacture and use to support risk mitigation techniques (see Section 2.4: Risk Mitigation Techniques).

If possible, the same transit payment application shall be used for both the EU and LU media.

The Vendor shall publish bit-level specifications for all transit payment applications across all supported card formats within the system, including information on all security protocols necessary to access and encode data on the media. The application specifications shall be subject to LeeTran review and approval during design review.

The Vendor-developed transit payment applications shall be fully owned by or licensed to LeeTran, including the right to distribute specifications to third-parties for media production and to support multi-application smart card implementations without further approval, license, or payment.

3.1.5 Third-Party Media

The FCS shall support the acceptance of third-party issued media that uses the Vendor-provided transit payment application in a multi-application environment. Compatible third-party media may include but is not limited to:

- State and local government employee IDs
- Transit employee and contractor IDs
- Corporate employee IDs
- School and college IDs

- Social service program cards
- Personal identity verification (PIV) and common access card (CAC) cards issued as identification to military and federal employees

Other third-party issued media may be specified during design review.

If LeeTran chooses to utilize the transit payment application for third-party media, the media shall be supported without any additional development to the Vendor-supplied devices and systems.

All third-party media accepted within the system shall be associated with a closed-loop transit account registered with the same personalization information on the ID. The rules associated with registration and use of third-party media shall be defined during design review.

3.2 Paper Ticket Media

3.2.1 General Requirements

Paper ticket media provided as part of the system shall meet all applicable common design requirements in Section 17: Design Requirements in addition to the requirements in this section.

TVMs shall issue select fare products in the form of paper tickets, with a Quality Certification of ISO 9001:2015 or equivalent. The Vendor shall provide documentation demonstrating the media manufacturer meets the minimum quality control requirements.

Paper ticket media shall be produced based on branding developed by LeeTran and a design developed jointly with the Vendor. Blank paper ticket media shall also be provided for custom printing.

3.2.2 Physical Characteristics

Paper ticket media shall have dimensions similar to existing LeeTran tickets, and have sufficient space to print the current information at minimum (see Appendix A.2). Other physical characteristics not defined in this specification shall be finalized during design reviews.

Paper ticket media shall be constructed of transit-proven durable materials for a storage life of at least 5 years. The paper media shall comply with recent industry standards for durability, usability, readability, and security. All common environmental requirements including temperature, humidity, and ticket issuance shall be met.

Paper ticket media shall be constructed of appropriate durable materials for a minimum active useful life of 90 days. Active useful life is the time period from when the ticket is printed and issued.

Ticket stock type and packaging shall conform to transit best practices. Any stock type (fanfold, roll stock, etc.) shall be proven in a transit environment similar to that of LeeTran.

All ticket stock shall contain a sequential preprinted ticket number, with specific number sequencing to be provided by LeeTran. Each paper ticket media batch shall have an identifier for inventory control by revenue/maintenance personnel.

The paper ticket media shall support a thermal printing (or equivalent) grayscale process, front and back, and support edge to edge printing (allowance of non-printing border up to 1mm). Security and fraud prevention features (see Section 3.3: Media Security and Fraud Prevention) shall be included in the preprinted stock. Design specifications shall be designated by LeeTran. Changes or edits to ticket design shall not require a change order.

Prior to commencing full production, and within 30 calendar days of approved graphic designs, the Vendor shall supply at least 20 proof samples of each paper ticket media type for review and approval by LeeTran, if not already provided as system test cards (see Section 3.4: Initial Fare Media Supply).

3.2.3 Two-dimension (2D) Barcode

An encrypted 2D barcode (quick response [QR] or Aztec) shall be dynamically printed on each paper ticket that contains all of the information printed on the ticket, in addition to other necessary security or anti-fraud features.

The 2D barcode shall contain all of the required information for ticket inspections, verifications, or other electronic validation purposes.

If the 2D barcode printed on tickets is QR format, they shall follow standard Model 2, Version 14 between 2.5cm-3cm square.

3.3 Media Security and Fraud Prevention

All contactless fare media shall support strong cryptography, such as 3DES or AES, and support offline cryptography as necessary.

The paper ticket media 2D barcode shall be encrypted or cryptographically signed with strong cryptography using an asymmetrical security key infrastructure to protect access to and modification of all data encoded to the barcode.

All encryption may be implemented using a digital signature, or functional equivalent, that minimizes overhead and maximizes validation performance. Asymmetric algorithms that add significant overhead (i.e., Rivest–Shamir–Adleman [RSA]) are not preferred.

The paper ticket media shall follow security best practices including, but not limited to: watermarks, holograms, special inks, and other fraud prevention techniques. The Vendor shall propose cost effective fraud prevention techniques that have been proven in other transit environments.

The Vendor shall manage the key infrastructure, and generate the public key to share with other vendors as required. The Vendor shall work with such vendors to securely manage and share any public encryption keys, and ensure that the media is compatible with existing validation devices.

The Vendor shall provide cryptographic key management services and tools for contactless fare media. Key management in this context includes but is not limited to:

- Key generation: Derived key generation for each manufactured card, including card manager key sets, as well as multiple application-related key sets (may include both encryption and authentication keys)
- Key storage: Secure storage and retention of card and application key sets
- Key updates: Ability to update, or roll, all cryptographic keys used within system
- Key sharing: Secure sharing of application key sets with third parties for use in multi-application environments

The Vendor shall use the highest possible security in generating, storing, deploying, and transmitting cryptographic keys. The Vendor shall submit a cryptographic key management plan for LeeTran review and approval during design review.

If the FCS design requires the card manufacturer to encode the cryptographic keys to the fare media, the cryptographic key management plan shall identify trusted card manufacturers with appropriate security mechanisms in place to ensure that the cryptographic keys remain safe and secure.

The Vendor shall provide detailed specifications for the generation and management of all cryptographic keys used within the system. The key generation algorithms shall be fully owned by or licensed to LeeTran, including the right to distribute specifications to third parties for media production and to support multi-application smart card implementations without further approval, license, or payment.

3.4 Initial Fare Media Supply

The Vendor shall provide the initial supply of fare media to support the first year of operation following system launch.

The initial fare media supply shall be comprised of several media types, including but not limited to:

- Extended-use full fare smart cards (with graphics)
- Extended-use full fare smart cards (blank)
- Extended-use reduced fare smart cards (with graphics/non-personalized)
- Extended-use reduced fare smart cards (personalized)
- Limited-use smart cards (with graphics)
- Custom printed smart cards for special programs
- Paper ticket media

The final list of media types shall be determined during design review.

Pricing for various fare media types shall be provided as part of the Vendor's proposal. Fare media pricing shall be updated prior to purchase of the initial supply to account for market adjustments.

The estimated quantity of fare media to be provided shall be based on projected quantities listed in the Appendix A.3. The Vendor shall work with LeeTran staff during design review to determine the necessary quantities and varieties of fare media to ensure the successful launch of all standard and special fare programs.

Prior to commencing full production, and within 30 calendar days of approved graphic designs, the Vendor shall supply at least 20 proof samples of each media type for review and approval by LeeTran.

Delivery of fare media may occur at once or in installments as deemed appropriate by LeeTran. The Media Inventory Management System (see Section 7.6: Media Inventory Management) shall maintain an inventory of all serialized fare media as it is produced, held in inventory, installed in the TVMs (optionally), and eventually issued to customers.

Fare media (contactless and paper ticket) shall be available for competitive purchase from multiple U.S. sources. The Vendor shall provide the specifications and associated documentation necessary to support the future procurement of media from third-parties.

All supplied fare media shall undergo a comprehensive quality assurance/quality control (QA/QC) process prior to delivery to ensure adherence to all required performance standards and certifications. Media that fails to meet these requirements shall be replaced by the Vendor at their own expense.

Test cards (at least 200) shall be provided for each version of fare media, including closed-loop EU and LU media, and paper 2D barcode tickets. Test cards may also serve as proof samples if provided within 30 days of approval of graphic designs, but 200 cards are required if proof samples are to serve as test cards.

3.5 Fare Media Sales

The EU fare media shall be associated with closed-loop transit accounts and shall be loadable with all fare product types described in Section 4.2: Fare Products. If LeeTran chooses to issue LU fare media in the future (see Section 3: Fare Media), the associated transit accounts shall be loadable with all of the same fare product types.

The FCS shall support a one-time charge, or “card fee,” for issuance of new fare media. This card fee shall be configurable based on fare media type, rider classification, and distribution channel, and may be set to zero (0) for specific fare media types or for sales through specific channels.

The FCS shall support replacement card fees, which shall be configurable based on fare media type and replacement thresholds (e.g., the first replacement is free and each successive replacement associated with the same account is \$5).

The ability to load a particular fare product to a transit account shall be configurable based on the fare media type and rider classification associated with the account.

The loading of stored value shall be restricted based on configurable parameters, including the minimum and maximum amount that can be loaded in a single transaction, and the maximum amount that a transit account can contain.

Fare product purchases made with transit benefits (e.g., through institutional accounts) shall be identified as such for reporting and refund investigation purposes.

3.6 Required Submittals

The following table displays items that must be submitted in advance of one or more design reviews.

Description	Submittal Due		
	CDR	PDR	FDR
Fare Media Specifications	X	X	X
Media Security and Fraud Prevention	X	X	X

4 Fare Structure

The fare payment system shall be able to support a variety of fare structure configurations at system launch and in the future. Fare structure includes the supported fare policies, fare media, fare products, and distribution channels through which customers purchase fare media and products. The fare structure shall be configurable by LeeTran and the Vendor, and designed to create a simple, unified system that enables interoperability across current and future transit modes without additional development. At minimum, the fare policies in Table 1 shall be supported, along with the detailed fare structure configuration requirements in this section.

Table 1. Supported Fare Structure

Fare Products	Stored Value
	Calendar-Based Passes
	Rolling Passes (Time-Based)
	Trip-Based Passes
	Fare Incentives (Bonus Rides)
Transfers	Mode-Specific (Bus-to-Bus)
	Intermodal (Passport-to-Bus, Bus-to-Passport)
	Optional: Upgrade Transfers (Local to Express)
	Rider Classification-Based Fares

Fare Policy	Mode-Based Fares (Bus/Passport)
	Optional: Service Type-Based Fares (Local/Express)
	Location-Based Fares
	Day- and Time-Based Fares (Peak/Off-Peak)
	Discount Pricing
	Fare Capping
	Event-Based Fares
	Distance-Based Fares
	Zone-Based Fares

4.1 General Requirements

The Vendor shall design, develop, and implement a fare engine, and the configurable fare sets, business rules, and transaction processing necessary to support the current fare structure referenced in Section 1.1: LeeTran Description and all fare structure configuration requirements in the section.

The Vendor shall work with LeeTran during design review to develop and submit a preliminary business rules document that describes the fare structure configuration to be deployed at launch. The final fare structure configuration shall be defined and documented no later than 120 calendar days before the start of integration testing for the applicable part of the system.

4.2 Fare Products

The FCS shall support stored value, which shall serve as an electronic cash-equivalent, and shall be accepted for payment across all modes and services. When stored value is used for payment, the system shall deduct the correct fare at each boarding or entry in real-time from the account, based on the fare pricing configuration described in Section 4.4: Fare Policy.

The FCS shall support calendar passes that are valid for unlimited rides during a pre-defined calendar period. Calendar passes shall be configurable to be valid for any calendar period from one (1) day to one (1) year, including periods that are bounded by specific dates (e.g., valid from Oct. 5 through Dec. 15).

The FCS shall support rolling passes that are valid for unlimited rides for a pre-defined period starting at pass activation, which may occur upon sale or first use. Rolling passes shall be configurable to be valid for a continuous duration from 30 minutes to one (1) year (e.g., valid for 24 hours from first use), or bounded by a service period (e.g., valid from first use through the end of the service day).

The FCS shall support trip-based passes that are valid for a pre-defined number of trips. Trip-based passes shall be configurable to be valid from one (1) to 100 trips, and to include transfer privileges or not (see Section 4.3: Fare Transfers).

The acceptance or denial of pass products for use on a particular mode or service shall be configurable based on all of the fare pricing parameters described in Section 4.4: Fare Policy.

All pass products shall be configurable with a grace period that extends the validity for a set period of time (e.g., 30 minutes or 10 days) or a number of rides (e.g., one ride), on a system-wide or Account-specific (i.e., card-specific) basis.

One (1) transit account shall be able to support an unlimited number of fare products (e.g., stored value and pass products), with the number of allowed unique fare products, including active and multiple inactive instances, to

be configurable by LeeTran. Order precedent rules, to be defined during design review, shall determine which fare products are used first and under which scenarios.

Pass products shall be configurable to grant a partial credit towards a fare for a premium service. In this scenario the remainder of the fare, or “upgrade fare,” shall be deducted from stored value. If the customer does not have enough stored value in their account to cover the upgrade fare, the system shall be configurable to allow the ride or not, with the balance due displayed on the validation device.

The FCS shall support fare incentives based on bonus rides. Ride bonuses shall be configurable to grant a free number of rides after a certain number of rides have been paid for using stored value or a trip-based pass (e.g., purchase \$10 in stored value, receive \$11; and ride 10 times, get one free).

The FCS shall support the assessment of a configurable dormancy fee against stored value balances following a period of transit account inactivity. The assessment of dormancy fees shall be defined during design review and shall comply with all applicable state and federal regulations.

4.3 Fare Transfers

The FCS shall support the granting of a transfer fare credit for a boarding (e.g., fare payment) that occurs within a defined time period of another boarding. The transfer period (e.g., time during which a boarding is eligible for a transfer) shall be configurable.

Transfers shall be supported for customers that pay fares using stored value and trip-based pass products.

The granting of a transfer fare credit, the credit amount, and transfer validity shall be configurable based on all fare pricing parameters described in Section 4.4: Fare Policy. Transfers shall be configurable by mode (e.g., valid for bus-to-bus only), service level, time of day, rider classification, and directionality (e.g., to prevent or allow round trips).

Transfers shall be configurable to grant a partial credit towards a fare for a premium service. In this scenario the remainder of the fare, or “upgrade fare,” shall be deducted from stored value. If the customer does not have enough stored value in their account to cover the upgrade fare, the ride shall be denied.

4.4 Fare Policy

The FCS shall support single-tap or “flat” fare pricing that is fully configurable based on the following parameters at a minimum:

- Rider classification
- Mode
- Service type
- Location
- Day and time
- Discounts

These fare pricing parameters shall also govern the acceptance or denial of fare products being used for payment (see Section 4.2: Fare Products) and the granting of transfers (see Section 4.3: Fare Transfers).

The default fare set shall be associated with transit accounts that have an Adult rider classification. Additional rider classifications shall be supported with unique fare sets, including but not limited to Child, Youth, Student, College, Senior, Disabled, Paratransit, Local, and Visitor. Rider classifications shall be modified manually or

automatically based on customer date of birth or the granting of a temporary classification with a configurable end date.

Fare pricing shall be configurable based on the mode being travelled (e.g., bus or Passport). LeeTran shall be able to add new modes or participants (e.g., parking and bike share) with unique fare pricing as needed and without additional development.

The FCS shall support premium pricing for certain types of service (e.g., express bus). Service-based fare pricing shall be configurable for a single route or groups of routes.

The FCS shall support location-based fares, or the ability to price fares based on the location of payment (e.g., boarding bus at specific stop locations). Location-based fare pricing shall be configurable based on the geolocation information captured from the CAD/AVL/APC system onboard vehicles.

The FCS shall support fare pricing based on the time of day and day of week (e.g., peak and off-peak fares). Peak/off-peak fare pricing shall be configurable for specific fare classifications, modes, and service types, and put into effect at all times or on a scheduled basis (e.g., every weekday).

The FCS shall support the offering of discounted fares on a temporary and permanent basis, up to and including the offering of free fares. Discounted fare pricing shall be configurable for specific fare media types, rider classifications, modes, service types, and routes, and put into effect indefinitely or for a defined period (e.g., from June 5 to June 7).

The FCS shall support mileage-based fares, where customers pay a fare based on trip length. Mileage-based fares shall be configurable for specific fare classifications, modes, and service types. Mileage-based fares shall be configurable to incorporate a base fare plus per-mile fare. The per-mile fare shall be configurable to incorporate different fare rates for different mileage groups (i.e., \$0.20 per-mile for miles 1-10, \$0.25 per-mile for miles 11-20, etc.).

The FCS shall support zone-based fares where customers are charged different fare rates depending on the number of fare zones traveled. Zone-based fares shall be configurable for specific fare classifications, modes, service types, and routes. The FCS shall allow for configuration of zone designations and zone fare levels.

The FCS shall support event-based fares. Event-based fares shall be configurable for specific fare classifications, modes, service types, regularly occurring events (Comic-Con, sporting events), and one-off events (concerts).

4.5 Fare Capping

The FCS shall support fare capping. The FCS shall allow customers to pay base fares using stored value until they reach a pre-defined amount over a calendar period. The FCS shall support fare capping at multiple levels (i.e., customers shall be able to accrue rides to reach the daily cap and then accrue a number of daily caps to reach a monthly cap).

The FCS shall support fare caps for individual service types, service levels, and modes (bus, express, etc.).

The FCS shall allow customers to reach fare caps for multiple service types and modes. The FCS shall allow customers who have reached the fare cap on one (1) service/mode to board premium services/modes at a discounted fare.

4.6 Fraud Detection

The FCS shall support fraud prevention policies, including the ability to automatically identify suspect usage patterns based on sales and ridership data, and block the use of fare media, transit accounts, and fare products based on configurable fraud rules.

The FCS shall support LeeTran-configurable velocity checks, and other fraud prevention measures, that identify excessive or potentially fraudulent use of stolen or compromised fare media.

The FCS shall support the setting of a configurable upper limit of rides for unlimited ride passes (e.g., 50 rides for a one-day pass) that shall generate an automated alert within the system, and optionally block the fare media or product, when the limit is reached.

The FCS shall detect, and generate an automated alert for potential fraudulent duplication of fare media, if the same card or account is used for payment in two (2) geographically separated locations within a configurable period of time.

For transit accounts with stored value, the system shall support the configuration of a “floor limit,” or value below which the account balance is not allowed to fall (so long as the device generating a fare payment is online). The floor limit may be configured to be a zero (0) or negative balance. Transit accounts with balances at or below the floor limit shall be automatically blocked by the system.

The FCS shall support configurable rules to prevent the sharing of fare media and accidental payments through “passback protection,” or a configurable time period in which a card shall not be accepted for payment at a device after an initial use. Passback protection shall be configurable by fare media type, fare product, and rider classification, and shall be enforceable at the bus and individual device level.

The FCS shall support the placing of fare media and transit accounts into “observation mode,” which shall generate an automated alert when the fare media or account is used. This may be used by fare enforcement staff to monitor known stolen or compromised fare media or transit accounts.

The blocking of fare media, transit accounts, and individual fare products may be performed automatically or manually, and on an individual or bulk basis (e.g., if a known batch of cards was lost, the entire batch may be blocked).

Additional fraud prevention policies may be defined during design review.

4.7 Special Fare Programs

The FCS shall support special fare programs, or institutional programs, with a unique fare distribution channel, fare products, and business rules.

The FCS shall support the current range of special fare programs offered by LeeTran, and future programs, including but not limited to:

- Paratransit (e.g., Passport) program
- U-Pass and other college programs
- Department of Education (DOE) and other school (K-12) programs
- Corporate and employer programs
- Government and military programs
- Social service agency programs
- Local attraction and tourist programs
- Partner programs supporting transit-related services, including parking, bike share, and tourist transportation

Special fare programs and their associated fare media, fare products, and business rules shall be defined during design review.

The FCS shall support the printing of personalized special fare program media using the TOT (see Section 5.12: Ticket Office Terminal). Rider classifications associated with unique fare policy (see Section 4.4: Fare Policy) shall be supported for special fare programs and media.

Fare products offered through special fare programs shall be distributed through the institutional website (see Section 9.3: Institutional Website), and shall not be available to the general public, with the exception of stored value.

At a minimum, the following configuration parameters shall be supported to govern an institution's participation in special fare programs:

- Program type (e.g., direct load, post-bill, or media order-only)
- Available fare media
- Available fare products
- Fare media and product pricing
- Fare media and product ordering windows
- Payment type (e.g., prepay or invoice)
- Payment terms

The special fare program configuration parameters shall be set by LeeTran during registration of an institutional customer and shall be stored in the institutional customer account (see Section 9.3: Institutional Website).

Special fare programs shall include post-bill programs where the institution is invoiced based on the participants' actual usage of the system. For these programs, the participants' transit accounts shall be loaded with an unlimited-ride pass, and the system shall calculate the amount due on a monthly basis using pass ridership data and a LeeTran-defined formula.

Special fare programs shall include fare sales using pre-tax transit benefits funds. Stored value and passes loaded through transit benefit programs shall be identified as such and segregated within the transit account to ensure compliance with all applicable Internal Revenue Service (IRS) regulations.

Special fare programs shall include the bulk sale of fare media. If LeeTran chooses to support limited-use media in the future, bulk sales shall include LU media where the associated transit accounts are pre-loaded with value.

The Vendor shall support the migration of data from any existing databases used for the administration of special fare programs, including data on qualified schools, employers, government agencies, and social service agencies.

4.8 Required Submittals

The following table displays items that must be submitted in advance of one or more design reviews.

Description	Submittal Due		
	CDR	PDR	FDR
Business Rules		X	X
Fraud Detection Design	X	X	X

5 Stand-alone Processor (SAP) Requirements

5.1 General Requirements

5.1.1 Description

All fixed-route buses and paratransit (Passport) vehicles operated by LeeTran shall be equipped with SAPs. These devices shall consist of three separate components: the Passenger Interface Module (PIM), the DCU, and coin and bill collection system.

The Passenger Interface Module shall contain the ISO/IEC 14443-compliant read/write antenna and support circuitry, a 2D barcode reader and support circuitry, a suitable display screen, simple multi-colored lamps to convey transaction results, audio transducers, and other required user interfaces.

The DCU shall contain a suitable display screen and operator input, and duplicates of the simple multi-colored lamps and audio transducers present in the Passenger Interface Module (permitting the operator to receive the same transaction feedback as the passenger).

SAPs shall accept the following fare media types:

- Coins
- Bills
- Contactless smart cards
- Single use tickets
- Mobile payment (optional)

The SAP shall automatically identify and count all US coins and bills in the following denominations: dimes, nickels, quarters, dollar coins, one dollar bills, two dollar bills, five dollar bills, ten dollar bills and twenty dollar bills. The SAP should be capable of processing all street quality currency, including, old, dull, flattened, folded, wrinkled, dirty or otherwise soiled coins. Additionally, the SAP should be capable of recognizing and processing all US legal currency that may be issued in the past or currency that may be issued over the service lifetime at LeeTran.

Collected currency should be deposited into a single cashbox, stored securely in compartmentalized areas, separating bills from coins.

Cashbox collection should be done via some type of probe inserted, held up to, or plugged into the SAP. The cashbox shall then need to be ejected from the SAP, and placed or dumped into a vaulting system. The entire cashbox collection process must be captured electronically with date and time stamped entries.

Other elements of the SAP, such as the wireless data communications hardware (Wi-Fi and cellular broadband), GPS receiver, microprocessor control unit, non-volatile memory for transactional data, configuration parameters, and dynamic data (such as action lists and autoloading lists), power supplies, etc., shall be included in either module as necessary and at the Vendor's discretion.

Subject to LeeTran approval at the PDR, the SAP may incorporate components into one or more additional modules to optimize the size of the PIM and DCU. The design and location of any such additional modules shall be subject to LeeTran review at the PDR, and approval at the FDR.

The SAP shall support at a minimum NXP MIFARE® Classic, MIFARE® Plus, MIFARE® Ultralight®, MIFARE® Ultralight® C, and DESFire® smart card media.

All smart card transactions on the SAP shall complete in less than 500 milliseconds (ms), which shall include the time to read and write to the smart media or read the barcode media, and display all results. As necessary, the operator may select an alternate transaction type, using the selection buttons on the DCU, prior to processing the media. The operator and the passenger shall see and hear the same information as a result of the transaction.

Installation of the SAP components shall optimize operator and passenger ergonomics. Upon entering a LeeTran facility or coming within range of a LeeTran wireless data network, the SAP shall exchange data (upload and download) to update dynamic data (such as action lists and autoloading lists) and transmit transaction records.

5.1.2 Operating Environment

The SAPs shall operate reliably in the environment of LeeTran's bus fleet, including elevated temperatures due to solar loading, shock, vibration, dust, and moisture from wind-driven precipitation and interior bus cleaning.

5.1.3 Installation Design

The SAP design shall support flexible, ergonomic, safe, and rugged installation methods that accommodate a wide variety of vehicle configurations, within the limited space available. As information, Attachment 1 provides pictures of LeeTran vehicle interiors.

5.1.4 Power Requirements and Wiring

For power input, the SAP modules shall be wired to the bus battery, which may be a nominal 12 VDC or 24 VDC, depending on vehicle model. The SAP modules shall also sense the ignition state of the vehicle engine and respond as specified herein.

5.2 SAP Functional Requirements

5.2.1 Configurability

SAPs shall be installed in both LeeTran fixed-route and paratransit (known as Passport) vehicles. While the hardware and software for all SAPs shall be identical (excluding mounting components), functional requirements differ between fixed-route and Passport installations, specifically in how the SAP processes Passport fares and other fare processing rules. The SAP shall be easily configurable to either fixed-route or Passport functionality.

As described herein, the SAP shall also support configurability through numerous adjustable parameters, centrally controlled and transmitted via the CDS.

The Vendor shall submit a comprehensive document describing the configurability of the SAP, including a listing of all configurable parameters and their value range, for LeeTran review at the PDR and LeeTran approval at the FDR.

5.2.2 Fare Tables

The SAP shall store a minimum of three complete fare tables. One fare table shall be designated the active table; all other stored tables shall include a date and time at which the table is to become active.

Fare tables shall be highly configurable and shall include support for all fare policies and pricing structures defined herein and necessary to support LeeTran operations.

5.2.3 Transaction Records

The SAP shall generate and store a discrete data record for each transaction performed. Each transaction record shall be unique within the New Fare Collection system and shall include the following information as a minimum:

- Date and time of transaction
- SAP (Device) number
- Vehicle number
- Operator ID

- Route number
- Block number
- Direction (no less than 8 values, including North, South, East, West, Inbound, Outbound)
- Vehicle location (latitude/longitude – most recently received GPS coordinates)
- Media ID number (LeeTran serial number if LeeTran-issued or barcode, chip UID if third party-issued)
- Third party account number (if applicable)
- Fare/Transaction type
- Action performed (if applicable)
- Autoload performed (if applicable)
- Transaction value (if applicable)
- Transaction number (which shall be unique per day per SAP)

The SAP shall have capacity to store no less than 20,000 transaction records.

5.2.4 Event Records

At minimum, the SAP shall generate and store an event record for each of the following actions or incidents:

- Power on
- Power On Self Test complete
- Power On Self Test failure, including failure mode
- Power off
- Operator login, including ID and login method (smart card, barcode, keyed entry)
- Failed login attempt (excessive PIN entries)
- Operator logout
- Maintenance parameter changed, including parameter and new value
- Route changed, including new route number
- Default fare (service level) changed, including new fare set
- End of transit business day (LeeTran programmable, default is 3:00 AM)
- Communication between the DCU and PIM failed
- Communication between the DCU and PIM is restored
- Communication with the Garage Data System (GDS) initiated
- Communication with GDS completed
- Communication with GDS terminated before complete (i.e., Wi-Fi signal lost)
- Communication with GDS terminated by operator (during login)
- GPS reception lost
- GPS reception restored
- New downloaded list received, including list type and version number
- New downloaded list activated, including list type and version number
- New fare table received, including version number
- New fare table version activated, including version number
- New SAP software version received, including version number
- New SAP software installed, including version number
- New SAP configuration data received, including version number
- New SAP configuration data activated, including version number
- SAP internal clock reset for a time discrepancy greater than 3 minutes
- Data memory nearing capacity (LeeTran configurable threshold)

- Data memory full
- SAP reset (when action occurs while operator is logged in)
- Unsuccessful data transfer
- SAP errors and failures

Each event record shall include, at minimum:

- Date and time of event
- SAP (Device) number
- Vehicle number
- Operator ID (if available)
- Route number (if available)
- Block number (if available)
- Direction (if available)
- Vehicle location (latitude/longitude – most recently received GPS coordinates, if available)
- Associated event parameters (as required)

The SAP shall have capacity to store a minimum of 2,000 event records.

5.2.5 Downloaded Lists

The SAP shall receive several lists of data from the CDS. These lists shall be updated regularly and as needed. The Vendor may provide alternate designs and content for these lists, but total capacity and functionality shall remain as specified herein.

The Vendor shall submit a complete description of the downloaded lists (including content and format, capacity, and the procedures employed to update the lists on the SAP) for LeeTran review at the PDR and LeeTran approval at the FDR.

5.2.5.1 Action List

The SAP shall store a list containing actions to perform, sorted by the sequential serial number of those cards and barcodes with pending actions. Actions supported by this function shall include, at minimum those described below:

Any LeeTran-issued smart card media and any barcode media may be placed on the Action List as a result of the media being reported as lost or stolen, for non-payment of account, for suspected fraudulent use, or other reasons defined by LeeTran. LeeTran shall have the ability to define the action to be taken by the fare collection device whenever a listed fare instrument is presented. These actions shall include, at minimum:

- Deactivate – Fail the transaction and permanently deactivate the card (LeeTran-issued smart card media only)
- Suspend – Fail the transaction only and encode the card with suspension status information as described in Section 5.2.5.2 (LeeTran-issued smart card media only)
- Reject – Fail the transaction (read-only media only)
- Track – Complete the transaction and track usage
- Reactivate – Reactivate a previously suspended card and complete the transaction (LeeTran-issued smart card media only)
- Modify – Alter encoded information on a LeeTran-issued smart card according to information accompanying the Action List entry

Whenever a listed fare instrument is presented to a device, the device shall store a transaction record indicating that a listed fare instrument was presented and the action taken.

A LeeTran-issued smart card that has been deactivated due to use after placement on the Action List shall be rejected as invalid for all subsequent attempted uses.

A LeeTran-issued smart card that has been suspended due to use after placement on the Action List shall be rejected as suspended for all subsequent attempted uses until and unless the card is reactivated as described in Section 5.2.5.2.

Actions to modify the encoding of LeeTran-issued media shall LeeTran to remotely modify cards as necessary to support functions described herein, and shall include (if dictated by the Vendor's design) establishing, modifying, and deleting subscription autoload transactions described in Section 5.2.5.3.

The Action List shall support no less than 50,000 entries.

5.2.5.2 Suspension and Reactivation

When a LeeTran-issued smart card is suspended, the suspension information encoded to the card shall indicate either a date upon which the card shall automatically be reactivated, or an indefinite suspension.

If the suspension information includes a reactivation date, upon presentation of the card on or after that date, the smart card processor shall encode the necessary information to reactivate the suspended card.

If the suspension is indefinite, or if LeeTran deems it necessary to reactivate a card before its predefined reactivation date, a corresponding reactivation entry in the action list shall cause the smart card processor to encode the necessary information to reactivate the suspended card.

5.2.5.3 Autoloading

Automatic loading ("autoloading") is the process that permits customers to remotely and automatically load and replenish fare products and value to a smart card without having to use a POS device to conduct the payment transaction. As applicable, SAPs and Portable Transaction Processors (PTPs) shall conduct automatic reload transactions, but the payment for those replenishment transactions shall be conducted via the customer-specific web portal or via a CDS-initiated bankcard transaction.

The new FCS shall provide customers three basic forms of autoloading:

- **Directed:** A one-time autoload that is initiated by the customer, usually via a web portal, for a specified value, pass, or both. Directed autoloads shall require the customer to identify their smart card (by sequential serial number and 4-digit truncated UID), payment method and product or value to add. Directed autoloads shall be one-time transactions and shall not be repeated unless the customer returns to the customer-specific web portal and instructs the system to do so.

The new FCS shall collect payment for Directed Autoloads at the time of order via a web portal.

- **Threshold:** A "subscribed" autoload that adds value or a pass to a fare instrument based on a low-value threshold or an expiring or expired pass. The new FCS shall allow customers to set up threshold autoloads via customer-specific web portals and the Administrative Point of Sale (APOS) Terminal. Establishing a threshold autoload shall require the customer to identify their smart media (by serial number), payment method (such as a credit card number), and the value or product to add to their card once the threshold is reached. Threshold values shall be LeeTran-configurable; LeeTran shall also have the ability to enable customers to select threshold values, and to restrict threshold values to LeeTran-configurable levels only.

The CDS shall initiate payment collection transactions automatically for Threshold Autoloads, based on the customer's selected payment method on file. Payment collection transaction processing for Threshold Autoloads is defined in Section 5.2.5.4.

- **Recurring:** Another "subscribed" autoload, but one that occurs on a regular calendar basis, usually monthly, and usually in support of employer-sponsored transit benefit programs or for calendar-based pass products.

The CDS shall initiate payment collection transactions automatically for Recurring Autoloads based on the customer's selected payment method on file. Payment collection transaction processing for Recurring Autoloads is defined in Section 5.2.5.4.

The new FCS autoload processes shall support use by registered and anonymous users.

The Vendor shall submit a complete description of all autoload transactions and the processes to establish, modify, and cancel subscribed autoloads for LeeTran review at the PDR and LeeTran approval at the FDR.

5.2.5.4 Pending Autoload List

The SAP shall store a list containing instructions and transactions to perform, sorted by sequential serial number, of those cards with pending autoload transactions, as described in Section 5.2.5.3.

The Pending Autoload List shall support no less than 50,000 entries.

5.2.5.5 Third Party-Issued Valid List

The SAP shall store a list containing the full UID numbers of all third party-issued smart cards that are to be accepted as payment of fare. Each entry in the list shall also contain a unique identifier of the third party that issued the card.

The Third Party-Issued Valid List shall support no less than 100,000 entries, and no less than 1,000 issuing party identifiers.

5.2.5.6 Valid Operator ID List

As part of the operator login process described in Section 5.8.3, the SAP shall confirm that the operator's ID and PIN are valid, based on a list received from the CDS. At minimum, each entry shall include:

- The sequential serial number of the operator's LeeTran Employee card
- The operator's Personal Identification Number
- Login type ("Operator" or "Maintenance")

Operator PINs shall be no less than 4 digits; the login process shall support operator PINs in the range of 0000 through 99999.

The Valid Operator ID List shall support no less than 2,000 operator and 1,000 maintenance entries.

Alternatively, valid operator and maintenance IDs may be maintained in separate lists; if valid IDs are stored in separate lists, the total capacity of each list shall be no less than as specified above.

5.2.5.7 Valid Block Number List

The SAP shall store a list, received from the CDS, of valid block numbers and associated routes and service levels. The Valid Block Number List shall support no less than 2,000 entries. Each entry on the Valid Block Number List shall include at minimum:

- Block Number
- Route Numbers assigned to the block (up to 10 route numbers per block)
- Default Service Level (which shall establish the default fare)

5.2.6 Software and Configuration Updates

As described in Section 8, the GDS shall manage and conduct all software and configuration updates to the SAPs. Each update shall have a unique version number and include a date and time upon which the update shall be effective.

The SAP shall activate updates to downloaded lists, described in Section 5.2.7, as soon as possible, and without interfering with a transaction in progress or requiring the operator to login or reset Service Parameters.

Updates (received from the GDS) to fare tables, configuration settings, and SAP software shall become effective upon the first SAP power-up or operator login after the effective date and time.

Under no circumstances shall interrupted communication with the GDS cause file or data corruption on the SAP or GDS.

The Vendor shall submit a description of the process used to update SAP software and configurations for LeeTran review at the PDR and LeeTran approval at the FDR.

5.2.7 Data Integrity

All SAP transaction, event, fare table, downloaded list, configuration, and software application data memory shall be non-volatile (i.e., retained without power).

The SAP shall retain transaction and event records in its non-volatile memory until notified that the CDS has successfully received and stored the records in the CDS database.

In the event a SAP cannot communicate with the GDS, and in cases where the SAP is non-functional, the SAP shall provide authorized maintenance technicians access to a removable non-volatile memory module that shall contain a duplicate of all transaction and event records. The Vendor shall provide means to upload the records in the removable memory module to the CDS, a description of which shall be submitted for LeeTran review at the PDR and LeeTran approval at the FDR.

The SAP shall not enter service without a properly installed and functional removable backup memory module.

5.2.8 Performance Requirements

All SAP use transactions shall complete in no more than 500 ms, as measured by when the fare media is within the defined read distance and orientation to the antenna or barcode reader and the transaction results are displayed. The transaction time allowed shall include processing of all Action, Pending Autoload, and Third Party-Issued Valid Card lists, described in Section 5.2.7, when all lists are at maximum capacity.

5.2.9 Europay, MasterCard® and Visa® (EMV) Certification

As delivered, the SAP shall be Level 2-certified as compliant with the EMV standards in effect at the time of contract award. The SAP shall, via software upgrades, be capable of being certified to newer versions of the EMV standard as they are published.

5.2.10 PCI Compliance

As delivered, the SAP shall be certified compliant with the Payment Card Industry's Data Security Standard (PCI DSS) in effect at the time of contract award.

5.3 Passenger Interface Module

The Passenger Interface Module (PIM) shall contain the following elements:

5.3.1 Passenger Display

The Passenger Display shall be a backlit liquid crystal display (LCD) display with sufficient size, resolution, brightness, and contrast to provide Americans with Disabilities Act (ADA)-compliant readability under all lighting conditions present in the transit vehicle environment.

The Passenger Display shall have ADA-compliant visual and audible indicators that provide the functionality listed below. The Passenger Display shall have different visual and audible indicators for each function. All visual and audio output shall be fully configurable and subject to LeeTran review and approval during the design review process.

The display shall be of sufficient ruggedness to withstand the rigors of the transit vehicle environment.

The Passenger Display shall at minimum:

- Prompt the passenger in the use of the PIM
- Display the operating status of the SAP
- Display the transaction type and value that shall occur upon presentation of a valid fare instrument
- Display the results of the transaction as described in the sub-bullets below, and in sufficient detail to inform the passenger of the validity of the presented fare media and the new status and value of the presented smart card (as applicable)
 - All new FCS devices that process fare media shall display the results (on the respective displays and via any status light-emitting diodes [LEDs]) of each usage transaction to the device operator and the patron:
 - For as long as the fare instrument is held within range of the reader
 - For a LeeTran-configurable time (default 2 seconds) after the fare instrument is removed from the reader
 - For a LeeTran-configurable maximum time (default 20 seconds), even if the fare instrument remains in range of the reader
 - Until another transaction is initiated or another fare instrument is presented to the new FCS device

5.3.2 Contactless Smart Card Processor (CSCP)

The PIM shall contain a Contactless Smart Card Processor (CSCP), which shall provide contactless smart card read and write functionality that is fully compliant with the ISO/IEC 14443 standard, able to process media defined as Type A and B, certified for use with EMV®-compliant bankcard media, and satisfies all other requirements stated herein.

The CSCP antenna shall be sized and operate at a power that satisfies the ISO/IEC 14443 read/write distance range requirements, and the read/write distance range requirements for the media being supplied under this Contract, as described in Section 3.4.

5.3.3 2D Barcode Reader

The PIM shall incorporate a barcode reader that is capable of reading and processing barcodes on LeeTran-printed tickets (described in Section 6.2.3.8.6), and barcodes created by the Mobile Ticketing Application as identified in Section 15. The barcode reader module incorporated into the PIM shall:

- Be housed completely within the PIM such that installation of the PIM shall provide ease of use by the customer when scanning their barcode and provide quick and easy presentation and removal of the smart phone
- Provide no hazard from the barcode reading laser or other components
- Be commercially available
- Have firmware upgradeable via the CDS data communication system
- Be high resolution (greater than 1.3 megapixels)
- Interface with the PIM via Universal Serial Bus (USB) cable or other standard interface for power and data communications
- Store a minimum of 10 inspection files
- Have a read range of not less than 4 inches and not more than 10 inches
- Read standard 1D barcode
- Read secure 2D barcodes (QR code, Aztec, or other LeeTran-approved format)
- Utilize an encryption key, configurable by LeeTran, and AES decryption algorithms to process secure 2D barcodes
- Forward validity information to the SAP logic for processing and determination of validity using standard data communications protocols
- Have a first read accuracy of not less than 99.5%

5.3.4 Transaction Status Lamps

The PIM shall include three LED lamps in red, yellow, and green, which shall be visible in all ambient lighting conditions. The operation of the LEDs shall be as shown in Table 2.

Table 2. SAP Status Lamp Operations

Illuminated Lamp	Condition Indicated
Red	A transaction has failed due to the media being deactivated, suspended, or dormant, or having no valid pass, or having insufficient value.
Yellow	Presented fare media is valid, but additional attention is required because the media is a reduced fare or the media is past its expiration date or the pass is nearing expiration or the remaining value is low. Remaining days and value thresholds shall be LeeTran-configurable.
Green	Transaction is successful.

After each transaction, the appropriate LED shall remain illuminated as defined in Section 5.3.1.

5.3.5 Audio Transducer

The PIM shall be capable of emitting at least 8 distinct sounds or sound patterns. All sounds emitted by the PIM shall be of sufficient volume to be heard by the passenger while the vehicle is in operation.

Each illumination of LEDs described in Section 5.3.4 shall have one or more distinct sounds or sound patterns assigned. For example, it shall be possible to assign a sound for a successful transaction that also requires the operator to inspect the passenger’s fare media that is distinct from the sound emitted for a successful transaction with media that has low residual value. (In both cases, the yellow LED shall illuminate.)

For each transaction result and operating condition, the Vendor shall submit samples of the tones emitted by the PIM audio transducer in .mp3, .wav, or other standard format for LeeTran review at the PDR and LeeTran approval at the FDR.

5.3.6 Enclosure

The PIM enclosure shall:

- Be sufficiently robust to withstand the public transit vehicle environment, resist vandalism, and maintain integrity for the expected life of the new FCS
- Satisfy all environmental requirements stated in Section 5.1.2
- Be made of engineered high-impact thermoplastics or other corrosion-resistant materials
- Have no sharp edges or corners
- Have no paint or other coatings that may scratch or wear off
- Be sealed against moisture ingress
- Accommodate LeeTran-approved graphics applied to identify the CSCP antenna and other interfaces as necessary
- Be of a LeeTran-approved color
- Be latched or secured closed in such a way that it can be opened only when properly removed from the mounting bracket

5.3.7 Mounting

The PIM mounting system shall satisfy the following requirements:

- A. The Vendor shall securely install the PIM using stainless steel hardware in a manner and location that is safe to passengers and operators, ergonomic, compliant with ADA, and suitably robust for the transit vehicle environment.
- B. When installed, the PIM shall not obstruct operator views nor cause excessive glare on the windshield during high ambient lighting conditions.
- C. PIM mounting shall facilitate easy and rapid exchange of defective modules without the use of tools or manipulation (disconnection and reconnection) of power or data cables.
- D. Exchange of a PIM shall require the use of a key or other physical security method to ensure that only authorized LeeTran personnel are performing the exchange.
- E. The PIM mounting system shall provide a sufficient degree of flexibility to support installation in the range of vehicle types in LeeTran's current fleet.
- F. Placement and mounting of the PIM shall not interfere with maintenance or revenue servicing of the nearby farebox; it shall not be necessary to move or remove the PIM to open any farebox panel or perform any farebox maintenance or servicing activities.
- G. When installed, the PIM displays shall be easily readable and all other passenger interfaces easily employed.

5.3.8 PIM Design Submittals

The Vendor shall submit descriptions of the PIM for LeeTran review at the PDR and LeeTran approval at the FDR. PIM design submittals shall include:

- PIM passenger interfaces

- PIM CSCP
- PIM 2D barcode reader
- PIM mounting system

5.4 Driver Control Unit (DCU)

5.4.1 Operator Display

The DCU shall incorporate a high visibility backlit display capable of displaying the full palette of colors and resolution of at least a Video Graphics Array (VGA) display. The display shall be no less than 6 inches in diagonal measure.

Display contrast and the brightness of the backlight shall be operator-adjustable without requiring the operator to logout. The display shall be of sufficient brightness to be visible in all levels of ambient lighting within the bus.

5.4.2 Operator Input Controls

The DCU shall utilize touch screen input controls in coordination with information displayed on the Operator Display. The touch regions shall be large enough to allow easy use by the operator, and shall be functional when used by gloved hands.

Selection of a touch region shall be accompanied by suitable visual and audio feedback to confirm each selection.

The touch screen shall be protected by an easily replaceable film (such as products used to protect smart phone touch screens) of clear plastic with a matte finish to reduce glare.

The DCU may provide physical buttons to perform functions that are fixed in nature. All such buttons shall provide tactile feedback when pressed.

5.4.3 Transaction Status Lamps

The DCU shall include similar LEDs that operate identically as those on the PIM described in Section 5.3.4. Alternatively, the DCU operator display may indicate by color representation the same information in lieu of discrete LED lamps.

5.4.4 Audio Transducer

The DCU shall include an audio transducer that operates identically to the transducer on the PIM described in Section 5.3.5. All sounds emitted by the DCU shall be of sufficient volume to be heard by the operator while the vehicle is in operation.

5.4.5 Enclosure

Space on the dashboard to the right of the operator – the ideal location for the DCU – is limited. The DCU shall be as compact as possible while still providing required usability and ergonomics.

The DCU enclosure shall:

- Be sufficiently robust to withstand the public transit vehicle environment, resist vandalism, and maintain integrity for the expected life of the new FCS
- Satisfy all environmental requirements stated in Section 5.1.2
- Be made of engineered high-impact thermoplastics or other corrosion-resistant materials
- Have no sharp edges or corners

- Have no paint or other coatings that may scratch or wear off
- Be sealed against moisture ingress
- Be of a LeeTran-approved dark color that shall minimize glare and reflections in the windshield
- Be latched or secured closed in such a way that it can be opened only when properly removed from the mounting bracket

5.4.6 Mounting and Ergonomics

The Vendor shall include appropriate hardware to permit DCU mounting on the bus dashboard or a stanchion as required by the configuration of a particular bus. The installed position shall allow operators to observe fare transactions while operating the DCU, and shall not interfere with any bus controls, block any bus indicators, obstruct the operator’s view, or create a safety hazard.

The DCU mounting shall be designed so that it can be quickly adjusted by each operator to the optimal viewing and operating angle. Once adjusted, the mounting hardware shall not allow the DCU to rattle or become loose as a result of shock and vibration encountered during normal bus operation.

5.4.8 DCU Design Submittals

The Vendor shall submit descriptions of the DCU for LeeTran review at the PDR and LeeTran approval at the FDR. DCU design submittals shall include:

- DCU operator interfaces
- DCU enclosure
- DCU mounting system

5.5 Cash Collection

5.5.1 Coin Collection System

The coin collection system should be solid state with no moving parts or motors and shall be capable of processing and validating US coins in the following denominations:

- Nickels
- Dimes
- Quarters
- Dollars

Coins being processed shall be street quality coins and the coin collection system should be resistant to jams or malfunctions created by street quality coins or other foreign objects or coin-like materials.

All valid coins collected should be indicated on the DCU screen as well as the PIM and the corresponding LED lights should be lit accordingly.

When coins or foreign objects are rejected, they must be dropped into a rejection slot that is accessible by boarding passengers and indicated on the DCU and PIM accordingly. Operators should have the ability to accept rejected coins and enter them into the farebox via coin override and manually add each coin’s value to the fare already collected by the farebox.

5.5.2 Bill Collection System

The bill collection validator should be capable of accepting, processing, and validating US currency in the following denominations:

- One dollar bills
- Two dollar bills
- Five dollar bills
- Ten dollar bills
- Twenty dollar bills

Bills being processed shall be of street quality and maybe old, flattened, folded, wrinkled, dirty, or otherwise soiled. The bill collection validator should be resistant to jams or malfunctions created by street quality bills.

All valid bills collected should be indicated on the DCU screen as well as the PIM and the corresponding LED lights should be lit accordingly.

The internal bill validator should show a green LED when ready to accept bills and a red LED while processing a bill or not ready to receive bills. It should accept an inserted bill in any orientation, including face up, face down, and either end first. Once inserted, the validator needs to examine the bill and determine its validity as well as its denomination. Currency determined invalid or denotations not programmed should be rejected and returned back to the boarding passenger via the bill collection validator slot.

LeeTran would like the ability to program the bill collection validator to temporarily reject selected denominations of bills for policy reasons determined by LeeTran.

The bill collection validator should encompass guides to assist with the entry and passing of the bills from bill insertion to entering the cashbox, ensuring that the bill is guided through the bill collection validator system correctly and reducing jams.

Any and all foreign bills, photocopies of bills, paper, or any other form of invalid bills should be rejected automatically. Also, the bill collection validator should automatically reject any bill inserted in folded condition, bills that are torn or have a tear in them greater than one half inch, bills with holes in them, or bills that are or appear to be taped with any form of tape. If any of the above are detected, the bill collection validator should immediately reverse and return the item to the boarding passenger.

Processing time should be two seconds or less for each bill inserted into the bill collection validator, regardless of the denomination being processed. This time is measured from the time the bill collection validator begins to pull the inserted bill until it is ready to accept the next bill. Additional time for bill transport and cashbox separation should not be included in the bill collection validator time as this process should be handled separately and simultaneously while the bill collection validator is ready for the next bill to be inserted.

Bus operators shall have the ability, after verifying that the rejected bill is legitimate, to accept the rejected bill via an override function and, when the originally rejected bill is reinserted the bill collection validator, it shall accept the bill without verification and transport it into the cashbox. Only one bill should be accepted under this override and after one bill has been accepted, the bill collection validator should automatically return to normal mode without any additional input from the operator.

If a bill is collected and entered into the farebox manually or by an override function, this fare is to be totaled separately from all other fare as "fare in question."

5.5.3 Cashbox Design and Basic Functionality

The cashbox should have at least two separate compartments, one for mixed coins and the other for bills. The coin compartment within the cashbox should be able to hold at least \$500 in mixed coinage. The bill compartment within the cashbox should have the ability to hold 600 unfolded, street condition bills.

The empty cashbox should weigh no more than twenty pounds and have at least one handle. SAP and cashbox insertion and removal should be smooth and completed easily in a single motion by one person.

The SAP must remain inoperable until the cashbox is properly inserted and the cashbox securement door is closed and locked. The cashbox should not have any removable doors, lids, or access areas that may come loose and cause the cashbox to become jammed inside the SAP, or prevent the operator from inserting or removing the cashbox.

The cashbox is to remain in the locked and sealed position at all times unless it is secured inside the SAP or is in the revenue receiving vault and actively “dumping.” The cashbox should be inserted into the SAP in a unique orientation and be placed into ready status automatically once it is properly secured.

If the cashbox utilizes an electronic locking system, the Vendor must provide a manual way to open the SAP, retrieve the cashbox, and also open it. Multiple key sets should be included with each SAP and cashbox. Keys and locks should use a high level of security and the manual unlocking of the farebox or cashbox should not require excessive force to open. Opening the SAP or cashbox manually should be done in one smooth operation.

The cashbox should not have any internal lips, ledges, or other area where coins and bills may catch or hang up, causing the farebox or cashbox to jam. Both compartments of the cashbox may be gravity fed, allowing the coins to drop into the cashbox.

Each cashbox should have a unique serial number that can be visible while the cashbox is secured in the farebox.

The cashbox should not contain any seams or joints that could cause the separation of the cashbox if dropped or hit firmly. Once collected and fare revenue has entered the cashbox, it should not be able to be removed in an unauthorized manner; the cashbox should require insertion into the revenue receiving vault for “dumping” before the fare revenue is released.

5.5.4 SAP Probing, Fare Collection, and Data Transmission

Secured cashboxes should remain in the SAP until probed. The SAP must have a clearly labeled location for the operator to place or insert the prober. When the prober comes in contact with the SAP, data transmission to the CDS should begin automatically. Successful, completed data transmission should complete within five (5) seconds.

Once successful data transmission has completed, the SAP should emit an audible tone and automatically unlock the secured cashbox area so cashbox can be removed. Cashbox removal should be completed in one full motion, allowing the operator to remove the current cashbox and install an empty cashbox.

The removed cashbox shall be carried directly to the vaulting dump where the operator shall insert the cashbox and with the twisting of a handle, the cashbox shall be emptied directly into the existing vaults onsite at LeeTran.

The vaulting dump mechanism shall open the cashbox and allow all the contents to fall into separate compartments, one for bills and one for coins, inside of the vault. Inside of the vault, the collection bin shall hold the dumped revenue securely until removed. The collection bin allows for securing prior to or at the time of removal so the revenue within shall be secure at all times. The collection bin should allow for easy transportation to a counting room by counting room personnel.

The collection bin’s compartments should allow for removal from the collection bin, so the bills and coins can be processed separately. The bill compartment should be lightweight and open from the top to allow for counting room personnel to remove the bills. The coin compartment should contain a sloped bottom, allowing the coins

to slide in one direction towards an opening, allowing counting room personnel to remove coins into a bucket or coin separator and counter onsite at LeeTran.

The Vendor shall supply extra vault collection bins for each vault. Currently, LeeTran utilizes two vaults; the Vendor shall supply a total of four vault collection bins.

Also, LeeTran has a portable collection vault into which cashboxes are emptied. The Vendor shall need to ensure that new cashboxes shall dump into the portable collection vault as well as the two physical onsite vaults. The Vendor shall provide new vaulting tops, if needed, for the new cashboxes to work with existing vaults onsite at LeeTran.

The Vendor shall install probing equipment or upgrade the current probing equipment used in the revenue collection process. This equipment includes, but is not limited to, cashbox receivers or vault tops, vault housing, portable collection vault, data transmission or communication cables, probes, and any other adapters or power connections required. The collection equipment should operate consistently in all weather conditions, temperatures, and humidities.

The data probe and cable should be made of heavy duty wire pairs, contained within a shielded jacket while maintaining flexibility. The probe and cabling shall be resistant to environmental conditions, such as weather, salt, moisture, fuel, and oil. The cable must be at least 25 feet in length and supported in the center by a retractable guiding system designed to support the cable and assist with cable retraction. Cable support can be mounted to an existing pole or on the side of the building.

The Vendor shall ensure that the probe shall fit into the existing building-mounted probing holder or install a new probing holder to secure the probing unit when not in use. The Vendor shall replace or upgrade an existing probe and cable, if required, to support the new SAPs as well as running cable and installing a new probe at the second vault's location.

The probe and cable shall allow for replacement if needed and the Vendor shall provide detailed instructions on probe and cable replacement.

The probe should always be powered on and in ready status, enabled to make a probe connection with an SAP. This shall allow for quick and easy probe connections and data transmission.

The data successfully transmitted to the CDS should be processed by the CDS software immediately following probing.

The Vendor shall educate LeeTran staff on wireless probing. Proposers shall indicate the wireless requirements needed, how the system functions, and the best practices associated with wireless probing.

5.6 Communications Interfaces

5.6.1 Wi-Fi

Power output of the SAP Wi-Fi network interface shall be 24dBm minimum.

The Institute of Electrical and Electronics Engineers (IEEE) 802.11n Wi-Fi interface internal to the SAP shall support Multi-Input, Multi-Output (MIMO) and dome-type, low profile antennas.

5.6.2 Cellular Broadband Modem

The internal cellular broadband modem shall support 3G and 4G/LTE communications from common carriers such as AT&T®, Verizon®, Sprint®, T-Mobile®, and other common carriers. The cellular broadband modem shall support MIMO antennas.

5.6.3 Global Positioning System

The SAP shall include an integrated 12-channel GPS receiver and interface to connect to an external GPS antenna via appropriate cabling and connectors, which shall be used to provide GPS coordinates stored as part of every transaction record as described in Section 5.2.3.

The SAP shall retrieve current GPS coordinates no less than once every 5 seconds.

5.6.4 Ethernet

The SAP shall provide at least one spare Ethernet interface, operating at switchable data rates of no less than 10/100 Mbps. The SAP Ethernet interface shall support future integration with other on-vehicle systems, including but not limited to: CAD/AVL/APC for real-time stop ID information, other systems as necessary to support single-point logon, and consolidated operator controls (to replace the DCU).

5.7 Roof-Mounted Antennas

All roof-mounted antennas shall:

- Not require external ground plane outside of antenna enclosure
- Be white in color
- Be UV and corrosion resistant
- Provide a watertight seal (rated IP7) against water ingress into the vehicle
- Not interfere with the operation of other existing and Vendor-installed antennas

Separate antenna enclosures are acceptable, but LeeTran prefers all antennas to be in a single radome, such as the LTM Surface Mount series provided by Mobile Mark, Incorporated:

www.mobilemark.com

The Vendor shall submit the design, make, model, operating characteristics (including both azimuth and elevation patterns), and installation details for all roof-mount antennas for LeeTran review at the PDR and LeeTran approval at the FDR.

5.7.1 Wi-Fi

Roof-mounted Wi-Fi antennas shall:

- Be low profile, surface-mount, omni-directional
- Include two MIMO antennas with a minimum gain of 5 dBi
- Operate at 2.4 and 5 Ghz bands

5.7.2 GPS

The GPS antenna shall support the installation and use of a LeeTran-installed splitter (at some future time if needed) so that the antenna may be shared by devices that need their own GPS antenna source.

5.7.3 Cellular Broadband

The cellular broadband modem antennas shall include two LTE MIMO antennas for the 700 MHz band, with the following minimum frequency response characteristics:

- 694 – 960 MHz band, minimum gain of 3 dBi
- 1710 – 2170 MHz band, minimum gain 4 dBi

5.8 Operations

At minimum, the SAP shall provide all of the operational functions described below. The Vendor shall provide a complete description of all operational functions and a flow chart depicting SAP operation for LeeTran review at the PDR and LeeTran approval at the FDR.

5.8.1 Power-up

The SAP shall have no external power switch. When the vehicle engine starts (i.e., the ignition is turned to “on”), if powered off, the SAP modules shall commence power-up sequence. While the vehicle engine is running, the SAP shall remain powered.

5.8.2 Power-on Self Test

Internal diagnostic programs shall check the SAP for proper performance each time it is turned on. When a failure is detected of sufficient severity to cause the SAP to cease functioning or cause transactions to fail, the SAP shall go out of service and provide visual indication. The detected deficiency shall be recorded in the SAP’s memory for later extraction.

Upon application of power, the SAP shall illuminate all three color LEDs on the PIM and DCU (as applicable), emit a distinct audio tone, and display the current and any pending versions of software, fare tables, and other configurable data files. The displays, LEDs, and audio tones shall remain active for sufficient time for the operator to assess the results.

While no login is active, pressing a button on the DCU shall cause the SAP to repeat the Power-on Self Test.

5.8.3 Login

The SAP shall require a valid operator login to function. Logging in shall require the following:

1. The SAP shall be operational but with no valid login active.
2. If the SAP is in communication with the GDS, all data exchange shall be complete prior to prompting the operator to login. During the period of communication, the DCU shall display a message indicating that data exchange is in progress, and a button or touch region shall be available to enable the operator to commence login prior to completion of data exchange. The SAP shall generate an event record whenever the login override button is pressed.
3. Upon completion of data exchange with the GDS (or the operator pressing the login override button), or if the SAP is not in communication with the GDS, the DCU shall activate the CSCP and 2D barcode reader on the PIM, and display a login prompt on the DCU.
4. The operator shall present his/her Operator ID Card to the smart card reader on the PIM. If the operator’s ID card is defective (i.e., cannot be read), the barcode reader on the PIM shall provide an alternate, backup method of reading the card’s sequential serial number. If both methods fail, the DCU shall provide the operator the ability to manually enter the card’s sequential serial number.
5. Using the Valid Operator ID List received from the CDS, the SAP shall confirm that the card is a valid LeeTran Operator ID Card. (If the list of valid cards is older than a LeeTran- definable age, the SAP shall reject all attempts at logging in until it has communicated with the CDS and received an updated list.) If the card is invalid, the login process shall fail.
6. If the card is valid, the SAP shall prompt the operator to enter his/her PIN on the DCU. (Operator PIN requirements are defined in Section 5.2.5.6.) If the PIN is valid for the presented Operator ID, the login shall be

successful. If the PIN is incorrect, the SAP shall prompt the operator to re-enter the PIN. After a LeeTran-definable number of failed attempts to enter a valid PIN, the login process shall fail and generate an event record.

7. Upon successful login, the SAP shall display a suitable message on the PIM and DCU displays, but shall not enter service until the operator enters all required service parameters, described in Section 5.8.4.

The method and operator interface design used to log into the SAP shall be subject to LeeTran review at the PDR and LeeTran approval at the FDR.

5.8.4 Service Parameters

If the successful login is an ID with operator permissions (as defined in the Valid Operator ID List), the DCU shall prompt the operator to enter various parameters prior to the SAP entering service. At minimum, these parameters shall include those shown in Table 3:

Table 3. SAP Service Parameters

Parameter	Format	Entry Method	Minimum Range	Verification
Block Number	Numeric	Keyed Entry	0 – 99999	Compared with Valid Block List
Route Number	Numeric	Menu	0 – 9999	Restricted to Menu Selections
Direction	Text	Menu	As per Section 5.2.3	Restricted to Menu Selections
Service Level Default Fare	Alphanumeric	Menu	As per Section 3.11	Restricted to Menu Selections Default Retrieved from Valid Block List

Menu selectable parameters shall be constrained to valid values based on lists constructed from data stored in the fare table or from data contained in an associated downloaded list. Changes in the fare table and the contents of associated downloaded lists shall have corresponding effects on the available menu selections. (The menu selections shall not be hard-coded, but shall be LeeTran-configurable, based on entries in the fare table or the contents of an associated downloaded list.)

The SAP shall require the operator to re-enter any keyed-entry values that fail verification. Upon successful input of the service parameters, the SAP shall enter service and be ready to process fare media.

Unless overridden by temporary actions defined in Section 5.8.8, all transaction records shall include the values of the service parameters in effect at the time of the transaction.

While the SAP is in service, the operator shall be able to modify any of the service parameters without having to logoff.

The method and operator interface design used to enter service parameters shall be subject to LeeTran review at the PDR and LeeTran approval at the FDR.

5.8.5 Maintenance Functions

If the successful login is an ID with maintenance permissions (as defined in the Valid Operator ID List), the DCU shall display one or more pages for maintenance and configuration purposes.

The method and operator interface design used to perform maintenance functions shall be subject to LeeTran review at the PDR, and LeeTran approval at the FDR.

5.8.5.1 Maintenance Parameters

While a valid maintenance login is in effect, the DCU shall display one or more screens of parameters used to configure the SAP. At minimum, these parameters shall include those shown in Table 4.

Table 4. SAP Maintenance Parameters

Parameter	Format	Entry Method	Minimum Range
SAP Serial Number	Numeric	Factory Setting	NA
Device Number	Numeric	Keyed Entry	0 – 9999
Vehicle Number	Numeric	Keyed Entry	0 – 9999
SAP Configuration	Text	Menu	Coach / Passport
IP Address	Numeric IP Address	Keyed Entry	0 – 255 (each field)
Subnet Mask	Numeric IP Address	Keyed Entry	0 – 255 (each field)
Wi-Fi Settings	As Necessary		
Cellular Broadband Modem Settings	As Necessary		
OCM Volume	Numeric	Keyed Entry	0 – 9
PIM Volume	Numeric	Keyed Entry	0 – 9
PIM Brightness	Numeric	Keyed Entry	0 – 9

As indicated in Table 4, the SAP Serial Number shall be a factory setting that cannot be altered by use of the DCU. The Vendor shall ensure that all SAPs have unique Serial Numbers.

Menu selectable parameters shall be constrained to valid values, based on lists constructed from data stored in the fare table or from data contained in an associated downloaded list. Changes in the fare table and the contents of associated downloaded lists shall have corresponding effects on the available menu selections. (The menu selections shall not be hard-coded, but shall be LeeTran-configurable, based on entries in the fare table or the contents of an associated downloaded list.)

The Maintenance Parameter screen(s) shall include a touch region that when selected shall save all maintenance parameter settings in the SAP’s non-volatile memory, where they shall remain unchanged unless altered by later use of the Maintenance Parameter screen(s).

All subsequent transaction records shall include the values of the Device Number and Vehicle Number in effect at the time of the transaction.

Upon exiting the Maintenance Parameter screen(s), the SAP shall return to the login prompt screen as described in Section 5.8.3.

5.8.5.2 Maintenance Commands

While a valid maintenance login is in effect, the DCU shall provide the technician the ability to test the SAP using a variety of maintenance commands. At minimum, the following maintenance commands shall be available:

- Initiate the SAP Power On Self Test and return to maintenance command screen when complete
- Activate the PIM's CSCP and display the sequential serial number of a presented LeeTran-issued card
- Activate the PIM's barcode reader and display the sequential serial number of a presented LeeTran employee ID card's barcode, LeeTran-printed barcode ticket, or Mobile Ticket
- Activate the PIM audio transducer at the volume specified
- Activate the DCU audio transducer at the volume specified
- Display the current power status (ignition on, ignition off, and remaining time to power down)
- Display the date and time of most recent communication with the GDS
- Display all current and pending version numbers for software, downloaded lists, configuration settings, etc.
- Display the current memory usage
- Display the current Wi-Fi communications status
- Display the current GPS status and location coordinates
- Display the current cellular broadband modem status

5.8.6 Smart Card Transaction Processing

While a valid operator login is in effect, the SAP shall energize the smart card read/write antenna and be ready to perform smart card transactions. The SAP shall conduct all smart card transactions according to the procedures and requirements set forth herein.

The SAP shall process all LeeTran-issued smart cards, and ISO/IEC 14443-compliant smart cards that are on the Third Party-Issued Valid List.

5.8.7 Barcode Transaction Processing

While a valid operator login is in effect, the SAP shall activate the barcode reader and be ready to perform barcode media transactions. The SAP shall conduct all barcode transactions according to the procedures and requirements set forth herein.

5.8.8 In-Service Operator Commands and Functions

At minimum, the SAP shall provide the following operator functions and commands while in service with a valid operator login in effect:

A. **Temporarily Override Default Fare:** Using as few buttons as practical, the operator shall be able to override the default fare set for the next transaction. Ideally, the available alternate fares shall be shown on the DCU display in such a way that only a single button or touch region is required to activate any temporary override and set the fare for the next transaction. The available choices for the temporary fare set shall be LeeTran-configurable and constructed from values in the fare table, similar to the menu-driven choices in the Service Parameters selection screen described in Section 5.8.4.

The SAP shall restore the default fare set upon completion of the transaction, upon the driver cancelling the override, or after a LeeTran-configurable time of inactivity, initially set to 20 seconds.

B. **Change Service Parameters (see Section 5.8.4):** A button or touch region on the DCU shall enable the operator to return to the Service Parameters screen and change any parameter. Upon completion, the new parameters shall be in effect for all subsequent transactions, unless changed or temporarily overridden.

C. Review Prior Transactions: The operator shall have the ability to review no less than the previous 5 transactions. When the transaction review function is selected, the DCU shall display a brief summary of each transaction and indicate in simple color-coded fashion (green / yellow / red) the results of each transaction as described in Section 5.3.4. By selecting one of the prior transactions, the DCU shall then display additional detail about the transaction.

D. Undo Last Transaction: Under strictly controlled conditions, the SAP shall support operator-initiated reversal of a prior transaction to LeeTran-issued smart cards. Transactions shall be reversed (that is, the value of the prior transaction shall be restored to the card) when all of the following conditions are in effect:

- The operator initiates the transaction reversal
- The presented card is a LeeTran-issued smart card
- The previous transaction was a stored value or stored ride transaction with no other pass products involved (e.g., the transaction was not an upgrade or transfer)
- The previous transaction was for complete payment of the fare due (i.e., did not trigger a “capped” fare).
- The previous transaction was on the same vehicle and within a LeeTran-configurable time, initially set to 120 seconds

Upon successful completion of the transaction, the SAP shall display an appropriate message to the operator and the passenger.

Failure to satisfy any of the above conditions shall cause the reversal transaction to fail and an appropriate message displayed to the operator and passenger.

The SAP shall resume normal operations upon completion of the reversal transaction, upon operator cancellation of the transaction, or upon a LeeTran-configurable time of inactivity, initially set to 20 seconds.

Availability of the Undo Last Transaction function shall be LeeTran configurable as a fleet-wide parameter.

E. Logout: To avoid unintentional logout during normal service operations, the operator logout function shall be available only on the Service Parameters and Maintenance Parameters data entry screens described in Sections 5.8.4 and 5.8.5.

5.8.9 In-Service Operating Status Messages

At minimum, the SAP shall provide the following operator status messages on the DCU while in service with a valid operator login in effect:

- Communications with GDS overdue (LeeTran configurable number of days since last GDS communication)
- Receiving update (from remote access point)
- Power-down imminent (while ignition off, displaying minutes and seconds countdown to self-actuated power-down)
- Data memory nearing capacity (LeeTran configurable percentage)
- Any detectable self-diagnostic failures, with error condition

5.8.10 Data Exchange

All SAPs shall exchange (upload and download) data with the GDS, described in Section 8:

- At vehicle startup (see Section 5.8.3)
- Upon entering the garage property

- Whenever the GDS initiates a request for data while the vehicle is in a LeeTran facility and the SAP is in operation

Data exchange functionality shall include the following as a minimum:

- Uploading of all SAP stored transaction, event, and route/run data
- Downloading of all parameter and fare table information to the SAP
- Downloading of all data configuration modifications to the SAP
- Downloading of the Action List to the SAP
- Downloading of the Pending Autoload List to the SAP
- Downloading of the Valid Operator ID List to the SAP
- Downloading of the Valid Block Number List to the SAP
- Clock synchronization
- Communication verification
- Downloading program/software updates to the SAP

Whenever a SAP is in range of a LeeTran remote wireless access point (described in Section 8.3.4), the SAP shall download and make active only any Action and Autoload Lists that are more recent than those in the SAP's memory. The SAP shall not upload data while communicating with the remote wireless access point, nor shall the SAP require the operator to login or re-enter service parameters as a result of communicating with the remote wireless access point.

While the SAP is communicating with the GDS or a remote access point, the DCU shall display a suitable message.

5.8.11 Diagnostics

To the extent possible, internal diagnostic programs shall check the SAP for proper performance while the device is operating. The malfunction detection shall cover at least failure of power or control circuitry, and any failure of a fare media read/write module (CSCP and barcode reader) that could result in a false, incomplete, or corrupted reading or encoding of a fare product.

When a failure is detected of sufficient severity to cause the SAP to cease functioning or cause transactions to fail, the SAP shall go out of service and provide visual indication on the DCU and PIM displays. The information displayed shall indicate the type of failure that caused the SAP to go out of service.

The detected deficiency shall be recorded as an event record (described in Section 5.2.4) in the SAP's memory for later extraction.

A description of the maintenance and service indicators for the SAP shall be submitted for LeeTran review and approval at the PDR.

5.8.12 Logout

Operator logout of the SAP shall occur:

1. When the operator selects the logout command on the DCU, as described in Section 5.8.8E.
2. Automatically within a LeeTran-configurable time after the vehicle ignition is shut off.
3. Automatically upon commencement of communication with a GDS.

Upon logout, the SAP shall generate and store an event record and go out of service; the DCU shall then revert to the login prompt state defined in Section 5.8.3 or power down, as appropriate.

5.8.13 Power-down

When the vehicle engine is turned off, the SAP modules shall remain powered, fully operational, and able to exchange data via the wireless data interface, for LeeTran-configurable duration, initially set to 30 minutes. After this configurable time has elapsed, the SAP shall commence automatic self-activated power-down, unless communications with the GDS are in progress. If communications with the GDS cause a delay in automated power-down, upon completion of the communications session, the SAP shall automatically power down. Prior to shutting down, the SAP shall generate and store an event record and perform all necessary steps to retain integrity of all stored data.

5.9 Ticket Vending Machine (TVM) (Optional)

A LeeTran TVM is envisioned to be a simple, low-cost machine that allows customers to purchase and reload extended-use fare media (one type), as well as purchase paper tickets. The TVM shall be configurable such that LeeTran shall have the ability to enable/disable features or components of the TVM as necessary (e.g., fare media issuance, change issuance, etc.). This simple TVM is expected to reduce the capital costs, maintenance activities, and customer complexity associated with traditional transit TVMs.

5.9.1 General Requirements

The TVM shall be designed as a simple, low-maintenance, and low-complexity machine in a cost-saving design that provides the functionality specified herein and the common design requirements in Section 17: Design Requirements. The TVM shall be modular and shall provide flexibility to easily turn on/off features, such as cash acceptance.

The TVM shall be designed to accommodate first-time or occasional users, as well as regular riders who need to reload their accounts. At a minimum, these functions shall be supported:

- Purchase one (1) or more new smart cards (associated with a new transit account) with or without value
- Load stored value or fare product(s) to an existing account
- Review account balance and history
- Purchase one (1) or more paper tickets
- Accept U.S. coins and bills (for cash-enabled TVMs)
- Accept authorized magnetic strip, contact, and contactless bank cards
- Return deposited cash if a transaction is canceled
- Provide change (for cash-enabled TVMs)
- Print and issue receipts
- Display instructions and notices
- Provide audio output of messages and instructions
- Contain required security and alarm system
- Communicate over a network to send and receive transaction data in real-time

A full list of TVM functions shall be determined during design reviews.

The TVM shall be modular and have the ability to replace, activate, or de-activate the hardware components listed in Section 5.9.3: TVM Hardware individually. The modules and components shall be easily serviced as specified in Section 17.6: Maintainability and Serviceability.

If a component or function is enabled/disabled, the TVM shall automatically adjust its display, operation, and maintenance status according to the active components.

The TVM shall be able to accept credit and debit cards and cash/coin (for cash-enabled TVMs) for payment.

The cash-enabled TVM shall issue change by default, but change issuance shall be configurable. Change shall be issued in the form of coins, or paper bills if an optional bill recirculator is installed.

When change is not issued or unavailable, any overpayment by a customer for the loading of value at a TVM may be returned (e.g., loaded) as stored value to the same transit account within the same transaction. This feature shall be configurable.

Two (2) types of fare media shall be issued by default, the extended-use contactless media and paper media specified in Section 3: Fare Media. Alternate media types may be configured for issuance in the future if it does not have an impact on the simple design of the machine.

5.9.2 Configurability

The Vendor shall provide a configurable TVM that shall allow the Bill Handling Units and Coin Handling Units to be easily removed, covered, or concealed.

Hardware shall be removable/installable by general maintenance staff and removal shall not require special tools.

The Vendor shall configure TVM software such that cash and coin acceptance modules can be easily turned on/off by LeeTran via the back office configuration management tool.

An initial quantity of both cash and cashless variants of the TVM are specified in the Appendix A.1 for pricing purposes.

The TVM shall allow LeeTran the ability to enable/disable fare media issuance (e.g., only allow card reloads, no paper tickets) and change issuance.

5.9.3 Hardware

5.9.3.1 Enclosure

The overall dimensions of the TVM enclosure shall be determined in conjunction with LeeTran. LeeTran prefers a simple design without excess size or features that may contribute to increased costs. Any additional costs arising from a deviation of the existing specified footprint shall be the cost of the Vendor.

The design of the TVM enclosure shall permit installation as stand-alone units, side-by-side units, back-to-back units, and in recessed areas.

TVM cabinets shall be constructed from stainless steel without any visible fasteners. The enclosure finish and corners shall be rounded to avoid sharp edges, corners, or protrusions that may cause injury to customers.

TVM enclosures shall be rugged and function under harsh environmental conditions including: direct sunlight, moisture, dust/grit/sand/salt, humidity, electrical storms, exposure to urban environment, and the range of temperatures in the operating region (see Section 5.1.2: Operating Environment).

TVM enclosures shall be resistant to corrosion, abrasion, scratching, impacts, and vandalism, and withstand standard cleaning materials. Color and finish shall be such that it minimizes reflection and is highly resistant to fading, cracking, and peeling.

The cabinet shall be constructed to provide the highest protection against vandalism and burglary. Reinforcement shall be provided at the locations (screen, door hinges, access ports, etc.) where there is a higher possibility of vandalism. Gaps shall be minimized to prevent or deter prying.

The TVM mounting pedestal and any external features (such as button panels, rain shields, and light fixtures) shall be weatherized, robust, and vandal-resistant.

While all outer doors are secured, the machine shall remain operational and undamaged after experiencing any impact resulting in a concentrated load of 400 pounds per one (1) square inch on any part of the enclosure.

The TVM cabinet and mounting hardware shall accommodate variations in station and sidewalk construction. Mounting pedestals shall be sized according to need, and specifics shall be provided by LeeTran during design review.

The TVM cabinet shall provide controlled levels of access to the interior of the equipment for maintenance personnel, revenue servicing personnel, and cash processing personnel, as defined by LeeTran.

The enclosure shall accommodate signage, markings, and other instructional materials produced by LeeTran.

As necessary, blanking plates shall be provided for installation over any outer door openings resulting from the removal of an external component or module. All such blanking plates shall be easily secured, and shall provide security against intrusion and vandalism.

The TVM enclosure and pedestal design shall be submitted to LeeTran for review and approval.

5.9.3.2 Display

The TVM shall include a customer display screen bearing simple and easy to read instructions that sequentially instruct the customer how to perform available functions.

The customer display shall incorporate a touch sensitive surface to allow clearly delimited regions of the display to perform variably-defined functions as transactions progress. This interface is hereafter referred to as "touchscreen."

Primary customer interaction with the display screen shall be performed via the touchscreen. The interface shall not rely on physical push buttons for functions other than CANCEL, HELP, or other ADA required functions. The final touchscreen interface shall be submitted for approval by LeeTran during the design review process.

The TVM display shall have ADA-compliant visual and audible indicators that provide distinctive messages for each TVM function. The TVM display shall have different visual and audible indicators for each function. All visual and audio output shall be fully configurable and subject to LeeTran review and approval during the design review process. Please see 5.9.3.9 for more detail.

Using the TVM's touchscreen, patrons shall be able to select any available transaction type; the TVM shall present patrons only those selections that are currently available according to operating status, module configuration, ticket stock availability, and so on.

The touchscreen shall provide for no less than 12 clearly delimited regions from which selections can be made. Each region shall be no less than two (2) square inches. Suitable spacing between regions shall be provided to limit accidentally erroneous selections.

One (1) or more touch regions shall be dedicated to selecting the language of displayed messages (and voice messages, if activated) between English and other languages. These regions shall be active throughout the transaction process.

One (1) region shall be dedicated to the CANCEL function, potentially duplicating the function of the pre-defined physical CANCEL push button. This region shall be active whenever cancellation of the transaction is possible.

When the same function appears in several screens, selection regions shall be consistently placed on the screen.

The technology used to detect patron selections shall be resistant to scratches and other normal wear. No coatings or other materials applied to the outer surface of the display's protective shield shall be required to detect the patron's selection.

The sensitivity of the touchscreen shall be unaffected by precipitation, temperature, sunlight, salt, and other environmental conditions typical of the LeeTran operating region.

The touchscreen shall accommodate patrons wearing gloves and using prosthetic devices.

The patron selection touchscreen shall be easily replaceable from within the TVM interior, and require minimal maintenance effort.

The Vendor shall submit details of touchscreen interface technology, size, and orientation on the TVM front panel for LeeTran review and approval.

The display screen shall consist of a color, trans-reflective backlit flat panel display that supports auto-adjust brightness and is clearly viewable in daytime and night time conditions. The screen shall allow for visibility under sun glare conditions.

The display screen shall measure at least 15 inches diagonally.

The display screen shall provide resolution of no less than 1024 by 768 pixels, and at least 65,000 colors (RGB 16 bit) per pixel.

The display screen shall produce a minimum of 1,000 nits brightness with at least a 750:1 contrast ratio, and provide a level of visibility sufficient to allow all displayed instructions to be read easily by the customer under all ambient light conditions and without the need for any additional peripheral light source or shading device.

The display screen shall display characters and symbols compliant with all ADA requirements.

The visibility and usability of the display shall be unaffected by precipitation, temperature, sunlight, salt, and other environmental conditions typical of the LeeTran operating region.

The display shall be protected to be resistant to scratches and other normal wear. Sacrificial screens are preferred. Alternative solutions such as coatings or other materials applied to the outer surface of the display's protective shield shall withstand normal customer use, industry standard station cleaning materials, and be easily replaced if necessary. The proposed solution shall not impede touchscreen capability.

The display screen shall be easily replaceable from within the TVM interior, and require minimal maintenance effort.

All portions of the display screen shall be visible and not obstructed by any portion of the TVM door, mounting bezels, or other external elements.

The display screen shall be installed close enough to the TVM surface to avoid any parallax effect, or the apparent shift of screen objects relative to customer touches or button placement.

5.9.3.3 Bill Handling Unit

The TVM Bill Handling Unit (BHU) shall accept paper currency and include a bill validator, escrow module or optional bill recirculator, and bill vault.

The bill validator shall be capable of accepting all variations of \$1, \$2, \$5, \$10, and \$20 bills in circulation at the time of Final Acceptance. The final list of acceptable bills shall be determined during the design review process.

As the U.S. Treasury releases new designs of bills, the bill validator shall be capable of being programmed to accept the new designs while continuing to accept the current designs.

The bill validator shall be equipped with a protective shutter to ensure that foreign matter does not enter the BHU while the machine is not accepting bills.

The bill validator shall remain closed until a transaction is selected for which cash payments are available. The shutter shall automatically open once the payment due has been displayed.

The bill validator shall be able to accept bills inserted in any of the four (4) possible length-wise orientations.

The bill validator shall accept one (1) bill at a time and shall determine the denomination and validity of the currency.

The bill validator shall determine the denomination and validity of both sides of a document by dimension checks, pattern and color recognition, and other industry proven techniques.

The bill validator shall meet the following acceptance rates:

- At least 98% of valid bills are accepted upon initial insertion.
- At least 99% of valid bills are accepted in no more than two (2) insertion attempts.

The bill validator shall identify valid acceptable bills with at least 99.99% accuracy.

The bill acceptor may reject bills with excessive physical defects.

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.

If the bill validator deems the inserted document to be invalid, the document shall be returned and gripped so that the TVM retains a hold on the item.

The bill validator shall be designed to reject or expel pieces of paper or other foreign material that can be introduced into the bill insertion slot.

The bill validator shall be secured via a high-security lock and shall be separately removable for servicing.

Upon acceptance of each inserted bill, the bill validator shall forward the bill to an escrow or optional recirculator module to be stored for completion or cancellation of the transaction.

The bill escrow module shall have the capacity to store a minimum of 15 bills. If an optional bill recirculator is used, each bill type shall store a minimum of 20 bills.

When the bill escrow is full, or a configurable limit of inserted bills per transaction is reached, the bill validator shall cease accepting bills. If an optional bill recirculator is used, the bills shall be deposited into the bill vault when the module for that bill type is full.

If the customer cancels the transaction or the TVM aborts the transaction, the BHU shall return from escrow or optional recirculator the amount inserted for the transaction.

When a transaction is completed, all bills in the bill escrow module shall be transported to the bill vault for retention. If an optional bill recirculator is used, the bills shall be transported to the bill vault when the recirculator

module is full. Using sensors or other means, the machine shall confirm the passage of all bills to the bill vault; failure to detect a bill being deposited into the bill vault shall be considered a jam and the machine shall cease accepting bills and display an appropriate message to customers.

The BHU shall be equipped with a removable bill vault. The bill vault shall have a capacity of no less than 2,000 stacked bills in street condition.

The bill vault shall be constructed of sturdy and tamper-proof material, and shall withstand normal handling and regular removal and replacement without deformation that would in any way interfere with the insertion and removal process.

Removal and replacement of the bill vault shall be possible without powering down the TVM.

It shall not be possible to open the bill vault while installed in the BHU, nor shall it be possible to install an open or unlocked bill vault into the BHU. When properly installed in the BHU, it shall not be possible to access bills in the bill vault without damaging the vault in an obvious manner.

The bill vault shall remain secure when removed from the TVM. Access to the bill vault shall be granted only with keys available to revenue staff.

The bill vault shall have handles placed to avoid injury and provide adequate hand clearance for easy insertion, removal, and carrying.

Each bill vault shall include a printed and electronically encoded serial number. The serial number shall be read by the TVM for reporting upon bill vault insertion and removal.

Once removed, a bill vault shall not function in another TVM without reset by authorized maintenance personnel.

The BHU shall accept and process paper currency when the TVM is in offline mode.

The bill vault shall have an external visual indicator that shows whether the vault is full, empty, or ready to be installed. This visual indicator shall allow revenue staff to determine what state the bill vault is in during the revenue servicing process.

5.9.3.4 Coin Handling Unit

TVMs shall be equipped with a Coin Handling Unit (CHU) including, but not limited to, a coin acceptor/verifier, a coin recirculator, a coin hopper, and a coin vault.

The coin acceptor/verifier shall accept all variations of nickels, dimes, quarters, and dollar coins in circulation at the time of Final Acceptance. The final list of acceptable coins shall be determined during the design review process.

As the U.S. Treasury releases new designs of coins, the coin acceptor/verifier shall be capable of being programmed to accept the new designs while continuing to accept the current designs.

The coin acceptor shall contain a coin insertion slot that shall be sized to limit the dimensions of inserted material to the largest coin accepted.

To minimize jams, the coin slot shall also be sized to prevent the simultaneous insertion of two (2) coins.

The coin insertion slot shall be equipped with a protective shutter to ensure that foreign matter does not enter the CHU while the machine is not accepting coins.

The coin insertion slot shall remain closed until a transaction is selected for which cash payments are available. The shutter shall automatically open once the payment due has been displayed.

The geometry of the coin path and other provisions of the coin acceptor shall prevent the retrieval of coins by fishing such as with wire or attached thread.

The coin acceptor/verifier shall determine the denomination and validity of coin types, and identify invalid or counterfeit objects (“slugs”).

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

- At least 98% of valid coins are accepted upon initial insertion.
- At least 99% of valid coins are accepted in no more than two (2) insertion attempts.
- All known counterfeit coins, common slugs, foreign coins, and coins of denominations not accepted by the machine are rejected upon every insertion.

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

The coin acceptor/verifier shall reject and return to a coin return bin unverified, counterfeit, excessively bent, and foreign coins, as well as slugs and other foreign objects.

The coin acceptor/verifier shall be key-locked into the machine and shall be removable for service and replacement.

To minimize jams, a tube solution for the coin acceptor is preferred. Alternative proposed solutions shall be able to demonstrate an acceptable level of resistance to coin jams.

Upon acceptance of each inserted coin, the CHU shall forward the coin to a recirculator module to be stored for completion or cancellation of the transaction.

Each coin type in the coin recirculator shall store a minimum of 50 coins.

When the configurable limit of inserted coins per transaction is reached, the CHU shall cease accepting coins. The coins shall be deposited from the coin recirculator into the coin vault when the module for that coin type is full.

If the customer cancels the transaction or the TVM aborts the transaction, the CHU shall return from recirculator (or hopper) the amount inserted for the transaction.

Coins shall be transported to the coin vault when the module is full. Using sensors or other means, the machine 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 the machine shall cease accepting coins and display an appropriate message to customers.

TVMs that accept cash shall be equipped with a removable coin vault that has a capacity of at least 300 cubic inches and weighs no more than 50 pounds when full.

TVMs that issue change shall be equipped with at least three (3) removable coin hoppers, each with a capacity of 1,000 coins, for a total of at least 3,000 coins for issuing change. Each hopper can be filled with any type of coin.

The coin vault/hopper shall withstand regular removal, replacement, and normal handling without deformation or in any way interfering with the insertion and removal process.

Removal and replacement of the coin vault/hopper shall be possible without powering down the TVM.

It shall not be possible to open the coin vault/hopper while installed in the machine, nor shall it be possible to install an open or unlocked coin vault into the machine. When properly installed in the machine, it shall not be possible to access coins in the coin vault/hopper without damaging the vault/hopper in an obvious manner.

The coin vault shall be self-locking and self-closing, so that when removed from the machine, it cannot be opened other than through an authorized process. Any coin vault shall remain secure when removed from the TVM. Access to the coin vault shall be granted only with keys available to revenue staff.

The coin vault/hopper shall have a handle or handles placed to avoid injury, which provides adequate hand clearance for easy insertion, removal and carrying.

Each coin vault shall include a printed and electronically encoded serial number. The serial number shall be read by the TVM for reporting upon coin vault insertion and removal.

The CHU shall accept and process coins when the TVM is in offline mode.

If the issuance of change is enabled, the TVM shall dispense change from either coin hoppers or a combination of coin and bill recirculators as required.

The preference is that the removal of coins from coin hoppers should be possible without special tools. If required, a tool shall be provided to easily remove coins from hopper prior to installation.

5.9.3.5 Bank Card Processing Unit

The TVM shall be PCI- and EMV-certified for the acceptance of bank-issued credit and debit cards using all common formats based on the latest version of the standard at the time of Final Acceptance. TVMs shall be capable of re-certification with newer versions of the PCI and EMV standards via software upgrades as necessary.

The TVM shall include a Bank Card Processing Unit (BCPU) to process bank cards (credit and debit) and NFC mobile wallets for the payment for fare products and media.

The BCPU shall include at minimum:

- Magnetic stripe reader
- Contactless bank card reader
- Contact (or chip) bank card reader
- PCI- and ADA-compliant PIN pad

The magnetic stripe and contact bank card reader shall be combined to accept and process standard size cards with ISO/IEC 7811 magnetic data stripes and all EMV-compliant contact (chip and PIN) cards.

The magnetic stripe/contact bank card reader shall consist of a push/pull (insert/remove) card reader such that the bank card is not captured completely by the reader. Sensors shall detect the insertion and removal of cards from the reader unit.

The magnetic stripe/contact bank card reader card slot shall be sealed so that no liquids introduced into the slot enter the interior of the machine.

The contactless bank card reader shall read and support all open payment contactless standards, including but not limited to:

- VISA payWave®
- MasterCard PayPass®
- American Express ExpressPay®

- Discover Zip®
- Contactless EMV
- Mobile wallets including Android Pay/Apple Pay/Samsung Pay

The contactless bankcard reader shall be separate and apart from the customer facing smart card reader (see Section 5.9.3.9: TVM Customer Interface) used to process load transactions. Both readers shall be clearly identified to avoid confusion.

The BCPU shall include a secure bank card PIN keypad. The PIN pad shall be vandal resistant, weather resistant, and not be removable from the outside and be easily replaceable. It shall have a life expectancy of at least 5 million cycles.

The layout of the keys on the PIN keypad shall be similar to those of touchtone telephones, and the central “5” key shall have a raised dot or other identifying tactile feature to aid the visually impaired, in compliance with all applicable ADA requirements.

The PIN keypad shall employ encryption as required in accordance with banking requirements. The Vendor shall supply all PIN keypads with production encryption keys injected in a secure, PCI-compliant manner.

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 selection by the visually impaired.

The PIN keypad shall support PIN entry when magnetic stripe debit cards are used, and whenever EMV-enabled cards are used and transaction procedures dictate. The PIN keypad may also be used to enter ZIP codes to satisfy address verification requirements.

5.9.3.6 Smart Card Encoder/Dispenser

The TVM shall incorporate an internal ISO/IEC 14443 contactless smart card reader/encoder that shall be used to encode and issue contactless media stored in the TVM. This is in addition to the external contactless smart card reader/encoder used by customers to process load transactions (see Section 5.9.3.9: TVM Customer Interface).

The smart card reader/encoder shall be integrated with a media dispensing unit that shall issue the extended-use fare media specified in Section 3: Fare Media and together comprise a Smart card Encoder/Dispenser (SED).

The SED shall utilize removable cassettes to store the contactless media card stock. The cassettes shall securely hold cards and enable service staff to replenish or exchange cassettes quickly and securely.

In total, the installed cassette(s) shall have a capacity of no less than 500 cards. Should multiple cassettes be utilized to provide this capacity, the dispenser shall automatically rollover to the new cassette when the first is depleted.

The SED shall dispense cards into a media dispense tray or slot no more than three (3) seconds after commencing the encode/dispense process.

Prior to dispensing a new card, the SED shall confirm that the card is functioning properly. If the SED cannot read the UID or verify that the data is encoded correctly, the module shall capture the card in a card reject bin and attempt to encode/dispense another card.

The card reject bin shall have a capacity of no less than 10 cards.

If the SED fails to issue a card after a configurable number of attempts (initially set to three), the TVM shall disable the SED module and send a maintenance alert.

5.9.3.7 Paper Media Dispenser

Each TVM shall be equipped with a Paper Media Dispenser capable of printing and dispensing paper fare media. The Paper Media Dispenser shall be able to select, cut, print and dispense media dynamically such that multiple ticket types can be printed on the same stock. Multiple media types are acceptable as long as there is no impact to cost.

The TVM's Paper Media Dispenser shall have the capability for fan fold or roll stock dispensers. Any paper fare media stock type is acceptable as long as it meets the fare media requirements and has been proven in a transit environment.

Each TVM shall include ticket stock capacities necessary to support the projected quantities listed in the Appendix A.3.

Upon depletion of a ticket stock, the TVM shall commence using secondary stock (if available), until all stock is depleted. When any ticket stock is nearing empty or depleted, the back office shall record as an event and transmit to the back office a ticket stock near-empty/empty condition.

The Paper Media Dispenser shall sense the progress of the ticket through the TVM and detect the completion of the dispensing process. A final sensor shall detect when the paper media has been issued by the TVM. Should the Paper Media Dispenser detect an unrecoverable ticket jam or the failure of the ticket to clear the final sensor, the TVM shall cancel the transaction and respond accordingly.

The Paper Media Dispenser shall include an adjustable sensor to detect when ticket stock is at an adjustable percentage of capacity (i.e., 10%, 25%). When this sensor is activated, the back office shall record it as an event and transmit an alert to the back office.

Software based detection of capacity levels is acceptable as long as it meets or exceeds the performance requirements of the sensor.

If a patron selects a product requiring stock that the TVM cannot dispense (due to stock depletion or other malfunction), the TVM shall display "Currently Unavailable." Alternatively, ticket selections that are unavailable shall be omitted from the menu of selections available shown on the customer display. Unavailable ticket functionality shall be determined during the design review process.

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.

The Paper Media Dispenser may be equipped with a self-sharpening cutting mechanism to cut individual tickets from the roll supply. Each cutter shall perform at least one (1) million cuts without requiring replacement or sharpening. The cutter shall be designed such that no adjustment of the cutting edges shall be required.

The Paper Media Dispenser shall be able to print all alphanumeric characters in both upper and lower case and the standard symbols of the ASCII character set. Printed characters shall be produced with a minimum height of 0.12 inches and a maximum height up to two (2) inches. The printer(s) shall be of the direct thermal type (or functional equivalent), with the flexibility of being programmed to print tickets with the following configurations:

- Various print sizes on the same ticket
- Reverse printing (white characters on black background)
- Composite type over several lines

- Vertical and horizontal character orientation
- LeeTran-specified graphics
- 2D barcodes
- Grayscale printing
- All requirements in Section 3: Fare Media
- Fraud prevention features such as holograms/watermarks and/or color in pre-printed stock

The final printing requirements shall be determined during the design review process.

The Paper Media Dispenser shall utilize one (1) or more thermal print heads that provide no less than 100 dots per inch (dpi) 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.

The Paper Media Dispenser shall be capable of printing a variety of information on each ticket, including but not limited to:

- Date and time
- Station of purchase
- TVM device number
- Rider classification (e.g., Regular or Reduced)
- Expiration date and time
- Purchase price

Paper media print data shall be clearly legible. Printing shall not degrade the physical condition of the paper media. There shall be no extraneous marks placed on the paper media as a result of the printing operation.

All printing shall be completed within two (2) seconds from start of the print cycle.

LeeTran shall require occasional paper media print format modifications, or additional fare products for sale from the TVMs. Such changes shall be able to be performed by LeeTran employees. Printing format, including information to be printed, print location, orientation, size, and font shall be configurable from the back office.

The Vendor shall provide the software utilities for adding, changing, and deleting text on paper media, passenger display messages, and accounting/registration printouts where fare products and transaction types are listed. The Vendor shall demonstrate these software utilities during the TVM functional tests.

The Vendor shall submit printer type, model, and manufacturer for LeeTran review and approval.

The barcode encryption and printing shall occur at the local TVM level. Real time communications shall not be required to print a ticket.

Offline ticket printing shall be supported.

Any Vendor encryption keys shall be securely stored and accessed from the TVM such that they cannot be compromised if the TVM hardware is breached or stolen.

5.9.3.8 Receipt Printer

The TVM shall be equipped to print and issue receipts for fare transactions and audit tickets for maintenance activities. Receipts shall be printed on separate receipt stock using a thermal receipt printer, or functional equivalent.

The receipt printer shall issue receipts and audit tickets from paper-based roll stock that is commercially available in the U.S. Receipt stock shall follow applicable standards for service and replacement.

The receipt printer shall be able to print all alphanumeric characters in both upper and lower case and all ASCII characters. Printed characters shall be produced with a minimum height of 0.12 inches and a maximum height up to one (1) inch.

The receipt printer shall utilize a thermal print head that provides no less than 100 dots per inch (dpi) of resolution.

Thermal print heads shall produce no fewer than 250,000 receipts without misprinted pixels due to wear or electronic failure.

The receipt printer may be equipped with a cutting mechanism to cut individual receipts from the roll supply. Each cutter shall perform at least one (1) million cuts without requiring replacement or sharpening. The cutter shall be designed such that no adjustment of the cutting edges shall be required.

The configuration of receipt information including text, layout, and general design shall be possible through the configuration management tool. Space for specialized text including service alerts, special events, advertisements, or other ad hoc messages shall be possible.

5.9.3.9 Customer Interface

In addition to the display and other modules described in this section, several elements on the front of the TVM shall comprise the customer interface including, but not limited to:

- Contactless smart card reader
- Physical push buttons (limited)
- Audio interface
- Headphone jack
- Media dispense tray/slot
- Instructional graphics and text
- Information sign

Final TVM configurations shall be determined during the design review process.

A customer-facing contactless smart card reader compliant with both Type A and B variants of the ISO/IEC 14443 standard shall be installed in the TVM to perform the following functions at minimum:

- Read and/or validate contactless smart card media
- Read mobile wallets or other NFC applications
- Read third party smart cards
- Read contactless media to bring TVM out of idle state
- Load fare products or value
- Check account balance and history

The reader shall also have write capabilities as per risk mitigation strategies defined in Section 2.4: Risk Mitigation Techniques.

The smart card reader shall support common ISO/IEC 14443 (Type A and B), ISO/IEC 18092 (NFC), and closed-loop (e.g., the entire MIFARE® product line) media formats, in addition to all open payment contactless standards.

The reader shall support “read mode” while the TVM is in the idle state (to allow initiation of the interface via a contactless read), and during those portions of transactions where reading a contactless card is necessary.

The contactless reader shall be separate and apart from the contactless bank card reader that is part of the BCPU (see Section 5.9.3.5: TVM Bank Card Processing Unit). Both readers shall be clearly identified to avoid confusion.

The push buttons that are present shall follow these characteristics:

- Made of stainless steel, hardened aluminum, or other LeeTran-approved hardened and weather-resistant material
- Have tactile movement when pressed
- Be accompanied by an audible tone when pressed
- Provide less than 8 ounces of resistance when pressed
- Be protected against vandalism, including impact from customers
- Be liquid-proof and sealed from outside moisture
- Not be removable from the outside
- Compliant with all applicable ADA guidelines

The TVM shall include an audio interface and internally mounted vandal-resistant speaker to provide configurable audio tones and voice annunciation.

TVM audio volume shall be remotely and field adjustable for each TVM, and shall be audible in all station environments.

The TVM shall provide a standard jack for headphone use in addition to the internally mounted speaker. Whenever headphones are plugged into the jack, the external speaker shall be disabled, and all tones and messages shall be directed to the headphone jack.

The TVM shall include a media dispense tray or bin that shall safely hold dispensed media and receipts.

The media dispense tray shall be recessed and may be covered with a clear polycarbonate spring-loaded or weighted door. The dispense tray and its door shall be robust, scratch-resistant, visually prominent, and resistant to intrusion from the outside.

The media dispense tray shall be designed to drain any liquids that enter.

TVM instructional graphics and text shall be modular and able to be changed to match different TVM configurations, if applicable.

Instructional graphics shall include diagrams that clearly depict proper insertion orientation of bills and bank cards into their respective slots.

The design of instructions and graphics shall minimize glare and other effects of sunlight and ambient lighting.

TVM instruction text shall include raised lettering and braille instructions in conformance with ADA requirements.

Conceptual designs of the TVM instructions and related graphics shall be submitted during design review for LeeTran review and approval.

The TVM shall incorporate a removable information signage holder in a prominent position to display printed information, including but not limited to:

- Fare pricing and information
- LeeTran contact information
- Service announcements
- Advertisements or other promotional items

The information signage holder shall be suitable for use in an outdoor environment, securely mounted, and may supplement information on the customer display.

LeeTran shall be responsible for the design and production of the signage to be placed in the information signage holder.

The TVM front panel shall include a convex “fish eye” mirror, which shall enable a customer using the TVM to see behind them.

5.9.3.10 Locks

The TVM outer door lock shall utilize an electronic high-security lock such as Cyber Lock® or LeeTran-approved equivalent. Locks shall be secured locks, programmable to more than one (1) key.

The keyways for all high security keys shall be registered to LeeTran, and replacements shall be available only to authorized personnel, or their authorized representative.

Sensors shall detect the status of the outer door lock. The TVM door shall be considered open and unsecure if the outer door lock is not in the fully locked position.

All security locks shall capture and hold the key whenever the lock is open.

The key shall be able to fit on a standard key ring and chain assembly to be carried by revenue staff.

5.9.3.11 Alarms

Each TVM shall be equipped with an alarm unit that shall have the ability to monitor machine security conditions and provide alerts to the back office in real-time. If the TVM does not have power or is disabled for any reason, the alarm unit shall continue to operate independently and monitor the machine for security breaches and impacts.

The alarm unit shall be disarmed through an authorized entry, and shall be triggered by an unauthorized entry. Each time an alarm event is detected, the event record with date and time shall be stored and transmitted to the back office.

Adjustable sensors shall detect direct physical impacts to the TVM enclosure, breakage of the customer display, and attempts at unauthorized or forced entry. The alarm unit shall activate the siren as soon as the impact sensor is triggered. The siren shall shut off and re-arm after an adjustable time period unless continued impacts or attempts at intrusion are detected.

Access to the interior of the TVM for maintenance and servicing using an authorized key shall disable the alarm while service is being performed. If authorized TVM access is not followed, the intrusion alarm shall be activated and the TVM shall record and transmit a security event.

A security and alarm process for TVM access shall be submitted for review and approval by LeeTran during the design review process.

5.9.3.12 Communications

The TVM shall communicate with the back office through a secure communications interface to send and receive data including but not limited to:

- Transaction information
- Event (alarm and maintenance) status alerts
- Time synchronization information
- Positive/negative lists
- Configuration parameters
- Remote commands or status inquiries

The list of communications information shall be finalized during the design review process.

All communications between the TVM and back office shall be via a hardwired connection, with optional wireless connectivity (see Section 5.9.3.13: TVM Cellular Modem).

If required for PCI certification, a second Ethernet port shall be provided to transmit payment data separate from other transaction data.

The TVM cabinets shall be capable of housing a network switch to enable all devices in one area to be connected through a single connection to the station communications room, and limit the number of Ethernet runs required to each installation location.

The capability to add a modular cellular modem shall be possible if requested by LeeTran at locations that do not have a hardwired network connection (see Section 5.9.3.13: TVM Cellular Modem).

Each TVM shall incorporate a Supervisory Control and Data Acquisition (SCADA) interface. The SCADA signals may be daisy-chained from other devices or fed directly from a station input.

The TVM SCADA interface may be tied to local station controllers, emergency management control panels, or remote control systems to initiate emergency mode or other SCADA conditions. The TVMs shall remain in emergency mode or other SCADA condition until the SCADA signal is closed or deactivated.

The SCADA control signals shall supersede any other control signals, including those from the monitoring management tool (see Section 7.4: Monitoring Management). For example, if the SCADA signal initiates emergency mode and a “enter revenue service” signal is sent from the monitoring management tool, the TVM shall remain in emergency mode.

5.9.3.13 Cellular Modem (Optional)

The Vendor shall optionally provide a modular 3G/4G/5G cellular modem as a backup communications channel.

The optional modular cellular modem shall support communication over 3G/4G/5G data networks on all major US carriers including but not limited to Verizon, AT&T, T-Mobile, and Sprint.

The modular 3G/4G/5G cellular modem shall support all 3G, 4G, and 5G frequencies for all major U.S. carriers (e.g., 3G GSM EDGE/CDMA, 4G HSPA+/LTE, etc.).

Cellular communications shall operate on a 4G/LTE/5G data network (or faster) where available, and fall back to 3G when necessary. LeeTran shall contract directly with its cellular carriers for cellular data service.

The 3G/4G/5G cellular modem shall provide the same connectivity functionality as the hardwired Ethernet connection. All TVM and back office functions shall operate the same whether the TVM is connected via wire or wireless.

5.9.3.14 Power Supply

The TVM shall be equipped with a modular, filtered power supply that shall be connected to the incoming grounded electrical service (120 V) and deliver all of the necessary operating voltages for the machine. Voltages internal to the TVM shall not exceed 125 V.

A power switch shall turn the power supply on or off, and shall be separate from the main circuit breaker that removes all power to the TVM. There shall be no safety risks to maintenance personnel with the machine power turned off.

A ground-fault circuit interrupter (GFCI) duplex convenience outlet may be installed within the interior of each cabinet. This outlet shall be protected by a separate circuit breaker internal to the machine enclosure and shall be grounded.

Appropriate warning labels shall be provided on or near any components or cables that may have hazardous voltages present.

If the TVM shuts down due to loss of power, upon restoration of power the TVM shall automatically resume operations.

The TVM shall be equipped with a supplemental battery power supply. This battery power supply shall be used to allow a controlled shut down in the event the incoming voltage falls below the reliable machine operating voltage or in the event of loss of alternating current (AC) power to the machine. Once primary power is restored, the backup battery shall be recharged.

The supplemental battery shall be rated at four (4) years or 500 discharge and charge cycles.

5.9.4 Software

5.9.4.1 Transaction Records

TVMs shall generate, store, and transmit a discrete data record for each transaction performed.

Each transaction record shall be unique and shall include the following information, at a minimum:

- Date and time
- Device ID
- Station/Location ID
- Card/account number
- Transaction type (e.g., card sale, value load, account inquiry)
- Cards sold (where applicable)
- Stored value or fare products loaded (where applicable)
- Tickets sold
- Fare category (e.g., full fare, reduced fare)
- Transaction value (where applicable)
- Payment type and amount
- Transaction result (e.g., success, failure)
- Transaction ID
- Ticket Serial #

Transaction record details shall be finalized during the design review process.

TVMs shall maintain local data records in non-volatile memory in the event that communications to the back office systems are unavailable. The local records shall only be removed when verification of database storage of each record is received from the back office.

Any offline transactions shall be recorded as such as part of the transaction data, so that offline transactions can be easily identified and tracked.

5.9.4.2 Audit Registers

All TVMs shall provide audit register counts for purposes of data tracking, verification, and analysis. The audit registers shall store counts and values of specific events in non-volatile memory and shall not be able to be modified or erased.

The audit registers shall maintain counts and values of the following events as applicable:

- New fare media issued
- Fare product sold
- Stored value loaded
- Account inquiries
- Cash transaction, by amount and denomination
- Credit Card transactions, by amount
- Debit Card transactions, by amount
- Count of approved and denied transactions
- Count of read failures

Final audit register events shall be determined during design review.

Audit register records shall be transmitted to the back office at the end of the service day for reconciliation, or based on a configurable time period.

5.9.4.3 Events and Alarms

TVMs shall provide real-time status of device events and alarms through the monitoring management tool (see Section 7.4: Monitoring Management). The TVM shall also maintain local event and alarm logs in the event that communications to the back office are unavailable.

In addition to transmitting real-time events and alarms, the TVM shall transmit periodic “heartbeat” messages that confirm communication with back office and basic status. The “heartbeat” frequency shall be adjustable by TVM.

The TVM shall generate, store, and transmit alert information for relevant events, including but not limited to:

- Power on
- Power off
- Reboot
- Back office communications failed/restored
- Maintenance parameter changed
- New fare set received/activated
- New software received/activated
- New configuration data received/activated
- New list received/activated

- Anti-virus definitions and security updates downloaded
- Internal clock reset
- TVM clock error
- Data memory near-full/full
- Low battery
- Failed bank card authorization request
- Defective media captured in reject bin
- Maintenance technician login and logout
- Maintenance parameter changed
- Revenue service technician login and logout
- Bill vault removed/installed
- Coin vault removed/installed
- TVM “heartbeat” check

Final events and alerts shall be determined during the design review process.

The TVM shall detect when the bill/coin vault is near-full and full, and record and transmit an event record. The determination of a nearly empty condition shall be adjustable by the LeeTran for each TVM.

The BHU shall cease to accept bills and indicate a “no bills accepted” message on the display when the bill vault becomes full.

The BHU shall automatically reset all appropriate counters when the bill vault is removed and/or replaced.

The coin acceptor shall not accept coins once the vault has reached 90% capacity, or another configurable amount.

The SED shall monitor the contents of the card stock and transmit an event to the back office when the inventory is below a configurable threshold, and when the inventory is empty.

The Paper Media Dispenser shall monitor the contents of the paper stock and transmit an event to the back office when the inventory is below a configurable threshold, and when the inventory is empty.

The receipt printer shall monitor the contents of the receipt paper stock and transmit an event to the back office when the inventory is below a configurable threshold, and when the inventory is empty.

Whenever an alarm siren or condition is active, the TVM shall go out of service. When the alarm condition ends, the TVM shall perform self-diagnostics, and resume normal operations.

Events shall be considered alarm conditions of varying severity. The assigned priority of all alarms shall be configurable by LeeTran.

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. Alarm conditions may be cleared either automatically by the TVM or manually by service staff.

The TVM shall have capacity to locally store a minimum of one (1) year of event and alarm data.

5.9.5 Operations

5.9.5.1 Voice Annunciation

When the headphone jack is used, a voice annunciation system with adjustable volume shall provide context-sensitive voice messages, in audio form, conveying information shown on the device display to meet all ADA requirements.

Each voice annunciation message shall occur as close as possible to the event or change in transaction status as possible, and be as brief as possible to convey the necessary information.

The voice annunciation shall support multiple languages in concert with the multi-lingual capabilities in Section 5.9.5.2: Multi-Lingual Capabilities. Required languages shall be finalized by LeeTran during the design review process.

5.9.5.2 Multi-Lingual Capabilities

The TVM shall include a selection button to change the display and the voice annunciation language between English, Spanish, and up to three (3) other available languages.

The Vendor shall provide a third-party to provide audio and text translations. The audio and text translations shall be submitted for LeeTran review and approval.

English shall be the default language while the TVM is in idle mode and the TVM shall return to English after a transaction is completed or cancelled.

The alternate language button shall be active at all times and available on all screens while the TVM is in service. Pressing an alternate language button at any time shall cause the display and audio messages to be provided in the selected language.

Supported languages shall be provided by the LeeTran during design review.

5.9.5.3 Customer Operations

The TVM shall provide the following core functions to support customer operations:

- Sell one (1) or more new cards in a single transaction where the associated transit accounts are initialized only (no value) or are loaded with value
- Load stored value and all available fare products to previously issued cards (e.g., transit accounts)
- Query the back office to retrieve the balance and transaction history for existing transit accounts
- Sell one (1) or more new tickets in a single transaction
- Interface with other systems that are integrated with the TVM. A final list of customer functions shall be determined during design review.

The operating status, configuration, and active fare set for each TVM shall determine the available options. Only options that are enabled shall be shown to the customer.

For all transactions, the TVM shall display a progression of screens to the customer that shall be easy to understand and intuitive.

All information presented by the TVM shall be capable of being modified by authorized LeeTran staff. Modifications shall be able to be made remotely or by removable storage media.

A detailed customer operations document, including screen flows depicting “snapshots” of each screen layout arranged as a logical flow chart shall be provided during the design review process for LeeTran review and approval.

Each TVM shall be ready to respond to a customer input when in the idle condition. Input may be a touchscreen press, a button press, or touching fare media to the contactless reader.

The TVM “home” or starting screen, shall include the following options at a minimum:

- Purchase a new card or cards (where applicable)
- Reload an existing card
- Check card balance
- Purchase a new ticket or tickets
- “Express” purchase of a card with one (1) ride (product configurable)

Screen flows and functions shall be finalized during the design review process.

The TVM shall have clear instructions to indicate the steps a customer must follow to perform any transaction. The sequence of steps shall be clearly indicated by the use of graphics and text. Wherever possible, universal graphics and symbols shall be used that can be understood without having to read the displayed text.

The TVM shall emit distinctive audio tones to provide feedback each time the touchscreen or a button is pressed.

English-speaking customers shall be able to purchase a new card (with stored value or a pass), load value to an existing card, or purchase a ticket in a maximum of three (3) screens.

For new card purchase transactions, the SED shall read and/or encode cards as necessary to capture account numbers and initialize the media. The TVM shall send the card data to the back office, along with all relevant fare purchase and payment information, to create and load the associated transit accounts and generate sales transactions.

For card reload transactions, the external contactless reader shall read (and, if necessary for risk mitigation, encode data to) the customer’s card. The TVM shall send the card data to the back office, along with all relevant fare purchase and payment information, to load the associated account and generate a sales transaction.

For balance check transactions, the external contactless reader shall read the customer’s card. The TVM shall send the card data to the back office to retrieve the associated balance and transaction history information.

Customers shall be able to select multiple tickets for purchase before paying, such that multiple tickets can be purchased in one (1) payment transaction.

The TVM shall send the ticket purchase data to the back office, along with all relevant fare purchase and payment information and generate sales transactions.

All transactions shall be individually recorded, stored, and transmitted to the back office by the TVM using the Vendor-provided APIs (see Section 2.3.1: Application Programming Interfaces).

All transactions shall initiate communication with the Account-Based Transaction Processor (ATP) (see Section 7.2: Account-Based Transaction Processor) to query or modify transit accounts associated with the fare media in real-time. If communications with the back office are unavailable, the TVM shall enter a limited or “degraded” mode and store the transaction data until communications are restored. Degraded functionality shall be defined during the design review process.

In offline mode, the TVM shall be able take cash payments to sell single rides or other limited fare products. The details of which products shall be sold in offline mode, and the risk mitigations strategies to be employed (such as writing to the media), shall be determined during design review.

If the TVM loses communications with the back office, upon restoration, the TVM shall automatically initiate communications and send any data generated in offline mode.

When payment is required, the TVM shall automatically detect what form of payment the customer has inserted. Customers shall not have to choose whether the transaction shall be by cash or bank card.

When paying by cash, the TVM shall permit the customer to deposit coins and bills in any sequence.

Prior to authorizing a bank card transaction, the TVM shall prompt the customer to choose whether the purchase is a credit or debit transaction. For debit transactions, the TVM shall prompt for PIN entry.

The TVM shall support Address Verification System (AVS) for bank card payments in a configurable manner that allows the AVS feature to be turned on or off by LeeTran and accommodates acceptance of both U.S. and non-U.S. issued cards. When a U.S. bank card is used for payment, the TVM shall prompt the customer to enter the billing address ZIP code.

All bank card transactions shall be authorized prior to dispensing media or loading fare products. If a bank card is declined for any reason, the TVM shall display related information to the customer and cancel the current transaction.

If bank communications are unavailable, bank card transactions shall be disabled and the TVM shall enter “cash only” mode.

The customer shall have the ability to cancel a transaction at any point before full payment has been inserted in cash or a bank card authorization has been received.

If any failure occurs during a transaction, the TVM shall automatically cancel the current transaction and indicate the cancellation on the screen.

If a transaction is canceled automatically or by the customer, all inserted cash shall be returned and credit/debit card transactions shall be reversed as necessary.

The TVM shall be configurable to provide receipts:

- Upon customer request
- Automatically for transactions above a configurable dollar value, or optionally for transactions below the configurable value
- For every transaction
- Never (when receipt stock is empty); final receipt behavior shall be configurable

All receipts shall have a printed indication that the receipt is not a valid ticket, and shall contain at least the following information:

- Machine number – up to eight (8) alphanumeric characters
- Date – month, day and the four (4) digits of the year, totaling eight (8) characters
- Time – four (4) digits separated by a colon and followed by two (2) letters “AM” or “PM,” using a 12-hour clock
- Station name or location where purchased – up to 16 characters
- Card/account number
- Value purchased and remaining balance (if applicable)
- Transaction amount
- Machine-unique transaction sequence number

Final receipt information shall be determined during the design review process.

Receipts for bank card transactions shall also include information as identified in Federal Regulations E and Z, and other information necessary to comply with banking and Federal regulations.

The TVM shall employ an adjustable time-out period to return the TVM to the idle state if no input is received between transaction steps. The time-out period shall be adjustable by authorized staff.

A screen saver may be activated after a programmable idle period has passed, and shall support the following at minimum:

- Static image in any common graphics format, e.g., JPG, TIFF, BMP, GIF
- A repeating “slide show” of static images
- Text messages and imported text-based files
- Webpages and other dynamic markup language files
- Pre-recorded video in any common format, including MPEG, WMV, MOV, AVI, H.264
- Any combination of the above

The screen saver shall automatically terminate and the TVM shall display the home screen as soon as the touchscreen or any button is pressed or a card is presented to the contactless reader.

For all new card or ticket purchase transactions, the time from acceptance of the cash payment or credit/debit card approval to media issuance shall not exceed three (3) seconds.

Where transactions produce multiple media, the time between successive media being deposited in the return tray shall not exceed two (2) seconds each.

When applicable, the receipt printer shall deposit receipts in the return tray within three (3) seconds of the completion of a transaction.

For completed or canceled transactions, the TVM readiness to begin another transaction shall not exceed three (3) seconds.

5.9.5.4 Service Operations

A detailed service operations document including service procedures and screen flows shall be provided during the design review process for LeeTran review and approval.

Each TVM shall automatically perform self-diagnostic tests upon startup, and at adjustable regular intervals (once per day by default). Self-diagnostic tests shall at minimum:

- Confirm communications with back office
- Check status of all major electronic modules
- Exercise all electro-mechanical devices
- Confirm that all software and configuration files are up to date

Any failures or exceptions identified during self-diagnostics shall be recorded in the TVM’s internal audit registers and transmitted to the back office.

Each TVM shall be capable of performing diagnostic tests that are manually initiated by service staff while the TVM is out of service and the front door is open.

Inside the TVM shall be a keypad and optional display or touchscreen for use by maintenance and revenue service personnel while the outer door is open. The customer display may be used for maintenance purposes if viewable while using the service keypad. An external keypad may be used, as long as the functional requirements are met.

The service keypad or touchscreen shall be used to enter access (login) codes and maintenance and diagnostic commands. All routine service interaction with the TVM shall be via this keypad.

A failure to login using the keypad or touchscreen after opening the TVM door shall generate an intrusion alarm.

The service display shall be used to indicate TVM error codes and shall have the capability of displaying multiple error codes, such that one (1) error code shall not need to be cleared to display other error codes.

The TVM shall not commence in-service operation until the outer door is closed and the outer door lock is returned to its fully secured position.

All access shall be traceable through the monitoring management tool (see Section 7.4: Monitoring Management) and all access transactions shall be individually recorded and transmitted to the monitoring management tool at time of occurrence.

To support revenue servicing and authorized maintenance technicians, the TVM shall produce audit tickets, including but not limited to:

- Coin vault removal/insertion
- Bill vault removal/insertion
- Software versions and TVM configuration
- TVM revenue status
- TVM maintenance alert status

Final audit ticket information shall be determined during the design review process.

Each audit ticket shall indicate at minimum: date, time, TVM number, technician name or number, component number (if applicable) and activity information (e.g., revenue details - denominations, count, and value - for bill vaults).

5.10 Inspection/Validation Device Application

5.10.1 General Requirements

The Vendor shall provide a mobile application that shall be installed on LeeTran-provided Android and Apple/iOS devices. The application shall enable LeeTran employees and partners to inspect and validate the contactless and 2D barcode fare media specified in Section 3: Fare Media, and LeeTran-issued mobile ticket barcodes. The application shall be designed for field inspection/validation and support real-time communications with the back office.

The Vendor shall include a configurable fare validation functionality that enables LeeTran personnel to collect fares by reading fare media in a mobile environment. The fare validation functionality may be used to support LeeTran-run and contracted paratransit service, and special events.

The fare inspection/validation application shall support the ISO/IEC 18092 (NFC) media format.

The fare inspection/validation application shall be designed to operate on NFC-enabled mobile handsets.

The fare inspection/validation application shall be designed to operate on the Android and Apple/iOS mobile platforms. The inspection/validation application shall be supported on the current and previous two (2) versions

of the Android and Apple/iOS operating systems at time of development.

Mobile devices shall be remotely managed through a systems integrator-provided Mobile Device Management (MDM) solution.

The provided applications shall be installed and managed using the MDM solution, which shall also control what services, applications, and functionality are accessible on the devices. By default, only the systems integrator-provided applications shall be enabled, and users shall not have access to any other device features such as phone calls, web browsing, email, etc.

The MDM solution shall include remote management and Over The Air (OTA) capability to locate, lock, disable, or erase lost/stolen devices.

5.10.2 User Interface

The fare inspection/validation application shall employ a user interface that is based on industry-accepted user interface design standards, and consider ergonomics, human factors, and graphic design best practices to assist in development of the application layout and interaction.

The fare inspection/validation application shall require login by the fare inspector via manual entry, or by reading a contactless employee badge, if available. The login shall be validated against a list of valid IDs. Repeated login rejections shall lock the device until unlocked by an administrator.

Following login, the fare inspection/validation application shall require the fare inspector to enter the route or location where inspection is occurring, and select the appropriate fare set if the validation feature of the application is on. The inspector shall be able to modify the route, location, or fare set without logging out of the application.

The fare inspection/validation application shall provide a standard interface ready to inspect/validate fare media. The application shall mirror the SAP user interface as closely as possible (see Section 5: SAP Requirements). The fare validation results shall be clearly presented to minimize confusion by employees, partners, and customers.

The fare payment status reported by the inspection/validation application shall include at a minimum the result (e.g., valid or no valid fare payment) and, if a valid payment has been found, the time and date of payment, location, fare product used, product validity, amount paid, and fare category associated with the account.

The fare inspection results shall be clearly presented to minimize confusion by inspectors and customers.

The fare inspection/validation application shall provide the inspector with a clear and visible notification when the device is offline.

The fare inspection/validation application user interface shall be subject to LeeTran review and approval during the design review process.

The fare inspection/validation application shall have ADA-compliant visual and audible indicators that provide distinctive messages for approval or denial of all fare media inspections and validations. The fare inspection/validation application shall have different visual and audible indicators for reduced fares. All fare inspection/validation application visual and audio output shall be fully configurable and subject to LeeTran review and approval during the design review process.

5.10.3 Transaction Processing

The fare inspection/validation application shall use the Vendor-provided fare inspection API (see Section 2.3.1.4: Fare Inspection API) to query the transaction history maintained within the ATP in real-time.

Consistent with risk mitigation techniques employed in the system (see Section 2.4: Risk Mitigation Techniques), the fare inspection/validation application shall be able to read any data written to the media, and receive updates of positive and negative lists from the back office to support offline processing.

All inspections shall generate fare inspection transactions that include the following information, at a minimum:

- Date and time
- Device ID
- Operator ID
- Route number/station ID
- Geolocation information (GPS data)
- Media type
- Card/account number
- Fare category (e.g., full fare, reduced fare)
- Fare instrument or product used (where applicable)
- Transfer validity (if applicable)
- Inspection result (valid, invalid, incomplete)
- Transaction ID

Final inspection transaction data shall be determined during the design review process.

In order to support fare validation functionality, the fare inspection/validation application shall communicate with the ATP (see Section 7.1: Back Office General Requirements and Section 7.2: Account-Based Transaction Processor) in real-time for the processing of fare payments using the Vendor-provided fare payment API (see Section 2.3.1.3: Fare Payment API).

Prior to transmitting a fare payment transaction to the ATP, the fare inspection/validation application shall perform local fare media validity checks, including checks against any locally-maintained positive and negative lists, as deemed necessary for security and the efficient processing of transactions.

The transaction result from the ATP shall include:

- Validation result
- Fare product used
- Fare amount charged
- Balance remaining
- Fare product expiration date
- Fare product remaining rides or days
- Rider class
- Transfer time remaining
- Low balance warning (threshold to be configurable)
- Time-based pass expiration warning (threshold to be configurable)

Displayed results shall be determined during the design review process. Results shall be configurable, set by downloadable configuration parameters from the back office.

The fare inspection/validation application shall provide a payment result within 500 ms of valid fare media being presented for all fare payment types.

The fare inspection/validation application shall be able to accept fare payments in an offline mode, and accommodate scenarios where a full authorization cannot be received within the required timeframe. In these scenarios, risk mitigation strategies shall be employed to limit exposure for declined payments (see Section 2.4: Risk Mitigation Techniques).

All transactions generated in an offline mode shall be sent to the ATP immediately upon restoration of communications.

The fare inspection/validation application shall generate, store, and transmit a discrete data record for each transaction and/or validation performed.

Each transaction record shall be unique and shall include the following information, at a minimum:

- Date and time
- Device ID
- Operator ID
- Route number/station ID
- Geolocation information (GPS data)
- Media type
- Card/account number
- Fare category (e.g., full fare, reduced fare)
- Action performed
- Fare instrument or product used (where applicable)
- Transaction value (where applicable)
- Transaction result (e.g., success, failure)
- Transaction ID

Transaction record details shall be finalized during the design review process.

The fare inspection/validation application shall maintain audit registers that track the following information at a minimum:

- The total count and value of all transactions completed by the mobile fare validation application since data was last uploaded to the back office.
- The date and time of the last successful data upload to the back office.

These registers shall be modified only by the fare inspection/validation application itself and shall not be manually alterable.

Audit register records shall be transmitted to the back office at the end of service day for reconciliation, or upon a configurable time period.

5.11 DCU Software

A DCU shall be provided that shall interface with the onboard SAP and display fare validation results to the bus operator.

The DCU shall be as simple and compact as possible while providing the required functionality in this section.

The DCU shall display fare payment results transmitted from the SAP, including but not limited to:

- Validation results
- Fare amount charged
- Fare balance remaining
- Fare product used
- Rider class
- Transfer time remaining
- Low balance warning (threshold to be configurable)
- Time-based pass expiration warning (threshold to be configurable)
- Card/account status (e.g. blocked and reason)

The operator may be shown additional fare payment details that are not shown to the customer.

The DCU shall include at least four (4) physical buttons to perform functions in the future, if needed. Touch screen shall also be acceptable.

The DCU communication interfaces shall conform to open communication standards, including:

- EIA-232/422
- RS-435
- J1708/1587
- 10/100 Base-T Wired Ethernet
- Bluetooth
- USB

The communication interface to be used shall be determined during the design review process and shall ensure adequate support for all DCU capabilities.

Communications utilized in the exchange of data between the DCU, the SAP, and other onboard systems shall be fully documented and the property of LeeTran.

The DCU enclosure and components shall be made of material suitable to service under the full range of the specified bus environmental and operating conditions (see Section 5.1.2: Operating Environment).

DCU housing shall be resistant to corrosion, abrasion, scratching, impacts, and vandalism, and withstand standard bus cleaning materials. DCU housing color and finish shall be such that it minimizes reflection and is highly resistant to fading, cracking, and peeling. The device shall follow all common design requirements in Section 17: Design Requirements.

All required mounting hardware and brackets for each bus type shall be provided by the Vendor.

The DCU shall be installed in a position to allow bus operators to observe fare transactions without interfering with other bus controls or indicators. The DCU shall in no way obstruct the bus operator's view.

The DCU shall be designed and mounted so that it can be quickly adjusted by the bus operator for optimal viewing angle. After adjusting, the mounting hardware shall not allow the DCU to shake or become loose as a result of shock and vibration encountered during normal bus operation.

Final DCU specifications and performance requirements shall be presented for LeeTran review and approval during the design review process.

If supported by the DCU interface, the Vendor may choose to integrate the DCU, rather than the SAP, with the CAD/AVL/APC system (see CAD/AVL/APC section).

5.12 Ticket Office Terminal (TOT)

5.12.1 General Requirements

The TOT shall be a modular device, and shall support multiple configurations, depending on the peripheral modules included. The TOT hardware shall be optimized for its intended use and configuration.

The TOT shall be designed to permit rapid exchange of the device and peripheral modules to restore service in minimal time. Repairs shall be performed in the field and no special tools or instruments shall be required for exchange of modules.

The TOT shall provide all functions available and shall be installed for walk-up customer transactions. The device shall include:

- Integrated touch-screen and computer enclosure
- Separate keyboard and mouse
- Contactless smart card reader
- 2D barcode reader
- Cash drawer
- Bank card processing module
- Customer display
- Receipt printer
- Check reader
- Ticket printer
- Document scanner
- Extended-use smart card printer/encoder
- Uninterruptible power supply
- Communications interfaces as necessary

The TOT and peripheral modules shall be subject to LeeTran review and approval.

To accommodate the required variety of installation locations, the TOT (excluding peripheral modules) shall be compact and easily positioned for user comfort and ergonomics.

The TOT shall conduct a variety of transactions. At minimum, these transactions shall include:

- Sell all supported fare media (and create new transit accounts)
- Sell all supported fare products (e.g., stored value and passes) and load fare products to transit accounts
- Query transit account status (e.g., associated rider classification, active/inactive, blocked/unblocked)
- Query fare payment transaction history
- Query sales transaction history
- Query adjustment transaction history
- Enable fare product for autoload (requires funding source in customer account)
- Generation of fare payment reversal (e.g., cancellation)
- Generation of sales reversal (e.g., refund)
- Generation of an account adjustment (e.g., credit or debit)
- Transfer of balance between two (2) accounts
- Block/unblock card, account, or individual fare product
- Lost, stolen, or damaged card replacement (e.g., associate new card with existing account)
- Generation of an opt-out refund (e.g., close transit account and issue refund)

- Create new individual customer account
- Create new institutional customer account
- Query customer account status/data
- Modify customer account data
- Modify institutional account data
- Register (e.g., link) a transit account to an individual or institutional customer account
- Unregister (e.g., unlink) a transit account from an individual or institutional customer account
- Add a funding source to an individual or institutional customer account
- Close an individual or institutional customer account
- Encoding, printing, and issuance of personalized extended-use fare media (when configured to do so), including the addition of a photo

5.12.2 Hardware

5.12.2.1 Personal Computers

The TOT shall include an integrated flat panel touchscreen display with no less than eXtended Graphics Array (XGA) resolution.

The touchscreen shall provide suitable touch sensitivity and resolution to satisfy operator selection and input requirements.

The TOT shall include integrated Gigabit Ethernet or a cellular broadband modem to satisfy the requirements of the configuration.

If possible, there is a preference for the TOT to be delivered as a web-based application, where the required peripheral modules could also be attached to existing PCs.

The TOT shall be designed with an adjustable monitor to accommodate the ergonomic needs of the ticket attendant.

5.12.2.2 Keyboard and Pointing Device

The TOT shall include a separate full-sized keyboard and a mouse with scrolling wheel.

The TOT keyboard and pointing device shall be adjustable for mouse pointer speed, sensitivity, and other user configurable options.

The TOT shall also be designed with an adjustable keyboard to accommodate the ergonomic needs of the ticket attendant.

5.12.2.3 Contactless Smart Card Reader

The contactless smart card reader shall be a separate module cabled to the TOT.

The TOT shall support the ability to interface with two (2) contactless smart card readers, one (1) each for the customer and the clerk.

5.12.2.4 2D Barcode Reader

The 2D barcode reader shall be a separate module cabled to the TOT.

The TOT shall support the ability to interface with two (2) barcode readers, one (1) each for the customer and the clerk.

5.12.2.5 Cash Drawer Module

The cash drawer shall open only under command of the TOT, which shall monitor the status of the drawer at all times.

The cash drawer shall incorporate an insert with space for five (5) bill denominations and five (5) coin denominations.

When the cash drawer opens or closes, an alarm or bell shall sound indicating when the drawer has released and is open, and when the drawer has been closed and is locked.

The cash drawer shall accommodate installation under a counter, be pry-resistant and be made of high-quality, heavy-gauge steel.

5.12.2.6 Bank Card Processing Module

The TOT shall be PCI- and EMV-certified for the acceptance of bank- issued credit and debit cards using all common formats based on the latest version of the standard at the time of Final Acceptance. TOTs shall be capable of re-certification with newer versions of the PCI and EMV standards via software upgrades as necessary.

The bank card processing module shall be an integrated module cabled to the TOT.

The bank card processing module shall include:

- Magnetic stripe reader
- Contactless bank card reader
- Contact (or chip) bank card reader
- PCI- and ADA-compliant PIN pad

The contactless bank card reader shall read and support all open payment contactless standards, including but not limited to:

- VISA payWave®
- MasterCard PayPass®
- American Express ExpressPay®
- Discover Zip®
- Contactless EMV
- Mobile wallets including Android Pay/Apple Pay/Samsung Pay

The bank card processing module shall include a secure bank card PIN pad. The layout of the keys on the PIN pad shall be similar to those of touchtone telephones, and the central “5” key shall have a raised dot or other identifying tactile feature to aid the visually impaired, in compliance with all applicable ADA requirements.

The bank card processing module shall employ PIN encryption as required in accordance with banking requirements. The Vendor shall supply bank card processing modules with production encryption keys injected in a secure, PCI-compliant manner.

The PIN keypad shall support PIN entry when magnetic stripe debit cards are used, and whenever EMV-enabled cards are used and transaction procedures dictate. The PIN pad may also be used to enter ZIP codes to satisfy address verification requirements.

The TOT shall support the ability to interface with two (2) bank card processing modules, one (1) each for the customer and the clerk.

The TOT shall include a check reader with real-time verification capabilities.

5.12.2.7 Receipt Printer

The TOT receipt printer shall print on a single roll of continuous thermal paper.

The receipt printer shall provide for easy loading of a new paper roll.

The receipt printer shall have a cutting edge to enable the operator to manually separate the receipt from the roll.

The configuration of receipt information including text, layout, and general design shall be possible through the configuration management tool. Space for specialized text including service alerts, special events, advertisements, or other ad hoc messages shall be possible.

5.12.2.8 Customer Display

The customer display shall convey transaction price, status, and other pertinent information.

Alternatively, the TOT shall use audio to convey transaction price, status, and other pertinent information for persons with visual impairments.

The customer display shall separately mount on a pole or other support for optimum visibility for all customers, including those in wheelchairs.

Audio shall be provided via an integrated speaker or separate speaker mounted within a LeeTran-specified distance of the customer display.

The customer display shall use backlit liquid crystal display (LCD), light-emitting diode (LED), or other highly visible display technology suitable for the office environment.

The customer display shall provide no less than two (2) lines of text, with minimum 24 characters per line, with each character no less than 0.5 inches high.

5.12.2.9 Scanner

When configured to issue personalized fare media, the TOTs shall include a digital scanner for capturing customer eligibility documents.

The scanner shall support the capture of black & white and color images at a resolution of at least 1200 x 1200 dpi.

The scanner shall support the auto-feeding of documents and support double-side scanning at no less than 10 pages per minute.

5.12.2.10 Extended Use Smart card Printer/Encoder

The Vendor shall include a single integrated EU smart card printer/encoder module that shall utilize re-transfer printing technology, and shall encode EU smart cards with requisite data (such as an encrypted token) in coordination with the printing process.

The EU smart card printer/encoder shall print edge-to-edge (e.g., "full bleed") in at least four (4) colors (Yellow, Magenta, Cyan, Black [YMCK]), and shall apply the printed images to a laminate film and then apply the laminate to either side of the card.

The EU smart card printer/encoder shall employ easily replaceable ribbons for the transfer printing and lamination films.

The EU smart card printer/encoder shall provide print resolution no less than 300 dots per inch.

The EU smart card printer/encoder shall produce at least 75 cards per hour.

The EU smart card printer/encoder shall include input and output card hoppers with a capacity of no less than 100 cards each, which shall be lockable for security.

Upon successful printing and encoding, the EU smart card printer/encoder shall inform the TOT of the successful issuance of each card, and the identification number of each issued card.

5.12.2.11 Communications

The TOT shall communicate with the back office via secure Internet connection to send and receive transaction information, event and status information, clock synchronization information, positive/negative lists, and configuration parameters. This shall be possible both automatically at scheduled times and manually by authorized users.

All communications between the back office and the TOTs shall be via a direct Ethernet connection or cellular broadband data modem.

For all transactions requiring back office access to a transit account, or establishing a new account, the TOT shall communicate with the back office in real-time using the Vendor-provided APIs (see Section 2.3.1: Application Programming Interfaces).

Transactions requiring back office access to a transit account shall be disabled if the TOT is unable to communicate with the back office.

TOT communication with the back office shall be able to be initiated manually at any time without affecting the automated procedures.

If the TOT has missed scheduled communications with the back office, upon restoration of communications, the TOT shall automatically initiate communications.

5.12.2.12 Uninterruptible Power Supply

Each TOT shall receive power from a dedicated Uninterruptible Power Supply (UPS) with sufficient battery capacity to operate all components of the TOT for a minimum of 10 minutes.

The UPS shall allow the TOT to perform a controlled shut down without any loss of data whenever the UPS determines that there has been a loss of primary power.

The UPS shall provide no less than 500 joules of overvoltage (surge) protection for all connected devices.

5.12.3 Software

5.12.3.1 Operating System and Application Software

The TOT shall utilize a standard, current Microsoft Windows® operating system. All OEM-supplied operating system and application software shall be subject to LeeTran review and approval during the design review process.

The TOT shall use application software that is developed with a high-level language and that supports all functions described herein.

If risk mitigation (e.g., positive/negative) lists are employed (see Section 2.4: Risk Mitigation Techniques), the TOT shall receive and store updated lists from the back office. If a card presented for replenishment is on a risk mitigation list, the TOT shall act accordingly.

Once installed, the TOT shall not enter service until it has communicated with the back office to receive current fare sets, application software, administrative and maintenance logins, positive/negative lists, and other configuration data.

Authorized users shall be able to remotely monitor and manage the TOTs using the monitoring management tool (see Section 7.4: Monitoring Management). Remote management functions shall include:

- Changing configuration parameters
- Enabling and disabling payment methods
- Downloading data
- Extracting transaction and event records
- Synchronizing date and time

On each TOT, the Vendor shall supply, install, and configure client versions of anti-virus and anti-malware software. The TOT shall automatically install updates to the anti-virus and anti-malware software upon receipt from the CDS.

The Vendor shall submit descriptions of the TOT software design for LeeTran review and approval. TOT software design submittals shall include:

- TOT data registers
- TOT transaction, event, login, etc., records
- TOT operator interface
- TOT configuration parameters and their value range
- TOT risk mitigation list storage, update, and processing (if applicable)
- TOT transaction limitation procedures
- TOT setup and administration procedures
- TOT login types and permitted functions
- TOT anti-virus and anti-malware software and procedures

5.12.3.2 Data Records

The TOT shall generate transactions and events, including operator login and logout and diagnostics. Each data record shall incorporate a unique identification number for that TOT and day, and shall be date/time stamped.

Each TOT customer transaction record shall consist of the following, at minimum:

- Date and time
- Device ID
- Location ID
- Operator (e.g., clerk) ID
- Card/account number
- Transaction type (e.g., card sale, value load, account inquiry)
- Last four digits of credit/debit card (if applicable)

- Cards sold (where applicable)
- Stored value or fare products loaded (where applicable)
- Fare category (e.g., full fare, reduced fare)
- Transaction value (where applicable)
- Payment type and amount
- Transaction result (e.g., success, failure)
- Transaction ID

Transaction record details shall be finalized during the design review process.

When a user signs on to the TOT, the following data shall be stored in a data record:

- Date and time
- Device ID
- Location ID
- Operator ID
- Login attempts

When the user logs off the TOT, the device shall store a similar record.

The TOT shall be capable of detecting basic internal malfunctions and shall annunciate failures directly on the operator display and to the monitoring management tool (see Section 7.4: Monitoring Management). The malfunction detection shall cover at least failure of power or control circuitry, and any failure of the contactless smart card reader that could result in a false, incomplete, or corrupted encoding of a smart card or ticket.

The TOT shall be capable of recording data locally representing no less than 1,000 events, including changes in status, communication problems, and problems detected during the automatic diagnostic testing. At a minimum, each event record shall include:

- Date and time
- Device ID
- Event code
- Any associated event data
- Identifier of the failed test
- Iteration number of test
- Reason for test failure (unique code)
- Additional information to define the nature of the failure

Each TOT shall contain audit registers that track the following information at a minimum:

- The total count and value of all transactions completed by the TOT since data was last uploaded to the back office.
- The date and time of the last successful data upload to the back office.

These registers shall be modified only by the TOT itself and shall not be manually alterable.

Audit register records shall be transmitted to the back office at the end of service day for reconciliation, or upon a configurable time period.

5.12.3.3 Software Updates

When required, modification of the TOT application software and any OEM application or operating system software shall be performed by downloading new software from the back office. The back office database shall record and track the version number of all such software in each TOT, and the date that the software versions were downloaded and installed.

Each time the TOT communicates with the back office, the back office shall transmit any updates to the TOT application software. The TOT shall not commence updating the application software until it has received and verified the complete update.

Upon receipt and verification of the software update, the TOT shall apply the update (rebooting if necessary) at a time configurable by LeeTran for each TOT.

5.12.3.4 Configuration Control

Operating parameters shall be downloadable to the TOT from the back office via the wide area network provided by LeeTran and cellular data networks, as appropriate for each installation or TOT configuration.

The TOT shall support configurability through numerous adjustable parameters. The TOT application software shall at minimum support configuration for:

- Value of deposit to be collected for new or replaced fare media
- Fare products available for sale and upgrade
- Pricing
- Payment method selection
- Receipt content
- All text and touchscreen labels
- Authorized users and passwords (if stored locally at the TOT)
- All other relevant fare set entries

5.12.3.5 Fare Media Inventory Control

Upon issuance and/or initialization of a fare media, the TOT shall record an issue record, including the date, time, fare category, card identification number, and other pertinent information of the smart card and any associated account. The TOT shall transmit this record to the back office.

The Media Inventory Management System (MIMS) (see Section 7.6: Media Inventory Management) shall track the fare media distributed to each LeeTran sales location. Using the list of cards issued to each sales location and the issuance and/or initialization records previously transmitted to the back office, it shall be possible for authorized users to query the MIMS for the identification numbers and total quantity of smart media that remain in each sale location's inventory.

5.12.4 Configuration

5.12.4.1 Login and Logout

The TOT shall remain inactive and unable to perform any functions unless a proper login has been completed.

The TOT shall support at least three (3) levels of logins with assigned functionality configurable by LeeTran.

The TOT shall require the operator to identify the starting cash drawer balance at the start of each shift.

The TOT shall support relief shifts, with the replacement of the cash drawer. The TOT shall also maintain statistics for the relief shift separately and shall not affect the main shift information.

If the TOT has not been used in a number of minutes configurable by LeeTran, the user shall be automatically logged out. The TOT shall close all files and display the login prompt screen.

Upon logging out or otherwise indicating an end-of-shift condition, the TOT shall produce a report and receipt depicting the ending balance of the cash drawer.

The TOT shall store a data record for each successful login, each unsuccessful login, and each logout.

5.12.4.2 Sales

The TOT shall function as an intelligent cash register, allowing customers and clerks to interact in a manner that is as similar as possible to normal retail sales transactions. Sales transactions shall include:

- Purchase of new fare media
- Adding of value and passes to existing media and accounts
- Supported customer service and sales functions

The final list of TOT functions shall be finalized during the design review process.

When issuing a new EU smart card, the TOT shall permit the clerk to select whether a LeeTran-configurable card fee (e.g., deposit) is to be collected.

The purchase of multiple cards, tickets, and multiple fare products for each account shall be able to be performed in a single transaction, with payment collected once.

When configured to conduct sales, the TOT shall support a variety of payment methods, including:

- Cash
- Checks
- Agency and third-party issued vouchers, including transit checks
- Bank cards (credit and debit)
- Charge to institutional accounts
- Money Orders
- Any combination of the above

The TOT shall also support the payment, or partial payment, for the purchase of a pass using stored value in the same transit account where the pass is being loaded.

The TOT shall support split payments where up to two (2) payment methods, including multiple bank cards, shall be able to be used to complete payment for a single sale.

For each sales transaction, the TOT shall enable the clerk to select the payment method. If the clerk selects more than one (1) payment method, the TOT shall prompt the clerk to enter the amount to be paid using each payment method.

Cash transactions shall provide the total amount due, allow the clerk to enter amount tendered, and display the change due.

The TOT shall control and monitor the cash drawer, and open the cash drawer upon calculation and display of the amount of change due.

The TOT shall print a customer receipt for every completed sales transaction. Receipts shall include the resulting status and value of the customer's account, where applicable.

For each completed transaction, a sales transaction shall be stored and transmitted to the system back office using Vendor-provided fare distribution API (see Section 2.3.1.2: Fare Distribution API).

The TOT shall enable a clerk to display (and print via the receipt printer) totals of all completed transactions by that clerk for the current day.

The TOT shall enable an administrative user to display (and print via the receipt printer) totals of all conducted transactions for the current and each of the prior seven (7) days. These totals shall indicate daily totals by clerk and payment type. As necessary, the TOT may retrieve this data from the back office.

5.12.4.3 Personalized Media

When configured to do so, the TOT shall include the necessary software and peripherals to enable LeeTran to issue personalized cards to customers eligible for reduced fares, LeeTran employees, and in support of other fare programs.

Personalized cards shall include the cardholder's name and photograph printed on one (1) side of the card, accompanied by other LeeTran-defined graphics and information.

The Vendor shall supply printing templates (also known as "masks") using LeeTran-supplied graphic designs for all personalized card types. The TOT shall support no less than 25 pre-loaded templates from which the user shall select prior to printing. Where possible, template selection shall be automatic based on card type.

When printing a personalized card, the TOT shall scale the photo image to fit within the area defined by the printing template without distorting the image or changing its native aspect ratio.

The TOT shall support issuance of personalized cards in individual and bulk production modes.

For individual card personalization, a digital camera controlled by the TOT shall capture the customer images as necessary.

Upon successful production of the personalized smart card, the TOT shall store a transaction record, including all personalization data, the identification number of the issued card, the digital photograph image, and all other transaction data. The TOT shall transfer the entire transaction record, and all accompanying data, to the back office.

The TOT shall exclusively support production runs (using data imported from an external source) for bulk card personalization in quantities of one (1) to no less than 100 cards per batch.

For bulk card personalization production runs, the TOT shall use data files imported in a Vendor-specified format. The data files shall include the customer name, digital photograph, and other information as required.

Upon successful production of each card, the TOT shall store a transaction record similar to those created for individually personalized cards, and transmit all records to the back office.

LeeTran shall issue customers with reduced fare and paratransit privileges smart cards with personalized information printed on the card, including a digital photograph and the name of the cardholder. Using the appropriate customized printing template for reduced fare and paratransit media, the TOT shall print and issue personalized cards.

The TOT shall support the capture of all data needed to validate, register, and issue personalized fare media for reduced fare and paratransit customers.

The TOT shall support manual entry of reduced fare and paratransit customer account registration data using a simple graphical user interface.

The TOT shall capture reduced fare and paratransit applications and supporting documentation using the Vendor-provided document scanner.

The TOT shall capture reduced fare and paratransit customer photographs using the Vendor-provided camera.

All customer data captured and used by the TOT shall be securely stored within the CRM system customer database (see Section 7.7.2: Customer Database) using the Vendor-provided APIs (see Section 2.3.1: Application Programming Interfaces) and shall not be stored locally on the TOT.

The Vendor shall provide a separate printer/encoder for bulk card personalization production. The bulk printer/encoder shall include a detached mobile encoding unit.

The bulk printer/encoder shall have the capacity to process at least 6,000 personalized cards per week.

5.12.4.4 Fare Media Inquiry

Whenever fare media is presented to the TOT contactless smart card reader, the TOT shall read the card and query the back office using the Vendor-provided transit account management API (see Section 2.3.1.5: Transit Account Management API) to display the current status and value of the associated transit account on the operator display and customer display.

If the customer's smart card is not functioning, the TOT shall permit the clerk to manually enter the card identification number.

Upon request, the TOT shall query the back office database for details of the most recent transactions posted to the transit account. Upon receipt of the transaction history, the TOT shall display the results on the operator display.

The number of prior transactions to display shall be LeeTran-configurable, and shall initially be set to the last 10 transactions.

For each prior transaction displayed, history details shall include, at minimum:

- Date and time of transaction
- Generating device/system (e.g., TVM, retail location, autoloader)
- Transaction type (e.g., sales transaction, stored value usage, pass usage, adjustment)
- Transaction value
- Transaction location (e.g., station name, bus route)

Upon request, the TOT shall print a receipt of the current status and value of the account.

5.12.4.5 Customer Account Management

The TOT shall enable operators to set up and modify customer accounts using the Vendor-provided customer account management API (see Section 2.3.1.6: Customer Account Management API).

The TOT shall enable the operator to create a new customer account and register an anonymous transit account.

The TOT shall enable the operator to modify any fields in the existing customer accounts that are deemed user-alterable.

The TOT shall enable operators to establish, modify, and cancel customer subscriptions for autoloading, including the addition and modification of funding sources.

To prevent manual data entry error, the identification number of the customer's card shall be captured by the contactless smart card reader, and the bank card processor module shall be used to read any bank card data required for autoloading subscription.

Reduced fare privileges are subject to expiration. The TOT shall include a function to re-authorize reduced fare privileges and update the customer's account information with a new reduced fare privilege expiration date.

5.12.4.6 Media Replacement

The TOT shall support replacing registered EU smart cards by disassociating the lost or stolen card from the account and linking a new card in its place.

Prior to replacing a registered EU card, the TOT shall require verification of the customer's identity through the entry of the customer's account information, password, and/or answers to secret questions, as recorded in the back office.

If the replacement card requires no personalization, the TOT shall prompt the operator to present the new card to the contactless smart card reader.

When replacing a previously issued personalized card, the TOT shall support use of the digital photograph, printing template, and other data from the original issue record to facilitate replacement without requiring the cardholder's presence, or the use of the digital camera to create and store a new digital image.

Upon reading or issuing the replacement card, the TOT shall transmit to the back office an issue record containing the card's identification number and a corresponding record to block use of the lost card.

Replacing a malfunctioning smart card shall be possible. Procedures to replace a defective card shall be similar to those used to replace a lost registered card, but replacement of a defective card shall not require the card to be registered. The replacement process shall support entry of the defective card's identification number as the means to initiate replacement.

5.12.4.7 Refunds and Adjustments

TOT operators with appropriate access rights shall be able to initiate transit account adjustments by reversing prior sales or fare payment transactions, or directly adding or removing stored value or passes.

TOT operators with appropriate access rights shall be able to initiate an opt-out refund that results in the closing of a transit account and issuance of a cash or check refund to the customer.

The TOT shall fully record and transmit to the back office all adjustment and reversal transactions.

5.13 Mobile Sales Device

5.13.1 General Requirements

The Vendor shall provide a laptop-based Mobile Sales Device (MSD), which shall support mobile ticket sales and mobile reloading of value.

The MSD shall be a modular device and shall support multiple configurations, depending on the peripheral modules included. The MSD hardware shall be optimized for its intended use and configuration.

MSDs shall be designed to permit rapid exchange of the device and peripheral modules to restore service in minimal time. Repairs shall be performed in the field and no special tools or instruments shall be required for exchange of modules.

The Vendor shall supply the MSD in the listed configurations, all of which shall utilize the same Vendor-supplied application and OEM software.

The MSD shall be based on a laptop computer with a screen, keyboard, and pointing device. The portable configuration shall support remote sales and card personalization programs. The device shall include the ability to connect to the following modules, which shall be identical to those used for the TOT (except where noted):

- Contactless smart card reader
- Bank card processing module
- Receipt printer
- Digital camera and tripod
- Document scanner
- Extended-use smart card printer/encoder
- Ticket printer
- Cellular broadband data modem and other communications interfaces as necessary

All MSD configurations and peripheral modules shall be subject to LeeTran review and approval.

5.13.2 Hardware

The Vendor shall provide the MSD as a laptop solution. The laptop shall be portable and meet the same general requirements of the TOT operating environment.

The MSD shall include an integrated keyboard and pointing device.

The MSD shall include the ability to connect to a contactless smart card reader. The contactless smart card reader shall meet the same requirements as the TOT contactless smart card reader.

The MSD shall include a receipt printer. The receipt printer shall meet the same requirements as the TOT receipt printer.

The MSD shall include the ability to connect to a bankcard processing module. The bankcard processing module shall meet the same requirements as the TOT bankcard processing module.

All communications between the back office and the MSD shall be via a direct Ethernet connection, Wi-Fi network, or cellular broadband data modem.

For all transactions requiring back office access to a transit account, or establishing a new account, the MSD shall communicate with the back office in real-time using the Vendor-provided APIs (see Section 2.3.1: Application Programming Interfaces).

5.13.3 Software

The MSD shall follow all operating system and application software requirements as the TOT (see Section 5.12.3.1: TOT Operating System and Application Software).

The MSD shall follow all data recording requirements as the TOT (see Section 5.12.3.2: TOT Data Records).

The MSD shall follow all media inventory control requirements as the TOT (see Section 5.12.3.5: TOT Fare Media Inventory Control).

The MSD shall follow all software update requirements as the TOT (see Section 5.12.3.3: TOT Software Updates).

The MSD shall follow all configuration control requirements as the TOT (see Section 5.12.3.4: TOT Configuration Control).

5.13.4 Configuration

The MSD shall follow all login and logout requirements as the TOT (see Section 5.12.4.1: TOT Login and Logout).

The MSD shall follow all sales requirements as the TOT (see Section 5.12.4.2: TOT Sales).

The MSD shall follow all fare media inquiry requirements as the TOT (see Section 5.12.4.4: TOT Fare Media Inquiry).

The MSD shall follow all account management requirements as the TOT (see Section 5.12.4.5: TOT Customer Account Management).

The MSD shall follow all replacement requirements as the TOT (see Section 5.12.4.6: TOT Media Replacement).

The MSD shall follow all refund requirements as the TOT (see Section 5.12.4.7: TOT Refunds and Adjustments).

The MSD shall follow all personalization requirements as the TOT (see Section 5.12.4.3: TOT Personalized Media).

5.14 Required Submittals

The following table displays items that must be submitted in advance of one or more design reviews.

Description	Submittal Due		
	CDR	PDR	FDR
Equipment Hardware and Software Common Design Specifications	X	X	X
TVM Hardware Design	X	X	X
TVM Software Design	X	X	X
Mobile Fare Inspection/Validation Application Design	X	X	X
DCU Hardware and Software Design	X	X	X
TOT Hardware Design	X	X	X
TOT Software Design	X	X	X
Mobile Sales Device Hardware Design	X	X	X
Mobile Sales Device Software Design	X	X	X

6 Point of Sale (POS) Requirements

6.1 Retail POS Terminals

6.1.1 General Requirements

Retail Point of Sale (RPOS) Terminals shall be modular in design and consist of a smart card read/write unit, operator interface and display, patron display, receipt printer, and power supply.

Independent retail sales outlets shall utilize the RPOS Terminals to conduct the transactions defined herein.

The RPOS Terminals shall communicate with the CDS via the Internet for the transfer of data and the uploading of action lists, fare table, parameter and configuration data, and software updates.

In general, each RPOS Terminal shall:

- Read and write to contactless smart cards
- Respond to inputs of the sales clerk
- Display validity and value information upon completion of transaction and upon request
- Register and store accounting and transaction data
- Print transaction receipts and local reports
- Provide different audible annunciations for valid and invalid transactions
- Communicate with the CDS to receive commands, and transmit and receive data regarding sales, revenue, accounting, status, and security information via the Internet connection automatically on a scheduled basis

RPOS Terminals shall have no modules to accept coins, bills, or bankcards. Rather, operators of these devices shall be expected to use the RPOS Terminals as stand-alone units and depend on separate cash registers and bankcard terminals to collect payment for RPOS Terminal transactions.

The CDS shall manage all communication with the RPOS Terminals and provide LeeTran with the ability to monitor and configure all RPOS Terminals.

A Retailer / POS web portal shall also provide retailers with the ability to manage their RPOS Terminals, clerk logins, and to generate reports detailing their sales activity.

6.1.2 Performance Requirements

The RPOS Terminals shall be compatible with the smart card fare media used by LeeTran and processed by the SAPs, APOS Terminals, and PTPs.

6.1.3 Functionality

The RPOS Terminals shall be solid-state devices, shall be modular in construction, and shall be designed to permit rapid exchange of the device to restore service in minimal time. Repairs and adjustments shall be performed in shop facilities and no special tools or instruments shall be required for exchange of modules. Minor repairs and adjustments shall be capable of being performed in the field.

The functions performed by the RPOS Terminals shall include the following:

- The RPOS Terminal shall process smart cards as appropriate to the type of card and transaction selected whenever a valid, genuine LeeTran smart card is presented within range of the RPOS Terminal's card read/write unit and the sales clerk has made the appropriate selections. Re-encoding of smart cards by the RPOS Terminal shall include equipment number, date, time, sales location, sales clerk identifier, new validity information, fare media type (e.g., pass or stored value card) and other information as required by the encoding format.
- The RPOS Terminal shall support all LeeTran-issued smart media.
- The RPOS Terminal shall communicate with the CDS via secure Internet connection to send and receive transaction information, send event and status information, and receive clock synchronization information, bad card lists, and configuration parameters. This shall be possible both automatically at a scheduled time and manually, upon selection by authorized users.
- The RPOS Terminal shall contain non-volatile memory, which shall record data for each smart card transaction processed by the RPOS Terminal. The stored transaction data shall be unaffected by RPOS Terminal power status.
- The RPOS Terminal shall be capable of detecting basic internal malfunctions and shall annunciate failures directly to the sales display and to the CDS. The malfunction detection shall cover at least failure of power or

control circuitry, and any failure of the smart card read/write unit that could result in a false, incomplete, or corrupted encoding of a smart card.

- The RPOS Terminal shall be capable of reading the information on the smart card without modification, upon selection of the “Read” function by the sales clerk.
- The RPOS Terminal shall have no payment modules, but shall record the payment methods used for each transaction as entered by the sales clerk. The RPOS Terminal shall support recording of up to three payment methods for each transaction, with the amount of payment for each method. Payment methods shall include but not be limited to: cash, credit, debit, check, voucher/coupon, and exchanged media.

6.1.4 RPOS Hardware

6.1.4.1 Enclosure

The RPOS Terminal shall be a desktop-mounted device requiring no other modules or external components. The RPOS Terminal shall be as compact as practical and shall not exceed the following dimensions:

- Height: 8 inches
- Width: 8 inches
- Depth: 12 inches

6.1.4.2 Power Requirements

The RPOS Terminals shall be powered by a standard 125V AC power source, and shall consume no more than 200 Watts.

6.1.4.3 Operator Interface

The RPOS Terminal shall employ a configurable touch-screen interface as the Operator Display that shall be a backlit color Liquid Crystal Display. The operator display shall provide, at minimum, VGA-level resolution and color palette. The Operator Display shall measure at least 7 inches diagonally, and be suitably bright to be viewed in all indoor ambient lighting conditions.

6.1.4.4 Smart Card Processor

The RPOS Terminal shall include a CSCP with an antenna located so that operators have easy access to tag cards. The external antenna shall not protrude from the exterior of the RPOS Terminal enclosure and shall be made of materials that are impervious to incidental moisture conditions and resist overt vandalism. The antenna shall be placed on the top horizontal surface of the RPOS Terminal and shall provide sufficient flat surface to allow smart cards to be placed on the antenna during read/write transactions.

The smart card read/write unit shall be compliant with both the A and B variants of the ISO/IEC 14443 standard.

The smart card read/write unit shall be activated (i.e., the antenna energized) only during those steps in a transaction where a smart card is to be queried or encoded, and while the smart card is in place on the antenna.

6.1.4.5 Patron Interface

A separate display shall face the patron and provide transaction status and value information. The Patron Display shall provide no less than two lines of text, with no less than 20 characters per line. Each character shall be no less than 0.625 inches high.

The Patron Display shall be backlit Liquid Crystal Display, vacuum fluorescent, or other suitable technology that is easily readable in indoor ambient light conditions.

Upon completion of a transaction, the Patron Display shall indicate the new stored value and the status of any pass contracts on the patron's media.

6.1.4.6 Electronic Control Unit

The RPOS Terminals shall be equipped with an Electronic Control Unit that controls RPOS Terminal operations, smart card interface, and external equipment interfaces, computes fares, and monitors RPOS Terminal operation. The RPOS Terminal shall use non-volatile solid-state memory with sufficient capacity to store a minimum of 20,000 data records.

6.1.4.7 Removable Backup Memory Module

Each RPOS Terminal shall include a removable memory module that shall store duplicates of all transaction records, event records, active logins, and other device-specific configuration data.

In the event of device failure, data stored in the removable memory module shall be transferred to a replacement device, enabling the replacement device to immediately resume operation after communicating with the CDS to receive any current data (such as fare tables, Action Lists, etc.) not stored on the removable memory module.

The RPOS Terminal shall require a functioning removable memory module to enter service.

6.1.4.8 Clock

The RPOS Terminal shall maintain date and time of day by an internal clock that shall have a battery, or equivalent, backup to keep the clock running for at least 150 hours without input power. The clock shall maintain time to an accuracy of less than 1-minute error within a 1-month period. Time shall be synchronized between the RPOS Terminal and the CDS each time data transfer occurs.

6.1.4.9 Receipt Printer

Each RPOS Terminal shall include an internal receipt printer. The printer shall print on a single roll of continuous thermal paper, nominally 2-1/4 inches wide and 150 feet in length. The unit shall provide for easy loading of a new paper roll when the current one is empty, and shall have a cutting edge for cleanly and accurately tearing off the receipt by the operator to give to the customer.

6.1.4.10 Cellular Broadband Modem

All communications between the CDS and the RPOS Terminals shall be via a cellular broadband data modem that is either integrated in the RPOS Terminal enclosure or an external module.

6.1.4.11 Power Supply

The RPOS Terminal power supply shall be internal to the device. The RPOS Terminal power cord shall be a standard National Electrical Manufacturers Association (NEMA) cord that is terminated with NEMA 5-15P and IEC 320 C-13 connectors, or LeeTran-approved equivalent.

6.1.4.12 Security Hardware

The RPOS Terminal shall accommodate some method of securing the device to deter theft. Using a high-security lock and a locking cradle, cable, or other similar means, it shall be possible to anchor the device to its location in a manner that permits authorized personnel to easily remove the device.

6.1.4.13 RPOS Hardware Design Submittals

The Vendor shall submit descriptions of the RPOS Terminal hardware design for LeeTran review at the PDR and LeeTran approval at the FDR. RPOS Terminal hardware design submittals shall include:

- RPOS Terminal enclosure
- RPOS Terminal physical security and mounting bracket
- RPOS Terminal operator interface
- RPOS Terminal smart card processor
- RPOS Terminal patron interface
- RPOS Terminal backup memory module
- RPOS Terminal receipt printer
- RPOS Terminal broadband modem

6.1.5 RPOS Software

6.1.5.1 Operating System

The RPOS Terminal shall utilize a currently-supported version of a commercially-available operating system.

6.1.5.2 Application Software

The RPOS Terminal shall use application software that is developed with a high-level language and that supports all functions described herein.

6.1.5.3 Fare Tables

The RPOS Terminal shall retain in non-volatile memory the current and at least two future fare tables. Each future fare table shall include all entries to reflect the intended fare structure and the date and time at which the new fare structure is to take effect.

6.1.5.4 Data Registers

Each RPOS Terminal shall contain registers that track the following information:

- The unique serial number of the RPOS Terminal. This register shall be stored in a Programmable Read-Only Memory (PROM) or other non-removable, non-reprogrammable device.
- The total number and value of all transactions completed by the RPOS Terminal since placed into service. These registers shall normally be modified only by the RPOS Terminal itself, but shall also be reset by use of a maintenance password.
- The total number and value of all transactions completed by the RPOS Terminal since data was last uploaded to the CDS. These registers shall be modified only by the RPOS Terminal itself and shall not be manually alterable.
- The date and time of the last successful data upload to the CDS. This register shall be modified only by the RPOS Terminal itself and shall not be manually alterable.
- The assigned IP address or secure web site to initiate data transfer to the CDS. This register shall be modifiable only by use of a maintenance password.
- Maximum number and value of transactions that can be conducted prior to uploading data to CDS. These registers shall be modifiable only by download from the CDS and by use of a maintenance password.
- Daily sales totals by payment type for the current and seven previous days. These registers shall be modified by the RPOS itself, but shall also be reset by use of a maintenance password.

6.1.5.5 Data Records

The RPOS Terminal shall store records of transactions, events, operator login and logout, and diagnostics. Each data record shall incorporate a unique identification number for that RPOS Terminal and day and shall be date/time stamped. Each data record shall be stored in the RPOS Terminal memory for transfer to the CDS.

6.1.5.5.1 Transaction Records

The RPOS Terminal patron transaction record shall, at minimum, consist of the following:

- Sequential transaction number (unique per RPOS Terminal)
- RPOS Terminal number
- Retailer identification number (i.e., per retail chain)
- Store identification number (unique per retailer)
- Sales clerk identifier (unique per store)
- Serial number of card
- Time and date
- Transaction type (e.g., stored value, pass type)
- Transaction value
- Payment amount per payment method

6.1.5.5.2 Login/Logout Records

When a user logs into the RPOS Terminal, the following data shall be stored in a data record:

- RPOS Terminal number
- Retailer identification number (i.e., per retail chain)
- Store identification number (unique per retailer)
- Sales clerk identifier (unique per store)
- Time and date
- Login attempts

When the user logs out, the RPOS Terminal shall store a similar record.

6.1.5.5.3 Event Records

The RPOS Terminal shall be capable of recording locally data representing no less than 1,000 events, including changes in status and communication problems. At a minimum, each event record shall include:

- RPOS Terminal number
- Time and date
- Event code
- Any associated event data

6.1.5.5.4 Diagnostic Records

Data records shall be created each time a problem is detected during the automatic diagnostic testing. These records shall be a sub-set of the event records identified above and shall include the following additional information:

- Identifier of the failed test

- Iteration number of test
- Reason for test failure (unique code)
- Additional information to define the nature of the failure

6.1.5.5.5 Clerk ID Activation Records

Whenever an administrative user creates or activates a clerk ID, the RPOS Terminal shall create a data record and transmit the information to the CDS. The Clerk ID Activation Record shall contain, at minimum:

- RPOS Terminal number
- New clerk ID
- New clerk name
- New clerk employee ID
- Administrative user ID that activated the clerk ID
- Time and Date

Alternatively, creation and activation of new clerk IDs may be performed exclusively by the Retail / POS web portal.

6.1.5.5.6 Clerk ID Deactivation Record

Whenever an administrative user deactivates a clerk ID, the RPOS Terminal shall create a data record and transmit the information to the CDS. The Clerk ID Deactivation Record shall contain, at minimum:

- RPOS Terminal number
- Deactivated clerk ID
- Administrative user ID that deactivated the clerk ID
- Time and date

Alternatively, deactivation of clerk IDs may be performed exclusively by the Retail / POS web portal.

6.1.5.6 Action List

The RPOS Terminal shall receive from the CDS and store a list of smart card serial numbers for which specific actions are required (i.e., the Action List).

All smart card transactions shall be confirmed against the Action List, which shall be internally recorded by the RPOS Terminal. No smart card transaction shall be completed until the smart card serial number has been confirmed to not be on the list. Transaction times for smart cards shall include the time necessary to search the maximum-length action list.

Whenever a smart card presented to the RPOS Terminal is on the Action List, the device shall record the transaction and respond according to the action list category (i.e., deactivate, suspend, reject, track, etc.). The "Action List Activity" transaction record shall include the RPOS Terminal number, date, time, smart card serial number, and the card's current value and status.

6.1.5.7 Authorized Transaction Limits

Each RPOS Terminal shall have limits that control the number and value of transactions that a RPOS Terminal may conduct before transaction data must be uploaded to the CDS. As each transaction is conducted, the RPOS Terminal shall increment internal data registers that track the number and value of completed transactions. When either data register is within 75% of the defined limits for the RPOS Terminal, the device shall initiate data communications with the CDS. Upon successful completion of data uploading, the data registers reflecting

number and value of transactions since last data upload shall be zeroed. If the RPOS Terminal cannot communicate with the CDS, the device shall make repeated attempts at communicating at a LeeTran-configurable interval, initially set to once every 5 minutes.

If a RPOS Terminal reaches the permitted limit of the number or value of transactions without data uploading, the device shall discontinue all sales and replenishment transactions until all transaction data is successfully transmitted to the CDS.

6.1.5.8 Configurability

The RPOS Terminal application software shall support configurability for:

- Operator interface
- Operating parameters
- Products available for sale and upgrade
- Pricing
- Payment method selection
- Receipt content

6.1.5.9 Setup and Administration

Before entering service, the RPOS Terminal shall require initialization via maintenance activity. Maintenance users shall be able to set local configurable parameters and reset data registers as necessary. Once installed, the RPOS Terminal shall not enter service until it has communicated with the CDS to receive current fare table, application software, administrative and maintenance login IDs, Action List, and other configurable data.

Only RPOS Terminals that are recognized by the CDS (as established in the CDS databases) shall receive initialization data.

6.1.5.10 Anti-Virus and Anti-Malware Software

On each RPOS Terminal, the Vendor shall supply, install, and configure client versions of anti-virus and anti-malware software that is compatible with the enterprise software described in Section 6.2.2.11. The RPOS Terminal shall automatically install updates to the anti-virus and anti-malware software upon receipt from the CDS.

6.1.5.11 RPOS Software Design Submittals

The Vendor shall submit descriptions of the RPOS Terminal software design for LeeTran review at the PDR and LeeTran approval at the FDR. RPOS Terminal software design submittals shall include:

- RPOS Terminal data registers
- RPOS Terminal transaction, event, login, etc. records
- RPOS Terminal operator interface
- RPOS Terminal Action List storage, update, and processing
- RPOS Terminal transaction limitation procedures
- RPOS Terminal setup, configuration, and administration procedures

6.1.6 RPOS Logins and Administration

The RPOS Terminal shall support at least three levels of login. Each login shall provide the functionality defined in Table 5 below.

Table 5. RPOS Terminal Logins

Login Type	Users	Access by	Uniqueness	Modified by	Functions
Maintenance	LeeTran Maintenance Personnel only	ID and Password	Same for all RPOS Terminals	Download from CDS by LeeTran only	<ul style="list-style-type: none"> • Configure RPOS • Reset data registers • Clear login IDs • Reset “locked” RPOS • Diagnose RPOS operations • Initiate CDS communications
Administrative	Store Manager	ID and Password	By RPOS Terminal	Download from CDS by LeeTran and Retailer	<ul style="list-style-type: none"> • All sales transactions • List, add, delete clerk IDs • Reset “locked” RPOS • Initiate CDS communications • Print sales and summary reports
Clerk	Store Clerk	ID	By RPOS Terminal	Manager Login at RPOS	<ul style="list-style-type: none"> • All sales transactions • Print shift report

The Vendor shall submit a complete description of the RPOS Terminal login types and permitted functions for LeeTran review at the PDR and LeeTran approval at the FDR.

6.1.7 RPOS Communications

6.1.7.1 Internet Communications

All communications between the CDS and the RPOS Terminals shall be via a cellular broadband data modem described in Section 6.1.4.10. Communication shall normally be accomplished automatically, at LeeTran-specified times or time intervals. In addition, the RPOS Terminal communication with the CDS shall be able to be initiated manually at the device at any time without affecting the automated procedures.

Under normal circumstances, all communication instances shall be initiated by the RPOS Terminal. However, the RPOS Terminal shall have the capability to respond to communications requests from the CDS and transfer data.

6.1.7.2 Stand-alone Operations

The RPOS Terminal shall, within limits prescribed herein, be capable of operating without communicating with the CDS. If the RPOS Terminal has missed a scheduled communications with the CDS, upon restoration of communications, the RPOS Terminal shall automatically initiate communications.

6.1.7.3 Remote Management and Administration

Authorized users of the CDS applications shall be able to remotely manage and administer RPOS Terminals. Remote management functions shall include:

- Changing configurable parameters
- Changing RPOS Terminal administration login
- Changing RPOS Terminal maintenance login (LeeTran users only)
- Deleting clerk logins
- Synchronizing date and time

6.1.7.4 Action List Updates

The RPOS Terminal shall maintain a list of smart card serial numbers for which specific actions are required (i.e., the Action List). Whenever the RPOS Terminal communicates with the CDS, the Action List shall be updated if necessary. With each update of the Action List, the RPOS Terminal shall confirm that the list has been properly updated.

6.1.7.5 Fare Table Updates

The RPOS Terminal shall maintain a table of fares which shall include the list of all fare products to be sold and replenished, their prices, characteristic parameters (such as the validity periods for unlimited ride passes), and other dynamic information such as the text to display on the operating and patron displays and receipts.

Each time the RPOS Terminal communicates with the CDS, the CDS shall transmit any updates to the fare table; the RPOS Terminal shall store any such updates as necessary. With each update of the fare table, the RPOS Terminal shall confirm that the list has been properly updated.

Any new fare table shall be activated automatically in the RPOS Terminal at the specified date/time, as programmed by LeeTran.

6.1.7.6 Software Updates

RPOS Terminals shall accept and apply updates from the CDS for the RPOS Terminal application software. Each time the RPOS Terminal communicates with the CDS, the CDS shall transmit any updates to the RPOS Terminal application software. The RPOS Terminal shall not commence updating the application software until it has received and verified the complete update.

Upon receipt and verification of the software update, the CDS shall apply the update (rebooting if necessary) at a time configurable by LeeTran for each RPOS Terminal.

6.1.8 Transaction Speed

Smart card transactions, as measured by the time the operator “tags” the read/write antenna until all transaction information is shown on the RPOS Terminal display, shall occur in no more than 500 ms. The card processing shall include checking of all data, including searching a maximum-sized action list, and performing all necessary computations, smart card encoding, and transactional data recording.

6.1.9 Operations

The Vendor shall submit a complete description of RPOS Terminal operations, transaction procedures, and administrative functions, including flow charts as necessary, for LeeTran review at the PDR and LeeTran approval at the FDR.

6.1.9.1 Sales Clerk Login

The RPOS Terminal shall remain inactive and unable to perform any functions unless a proper login has been completed as follows:

- Step 1 The touch screen is pressed on the RPOS Terminal and “User ID” is displayed, together with a prompt, on the RPOS display.
- Step 2 The sales clerk shall enter their user ID, a minimum of 4 characters, and press the “ENTER” key. (Alternatively, upon entering the last character, the validation process shall commence.) If the user ID is invalid, the RPOS Terminal shall display “Invalid ID” and prompt the user to re-enter their ID. This step shall be repeated until a valid user ID is entered or a LeeTran-configurable number (initially set to 5) of unsuccessful

attempts have been made. After the fifth unsuccessful attempt, the RPOS shall not permit the invalid ID to login until the ID has been reset by an administrative or maintenance user.

- Step 3 Upon successful login, the RPOS Terminal shall display the current date and time and the sales selection screen.

A data record shall be stored for each successful login, and each unsuccessful login. This data record shall include the information identified in Section 6.1.5.5.1.

6.1.9.2 Maintenance and Administrative Login

The RPOS Terminal shall remain inactive and unable to perform any functions unless a proper login has been completed as follows:

- Step 1 The touch screen is pressed on the RPOS Terminal and “User ID” is displayed, together with a prompt, on the RPOS Terminal display.
- Step 2 The maintenance (LeeTran only) or administrative (store manager) personnel shall enter their user ID, a minimum of 4 characters, and press the “ENTER” key. (Alternatively, upon entering the last character, the validation process shall commence.) If the user ID is invalid, the RPOS Terminal shall display “Invalid ID” and prompt the user to re-enter their ID. This step shall be repeated until a valid user ID is entered or a LeeTran-configurable number (initially set to 5) of unsuccessful attempts have been made. After the fifth unsuccessful attempt, the RPOS Terminal shall not permit the user ID to login until the ID has been reset by an administrative or maintenance user.
- Step 3 Upon entering a user ID that is recognized as requiring a password, the RPOS Terminal shall display a prompt for the user to enter a password.
- Step 4 The user shall enter their password (minimum of 4 characters) and press the “ENTER” key. (Alternatively, upon entering the last character, the validation process shall commence.) If the password is invalid, the RPOS Terminal shall display “Invalid password” and prompt the user to re-enter their password. This step shall be repeated until a valid password is entered or a LeeTran-configurable number (initially set to 5) of unsuccessful attempts have been made. After the fifth unsuccessful attempt, the RPOS Terminal shall not permit the user ID to login until it has been reset by an administrative or maintenance user.
- Step 5 Upon successful login, the RPOS Terminal shall display the current date and time and the main menu screen with items specific to the user’s permission.

A data record shall be stored for each successful login, and each unsuccessful login. This data record shall include the information identified in the following:

- When a user logs into the RPOS Terminal, the following data shall be stored in a data record:
 - RPOS Terminal number
 - Retailer identification number (i.e., per retail chain)
 - Store identification number (unique per retailer)
 - Sales clerk identifier (unique per store)
 - Time and date
 - Login attempts
- When the user logs out, the RPOS Terminal shall store a similar record.

6.1.9.3 Logout

Step 1 The user shall press the appropriate logout key or key combination on the touch screen. The RPOS Terminal shall display “Logout?” and a prompt.

Step 2 The user shall confirm the intent to log off.

Step 3 The RPOS Terminal shall close all files and display the login prompt screen.

Step 4 A data record shall be stored for each successful logout. Additionally, if the machine has not been used in a number of minutes configurable by LeeTran (initially set at 10 minutes); the user shall be automatically logged out. The RPOS Terminal shall close all files and display the login prompt screen.

6.1.9.4 Patron Transactions

6.1.9.4.1 New Smart Card Sale

The RPOS Terminal shall operate as follows when selling a new smart card.

Step 1 The patron identifies the value (if applicable) and the type of pass (if applicable) to be placed on the card. Note that the RPOS Terminal shall be capable of encoding new cards with both stored value and an unlimited ride pass in a single transaction.

Step 2 The sales clerk selects a new, valueless card and places it onto the RPOS Terminal's read/write antenna.

Step 3 If the smart card is valid then the green LED shall illuminate. If the smart card is invalid, the RPOS Terminal shall emit an "invalid" tone, the red LED shall be lit and the reason for smart card invalidity shall be displayed. The clerk shall select a new card and try again.

Step 4 The sales clerk identifies the type of transaction (stored value or pass) and enters the necessary data via the touch screen.

Step 5 Upon receipt of payment (via the independent payment process), the sales clerk enters the payment method and the new validity information is added to the smart card.

Step 6 The RPOS Terminal displays the new value or expiration information on the Operator Display and the Patron Display, and the RPOS Terminal shall emit a "valid" tone and illuminate the green LED.

Step 7 Upon request of the customer, the clerk shall print a receipt of the transaction.

For each transaction, a data record shall be stored containing the information as identified in Section 6.1.5.5.1.

If the clerk removes the card from the read/write antenna before the transaction is complete, the RPOS Terminal shall prompt the clerk to replace the card. If the clerk fails to return the card to the reader within a LeeTran-configurable time-out, the RPOS Terminal shall cancel the transaction and store a record of the event.

6.1.9.4.2 Smart Card Update

The RPOS Terminal shall operate as follows when adding stored value to a smart card or when renewing an existing unlimited ride pass:

Step 1 The patron presents the smart card to the sales clerk and identifies the value to be added or the type of pass to be added.

Step 2 The sales clerk places the smart card onto the RPOS Terminal's read/write antenna. If the smart card is identified as on the "bad card" list or the card is dormant (more than 2 years since the last transaction), the RPOS Terminal shall emit an "invalid" tone, the red LED shall be lit and the reason for smart card invalidity shall be displayed. At this point, the RPOS Terminal shall stop processing the transaction.

Step 3 If the smart card is valid then the green LED shall illuminate. The sales clerk identifies the type of transaction (stored value or pass) and enters the necessary data via the keypad.

Step 4 Upon receipt of payment (via the independent payment process), the sales clerk enters the payment method and the new validity information is added to the smart card.

Step 5 The RPOS Terminal displays the new value or expiration information on the Operator Display and the Patron Display, and the RPOS Terminal shall emit a “valid” tone and illuminate the green LED.

Step 6 Upon request of the customer, the clerk shall print a receipt of the transaction.

For each transaction, a data record shall be stored containing the information as identified in Section 6.1.5.5.1.

If the clerk removes the card from the read/write antenna before the transaction is complete, the RPOS Terminal shall prompt the clerk to replace the card. If the clerk fails to return the card to the reader within a LeeTran-configurable time-out, the RPOS Terminal shall cancel the transaction and store a record of the event.

6.1.9.4.3 Read Smart Card

The RPOS Terminal shall operate as follows when reading transactional data from a smart card:

Step 1 The patron presents the smart card to the sales clerk.

Step 2 The sales clerk presses the “Read” key, tags the smart card to the RPOS Terminal and then returns the card to the patron.

Step 3 The RPOS Terminal shall read the data from the card and display the card’s current profile (including stored value and the status of any active pass), card type (full fare, reduced fare), and other pertinent information. The RPOS Terminal shall also read all stored transaction records and display them to the sales clerk, from latest transaction to earliest. As necessary, the RPOS Terminal shall allow the sales clerk to scroll through these transactions to provide the patron with the requested information.

Step 4 Upon request of the customer, the clerk shall print a receipt of the transaction.

6.1.9.4.4 Refund and Reversal Transactions

For refund or error correction purposes, the RPOS Terminal shall provide operators the ability to reverse the last replenishment transaction performed on a card if:

- The same RPOS Terminal conducted the replenishment transaction
- The transaction occurred within a LeeTran-configurable period (initially set to five [5] minutes)
- The card has no usage transactions since the replenishment

Reversal transactions shall require the deletion of the relevant fare product from the patron’s smart card, or deduction of the stored value or stored rides added during the replenishment transaction. The RPOS Terminal shall fully record and transmit to the CDS all reversal transactions.

6.1.9.4.5 Payment Method Selection and Data Entry

For each sales transaction, the RPOS Terminal shall enable the clerk to select the payment method and record the result. Payment method selection shall be by “check box” data entry.

By default, the entire transaction value shall be assigned to the first box selected. If the clerk selects more than one payment method, the RPOS Terminal shall prompt the clerk to enter the amount paid for the subsequent selection(s) and calculate the remaining amount of the transaction value to be assigned to the first selection.

When multiple payment methods are selected, the RPOS Terminal shall prevent the clerk from assigning total payment values that exceed the transaction value.

6.1.9.4.6 Transaction Review

The RPOS Terminal shall enable a clerk to display (and print via the receipt printer) totals of all completed transactions by that clerk for the current day.

The RPOS Terminal shall enable an administrative user to display (and print via the receipt printer) totals of all conducted transactions for the current and each of the prior 7 days. These totals shall be displayed on the operator's display, and shall indicate daily totals by clerk and payment type. As necessary, the RPOS Terminal may retrieve data from the CDS. Alternatively, prior days' sales reports may be provided by Internet access to the CDS or the Retailer Customer Service Manager directly from a browser interface.

6.1.9.5 Retailer Administration Functions

Each RPOS Terminal shall be assigned one or more administrative logins, configurable by the CDS and downloaded to the RPOS Terminal. These logins shall be configurable such that each RPOS Terminal may be assigned one or more administrative logins that are unique to an individual RPOS Terminal, should the retailer prefer to do so. (Via the CDS, LeeTran and authorized retailer users shall have the ability to manage the administrative logins per the retailer's preferences.) In addition to selling all products available, administrative users of the RPOS Terminal shall have the following functions available:

6.1.9.5.1 Manage Retail POS Terminal Logins

The RPOS Terminal administrator shall have the ability to list, create, activate, and deactivate clerk logins. (The CDS shall have no role in assigning clerk logins.)

Creation of a clerk login shall include the assignment of the clerk's login ID and entry of the name and employee ID of the clerk assigned to the login.

6.1.9.5.2 Unlocking a User ID

When a User ID is locked due to excessive failed login attempts, only administrative and maintenance logins shall be permitted to unlock the User ID.

6.1.9.5.3 Generate Summary Reports

Reports (and receipts issued by the receipt printer) that display daily summary sales information for all clerks shall be available only to administrative users.

6.1.9.5.4 Initiate CDS Communications

The RPOS Terminal shall enable administrative users to initiate communications with the CDS.

6.1.9.6 Maintenance Functions

Each RPOS Terminal shall be assigned one or more maintenance logins, configurable by the CDS and downloaded to the RPOS Terminal. These logins shall be configurable such that all RPOS Terminals have the same maintenance logins. Maintenance RPOS Terminal users shall have the following functions available:

6.1.9.6.1 Configure Retail POS Terminal

All configurable parameters that are RPOS Terminal-specific shall be configurable by maintenance users. Any change to a configurable parameter shall be stored in a data record and transmitted to the CDS.

6.1.9.6.2 Reset Data Registers

Maintenance users shall have the ability to reset data registers discussed in Section 6.1.5.4. The RPOS Terminal shall store a data record for all reset data registers and transmit the record to the CDS.

6.1.9.6.3 Clear Login IDs

Maintenance users shall be able to clear all login IDs (except the maintenance ID) from a RPOS Terminal.

6.1.9.6.4 Unlock a User ID

When a User ID is locked due to excessive failed login attempts, only administrative login and maintenance logins shall be permitted to unlock the User ID.

6.1.9.6.5 Diagnose RPOS Operations

Maintenance users shall be restricted from all sales transactions, but shall be permitted to view the sales interface and test all sales transaction screens. While in diagnostic mode, the maintenance user shall be able to confirm proper operation of all RPOS Terminal functions and modules, but at no time shall a maintenance user be able to conduct a valid sales transaction.

Diagnostic RPOS Terminal screens available to the maintenance user shall include a display of configuration parameters (including IP address of the CDS, and IP and MAC address of the RPOS Terminal), the date and time of last CDS communication, versions of all software, as well as the date and version information for fare table, configuration tables, and action lists.

6.1.9.6.6 Initiate CDS Communications

The RPOS Terminal shall enable maintenance users to initiate communications with the CDS.

6.1.9.6.7 Replace Defective RPOS Terminal

When a defective RPOS Terminal is replaced, all configuration data, including all active logins, and all other device-specific data, shall be transferred from the defective device to the replacement RPOS Terminal, using the removable backup memory module described in Section 6.1.4.7. Upon transfer of all data, the RPOS Terminal shall initiate communications with the CDS to retrieve any general system-wide data (such as fare tables, Action List, etc.) not stored on the memory module.

6.1.10 Smart Card Inventory Control

Upon issuance and initialization of a new smart card, the RPOS Terminal shall record in a special "issue record" the date, time, fare category, serial number, and other pertinent information of the smart card. The RPOS Terminal shall transmit this record to the CDS, where the existing central inventory database shall track the status of all smart cards in inventory and in circulation.

6.1.11 Receipts and Reports

The RPOS Terminal shall generate receipts and reports as outlined below. The Vendor shall submit sample RPOS Terminal receipt layouts for all receipt types, for LeeTran review at the PDR and LeeTran approval at the FDR.

6.1.11.1 Patron Transaction Receipt

The Patron Transaction Receipt shall provide a record of successful transactions. The RPOS Terminal shall generate Patron Transaction receipts automatically. The receipt shall contain at minimum:

- LeeTran-configurable header (in text form)
- Current date and time
- Store name and location
- RPOS Terminal number
- Clerk conducting the transaction
- Transaction ID
- Smart card serial number (truncated to last digits if necessary)
- Contents of the transaction (items as applicable)
- Total value of the transaction
- Resulting value (balance) and content (passes and other products) on the smart card

6.1.11.2 Smart Card Profile Receipt

Upon patron request and clerk command, the RPOS Terminal shall generate a receipt showing the profile and content of a patron's presented smart card. The receipt shall contain at minimum:

- Current date and time
- Store name and location
- RPOS Terminal number
- Clerk conducting the transaction
- Smart card serial number (truncated to last digits if necessary)
- Current value (balance) and content (passes and other products) on the smart card
- Any current transfer privileges, including service level and expiration date and time
- Any recurring or subscribed transactions encoded on the card

6.1.11.3 Clerk Daily Summary Report

Upon demand of the clerk, the RPOS Terminal shall generate a daily sales summary report for the clerk. The report shall contain at minimum:

- Clerk ID
- RPOS Terminal number
- Store ID and location
- Current date and time
- Tallies by product of quantity sold and value
- Total of all products sold and value
- Totals of all payments by payment method

6.1.11.4 Retail POS Terminal Daily Sales Summary

Upon command of an administrative user, the RPOS Terminal shall generate a daily sales summary report. The administrative user shall be able to request a report for the current day and a report for any of the prior 7 days. RPOS Terminal Daily Sales Summary reports shall contain at minimum:

- Clerk ID
- RPOS Terminal number
- Store ID and location
- Current date and time
- Date for which report is run

- Tallies by Clerk ID (including active Clerk IDs for which no sales occurred) of total transaction quantity and value
- Total of all transaction quantities and value
- Totals of all payments by payment method

6.2 Administrative POS (APOS) Terminals

6.2.1 Description

The APOS Terminal shall be a modular, PC-based device and shall support multiple configurations, depending on the modular components included. The APOS Terminal hardware shall be optimized for its intended use and configuration.

The Vendor shall supply three configurations of the APOS Terminal:

- Front Office APOS Terminal
- Back Office APOS Terminal
- Portable APOS Terminal

These configurations are described in Section 6.2.5, along with the components comprising each configuration.

6.2.2 APOS Software

All OEM-supplied operating system and application software shall be subject to LeeTran review at the PDR and LeeTran approval at the FDR.

6.2.2.1 Operating System

The APOS Terminal shall utilize a standard Microsoft Windows® operating system (minimum Windows® 7).

6.2.2.2 Application Software

The APOS Terminal shall use application software that is developed with a high-level language and that supports all functions described herein.

6.2.2.3 Fare Tables

The APOS Terminal shall retain in non-volatile memory the current and at least two future fare tables. Each future fare table shall include all entries to reflect the intended fare structure and the date and time at which the new fare structure is to take effect.

6.2.2.4 Data Registers

Each APOS Terminal shall contain registers that track the following information:

- The unique serial number of the APOS Terminal
- The total number and value of all transactions completed by the APOS Terminal since data was last uploaded to the CDS. These registers shall be modified only by the APOS Terminal itself and shall not be manually alterable.
- The date and time of the last successful data upload to the CDS. This register shall be modified only by the APOS Terminal itself and shall not be manually alterable.
- The assigned IP address or secure web site to initiate data transfer to the CDS. This register shall be modifiable only by use of a maintenance password.

- Maximum number and value of transactions that can be conducted prior to uploading data to the CDS. These registers shall be modifiable only by download from the CDS and by use of a maintenance password.

6.2.2.5 Data Records

The APOS Terminal shall store records of transactions, events, operator login and logout, and diagnostics. Each data record shall incorporate a unique identification number for that APOS Terminal and day and shall be date/time stamped. Each data record shall be stored in the APOS Terminal memory for transfer to the CDS.

6.2.2.5.1 Transaction Records

Each APOS Terminal patron transaction record shall, at minimum, consist of the following:

- Sequential transaction number (unique per APOS Terminal)
- APOS Terminal number
- Location (where available)
- User ID
- Serial number of card
- Time and date
- Transaction type (e.g., stored value, pass type)
- Transaction value
- Payment amount per payment method

6.2.2.5.2 Login / Logout Records

When a user signs on to the APOS Terminal, the following data shall be stored in a data record:

- APOS Terminal number
- Location (where available)
- User ID
- Time and date
- Login attempts

When the user logs off the APOS Terminal, the device shall store a similar record.

6.2.2.5.3 Event Records

The APOS Terminal shall be capable of recording locally data representing no less than 1,000 events, including changes in status and communication problems. At a minimum, each event record shall include:

- APOS Terminal number
- Time and date
- Event code
- Any associated event data

6.2.2.5.4 Diagnostic Records

The APOS Terminal shall create data records each time a problem is detected during the automatic diagnostic testing. These records shall be a sub-set of the event records identified above and shall include the following additional information:

- Identifier of the failed test
- Iteration number of test

- Reason for test failure (unique code)
- Additional information to define the nature of the failure

6.2.2.6 Action List

The APOS Terminal shall receive from the CDS and store a list smart card serial numbers for which specific actions are required (i.e., the Action List).

A. All smart card transactions shall be confirmed against the Action List, which shall be internally recorded by the APOS Terminal. No smart card transaction shall be completed until the smart card serial number has been confirmed to not be on the list. Transaction times for smart cards shall include the time necessary to search the maximum-length action list.

B. Whenever a smart card presented to the APOS Terminal is on the Action List, the APOS Terminal shall record the transaction and respond according to the action list category (i.e., deactivate, suspend, reject, track, etc.). The “Action List Activity” transaction record shall include the APOS Terminal number, date, time, smart card serial number, and the card’s current value and status.

6.2.2.7 Authorized Transaction Limits

Each APOS Terminal shall have limits that control the number and value of transactions that the device may conduct before transaction data must be uploaded to the CDS. As each transaction is conducted, the APOS Terminal shall increment internal data registers that track the number and value of completed transactions. When either data register is within 75% of the defined limits for the device, the APOS Terminal shall initiate data communications with the CDS. Upon successful completion of data uploading, the data registers reflecting number and value of transactions since last data upload shall be zeroed. If the APOS Terminal cannot communicate with the CDS, the device shall make repeated attempts at communicating at a LeeTran-configurable interval, initially set to once every 5 minutes.

If an APOS Terminal reaches the permitted limit of the number or value of transactions without data uploading, the device shall discontinue all sales and replenishment transactions until all transaction data is successfully transmitted to the CDS.

6.2.2.8 Configurability

In addition to the ability to configure the APOS Terminal hardware for the three versions described in Section 6.2.1, the APOS Terminal application software shall at minimum support configurability for:

- Operator interface
- Operating parameters
- Products available for sale and upgrade
- Pricing
- Payment method selection
- Receipt content

As described herein, the APOS Terminal shall also support configurability through numerous adjustable parameters, centrally controlled and transmitted via the CDS.

The Vendor shall submit a comprehensive document describing the configurability of the APOS Terminal, including a listing of all configurable parameters and their value range, for LeeTran review at the PDR and LeeTran approval at the FDR.

6.2.2.9 Setup and Administration

Before entering service, the APOS Terminal shall require initialization via maintenance activity. Maintenance users shall be able to set local configurable parameters and reset data registers as necessary. Once installed, the APOS Terminal shall not enter service until it has communicated with the CDS to receive current fare table, application software, administrative and maintenance login IDs, Action List, and other configurable data.

Only APOS Terminals that are recognized by the CDS (as established in the CDS databases) shall receive initialization data.

6.2.2.10 Anti-Virus and Anti-Malware Software

On each APOS Terminal, the Vendor shall supply, install, and configure client versions of anti-virus and anti-malware software that is compatible with the enterprise software described in Section 6.2.2.11. The APOS Terminal shall automatically install updates to the anti-virus and anti-malware software upon receipt from the CDS. Upon receipt of new definitions files from the CDS, the GDS shall immediately activate the new definitions.

6.2.2.11 Anti-Virus and Anti-Malware Software and Definitions Management

A commercially-available program shall protect the CDS from software viruses and malware. All incoming files from all sources, including but not limited to LeeTran's network communications, bankcard payment entity interface, removable data storage media readers, and all other external sources, shall be scanned prior to transfer to any CDS data storage device and memory. The CDS shall automatically apply updated definitions for the protection software within 48 hours of the OEM's release of the update.

The CDS shall provide centralized distribution of updated software and definitions for the anti-virus and anti-malware application installed on the GDS, all APOS Terminals, and all other networked new FCS devices running a compatible, commercial operating system. Within 48 hours of the OEM's release of updated software and definition files, the CDS shall distribute the updates to all requisite devices. The CDS shall receive and distribute such updates automatically; no manual action shall be required to distribute the updated definition files.

The Vendor shall purchase and convey to LeeTran subscription services for no less than three (3) years of virus and malware definition updates from the OEM supplier. Subscription services shall start no more than 30 days prior to commencement of revenue service.

The Vendor shall identify the specific anti-virus and anti-malware software package for LeeTran review and approval at the PDR.

6.2.2.12 APOS Terminal Software Design Submittals

The Vendor shall submit descriptions of the APOS Terminal software design for LeeTran review at the PDR and LeeTran approval at the FDR. APOS Terminal software design submittals shall include:

- APOS Terminal data registers
- APOS Terminal transaction, event, login, etc. records
- APOS Terminal operator interface
- APOS Terminal Action List storage, update, and processing
- APOS Terminal transaction limitation procedures
- APOS Terminal setup and administration procedures
- APOS Terminal anti-virus and anti-malware software and procedures

6.2.3 Functionality

The APOS Terminal shall provide similar sales and replenishment functionality of the RPOS Terminal, with the following additional capabilities.

The Vendor shall present a comprehensive summary of the APOS Terminal functionality for LeeTran review at the PDR and LeeTran approval at the FDR. Also included in this summary shall be the layout of all APOS Terminal screens, descriptions of all configurable parameters and tables, and the process flows for all transaction types.

6.2.3.1 General Requirements

The APOS Terminal shall satisfy the following general requirements:

- A. When configured to do so, the APOS Terminal shall replace LeeTran's current cash registers and credit card devices with a single integrated system.
- B. The APOS Terminal shall be the primary user interface used by LeeTran clerks for selling products and fare media available at the LeeTran-operated retail sales locations.
- C. The APOS Terminal shall be the primary user interface used by LeeTran sales clerks for the issuing, loading value or products, reviewing, and updating smart cards.
- D. The APOS Terminal shall manage product menu selections and payment collection and sources.
- E. The APOS Terminal shall interface to the CDS to download fare tables, configuration parameters, login authorizations, and other functions described herein, and to upload transaction records and other data as required. Communications with the CDS shall be via a wide area network supplied by LeeTran.
- F. Normally, the APOS Terminal shall be in communication with the CDS and report all transactions to the CDS as each transaction concludes. However, if the APOS Terminal is not on-line with the CDS, all transaction records shall be stored locally and transferred once the connection to the CDS is restored. In addition, all transaction data shall be stored on a secure USB drive and manually transferred to the CDS when necessary.
- G. The APOS Terminal shall track the issuance of new smart media and inform the CDS via transaction records when each smart media has been placed in circulation.
- H. The APOS Terminal software shall provide selection buttons by which multiple smart fare media with identical characteristics and products may be purchased or produced.
- I. The menu and price of all products presented for sale shall be customizable by downloading configuration data and tables from the CDS.
- J. The APOS Terminal shall provide the capability by which patrons are permitted to pay for their transactions using a combination of the payment methods, cash, credit, and check.
- K. The APOS Terminal shall fully comply with the Payment Card Industry's Data Security Standard (PCI DSS) in effect at the time of contract award.

6.2.3.2 Smart Card Sales Transaction Types

The LeeTran clerk shall utilize the APOS Terminal to make the appropriate menu selections and collect payment. Upon collection of payment, the clerk shall present the smart media to the APOS Terminal's CSCP, which shall encode the media according to the selected transaction.

The APOS Terminal shall conduct the varieties of smart media transactions required to support LeeTran's fare policies in effect at the time of Contract award, and those defined herein. At minimum, these transactions shall include:

- Issue new fare cards (with and without fare product, and with and without deposit)
- Add stored value to an issued smart card
- Add a pending unlimited ride pass to an issued smart card
- Add a stored ride pass to an issued smart card
- Conduct a read-only transaction and display the card's current information

At time of issuance, all LeeTran-issued smart cards shall be encoded with user profile information (as described in Section 4).

At no time shall the APOS Terminal add a pass to a smart card if doing so would result in the smart card having more than two passes (active or pending).

If a smart card has an existing pending pass and no active pass, the APOS Terminal shall restrict any second pending pass to be identical to the existing pending pass. If the patron wishes to add two pending passes in one transaction (provided no other pass exists on the patron's card), the APOS Terminal shall restrict the pending passes to be identical.

All unlimited ride floating period passes shall be encoded in the pending state (without an expiration date associated with the pass product).

6.2.3.3 Integration with Cash Drawer and Payment Modules

When configured to process cash transactions, the APOS Terminal shall control a cash drawer to securely store coins, currency, coupons, and other instruments of value. The cash drawer shall open only under command of the APOS Terminal, which shall also monitor the status of the drawer at all times.

In addition, when configured, the APOS Terminal shall also include an integrated bankcard reader for conducting and authorizing credit and debit card payments.

6.2.3.4 Integration with Media Personalization Equipment

The APOS Terminal shall include the necessary software and peripherals to enable LeeTran to issue personalized cards to customers eligible for specialized fares, LeeTran employees, and in support of other fare programs (such as personalized cards for Corporate Partners). Personalized cards shall include the cardholder's name and photograph printed on one side of the card, accompanied by other LeeTran-defined graphics. In addition, the APOS Terminal shall encode personalized cards at the time of issuance with the relevant user profile information and other data as necessary to satisfy the transaction and LeeTran fare policies.

6.2.3.5 Payment Methods

In recognition that LeeTran desires to provide convenient point-of-sales services, the APOS Terminal shall support a variety of payment methods. These shall include:

- Cash
- Bankcards: credit and debit, one or more per transaction , but only one bankcard type (credit or debit) per transaction
- Checks
- PayPal®

- Exchange of non-smart card fare media (see Section 6.2.3.6.3)
- Any combination of the above

The APOS Terminal shall track, count, and accumulate all transaction payments, by method of payment.

6.2.3.6 Sales Procedures

When configured to conduct sales transactions:

- The APOS Terminal shall function as an “intelligent cash register,” allowing patrons and clerks to interact in a manner that is as similar as possible to normal retail sales transactions. To that end, the APOS Terminal shall structure each transaction around a patron’s desire to purchase smart cards, to add value to existing smart cards, and/or to purchase other non-fare products.
- The APOS Terminal shall present the clerk with selections that change as the transaction progresses, and prompt the clerk when certain tasks are required.
- When issuing a new smart card, the APOS Terminal shall permit the clerk to select whether a LeeTran-configurable deposit is to be collected.
- Via the APOS Terminal software, the purchase of multiple fare products for a single smart card shall be possible with a single (total) amount due shown, and with payment collected once.
- When the addition of a product to a previously issued smart card is required, the sales clerk shall tag the fare instrument to the APOS Terminal CSCP once at the beginning of the transaction to read the fare card’s current contents. After payment is collected, the sales clerk shall tag the fare card a second time to the CSCP to encode the fare card with the new fare product. Alternatively, and preferred, the CSCP shall be designed so that smart cards may be placed on the reader for the duration of the transaction.
- When multiple fare products are being purchased for addition to a single smart card, selections shall be editable at the APOS Terminal prior to collecting payment.

6.2.3.6.1 Cash Transactions

Cash transactions shall provide total amount due, shall allow clerk to enter amount tendered, and shall display change due.

The APOS Terminal shall control and monitor the cash drawer, shall open the cash drawer when the clerk indicates that payment has been received, and upon calculation and display of the amount of change due.

The APOS Terminal shall require the operator to identify the initial funds bank (i.e., starting cash drawer balance) at the start of each shift (main and relief). Upon logging out or otherwise indicating an end-of-shift condition, the APOS Terminal shall produce a report and receipt depicting the ending balance of the cash drawer.

The Terminal shall also support relief shifts, with the replacement of the cash drawer. The APOS Terminal shall also maintain statistics for the relief shift separately and shall not affect the main shift information.

6.2.3.6.2 Bankcard Transactions

- All credit and debit card transactions shall be authorized via the APOS Terminal and its connection to the LeeTran bankcard authorization service. Communication with the bankcard authorization service shall be via the LeeTran wide area network.
- For bankcard transactions, the APOS Terminal shall read the card using the bankcard reader.
- If the credit card transaction is authorized by the processing center, the APOS Terminal shall activate the electronic signature capture device. The APOS Terminal shall record the patron’s signature and display the captured signature on the APOS Terminal screen for the clerk’s inspection.

- Upon the clerk’s confirmation, the patron shall be requested to authorize the transaction using a button or touch region on the bankcard processing module.
- When credit card processing is complete, the clerk shall tag the patron’s fare instrument to the CSCP, and upon successful encoding, the APOS Terminal shall issue a receipt for the transaction that complies with all Federal Reserve Board and relevant industry regulations. If the transaction is not authorized, the sales clerk shall be notified and the patron shall be allowed to make alternate payment.
- Debit card transaction processing shall be similar to credit card transactions, except that in lieu of collecting the patron’s signature, the patron shall be prompted to enter their PIN using the PIN pad on the bankcard module.
- Similarly, for credit card transactions that require PIN entry, the APOS Terminal shall prompt the patron to enter their PIN using the PIN pad in lieu of activating the signature capture device.

6.2.3.6.3 Exchange of Old Fare Media

The APOS Terminal shall provide means by which patrons may exchange unused existing LeeTran fare products (non-smart card) for smart card-based fare products, pro-rated if necessary according to policies defined by LeeTran. Such exchange policies need not be programmed into the APOS Terminal, but may be based on manual entry of exchange value.

6.2.3.6.4 Non-Fare Media Sales Transactions

The APOS Terminal shall support the sale of products that do not involve smart card fare media. All such products shall include entries in the CDS fare table that shall include description, price, and applicable sales taxes.

The APOS Terminal shall support transactions involving non-fare media products independently and in conjunction with fare media transactions.

6.2.3.6.5 Receipts

The APOS Terminal shall print a patron receipt for every completed sales transaction.

All receipts for credit and debit card transactions shall comply with all Federal Reserve Board regulations and other applicable standards.

Each receipt shall include a LeeTran-configurable header (in text form), the date, time, store location, clerk identification number, device number, and the total value of the transaction.

At minimum, the APOS Terminal shall provide the same receipts and reports as the RPOS Terminal, as described in Section 6.1.11.

6.2.3.7 Issuance of Personalized Media

The APOS Terminals shall provide LeeTran with the necessary features to produce personalized long-term use smart cards, encoded with the relevant fare privileges, for each user requiring personalized media.

The APOS Terminal shall support issuance of personalized cards in individual and multiple “bulk” production modes.

A. For individual card personalization, a digital camera controlled by the APOS Terminal shall capture the customer’s image in .jpg or other standard graphics file format.

B. For bulk card personalization production runs, the APOS Terminal shall use data files imported from an external source in a Vendor-specified format; the data files shall include the customer name, digital photograph, and other information as required.

C. All transaction records for issuance of a personalized card shall include a record of the digital photograph printed on the card.

D. The Vendor shall supply printing templates (also known as “masks”) using LeeTran-supplied graphic designs for all personalized card types. The APOS Terminal shall support no less than 10 pre-loaded templates from which the user shall select prior to printing. Where possible, template selection shall be automatic based on card type; for example, when selecting a Half Fare, Passport Fare, or LeeTran Employee ID card, the APOS Terminal shall automatically select the appropriate template.

LeeTran shall supply the graphics for printing templates within 90 days after NTP.

The Vendor shall supply printing masks no later than 30 days before the commencement of APOS Terminal Factory Acceptance Testing.

The Vendor shall supply complete documentation describing the format and layout of printing templates for LeeTran review at the PDR and LeeTran approval at the FDR.

E. When printing a personalized card, the APOS Terminal shall scale the photo image to fit within the area defined by the printing template (i.e., “mask”) without distorting the image or changing its native aspect ratio.

6.2.3.7.1 Media Personalization Process

The APOS Terminal shall provide the operators with a structured process to produce personalized cards individually, for use in cases where the customer is present. In such cases, the APOS Terminal shall prompt the operator for the relevant input required for each step of the issuance process, including but not limited to:

Step 1 Operator queries the customer for their LeeTran account information (login and a secret question). If the customer has an existing account, upon verification, the CDS shall transmit to the APOS Terminal the customer’s name and other data as necessary and populate the relevant data fields on the APOS Terminal screen. If the customer has no existing LeeTran account, the operator shall assist the customer in creating a new account as described in Section 6.2.3.9.1.

Step 2 The APOS Terminal shall prompt the operator to enter additional information including:

- The customer’s specialized fare authorization information (e.g., authorization case number, provided by LeeTran, Medicare Card information, retiree number, etc.), if applicable
- The fare category (Full Fare, Half Fare, Passport Fare, LeeTran Employee, Concession Fare)
- If applicable, the specialized fare profile expiration date (default configurable by LeeTran; the APOS Terminal shall provide the operator the ability to override the default expiration to a shorter validity period)

Step 3 The APOS Terminal shall prompt the operator to capture a digital photograph, using the Terminal’s digital camera. If the customer has an existing account with a stored digital image, the APOS Terminal shall display that image for the operator. If the customer wishes to use the existing photograph (subject to approval and verification by the operator), the APOS Terminal shall use the existing image for production of the card.

Step 4 Upon entry of all necessary information and the transfer of the digital photograph to the APOS Terminal, the Terminal shall initiate the production of the personalized smart card, including all printing and data encoding.

Upon successful production of the personalized smart card, the APOS Terminal shall store a transaction record, including all personalization data, the sequential serial number of the issued card, the digital photograph image, and all other transaction data. The Terminal shall transfer the entire transaction record and all accompanying data to the CDS.

The APOS Terminal shall use distinctive printing templates (or “masks”) according to the fare category selected.

6.2.3.7.2 Issuance of Half Fare and Passport Fare Media

LeeTran shall issue customers with Half Fare and Passport Fare privileges personalized smart cards for their individual use. These smart cards shall incorporate personalized information printed on one side of the card, including a digital photograph and the name of the cardholder.

Using the appropriate customized printing template (Half Fare or Passport Fare), the APOS Terminal shall print and issue (encode) personalized cards using the appropriate long-term smart card stock.

6.2.3.7.3 Issuance of LeeTran Employee and Operator ID Cards

Using a printing template customized for LeeTran employee ID cards, the APOS Terminal shall print and issue (encode) personalized LeeTran employee cards on the LeeTran Employee Combination Media described as follows:

The Vendor shall supply LeeTran employee media that shall provide fare media and access control functionality. To do so, LeeTran employee media shall include both the ISO/IEC 14443-compliant interface and an HID® access control interface.

When used as a contactless smart card, the LeeTran Employee media shall function identically to the extended-use fare media described in Section 3.

During the issuance process, the APOS Terminal shall prompt the operator to enter personal information as required by LeeTran personnel policies, and whether the employee is an authorized bus operator or maintenance technician; the APOS Terminal shall incorporate all information into the issuance transaction record and transmit each record to the CDS.

LeeTran Employee ID cards with “Operator” or “Maintenance” permissions shall also have such permissions printed on the card as part of the personalization process.

If the issue record indicates that the LeeTran Employee ID is for an operator or maintenance technician, the CDS shall automatically add the card’s sequential serial number, type (“Operator” or “Maintenance”), and PIN to the Valid Operator ID List described in Section 5.2.5.6. (Operator and Maintenance PINs shall be the LeeTran Employee Number, entered with other personnel information.)

6.2.3.7.4 Issuance of LeeTran Concession Fare ID Cards

Immediate LeeTran employee family members and LeeTran retirees are eligible for concession fares on all LeeTran services. Currently, the fares are free, but the new FCS shall support setting these concession fares independently of all other fare categories.

Using a printing template customized for LeeTran concession fare IDs, the APOS Terminal shall print and issue (encode) personalized LeeTran concession fare IDs onto long-term smart card stock.

6.2.3.7.5 Bulk Card Personalization Production

The Back Office APOS Terminal shall exclusively support production runs (using data imported from an external source) for bulk card personalization in quantities of 1 to no less than 100 cards per batch. The Back Office APOS Terminal shall support selection of custom printing templates for bulk personalization production, which may be used to support Corporate Partner, University, or other institutional programs.

Upon successful production of each card, the Back Office APOS Terminal shall store a transaction record similar to those created for individually personalized cards, and transmit all records to the CDS.

6.2.3.8 Non-Sales Transactions

6.2.3.8.1 Replacement of Lost or Stolen Registered Media

- The APOS Terminal shall support replacement smart cards with restoration of the remaining value from the lost or stolen media onto the replacement media.
- If the patron registered their smart card with LeeTran, this action shall not require the presence of the patron's old fare instrument.
- The APOS Terminal shall utilize the CDS database for information about the card to be replaced. The sales clerk shall access the CDS database to determine if the fare instrument is eligible for replacement (that is, it is not on the action list for deactivation) and the value and/or products to be encoded on the replacement card. If the smart card is eligible for replacement, the APOS Terminal shall automatically establish the transaction or transactions necessary to issue and encode the replacement card.
- Upon placing the replacement card against the CSCP antenna, or upon initiation of the production of a replacement personalized card in the Smart Card Encoder/Printer, the APOS Terminal shall issue and encode the replacement card.
- In conjunction with issuing and encoding the replacement card, the APOS Terminal shall notify the CDS to place the replaced card on the action list for deactivation.
- Appropriate entries in the database shall indicate that the old card is deactivated and no longer in circulation, and that the new card has been issued as a replacement.
- When replacing a previously-issued personalized card, the APOS Terminal shall support use of the digital photograph, printing template, and other data from the original issue record to facilitate replacement without requiring the cardholder's presence, or the use of the digital camera to create and store a new digital image.

6.2.3.8.2 Replacement of Defective Media

Replacing a malfunctioning smart medium shall be possible if the patron can present the malfunctioning fare instrument. Procedures to replace a defective card shall be similar to those used to replace a lost registered card, but replacement of a defective card shall not require the card to be registered.

6.2.3.8.3 Reactivation of Dormant Fare Media

The APOS Terminal shall support reactivation of dormant smart cards. Smart cards that are dormant according to the definition and process defined in Section 6.2.3.8.4 shall be reactivated by the APOS Terminal in the following manner:

Step 1 A patron with a dormant smart card shall present the fare instrument to the APOS Terminal clerk.

Step 2 The clerk shall cause the APOS Terminal to read the card to confirm that the card is functional but dormant.

Step 3 The clerk shall initiate a reactivation procedure wherein the APOS Terminal shall query the CDS database to determine if the fare instrument was deactivated. (Note that after a smart card is declared dormant, it may be removed from the action list. The CDS shall retain a record of all smart cards that were ever deactivated.)

Step 4 If the smart card was never deactivated, the APOS Terminal shall reactivate the smart card by encoding it with a new “last transaction date” record. At such time, any fare products that are not time-sensitive (i.e., stored value, stored ride) shall be reinstated on the card. If the smart card was deactivated, the transaction shall abort.

Step 5 The APOS Terminal shall record the reactivation transaction and transmit the record to the CDS.

6.2.3.8.4 Dormancy

Any LeeTran-issued smart card that is unused for a LeeTran-adjustable period shall be rejected upon use at any field device (except APOS Terminals) as being “dormant.” Dormancy shall be determined by reading the date of the last transaction record encoded on the card. If this date is older than the LeeTran-defined dormancy period (initially set to two [2] years), the card shall be considered dormant.

Because dormancy shall be considered part of the card validity processing regardless of the card’s presence on the Action List, it shall be possible to maintain system integrity and delete a card from the Action List once its deactivation or suspension entry is older than the dormancy period.

To prevent reactivation of a dormant card that was to be deactivated or suspended, the CDS shall retain a list of all fare media that were ever on the Action List to be deactivated or suspended; this list shall be checked prior to reactivating a dormant fare instrument.

Only the APOS Terminal device shall be capable of restoring to active status a dormant card.

When a smart card with stored cash value is declared dormant, LeeTran shall comply with all Federal and State regulations regarding escheat; the CDS shall supply all necessary data and reports to support LeeTran’s compliance with Federal and Florida State escheat regulations.

6.2.3.8.5 Refund and Reversal Transactions

The APOS Terminal shall provide operators the ability to reverse previous transactions for refund or error correction purposes. If necessary, multiple reversal transactions shall be used to reverse multiple fare products on a single fare card. Reversal transactions shall require the deletion of the relevant fare product from the patron’s smart card, or deduction of the stored value or stored rides added during the replenishment transaction.

Reversal transactions shall require the operator to select the transaction for reversal from a list of eligible replenishment transactions generated by the APOS Terminal after reading the card.

The APOS Terminal shall also provide the ability for patrons to receive refunds for unused fare products, prorated if necessary by formulae defined by LeeTran, and downloaded to the APOS Terminal from the CDS.

The APOS Terminal shall fully record and transmit to the CDS all refund and reversal transactions.

6.2.3.8.6 Multiple Card Issuance Transactions

The Back Office APOS Terminal shall exclusively support transactions that issue multiple (non- personalized) cards of the same type. These transactions shall be separately tracked and recorded, and shall enable authorized users to produce multiple cards (encoded manually, one at a time) for bulk production purposes.

The multi-card issuance function shall support transactions in the range of 2 to 1,000 cards. While conducting these transactions, the APOS Terminal shall display the number of cards completed and the number of cards remaining in the transaction. Cards that fail to encode properly shall be clearly identified to the operator for retry or replacement; the counters of cards completed and remaining shall not change unless a card is successfully encoded.

At the conclusion of the transaction, the APOS Terminal shall generate and display a report showing the sequential serial numbers of all cards encoded in the transaction. The displayed report shall be user-configurable to be sorted by order of production or by sequential serial number. The user shall be able to easily direct the displayed report to a local printer.

A record of the multi-card transaction shall be transmitted to the CDS. Each card successfully encoded during the transaction shall be recorded in the CDS in the “issued” state.

6.2.3.8.7 Barcode Ticket Printing

Using a standard, commercial laser printer, the Back Office APOS Terminal shall exclusively support production and printing of barcode tickets to be used for special events and other time-specific, short-term use.

Barcode tickets shall be printed onto commercially-available, pre-perforated sheets containing 8 to 12 tickets per sheet.

Barcode tickets shall include printed information in human-readable form (no less than 14-point font) and in secure 2D barcode, using the same encryption key and algorithm defined in Section 3.3. Printed human-readable and barcode data shall include at minimum:

- Unique serial number
- Ticket type
- Validity start (date, time)
- Validity end (date, time)

Printed human-readable information shall also include LeeTran-configurable text, no less than 3 lines with no less than 12 characters each, in 14-point font or larger.

Tickets shall be produced in batches consisting of user-selectable quantities ranging from 1 to no less than 1,000 tickets. Ticket type, validity start and end parameters, text fields, and other data shall be user-selectable prior to commencing printing. Except for the serial numbers, all tickets produced for a batch shall be identical.

The Back Office APOS Terminal shall produce a variety of no less than 16 pre-defined ticket types (durations), configurable at the CDS. As delivered, the following ticket types shall be pre-configured for barcode ticket production, in both Full Fare and Half Fare versions:

- 1-day pass
- 7-day pass
- 30-day pass

The APOS Terminal shall record the production of all barcode tickets and transmit relevant transaction records to CDS.

6.2.3.9 Customer Account Management

6.2.3.9.1 Customer Account Setup and Modification

Via interaction with the CDS data entry forms, the APOS Terminal shall enable operators to set up and modify customer accounts.

For new accounts, the APOS Terminal shall sequentially prompt the operator to enter the customer’s name, address, phone number, and other requisite information, including a requested login ID (which the APOS Terminal shall verify as being unique via a query to the CDS). The CDS shall assign all new accounts a random 4-digit

password, which the APOS Terminal shall print on a receipt and which the CDS shall require the customer to change upon first subsequent login.

6.2.3.9.2 Media Registration

The APOS Terminal shall enable patrons to register their smart cards to enable replacement of the card with restoration of residual value in the event of theft or loss. Registration shall require the patron to present the smart card being registered. The clerk shall populate the requisite registration information by accessing the CDS database data entry form. To prevent manual data entry error, entry of the sequential serial number of the patron's smart card shall be by use of the APOS Terminal's CSCP.

6.2.3.9.3 Setup, Modification, and Cancellation of Autoload Subscriptions

Via interaction with the CDS data entry forms, the APOS Terminal shall enable operators to establish, modify, and cancel patron subscriptions for autoload transactions. To prevent manual data entry error, entry of the sequential serial number of the patron's smart card shall be by use of the APOS Terminal's CSCP, and the Terminal's Bankcard Processor module shall read any bankcard data required for the subscription.

If subscription autoload transactions require data encoded on the customer's card, upon successful entry of all requisite data, the APOS Terminal shall encode or modify the subscription data to the customer's card using the CSCP.

6.2.3.9.4 Reduced Fare and Passport User Profile Reauthorization

Reduced and Passport fare privileges, encoded as part of the user profiles on Long-Term smart cards are subject to expiration. The APOS Terminal shall include a function to re-authorize reduced and Passport fare privileges (that is, encode a new profile expiration date) onto cards that are previously issued with reduced or Passport fare privileges. Reauthorization of such privileges shall not result in conversion of a card from full fare to any reduced fare privilege, nor from one non-full fare type to another.

6.2.3.10 Operations

6.2.3.10.1 Clerk Login Procedures

The APOS Terminal shall require all users to be authorized according to permissions assigned to each login and password. Authorized logins and passwords shall be managed by a LeeTran administrator and disseminated to all APOS Terminals via the CDS.

6.2.3.10.2 Access to CDS Database

The APOS Terminal shall provide authorized clerks the ability to query the CDS database to determine the last known status of any smart card. When querying the database for the status of a fare instrument, it shall be possible to use the CSCP to read the smart card's serial number for the query. If the patron's smart card is not functioning, the APOS Terminal shall permit the clerk to manually enter the serial number.

The APOS Terminal shall permit authorized users to conduct other queries of the CDS database as required herein, limited by permissions granted and configurable by LeeTran.

6.2.3.10.3 Web Browser Interface for Customer Service and CDS Database Queries

Via standard web browser interface, the APOS Terminal shall provide authorized LeeTran clerks access to LeeTran's intranet site to answer questions from patrons, and to send and receive messages through LeeTran's email system. The APOS Terminal shall restrict browsing to only those sites in a configurable table; LeeTran shall identify the initial list of permitted sites at the FDR.

The APOS Terminal shall provide authorized LeeTran clerks with the ability to query the CDS database to search transaction history of a presented smart medium and provide other customer service-related information.

6.2.3.10.4 Smart Media Inventory Control

Upon issuance and/or initialization of a smart card, the APOS Terminal shall record in a special “issue record” the date, time, fare category, sequential serial number, and other pertinent information of the smart card. The APOS Terminal shall transmit this record to the CDS, where the existing central inventory database shall track the status of all smart cards in inventory and in circulation.

The CDS database shall track the smart cards distributed to each LeeTran sales location. Using the list of cards issued to each store and the issuance and/or initialization records previously transmitted to the CDS, it shall be possible for authorized APOS Terminal users to query the CDS database for the serial numbers and total quantity of smart media that remain in the sale location’s inventory.

6.2.3.10.5 Integration with CDS

The APOS Terminal shall connect to the CDS to upload all transactional information and receive downloaded configuration and fare tables, software updates, time of day, and so on.

6.2.3.10.6 APOS Terminal Configuration Control

Operating parameters shall be downloadable to the APOS Terminal from the CDS via the wide area network provided by LeeTran. Configurable parameters shall include:

- All sales selections (for smart card and non-smart card transactions)
- All text and touch screen region labels
- Value of deposit to be collected for new or replaced fare media
- Available intranet and other web sites
- Authorized users and passwords
- All other relevant fare table entries

When required, modification of the APOS Terminal application software and any OEM application or operating system software shall be performed by downloading new software from the CDS. The CDS database shall record and track the version number of all such software in each APOS Terminal and the date that the software versions were downloaded and installed.

6.2.4 APOS Terminal Modules

All APOS Terminal hardware modules shall be subject to LeeTran review at the PDR and LeeTran approval at the FDR.

6.2.4.1 Computer Hardware

All configurations of the APOS Terminal shall be based on Windows®-based personal computers.

6.2.4.2 Touch Screen

All configurations of the APOS Terminal shall include an integrated Flat Panel Touch Screen Personal Computer. (That is, the touch screen user interface shall be integrated with the computer enclosure.)

The touch screen shall provide no less than XGA resolution and suitable touch sensitivity to satisfy operator selection and input requirements.

6.2.4.3 Keyboard and Pointing Device

Fixed (non-portable) configurations of the APOS Terminal shall include separate full-sized keyboards and mouse pointing devices (with scrolling wheel).

Portable configurations shall include integrated keyboards and pointing devices.

6.2.4.4 Contactless Smart Card Processor (CSCP)

The CSCP module shall be a separate module cabled to the APOS Terminal. Ideally, the CSCP shall allow the smart card to be placed atop the module throughout the transaction process.

6.2.4.5 Cash Drawer

The cash drawer shall incorporate an insert with space for five bill denominations and five coin denominations. When the cash drawer opens, an alarm or bell shall sound indicating that the drawer has released and is open. Similarly, an alarm or bell shall sound when the drawer locks upon closing.

The cash drawer shall accommodate installation under a counter, be pry-resistant, and shall be made of high quality, heavy gauge steel.

6.2.4.6 Bankcard Processor

The Bankcard Processor module shall include:

- Magnetic stripe reader
- Contact bankcard reader (EMV certified)
- Contactless bankcard reader (EMV, payWave®, and PayPass® certified)
- Signature capture pad
- PCI-compliant PIN pad

Bankcard processing shall be as described in Section 6.2.4.6.

6.2.4.6 Bankcard Processing

Valid bankcards (i.e., credit, debit, and prepaid cards) issued by financial institutions shall be accepted for new FCS purchases of smart cards and fare products.

- Bankcard payments for new FCS transactions shall occur via sales channels that include APOS Terminals and new FCS websites, including a general public web portal.
- Payment for bankcard purchases shall be processed directly by LeeTran's selected third-party merchant services provider or payment gateway ("payment entities").
- If supported by the payment entities, bankcards shall be compared to the negative / "hot" lists stored by the payment entities to limit LeeTran exposure to fraud; the new FCS shall store the results of such denied authorization requests. LeeTran's third party payment entities shall process authorization of each bankcard purchase transaction and provide LeeTran with funds via a standard funds transfer process.
- With the possible exception of initial data capture at the APOS Terminal Bankcard Processor Module, at no point shall any element of the new FCS transmit or process full, unsecured bankcard Primary Account Numbers (PANs) and other related cardholder-sensitive data. In addition, at no point shall full bankcard PANs and other related cardholder-sensitive data (secure or unsecure) be stored by the new FCS. All bankcard PANs shall be secured (e.g., "tokenized") by LeeTran's payment entities so that all new FCS records of bankcard transactions, and all records of new FCS authorized payment methods, shall be devoid of true bankcard PANs.

- The new FCS shall provide a means, without the use of true bankcard PANs, to “link” purchases to applicable fare media to enable various customer service functions such as fare media deactivation, and shall provide for a seamless process for various customer service functions, including but not limited to researching transactions and processing refunds.
- Autoload transactions generated by the new FCS shall be transmitted to the payment entities for authorization. LeeTran’s payment entities shall transmit the result of autoload payment processing back to the new FCS in real time.
- Where allowed or required by card brand operating regulations, the new FCS shall incorporate Address Verification Service (AVS), partial approvals, real-time reversals, and split-payments when processing bankcard purchases.
- The Vendor shall introduce no technical or design features that prevent forward compatibility with standards of the financial services and payment industries. LeeTran requires that all aspects of the new FCS comply with generally accepted operating procedures and practices for processing electronic funds transfers of the financial services and payments industries.
- All software resident on the system to accommodate electronic payments shall conform to applicable American Bankers Association (ABA) requirements, ISO/IEC standards, Federal Reserve Regulations (including “E” and “Z”), card brand operating regulations, and other regulations, laws, and standards for electronic payment processing. The new FCS shall be fully compliant with all applicable data security standards in effect at the time the first element or function of the new FCS enters revenue service.

The Vendor shall submit a comprehensive document describing all procedures and processes in support of bankcard transaction processing. Because of its sensitive nature, the Vendor shall submit this document under secure cover or in encrypted form only, for LeeTran review at the PDR and LeeTran approval at the FDR.

6.2.4.8 Receipt Printer

Where specified, APOS Terminals shall include a receipt printer. The printer shall print on a single roll of continuous thermal paper, nominally 2-1/4 inches wide and 150 feet in length. The unit shall provide for easy loading of a new paper roll when the current one is empty, and shall have a cutting edge to enable the operator to separate the receipt from the roll.

6.2.4.9 Patron Display

Where specified, APOS Terminals shall include a Patron Display that satisfies the following requirements:

- Separately mounts on a pole or other support for optimum visibility for all customers, including those in wheelchairs
- Uses backlit LCD, LED, vacuum fluorescent, or other highly visible display technology suitable for the office environment
- Provides no less than 2 lines of text, with minimum 24 characters per line, with each character no less than 0.5 inches high

The Patron Display shall convey transaction price, status, and other pertinent information.

6.2.4.10 Digital Camera and Tripod

APOS Terminals shall include a digital camera and tripod for capturing customer photos for printing on personalized cards. The camera shall include a built-in flash and an image sensor of no less than 2 Megapixels; the camera shall produce images of suitable resolution, clarity, and contrast to satisfy the requirements of photo ID cards.

The Vendor shall provide a tripod for each camera optimized for the specific APOS installation and photo capture location. For example, a compact, counter-top tripod may be well suited for permanent APOS Terminal installations, whereas a floor-standing tripod may be better suited for portable APOS Terminal application.

6.2.4.11 Smart Card Printer / Encoder

The Smart Card Printer module shall utilize re-transfer printing technology, and shall encode smart cards with requisite data (such as the issue and user profile data) in coordination with the printing process.

The Smart Card Printer / Encoder shall print edge-to-edge (i.e., "full bleed") on one side of the card in at least 4 colors (YMCK). As a re-transfer device, the Smart Card Printer / Encoder shall apply printed images to a laminate film, and then apply the laminate to the card. Each Smart Card Printer Encoder shall employ easily replaceable ribbons for the transfer printing and lamination films.

Print resolution shall be no less than 300 dots per inch.

The Smart Card Printer / Encoder shall provide a print speed of no less than 75 cards per hour.

Input and output card hoppers shall have a capacity of no less than 100 cards each, and shall be lockable for security.

Upon successful printing and encoding, the Smart Card Printer / Encoder shall inform the APOS Terminal of the successful issuance of each card, and the sequential serial number of each issued card. The APOS Terminal shall include the produced card's sequential serial number in the transaction record sent to the CDS.

6.2.4.12 Barcode Ticket Printer

The barcode ticket printer shall be a standard, commercial monochrome (black & white) laser printer rated for monthly duty cycle of no less than 100,000 pages, and providing print resolution of no less than 600 dpi.

Toner cartridges sufficient to produce no less than 5,000 pages as rated by the manufacturer shall accompany each printer.

The barcode ticket printer shall use commercially available, standard-sized (A4 or Letter) pre-perforated paper, producing 8 to 12 tickets per page.

6.2.4.13 Uninterruptible Power Supply

Each APOS Terminal shall receive power from a dedicated UPS with sufficient battery capacity to operate all components of the APOS Terminal for a minimum of 10 minutes. The UPS shall cause the APOS Terminal to shut down without loss of data integrity whenever the UPS determines that its remaining battery capacity is low.

The UPS shall also provide no less than 500 joules of overvoltage (surge) protection for all connected devices.

6.2.4.14 Communication Interfaces

As necessary, the APOS Terminal shall include integrated (10BaseT Ethernet or cellular broadband modem) or external communications interfaces (such as an external USB hub) to satisfy the requirements of the configuration.

6.2.5 APOS Terminal Configurations

The Vendor shall supply APOS Terminals in three configurations, all of which shall utilize the same Vendor-supplied application and OEM software.

6.2.5.1 Front Office APOS Terminal

The Front Office APOS Terminal shall provide all functions available (except as noted herein), and shall be installed for walk-up customer transactions. The device shall include:

- Integrated touch-screen and computer enclosure
- Separate keyboard and mouse
- CSCP module
- Cash drawer
- Bankcard Processor module
- Patron display
- Receipt printer
- Separate digital camera and tripod
- Smart card printer / encoder
- Uninterruptible power supply
- Communications interfaces as necessary

6.2.4.2 Back Office APOS Terminal

The Back Office APOS Terminal shall be configured to support LeeTran internal needs and transactions where the customer is not present, including single and multiple card order fulfillments, LeeTran employee card issuance, and other transactions. The device shall include the following modules, which shall be identical to those used in the Front Office APOS Terminal:

- Integrated touch-screen and computer enclosure
- Separate keyboard and mouse
- CSCP module
- Separate digital camera and tripod
- Smart card printer / encoder
- Barcode ticket printer
- UPS
- Communications interfaces as necessary

6.2.4.3 Portable APOS Terminal

The Portable APOS Terminal shall be based on a laptop computer with an integrated touch screen interface, keyboard and pointing device. The portable configuration shall support remote sales and card personalization programs. In addition to the laptop computer, the device shall include the following modules, which shall be identical to those used for the Front Office APOS Terminal (except where noted herein):

- CSCP module
- Bankcard Processor module
- Receipt printer
- Separate digital camera and tripod
- Smart card printer / encoder
- Cellular broadband data modem and other communications interfaces as necessary (may be unique to the Portable APOS Terminal)

6.3 Mobile POS Devices

6.3.1 General Requirements

In the future, it may be the case that LeeTran chooses to contract with taxicab services to provide a portion of its paratransit demand-response service. If so, this would require portable fare media processors that provide functionality equivalent to the SAP, but in a handheld, portable form factor. To satisfy this need, the Vendor shall supply PTPs, which shall be based on commercially-available, consumer or industrial-grade devices, be as compact as practical, and be based on a “smart phone” platform with an integrated ISO/IEC 14443-compliant smart card reader.

LeeTran staff shall also use PTPs to conduct transactions for other purposes, such as validating parking payments, inspecting fares, and other activities that are in addition to processing Passport fares. The PTP shall support these activities.

PTPs shall normally operate in a semi-protected bus and taxi environment; however, they shall also be capable of reliable operation in an outdoor environment and while experiencing rough handling.

The PTPs shall be compatible with all LeeTran-issued smart cards and all other smart card fare media and processed by the SAPs and POS Terminals.

In general, the PTP shall:

- Read and write to LeeTran-issued contactless smart cards
- Read Third Party-issued smart cards
- Read 2D barcode fare media
- Respond to inputs of the operator
- Display validity and value information upon request
- Register manually-entered counts of services provided to non-smart card users
- Register and store accounting and transaction data
- Provide different audible annunciations for valid and invalid transactions
- Communicate with the CDS to transmit and receive data regarding smart cards reviewed

The PTPs shall provide an expected useful life of no less than 2 years.

6.3.2 PTP Requirements

The PTP shall:

- Weigh no more than one pound, including rechargeable batteries.
- Be contained within a single enclosure and shall be easily and comfortably held and operated in one hand.
- Include at least 128 Mb of Random Access Memory and 2 Gb of non-volatile flash memory.
- Have a commercially available ISO/IEC-14443 compliant Type A and B contactless smart card read/write module.
- Support at minimum NXP MIFARE® Classic, MIFARE® Plus, MIFARE® Ultralight®, MIFARE® Ultralight® C, and DESFire® smart card media.
- Have the ability to read one- and two-dimensional barcodes.
- Utilize a display that measures at least 3.5 inches diagonally, displays in no less than full VGA resolution (640 x 480 pixels), and provides a touch screen user interface.
- Employ a data entry keypad to select functions, query stored databases, enter data, and to provide other functionality required to ensure proper operation. The entry interface shall be either a combination of fixed and variable function buttons or a combination of touch-screen display and pushbuttons.
- Process the LeeTran-issued smart card fare media.

- Provide different audible and visual annunciations for each type of transaction.
- Be GPS or differential GPS enabled to log the whereabouts of the PTP user throughout the day.
- Include real-time integrated 3G/4G cellular broadband data communications to exchange data and transmit the current location of the PTP to the CDS.
- Include a Bluetooth® Class II, v 2.0 on-board chip antenna to communicate with future peripherals.
- Operate under any of a minimum of two fare tables residing in its local memory, each that shall be programmable to become the active set at a particular time and date and to expire at a particular time and date.
- Communicate with the CDS while placed in a Recharging / Data Cradle or via 3G/4G cellular broadband to: transmit data, update the action and autoloading lists, update the Third Party Valid Card List, and receive new fare tables, configuration and operations data, and new application software.
- In the event of communications loss or device failure, all transaction data records shall be retrieved from a removable memory module shall, which shall store duplicate records of all transactions.

The Vendor shall submit the make, model, and configuration of the PTP for LeeTran review at the PDR and LeeTran approval at the FDR.

6.3.3 Configurability

As described above, the PTPs shall support future use by taxis in servicing Passport Fare transactions, and use by LeeTran staff in performing other non-Passport fare transactions. While the hardware and software for all PTPs shall be identical, the PTP shall be easily configurable to either the Passport or non-Passport fare processing functionality. This configurability shall be available only to authorized LeeTran users; taxi operators shall only have access to functions designed for processing Passport fares.

As described herein, the PTP shall also support configurability through numerous adjustable parameters, centrally controlled and transmitted via the CDS.

The Vendor shall submit a comprehensive document describing the configurability of the PTP, including a listing of all configurable parameters and their value range, for LeeTran review at the PDR and LeeTran approval at the FDR.

6.3.4 PTP Operations

The primary use of the PTP shall be for the reading and validation of smart cards and barcode tickets. The PTP shall:

- Not be operational until a proper log-on is successfully made by a valid user. Login shall require entry of a username, and password. LeeTran-issued smart card-based operator ID cards may also be used as part of the log-on process.
- Process all smart card fare media (LeeTran-issued and Third Party).
- Process all barcode fare media (Mobile Ticketing Application and LeeTran-printed tickets).
- Review and display the information on a customer's smart card.
- Manually track (tally) the number of rides provided that were not paid with smart cards, and the value of such rides.
- Receive Short Message Service (SMS) text messages from LeeTran-authorized senders only. The ability of a PTP to send SMS text messages shall be restricted to users authorized to do so and LeeTran-specified recipients.

- Be restricted to performing only transaction processing and other functions defined herein; the PTP shall not provide telephone, web browsing, SMS texting, or other functions commonly found on smart phones unless approved by LeeTran at the PDR.
- Require no more than 60 seconds to resume operations from a full power-down condition, and no more than 10 seconds to resume operations from a “sleep” condition.

The Vendor shall submit a complete description of all PTP operations, including but not limited to operator interface commands and displays, smart card read/write module functionality, and 2D barcode reader operations, for LeeTran review at the PDR and LeeTran approval at the FDR.

6.3.4.1 Functionality

The PTP shall:

- Read smart cards as appropriate to the type of card and transaction selected whenever a valid, genuine LeeTran smart card is presented within range of the card read unit. The PTP shall verify that the smart card is valid for the patron’s present trip.
- Conduct smart card transactions identically to the SAP, as described in Section 5.8.4.
- When conducting smart card transactions, utilize the same Action List, Autoload List, and Third Party Valid Card List as the SAP, as described in Sections 5.2.5.1, 5.2.5.2, and 5.2.5.5.
- Require a valid login to commence operations; logins shall be validated against a list managed by the Passport Service Provider web portal.
- Contain non-volatile memory that shall record data for each smart card transaction processed.
- Be capable of detecting basic internal malfunctions and shall annunciate failures to the display for the inspector to review. The malfunction detection shall cover at least failure of power circuitry and any failure of the smart card read unit that could result in a false, incomplete, or corrupted reading of a smart card.
- Incorporate an indicator to inform the operator of a low battery condition. This indicator shall activate when less than 2 hours of power remains.
- When inactive for a LeeTran-adjustable period (initially set to 5 minutes), revert to a sleep mode requiring depression of the "Enter" key or other designated key to activate the unit. During sleep mode, the smart card read antenna shall be deactivated and any backlight shall be extinguished. User log-on shall not be again required.
- After a LeeTran-adjustable period in sleep mode (initially set to 30 minutes), shut down completely, and shall require the user to log on after restoring power.

6.3.4.2 Operator Interface

6.3.4.2.1 Display

The PTP display shall provide operators with instructions, prompts, and transactional information. The display shall meet the following minimum requirements:

- The display shall be easily read under all conditions of ambient light throughout the day and night. If necessary, a backlight shall be provided.
- Displayed messages shall be easily modifiable by LeeTran once the system is in operation.

6.3.4.2.2 Keyboard and Touch Screen Input

The PTP shall provide operator input by touch screen and keyed input where appropriate. Touch regions shall be as large as practical, and sufficiently separated from each other to minimize accidental erroneous input.

Because the smart card read/write module shall consume battery power when active, as described in Section 6.3.4.3, the PTP shall activate the smart card read/write module only under operator command. Because this button shall likely see repeated use, the button to activate the smart card read/write module shall be ergonomically located, preferably so that it can be pressed with the user's thumb. A suitably large and prominent touch region on the screen shall duplicate the function of the physical button.

6.3.4.2.3 Validity Status Visual Indicators

The PTP shall include three indicators to indicate the validity of the smart card. The status indicators shall be located on the top of the PTP and shall be positioned so that they are visible in all ambient lighting conditions. Alternatively, dedicated regions of the PTP display may be used for these purposes, provided that the indications are unambiguous and are easily seen in all ambient light conditions. These indicators shall operate as follows.

- While the PTP is in the idle or sleep states, all of the displays and indicators shall be extinguished or blank.
- Upon processing a smart card or barcode fare medium, the transaction status indicators shall function as shown for the SAP in Section 5.3.4.
- The appropriate status indicator shall remain activated for a LeeTran-adjustable inter-transaction timeout period, or until the operator presses a button or tags another card to the PTP, whichever occurs first.

6.3.4.2.4 Audio Transducer

Coincident with the activation of the visual validity status indicators, the PTP shall emit a distinctive tone for each status indicator. In addition, the audio transducer shall emit a distinct short tone each time a push button is pressed. The tones shall be audible in the transit environments, and the volume of the tones shall be field-adjustable by the operator.

6.3.4.3 Smart Card Read/Write Module

The PTP shall include a smart card read/write module and an antenna located so that the operator has easy access to tag cards. The external antenna shall not protrude from the exterior of the PTP and shall be made of materials that are impervious to weather conditions.

The PTP smart card read/write module shall provide the following features:

- The smart card read/write module shall be compliant with both the A and B variants of the ISO/IEC 14443 standard, and provide contactless smart card read and write functionality that is fully compliant with the ISO/IEC 14443 standard.
- The smart card read/write module shall be activated (i.e., the antenna energized) only while commanded to do so by the PTP operator.
- The antenna shall remain energized while a card is in range of the antenna, and for a LeeTran-configurable period after a card is removed from the antenna field. As delivered, the PTP smart card read/write antenna shall remain energized for 10 seconds after a card is removed from the antenna.

6.3.4.4 2D Barcode Reader

The PTP shall include a 2D barcode reader to process (validate) all LeeTran 2D barcode media (Mobile Ticketing Application and LeeTran-printed tickets). The 2D barcode reader shall:

- Be housed completely within the PTP
- Provide no hazard from the barcode reading laser or other components
- Be high resolution (greater than 1.3 megapixels)
- Have a read range of not less than 4 inches and not more than 10 inches

- Read standard 1D barcode
- Read secure 2D barcodes (QR code, Aztec, or other LeeTran-approved format)
- Utilize an encryption key, configurable by LeeTran, and AES decryption algorithms to process secure 2D barcodes
- Have a first read accuracy of not less than 99.0%

6.3.4.5 Fare Tables

The PTP shall store a minimum of two complete fare tables. One fare table shall be designated the active table; all other stored tables shall include a date and time at which the table is to become active.

Fare tables shall be highly configurable and shall include support all fare policies and pricing structures defined herein and necessary to support LeeTran operations.

6.3.4.6 Data Storage

The PTP shall record, at minimum, the following:

- Individual transaction records as described in Section 5.2.3
- Transaction accumulation records
- Alarms and events
- Data communication incidents
- Operator logins and logouts

Each record shall be stored in memory for transfer to the CDS.

The PTP shall use solid-state memory with sufficient capacity to store a minimum of 10,000 transaction records.

The PTP shall also include a removable memory module, which shall store duplicates of all transaction records. In the event that the PTP malfunctions, transaction records in the removable memory module shall be transferred to the CDS via a method subject to LeeTran approval at the PDR.

6.3.4.7 Clock

The PTP shall maintain date and time of day by an internal clock, which shall have a battery, or equivalent, backup to keep the clock running for at least 150 hours without external power. The clock shall maintain time to an accuracy of less than 1-minute error within a 1-month period. Time shall be synchronized between the PTP and the CDS each time data is downloaded to the PTP via the cradle. (To avoid potential time conflicts, the PTP shall not synchronize its clock with the cellular network clock.)

6.3.5 Transaction Processing

The PTP shall reliably read and write smart cards and read barcodes in no greater time and manner then defined for the SAP in Section 5.2.7.

To the extent practical, the PTP shall conduct all transactions (smart card and barcode) identically to the SAP.

The Vendor shall provide a comprehensive description of all PTP transaction processes, including flow charts, for LeeTran review at the PDR and LeeTran approval at the FDR.

6.3.6 PTP Report Requirements

The PTP shall be able to produce and display the following reports (generated by the device or queried from the CDS):

- Transaction summary report – A summary of all smart card transactions during the user’s shift
- Transaction detail report – A list of all smart card transactions during the user’s shift

The Vendor shall provide samples of all PTP reports for LeeTran review at the PDR and LeeTran approval at the FDR.

6.3.7 Power and Communications

The PTP shall utilize rechargeable batteries for power. The batteries shall provide power to operate the device for not less than 12 continuous hours, with the smart card reader and any backlight activated not less than 50% of the time. Batteries shall be lithium-ion technology, or LeeTran-approved equivalent. The use of nickel-cadmium batteries is prohibited.

Battery recharging shall take place in Recharging / Data Cradles or 120 VAC power adapters. One cradle or 120 VAC power adapter shall be provided for each device. In addition, for each PTP, the Vendor shall provide a “cigarette lighter” power adapter for recharging the device while in use in a vehicle and while installed in the Dashboard Cradle described in Section 6.3.8.

Full recharging of a PTP’s batteries shall require no more than 4 hours.

The Recharging / Data Cradle shall sufficiently protect itself and all inserted devices against power surges.

If necessary, the Recharging / Data Cradle shall also be used to exchange information with the CDS. Any communications through the cradle shall be non-proprietary and shall use a TCP/IP protocol.

6.3.8 Dashboard Cradle

Each PTP shall be supplied with a dashboard cradle, which shall securely hold the PTP in place. The dashboard cradle shall be easily mounted to (and subsequently easily removed from) a variety of vehicle dashboards. While the PTP is installed in the dashboard cradle:

- The PTP shall be able to process presented smart cards
- The entire operator display and all function keys (used by the PTP application) shall remain visible and operable

The Vendor shall provide a description or sample of the PTP dashboard cradle for LeeTran review at the PDR and LeeTran approval at the FDR.

6.3.9 Required Submittals

The following table displays items that must be submitted in advance of one or more design reviews.

Description	Submittal Due		
	CDR	PDR	FDR
RPOS Terminal hardware design description, including: <ul style="list-style-type: none"> • RPOS Terminal enclosure • RPOS Terminal physical security and mounting bracket • RPOS Terminal operator interface • RPOS Terminal Smart Card Processor • RPOS Terminal patron interface • RPOS Terminal backup memory 		X	X

Description	Submittal Due		
	CDR	PDR	FDR
module <ul style="list-style-type: none"> • RPOS Terminal receipt printer • RPOS Terminal broadband modem 			
RPOS Terminal software design description, including: <ul style="list-style-type: none"> • RPOS Terminal data registers • RPOS Terminal transaction, event, login, etc. records • RPOS Terminal operator interface • RPOS Terminal Action List storage, update, and processing • RPOS Terminal transaction limitation procedures • RPOS Terminal setup, configuration, and administration procedures • RPOS Terminal anti-virus and anti-malware software and procedures 		X	X
Description of the RPOS Terminal login types and permitted functions		X	X
Complete description of RPOS Terminal operations, transaction procedures, and administrative functions, including flow charts as necessary		X	X
Sample RPOS Terminal receipt layouts for all receipt types		X	X
All OEM-supplied operating system and application software		X	X
A comprehensive document describing the configurability of the APOS Terminal, including a listing of all configurable parameters and their value range		X	X
Descriptions of the APOS Terminal software design, including: <ul style="list-style-type: none"> • APOS Terminal data registers • APOS Terminal transaction, event, login, etc. records • APOS Terminal operator interface • APOS Terminal Action List storage, update, and processing • APOS Terminal transaction limitation procedures • APOS Terminal setup and administration procedures • APOS Terminal anti-virus and anti-malware software and procedures 		X	X
A comprehensive summary of the APOS Terminal functionality, including		X	X

Description	Submittal Due		
	CDR	PDR	FDR
the layout of all APOS Terminal screens, descriptions of all configurable parameters and tables, and the process flows for all transaction types			
LeeTran shall supply graphics for printing templates ¹			
Printing masks ²			
Complete documentation describing the format and layout of printing templates		X	X
LeeTran shall identify the initial list of permitted browsing sites			X
All APOS Terminal hardware modules		X	X
Submit the make, model, and configuration of the PTP		X	X
A comprehensive document describing the configurability of the PTP, including a listing of all configurable parameters and their value range		X	X
A complete description of all PTP operations, including but not limited to operator interface commands and displays, smart card read/write module functionality, and 2D barcode reader operations		X	X
In the event the PTP malfunctions, transaction records in the removable memory module shall be transferred to the CDS via a method. Describe this method		X	
A comprehensive description of all PTP transaction processes, including flow charts		X	X
Provide samples of all PTP reports		X	X
A description or sample of the PTP dashboard cradle		X	X

7 Back Office (Central Data System [CDS]) Requirements

The back office (CDS) shall provide all core functions to support the operation of the account-based FCS, and integrate with third-party systems as required.

7.1 General Requirements

¹ Within 90 days after NTP

² No later than 30 days before the commencement of APOS Terminal Factory Acceptance Testing
LeeTran Fare System Specifications

The back office shall comply with all common design requirements in Section 17: Design Requirements and all system security requirements in Section 2.5: System Security.

The Vendor shall develop and submit a back office hardware design specification that provides a detailed description of all hardware components that shall comprise the back office, and the purpose, functions, interdependencies, configuration, and communication requirements of each component.

The Vendor shall develop and submit a back office software design specification that provides both graphical and narrative descriptions of each software component of the back office. The back office software design document shall include at a minimum:

- Functional description, purpose, supplier, and version of each software component
- Interfaces and communication flows between components
- Installation and configuration documentation

All back office systems shall provide real-time access to no less than five (5) years of historical detailed data and ten (10) years of summary data.

User access to all elements of the back office shall require two-factor authentication controlled through a centrally-managed user authentication and access control platform provided by the Vendor. Individual users or user groups shall have access to specific systems where appropriate for standard business operations. All access control shall comply with LeeTran security policies.

The Vendor shall be responsible for all back office operations and maintenance defined under the operations and maintenance agreement.

Software updates to back office software, databases, and associated modules shall be centrally managed with appropriate version control in place. Software releases shall be released only by authorized system administrators following LeeTran approval.

7.2 Account-Based Transaction Processor (ATP)

The primary component of the back office shall be the ATP. The Vendor shall deploy an ATP that maintains all transit accounts and performs real-time fare calculation and validation for closed-loop payments. Accurate and secure transaction processing shall be critical to ATP operations.

7.2.1 General Requirements

The ATP shall enable core system functions, including but not limited to:

- Fare media sales and issuance, and the creation of new transit accounts
- Fare product sales and the loading of fare products (e.g., stored value and passes) to transit accounts, and identification of purchases made using transit benefits (e.g., subsidized purchases)
- Maintenance of transit account status, balance, and transaction history
- Real-time fare calculation and payment processing (e.g., validation) for closed-loop fare payments
- Real-time fare payment inspection for closed-loop fare payments
- Automatic reloading of value to transit accounts (e.g., autoload)
- Modification of transit account balances based on adjustments, refunds, reversals, and balance transfers
- Blocking/unblocking and closing of transit accounts
- Setting of all specified transit account management configuration parameters (e.g., fraud detection parameters, negative balance limits, etc.)
- Integration and interfacing with third-party systems and devices

The ATP shall provide all other necessary functions to support the requirements defined in this specification.

The fare distribution/payment/inspection devices, and supporting back office systems, shall access ATP functions using the Vendor-provided APIs (see Section 2: System Architecture) and a direct, real-time connection to the ATP.

The ATP shall maintain transit accounts that store all fare products (e.g., stored value and passes) loaded by customers, and deduct value in real-time as accounts are used for payment.

The ATP shall maintain separate stored value purses within the transit accounts to segregate stored value loaded using pre-tax funds through pre-tax benefit programs. The system shall support pre-tax purses, and a post-tax (e.g., general) purse. Order of precedence rules shall be able to be configured to deduct stored value from the pre-tax purses first when the service being paid is eligible for the use of pre-tax funds.

The ATP shall support all customer service functions impacting transit account status and balance that are available through all customer service channels including the TVMs, TOTs, CRM, websites, and third-party systems (retail network and mobile ticketing).

7.2.2 Fare Distribution

The ATP shall support the real-time loading of fare products through all fare distribution channels. Except where allowed under risk mitigation (see Section 2.4: Risk Mitigation Techniques), no loading of fare value/product to a transit account shall be permitted without an active connection to the ATP.

The ATP shall manage the automatic reloading of value for fare products that are configured for autoload. Autoload shall be based on configuration parameters (see Section 7.3: Configuration Management), and shall require the transit account to be registered with a valid funding source stored in the associated customer account.

All payments shall be accepted or authorized prior to the loading of any fare value. Following payment confirmation, the ATP shall update the transit account balance in real-time to allow for immediate use by the customer.

7.2.3 Fare Payment

When processing a fare payment, the ATP shall provide a real-time online server authorization, and shall query the transit account, perform the fare calculation, and update the account balance, prior to providing an approval or denial response to the fare payment device.

The real-time fare calculation performed by the ATP shall be based on the fare structure configuration described in Section 4: Fare Structure. The calculation shall incorporate all attributes of the ride being taken, transit account rider classification, transit account balance, available fare products and order of precedence rules, and all other factors that influence the fare to be charged. The online fare payment calculation algorithm shall be presented for LeeTran review and approval during the design review process.

The online fare payment response generated by the ATP shall include at minimum:

- Payment status (e.g., success or failure)
- Account rider classification
- Fare product used
- Fare charged
- Remaining balance
- Transfer time remaining (if applicable)

Other relevant transaction data may be included and identified during the design review process.

When real-time communications are not available, device-level fare payment authorization may occur using the risk mitigation techniques (see Section 2.4: Risk Mitigation Techniques). Transaction data shall be sent to the ATP and processed to update the account status and balance as soon as communications are reestablished. Any device-authorized transactions shall be recorded as such, so that offline transactions can be easily identified and tracked. The offline fare payment authorization algorithm shall be presented for LeeTran review and approval during the design review process.

The ATP shall accommodate late arriving transactions through the recalculation of individual fare payments, or the total fare due for a prior accounting period. Transactions occurring within an accounting period may remain in a pending state until that account period (e.g., service day) is closed. Transit account transaction history and balance information shall be updated in real-time as transactions are received, and reflect any recalculation performed as a result of late-arriving transactions.

The ATP shall support the tracking of negative stored value balances that occur as a result of offline fare payment acceptance or LeeTran configured fare policies (see Section 4: Fare Structure).

7.2.4 Fare Inspection

When processing a fare inspection, the ATP shall provide a real-time online server response and shall query the transit account to determine the inspection result prior to providing a confirmation of fare payment.

Real-time fare inspection determination by the ATP shall be based on the fare structure configuration described in Section 4: Fare Structure. The determination shall incorporate fare payment transactions (e.g., approved and denied) recorded by the ATP, transit account rider classification, available fare products, transfer status, and all other factors that influence possible payment by the customer. The online fare inspection algorithm shall be presented for LeeTran review and approval during the design review process.

The online fare inspection response generated by the ATP shall include at minimum:

- Payment status (e.g., valid or invalid)
- Account rider classification
- Fare product used (if valid tap is found)
- Fare charged (if valid tap is found)
- Transfer time remaining (if valid tap is found)
- Account balance
- Fare payment transaction history

If the payment is determined to be invalid, an associated reason code shall be provided (e.g., no tap, blocked card). Other relevant transaction data may be included and identified during the design review process.

When real-time communications are not available, device-level fare inspection may occur using the risk mitigation techniques described in Section 2.4: Risk Mitigation Techniques. Transaction data shall be sent to the ATP as soon as communications are reestablished. Any fare inspections performed offline shall be recorded as such, so that offline transactions can be easily identified and tracked. The offline fare inspection algorithm shall be presented for LeeTran review and approval during the design review process.

7.3 Configuration Management

7.3.1 Fare Configuration Management

The system shall include a fare configuration management tool to support fare configuration (distribution, payment inspection processing) by the ATP (see Section 7.2: Account-Based Transaction Processor). A web-based fare configuration management tool is preferred, but the tool needs to meet all functional security requirements (see Section 2.5: System Security).

The configuration of fare sets, including all fare sets, fare rules, product availability, and other parameters necessary to support the fare structure configuration described in this section, shall be accessible and modifiable using the Vendor-provided tools.

The system shall be able to configure the availability of specific products based on time of day and/or location. For example, if service is unavailable to a particular location or at a particular time (e.g., weekends), those tickets shall be unavailable for purchase.

The system shall be able to manage, store, and deploy an active fare set and at least two (2) pending fare sets. An active fare set shall become effective immediately upon publication. Pending fare sets shall be able to be activated manually or automatically based on a future activation date configured within the tool.

The configuration of the fare products available for sale and fare product pricing shall be accessible and modifiable using the configuration management tool. Available fare products and pricing shall be able to be configured by sales channel, location, time, day, and individual device.

To the extent that any fare product availability and pricing information is maintained locally at the devices, the system shall publish this information for distribution. Devices that are not in communication at the time of distribution shall receive updates as soon as communications are reestablished.

The system shall publish fare media positive and negative lists generated and used by the ATP, and distributed to devices, to support the risk mitigation techniques discussed in Section 2.4: Risk Mitigation Techniques. Positive and negative list updates shall be published no less than every five (5) minutes and include version control to ensure timely and accurate synchronization.

All configuration parameters distributed to the devices, including positive and negative list updates, shall be distributed using the Vendor-provided device management API (see Section 2.3.1.7: Device Management API).

All fare configuration shall be able to be performed by LeeTran, as well as by the Vendor, during implementation and throughout the term of the warranty and operations and maintenance agreement (see Section 19: Operations and Maintenance Agreement).

7.3.2 Device Management

The system shall include a device configuration management tool to support configuration of device settings and basic user interface parameters. A web-based device configuration management tool is preferred, but the tool needs to meet all functional security requirements (see Section 2.5: System Security).

The device configuration management tool shall support the real-time issuance of device commands and device configuration, using the Vendor-provided device management API (see Section 2.3.1.7: Device Management API).

The device configuration management tool shall support the issuance of device commands system-wide and by device type, location, and individual device.

Command sets shall vary by device, but shall include configuration, maintenance, revenue, and customer service functions.

Device commands include, but are not limited to:

- Reboot
- Shut down
- Activate and display a “degraded” mode
- Emergency mode

Commands shall be defined during design review.

Commands shall utilize an appropriate command protocol based on industry standards, such as Simple Network Management Protocol 3 (SNMP3), or a modern functional equivalent. The protocol chosen shall be supported by all devices and systems, and consider expected network traffic and potential for intermittent communications.

The device configuration management tool shall support the setting and distribution of all configuration parameters stored locally at the devices, including positive and negative lists, as described in these specifications. The frequency of list updates shall be configurable.

Device configuration functions shall include, but are not limited to:

- Modules (cash, debit, change, etc.)
- Audio
- Device screen brightness
- Device screen contrast
- Screen layout
- Paper ticket layout
- Receipt layout
- Software updates

Final configuration functions shall be determined during the design review process.

7.4 Monitoring Management

The Vendor shall deploy a monitoring management tool that provides real-time monitoring of all devices and back office systems down to the component and process level.

7.4.1 General Requirements

The Vendor shall deploy a monitoring management tool (preferably web-based) that enables the central monitoring of all Vendor-provided devices and systems.

The monitoring management tool shall provide access to all monitoring functions and shall provide all information in a clear, organized dashboard using color graphics and text.

The monitoring management dashboard shall include a system map or list (or both) that can be drilled-down into by location to view the status of system components. The system map/list shall be dynamically updated when devices or systems are added and removed, and configurable to allow editing of device groups, locations, and location names as the system expands. The user interface shall be defined during the design review process.

If the monitoring management tool is web-based, it shall be accessible remotely using any modern desktop or mobile web browser or mobile application.

7.4.2 Device and System Monitoring

The monitoring management tool shall provide real-time performance and status monitoring for all devices, back office systems, and network nodes using the Vendor-provided device management API (see Section 2.3.1.7: Device Management API).

The monitoring management tool shall monitor the operational status and performance of the devices and their components, including but not limited to:

- SAPs
- DCUs
- TVMs
- TOTs
- Mobile fare inspection/validation device application
- Back office hardware
- Test environment devices

The monitoring management tool shall display device attributes, including but not limited to device type, device ID, location, status, events, and alarms.

Device status reported by the monitoring management tool shall include operational status (e.g., in service, degraded mode, out of service, or no communications), maintenance alarms associated with individual device modules, and revenue alerts (e.g., vault near-full/full and low stock/out of stock).

The monitoring management tool shall monitor and display in real-time the status of all back office systems, subsystems, applications, databases, and processes. Details of which processes shall be monitored shall be provided during the design review process.

Devices or systems that are not reporting status for any reason shall be easily identifiable, and the last known status and history shall be available.

The monitoring management tool shall automatically generate alerts via email and text message. The trigger, frequency, and cancellation of these alerts shall be configurable.

7.5 Revenue Management

The Vendor shall deploy a Revenue Management System (RMS) that maintains a general ledger of all financial activity within the system, tracks receivables, and supports funds settlement.

7.5.1 General Requirements

The RMS shall be built using commercial off-the-shelf (COTS), enterprise-level financial management software and, if necessary, custom software modules that interface with Vendor-designed software modules as necessary to provide the required functionality. The RMS shall allow for export of relevant data to LeeTran's current financial management system.

The RMS shall support the full auditing of all system financial activity, including reconciliation of all system accounts, and end-to-end tracking of revenue as it is generated and recognized by LeeTran.

The Vendor shall employ an expert with the accounting and technical knowledge necessary to fully set up and configure the RMS based on accounting best practices and the specific design of the delivered system.

7.5.2 General Ledger

The RMS shall include a COTS General Ledger (GL) module that shall be fully installed and configured by the Vendor.

The GL shall include accounts to track deferred revenue, earned revenue, receivables, payables, and expenses based on the transactions generated by the system.

The system shall support the reconciliation of the stored value deferred revenue GL account balance to the total transit account balances maintained within the ATP at any point in time.

As part of design review, the Vendor shall be responsible for mapping each transaction type generated by the system to the appropriate general ledger entries to support automated categorization and summarization by the system.

Summary entries shall be posted to the GL automatically at the end of each closeout period, no less than daily.

LeeTran shall have the ability to generate manual GL postings to support corrections and the tracking of activity that is not performed by the system.

7.5.3 Accounts Receivable

The RMS shall include a COTS Accounts Receivable (AR) module that shall be fully installed and configured by the Vendor, and shall support the creation and management of receivables within the GL.

The AR module shall track receivables for prepaid and post-bill fare media and product sales initiated through the CRM system (see Section 7.7: Customer Relationship Management) and institutional website (see Section 9.3: Institutional Website) to support bulk sales and special fare programs (see Section 4.7: Special Fare Programs).

The AR module shall support the establishment of AR customer accounts based upon billing source, event and time period, and transaction type.

The AR module shall support the ability to record billing items (e.g., fare media and products) by line item in order to identify unique accounting classification codes.

The AR system shall support the issuance of refunds for fare media and product sales as needed.

The AR module shall support the application of payments (full and partial), credit memos, and adjustments against AR customer accounts. The process shall support batch entry of receipts and lockbox functionality.

Receivables against individual customers shall be supported in instances of funding source failures or negative account balances due to an offline payment authorization.

The AR module shall support the setting of configurable credit limits for institutional customers. The AR module shall support the automated generation of credit holds and disabling of order privileges within the institutional website when the credit limit is reached.

The AR module shall support a time-based assessment of fees against individual customer accounts after a defined period of inactivity.

Time period, fee amount, and inactivity period shall be defined during design review, and be configurable by LeeTran staff.

The AR module shall support the aging of receivables and an automated, fully auditable write-off process to be defined during the design review process.

The AR module shall support the automatic generation of invoices and monthly statements detailing account activity, including consolidation of multiple AR accounts on a single customer statement.

The AR module shall provide the ability to perform online queries of account activity (e.g., billing, collection, and adjustment) by customer and receivable to support the display of invoice, account, and payment status in the CRM system and on the institutional website.

User interface access to all elements of the FCS shall be controlled through a centrally-managed user authentication and access control platform as required in Section 2.5: System Security.

Individual users or user groups shall have access configured to allow for standard business operations. Examples include ability to execute particular types of actions, etc.

7.5.4 Funds Settlement

The RMS shall support funds settlement using allocation formulas based on known system elements (e.g. ridership, operator, route, point of sale, pass type) and external variables, to be defined during the design review process, and shall be configurable by LeeTran.

The RMS shall perform the revenue distribution calculations and provide the necessary reporting to enable the settlement of funds.

The RMS GL shall serve as a sub-ledger to the general ledger maintained within LeeTran's existing financial management system.

The RMS shall produce standard summary and detail accounting reports, in both formatted and exportable formats, for LeeTran.

Select reports, to be determined at design review, shall be mapped to accounts within LeeTran's financial management system to support manual entries and download to LeeTran's general ledger.

The AR module shall provide standard AR reports, including but not limited to aged trial balance (with "as-of date" functionality), customer transaction, cash on account, and AR customer listing reports.

7.6 Media Inventory Management

The Vendor shall deploy a MIMS that maintains a full inventory of all fare media procured and issued by LeeTran.

The MIMS shall maintain an inventory of all serialized LeeTran-issued fare media (e.g., EU and paper media) as it is produced, held in inventory, available at the different sales channels, held by other agencies or third parties, and eventually issued to customers.

Fare media shall be tracked when it is delivered, stored, and in use at any of the LeeTran sales channels. When the fare media is issued, both the batch number as well as the media serial number shall be tracked to distinguish what media was issued from which device.

The fare media inventory data maintained within the MIMS shall include at a minimum:

- Media serial number
- Media type
- Media/account status
- Expiration date
- Batch ID
- Order ID

- Location
- Ship date

Final data fields used for inventory management purposes shall be determined during the design review process.

The MIMS shall support the bulk issuance of media by identifying appropriate batch IDs and serial number ranges to fulfill orders placed by LeeTran, third-party partners, and through the institutional website (see Section 9.3: Institutional Website).

The MIMS shall track the current and historical status of all media in inventory. Whenever media loading or issuance occurs, the MIMS shall update all media records accordingly. A history of all updates shall be maintained to provide an audit trail.

7.7 Customer Relationship Management (CRM)

The Vendor shall deploy a CRM system that provides access to all transit and customer account information, and the ability to track all customer service contacts and requests from initiation through resolution.

7.7.1 General Requirements

The Vendor shall deploy a CRM system that provides central management for all customer data, customer service operations, and fare media and product ordering and fulfillment, as well as cradle-to-grave tracking of all customer service contacts and requests. There is preference for a COTS, web-based CRM solution.

The core function of the CRM system shall be to support call center and ticket office operations with a tool that provides a 360° view of the customer, and enables creation, viewing, and modification of customer service records related to contacts and requests, and the actions taken to resolve those requests.

The CRM system shall be supported by an isolated customer database, which shall be fully compliant with all applicable PCI standards at the time of Final Acceptance, and with all LeeTran, state, and local policies for the handling of Personally Identifiable Information (PII).

The CRM system shall support the management of special fare programs, which shall allow transit accounts to be linked to an institutional customer (e.g., employer or school) for account management and the loading of value (see Section 4.7: Special Fare Programs).

The CRM system shall provide central order management and fulfillment functionality for the distribution of fare media and products sold through all fare distribution channels, including orders placed through the institutional website (see Section 9.3: Institutional Website). The CRM system shall interface with the MIMS (see Section 7.6: Media Inventory Management) to maintain proper fare media inventory controls.

Access to the CRM system and tool shall be password-controlled with the displayed information and allowed functions restricted based on centrally-defined user-access privileges. Access to all elements of the CRM system shall be controlled through a centrally-managed user authentication and access control platform as required in Section 2.5: System Security.

7.7.2 Customer Database

An isolated customer database shall maintain customer accounts that store all customer data, including all personal and payment information, associated with both individual and institutional customers (see Section 9.2.2: Account Registration).

All data in the customer database shall be encrypted using strong cryptography, such as 3DES or AES, and all payment data shall be stored in a tokenized form.

The customer database shall serve as the repository for all information on customers applying for a reduced fare classification and paratransit access, including applications and supporting documentation, eligibility parameters, and card personalization information, such as a customer photograph.

The customer database shall serve as the repository for all information on employees and contractors who are issued transit access cards, including card personalization information, such as an employee photograph.

7.7.3 CRM Tool

The CRM tool shall support call center and in-person customer service operations by providing a complete view of the customer and related transit and customer account activity, including all activity associated with anonymous transit accounts.

The CRM tool shall connect to the ATP and customer database using the Vendor-provided APIs (see Section 2.3.1: Application Programming Interfaces), and provide a fully-integrated interface for customer service staff to view and modify customer and transit account data.

The CRM tool shall allow customer service staff to perform customer account actions, including but not limited to:

- Create new individual customer account
- Create new institutional customer account
- View customer account status and data
- Modify customer account data
- Register (e.g., link) a transit account to an individual or institutional customer account
- Unregister (e.g., unlink) a transit account from an individual or institutional customer account
- Add a funding source to an individual or institutional customer account
- Close an individual or institutional customer account

The CRM tool shall enable customer service staff to perform transit account actions, including but not limited to:

- Sell all supported fare media (and create new transit accounts)
- Sell all supported fare products (e.g., stored value and passes) and load fare products to transit accounts
- Query transit account status (e.g., associated rider classification, active/inactive, blocked/unblocked)
- View fare payment transaction history
- View sales transaction history
- View adjustment transaction history
- Enable fare product for autoloan (requires funding source in customer account)
- Generate fare payment reversal (e.g., cancellation)
- Generate sales reversal (e.g., refund)
- Generate an account adjustment (e.g., credit or debit)
- Transfer balance between two (2) accounts
- Block/unblock card, account, or individual fare product
- Replace lost, stolen, or damaged card (e.g., associate new card with existing account)
- Generate an opt-out refund (e.g., close transit account and issue refund)
- Extend reduced fare eligibility (e.g., expiration dates)

The CRM tool shall allow viewing and modification of all customer, individual and institutional, account data. A request by the customer to reset a password shall require the answering of security questions set at the time of account registration (see Section 9.2.2: Account Registration). For password resets, a temporary password shall be automatically emailed to the customer.

The CRM tool shall accept credit cards, debit cards, and bank account Automated Clearing House (ACH) transfers for payment during fare media and product sales and the setup of autoload. The CRM tool shall also support the payment, or partial payment, for the purchase of a pass using stored value in the same transit account where the pass is being loaded.

The CRM tool shall support split payments where up to two (2) payment methods, including multiple bank cards and stored value, shall be able to be used to complete payment for a single sale.

The CRM system shall support the association of multiple transit accounts with a single customer account (i.e., parent/child) for account management and the loading of value.

The CRM system shall support the management of institutional programs (see Section 4.7: Special Fare Programs), which shall allow customers and the associated transit accounts to be linked to an institution for account management and the loading of value.

The CRM tool shall enable the bulk registration and loading of transit accounts in support of special fare programs through entry of a transit account/fare media ID range or upload of a file.

The CRM tool shall enable the bulk sale and issuance of EU and LU fare media, including the initialization and loading of the associated transit accounts, through entry of a transit account/fare media ID range or upload of a file.

The CRM tool shall enable the bulk blocking of transit accounts and issuance of transit account adjustments through entry of a transit account/fare media ID range or upload of a file.

7.7.4 Customer Service Records

The CRM system shall track all customer service contacts and requests, and the actions taken to resolve those requests, in customer service records that can be created, viewed, and modified using the CRM tool.

Customer service records shall be created automatically based on customer-initiated actions performed through the websites.

The Vendor shall provide a mechanism (e.g., embedded hyperlink based on transit account number), to be determined at design review, for linking customer service requests through LeeTran's existing ACCELA CRM to the new fare collection CRM for investigation and response.

Any access of customer or transit accounts by LeeTran staff, whether a change to the account is made or not, shall automatically generate a customer service record.

Customer service staff shall be able to manually create or update (e.g., add notes) a customer service record when responding to customer service requests in person, over the web, or by phone.

Customer service records shall be created for actions associated with both anonymous and registered transit accounts, and shall be linked to a specific customer account whenever possible.

The CRM system shall support the classification of customer service records by type and severity for reporting purposes, using pre-defined selections and custom text fields.

7.8 Data Warehouse

The Vendor shall deploy a data warehouse that serves as a repository for all system-generated data. The central back office database and all other supporting databases (e.g., customer and financial databases) shall feed the data warehouse. The data warehouse shall be the source for data analytics and reporting.

The data warehouse shall be built using an enterprise-class Open Database Connectivity (ODBC)-compliant relational database scaled to 200% of the anticipated transaction volumes. The data warehouse shall utilize the most recent version of a commercial enterprise database, with a strong preference for Microsoft Structured Query Language (MSSQL) Server. Any alternative must be discussed and approved by the LeeTran during the design review process.

The data warehouse shall store all transaction data generated by the system. At minimum, the data warehouse shall collect data from the following systems:

- ATP
- CRM System, including customer and institutional websites
- Monitoring Management tool
- MIMS
- RMS

Data captured in the data warehouse shall include at minimum:

- Fare media and product sale transaction details (e.g., time, date, location, device, amount) from the ATP
- Fare payment transaction details (e.g., time date, location, device, amount) from the ATP
- Fare inspection transactions from the ATP
- Adjustment, refund, reversal, and balance transfer transactions from the ATP
- Customer service records from the CRM system
- Device events and alarms from the monitoring management tool
- Back office events and alarms from the monitoring management tool
- Device audit register data
- Fare media inventory data from the MIMS
- Financial data and accounting entries from the RMS
- Other analytics data to support fraud detection/prevention

The data warehouse shall not store any customer PII or payment data.

Data received from the various systems shall be maintained in the data warehouse at the individual event, record, or transaction level. Normalization and de-normalization for purposes of improving database efficiency shall be allowed.

All data shall be transmitted to the data warehouse in real-time or on a configurable frequency that can set depending on the source, and never less than daily. The Vendor shall maintain a standardized data transmission specification.

An interface to the data warehouse shall provide the ability to query the database directly. All data shall be accessible and available for use by LeeTran.

All data in the data warehouse shall be accessible using standard SQL query tools (preferred), or equivalent query language tools. All data shall be retrievable as standard ASCII or binary data.

The data warehouse shall provide online access to detailed transaction information for no less than five (5) years following the date of generation. Summary data, to be defined during design review, shall be available for at least 10 years.

The Vendor shall supply tools that enable LeeTran to archive data, and to purge old or unwanted data from the data warehouse. Purging shall be an administrative function that shall permanently delete data over a specified date range or based on other criteria.

The Vendor shall provide a preliminary design specification for the data warehouse at design review, including at a minimum:

- Descriptions of all data to be stored
- Data fields with type and length
- Searchable fields (e.g., agency, location, device)
- Total amount of data storage available and any data compression schemes
- Communications protocols being used
- Timing for the transmission of data to the data warehouse
- Test procedures to ensure that all required data is being captured and that all required capabilities are present
- Data warehouse operating procedures

The final design specification for the data warehouse, including the complete data dictionary and schema, shall be delivered 120 days prior to the start of system integration testing.

All systems and interfaces requiring access to real-time data, including the ATP, CRM system, monitoring management tool, RMS, and websites shall capture data from the source systems directly. The data warehouse shall not be used for any purpose other than data analytics, reporting, and the export of data to external systems.

As part of implementation, the Vendor shall deliver a full and complete data dictionary and schema for the data warehouse. The Vendor shall also provide details for the extract, transform, and load (ETL) processes used to capture data from the source systems.

The Vendor shall provide read access for all data in the data warehouse. The Vendor may provide limited write access for fields that do not impact revenue or operations. Fields to include write access shall be determined during the design review process.

7.9 Reporting System

The Vendor shall deploy a reporting system that provides an interface to run pre-defined and custom reports. The primary data source for the reporting system shall be the data warehouse, although other sources of data may be utilized depending on the reporting need.

The Vendor shall deploy a reporting system that interfaces with the data warehouse, and other systems as necessary, for the generation of canned and custom reports.

Canned or predefined reports shall include, but are not limited to:

- Ridership reports
- Sales reports
- Customer service reports
- Maintenance reports
- Device and system performance (KPI) reports

- Financial reconciliation reports
- Financial settlement reports
- Exception reports
- Fraud detection reports

The Vendor shall provide up to 50 canned reports, or what is achievable with 200 design hours, to be defined and developed with LeeTran during the design review process and throughout the first year of operations and maintenance (see Section 19: Operations and Maintenance Agreement).

The reporting system shall allow LeeTran users to design and run custom reports. These reports shall be able to be saved and shared across users.

Custom reports shall be defined using a query design tool. Custom report queries shall be able to access all data within the data warehouse.

Reports shall be able to be run and viewed through a web interface, as well as exported in several formats, including but not limited to Adobe Acrobat, MS Excel, MS Word, CSV, and plain ASCII text. All file formats shall include the same data and general layout where possible. Data files (e.g., Excel and CSV) shall be generated such that data can be extracted without formatting, and can be imported into third-party tools without manipulation.

The reporting system shall allow all reports to be configured to run on a scheduled basis through the web interface, and automatically delivered to one (1) or multiple email addresses. Email deliveries may be scheduled on a daily, weekly, or monthly basis and in any of the available file formats.

The reporting system shall support data analytics and web-based dashboards to display real-time system performance indicators or metrics to be defined by LeeTran.

The reporting system web interface shall support all modern desktop and mobile browsers, including but not limited to Internet Explorer, Firefox, Safari, Chrome, and Opera.

Access to the reporting system web interface shall be password-controlled. The ability to create and run reports shall be configurable by user type. User accounts shall be set up with custom access levels that define which reports can be viewed, and what data can be queried for custom reports.

7.10 System Hosting

The Proposer shall provide hardware and software specifications in the proposal for the following scenarios:

- 1) Lee County hosting the system
- 2) Cloud hosting by the Vendor or a third party (e.g., Amazon Web Services [AWS], Microsoft Azure, Google Cloud Platform, or equivalent local provider). Please note that in this scenario, the third-party hosting provider shall provide the performance, security, and redundancy to support the requirements of the account-based back office.
- 3) Vendor hosting (non-Cloud) (if the Vendor provides this option)

The Vendor shall be responsible for installation, configuration, and testing of the hosted solution. The determination of hosting capacity and functionality shall be determined by the Vendor based on LeeTran expected transaction volumes and performance requirements.

If cloud or vendor hosting is selected, all hosting operations shall be transparent to LeeTran. The capacity and bandwidth chosen shall be commensurate with the required transaction volume, and may be adjusted upon

increased usage. LeeTran shall not be responsible for excessive hosting costs that are not required to operate the system at the performance level specified in this specification.

The Vendor shall be responsible for all back office operations, monitoring, and maintenance under the operations and maintenance agreement (see Section 19: Operations and Maintenance Agreement).

The Vendor shall provide LeeTran access to the hosting provider as necessary.

The Vendor shall provide a high availability system (see Section 14: Performance Measurement) that offers maximum protection against data loss and system failure. Means shall be provided in the system design to ensure complete recovery from the loss of any system components at any point during operation.

All hosted data shall be protected against loss or failure at a given hosting site. The hosted solution shall be equipped with the appropriate hardware, software, and procedures to provide redundancy and meet all performance requirements. Load balancing, automated failover, and data mirroring between multiple sites shall be provided as necessary.

Processor load, memory utilization, errors, and other system performance indicators shall be available in real-time to help prevent performance degradation and troubleshoot back office issues. Alarm types and thresholds shall be able to be configured to allow for custom alerts.

The Vendor shall develop and submit a disaster recovery plan that describes data backup and recovery, and ensures minimal data loss in the event of a catastrophic event or system failure.

The disaster recovery plan shall contain detailed procedures to be followed to restore the system to full operation following a disaster or failover event. The Vendor shall on a yearly basis demonstrate that the disaster recovery plan functions as expected.

The Vendor shall provide documentation and training for LeeTran staff in all procedures to maintain the hosted environment and restore the system in the case of a disaster recovery event.

7.11 Required Submittals

The following table displays items that must be submitted in advance of one or more design reviews.

Description	Submittal Due		
	CDR	PDR	FDR
Back Office Software Design Specifications	X	X	X
Account-Based Transaction Processor Design	X	X	X
Fare Configuration Management Design	X	X	X
Device Management Design	X	X	X
Monitoring Management Tool Design	X	X	X
Revenue Management System Design	X	X	X
Media Inventory Management System Design	X	X	X
Customer Relationship Management System Design	X	X	X
Data Warehouse Design	X	X	X
Data Warehouse Data Dictionary and			

Description	Submittal Due		
	CDR	PDR	FDR
Schema ³			
Reporting System Design	X	X	X
Canned Report Specifications ³			
Hosting Specifications	X	X	X
Disaster Recovery Plan		X	X

8 Garage Data System (GDS) Requirements

8.1 General

The Vendor shall supply, install, and configure Garage Data Systems (GDSs) and wireless data networks at each of the garage facilities where LeeTran vehicles are parked and serviced. Via Wi-Fi communications, the GDSs shall manage the secure and expedient transfer of all data transfers between the CDS and the SAPs.

At minimum, the GDS shall transfer the following data to and from the SAPs:

- Uploads from SAPs – stored and then forwarded to CDS on a scheduled basis, at a minimum of once per day:
 - Transaction records, including
 - Cash transactions
 - Smart card usage transactions
 - Barcode media usage transactions
 - Third party-issued media usage transactions
 - Action List activity
 - Fare replenishment (autoload) records processed
 - Event records
- Downloads to SAPs – received from CDS, stored, and then downloaded to SAPs when communications are established:
 - Current date and time (from a master clock)
 - Action List
 - Pending Autoload List
 - New fare tables (when required)
 - Updated device software (when required)
 - Updated device configuration settings (when required)
 - Valid Operator ID List
 - Valid Block List

The Vendor shall submit a detailed description of the GDS, including functionality, installation, and installation requirements. This document shall be delivered for LeeTran review at the PDR and LeeTran approval at the FDR.

8.2 GDS Communications

The SAP shall initiate and then maintain a wireless connection with the GDS while the SAP is powered on and is within range of the GDS Wi-Fi. Upon receipt of the proper authentication and security information from the SAP, the GDS shall instruct the SAP to commence data transfer.

The system shall provide for data transfer at least once per day. No bus or vehicle shall be required to stop for

³ 120 Calendar Days Prior to Integration Testing
LeeTran Fare System Specifications

any length of time at a service island or other queue location prior to pull-out or following pull-in.

The GDS shall maintain a log of each successful and unsuccessful data transfer with an SAP. Records of successful transfers shall include the version numbers of all software and data files sent to the SAP. The wireless communication system shall include appropriate security and authentication as well as error detection and recovery capabilities. If an error occurs in transmission, a retry shall be initiated by the system immediately and automatically. If three attempts to extract data automatically result in no success, an alarm message shall be generated and sent via the CDS to appropriate LeeTran personnel.

8.3 GDS and Networking Hardware

The Vendor shall submit descriptions, specifications, and OEM literature for all GDS hardware for LeeTran's review at the PDR and LeeTran's approval at the FDR.

8.3.1 Computer Hardware

The Vendor shall supply, install, and configure computer hardware with sufficient processing, memory, expandability, and data storage capacities to support successful operation of the GDS. GDS capacity and performance shall meet the following criteria:

- Sufficient memory capacity to retain data until redundant copies have been made and verified
- At least twice the storage and processing capacity that is required to support the number of daily customer transactions projected by LeeTran for full system deployment (base contract)
- Sufficient capacity to accommodate at least four times the number of devices of the full system deployment (base contract quantities)
- Redundancy to enable continued operation of critical security functions or of transaction functions without degradation that is obvious to the user

Transfer of data between the CDS and a GDS shall be possible using secure removable backup storage media, for use in the event that a failure prevents the transfer of data via the communications network. These storage media shall also serve as backup data storage to protect data against loss in the event of GDS computer hardware failure or corruption.

All GDS hardware to be installed in an office environment shall be commercial grade. Hardware installed in a non-office environment shall be industrial grade. The Vendor shall supply and install a compact rack with locking doors for the GDS, and install all GDS hardware in the rack.

8.3.2 Uninterruptible Power Supply

For each GDS, the Vendor shall supply and install a dedicated UPS, which shall power the GDS. The UPS shall supply sufficient battery capacity to operate all components of the GDS for a minimum of 30 minutes, and shall cause the GDS to shut down without loss of data integrity whenever the UPS determines that its remaining battery capacity is low.

The UPS shall also provide no less than 500 joules of overvoltage (surge) protection for all connected devices.

8.3.3 Garage Facilities Wireless Networks

The Vendor shall design and install the wireless communication system for all LeeTran and contracted-service facilities. Vendor-installed wireless networks at all facilities shall provide coverage for all areas where LeeTran parks vehicles equipped with new FCS equipment. Vendor-supplied wireless communication systems shall utilize access points that:

- Employ MIMO antennas
- Are fully compliant with IEEE 802.11n standards
- Are fully compliant with IEEE 802.11i standards for security and encryption
- Are suited to the installation environment (some indoor, some outdoor)
- Are managed by a Vendor-supplied dedicated Access Point Controller
- Use Power over Ethernet

The Vendor shall also supply, install, and configure one or more dedicated Access Point Controllers for each facility, such as a Cisco 2500 Series Wireless Controller or LeeTran-approved equal.

Subsequent to installation at each facility, the Vendor shall perform a Wi-Fi coverage analysis; within 5 days of completing installation at each facility, the Vendor shall submit documentation demonstrating satisfactory Wi-Fi coverage at each facility to LeeTran for review and approval.

8.3.4 Remote Wireless Access Points

If LeeTran’s existing wireless access points do not have sufficient capacity to accommodate the requirements of the new fare system, then the Vendor shall procure remote wireless access points, suitable for outdoor installation, and install them in locations specified by LeeTran. These locations shall be within 100 feet of LeeTran wide area networking infrastructure and power.

The cost of procuring new wireless access points must be specified on the Price Proposal Form.

The Vendor shall supply remote wireless access points that:

- Employ MIMO antennas
- Are fully compliant with IEEE 802.11n standards
- Are fully compliant with IEEE 802.11i standards for security and encryption
- Are suited to outdoor installation
- Are managed by a Vendor-supplied dedicated Access Point Controller
- Use Power over Ethernet

The Vendor shall also supply, install, and configure a dedicated Access Point Controller for each remote access point, such as a Cisco 2500 Series Wireless Controller or LeeTran-approved equal.

Remote wireless access points shall provide wireless data communications to SAPs in range of the antenna and to the CDS, either directly via LeeTran’s wide area network, or via the Wide Area Network to a GDS located in the nearest garage facility. (Sites for remote wireless access points cannot support installation of a dedicated GDS.)

8.4 GDS Software

8.4.1 GDS Operating System

The Vendor shall supply, install, and configure OEM operating system software for each GDS suitable for its role as an unattended “store and forward” service. The GDS shall automatically install updates to the OEM operating system upon receipt from the CDS.

8.4.2 GDS Application Software

The Vendor shall supply, install, and configure application software as necessary for the GDS to perform as required herein. The GDS shall automatically install updates to the application software upon receipt from the CDS.

The Vendor shall submit design documentation providing complete descriptions of the GDS application software, its function, administration, configuration, operation, and other salient characteristics, for LeeTran review at the PDR and LeeTran approval at the FDR.

8.4.3 Anti-Virus and Anti-Malware Software

The Vendor shall supply, install, and configure client versions of anti-virus and anti-malware software that is compatible with the enterprise software described in Section 6.2.2.11. The GDS shall automatically install updates to the anti-virus and anti-malware software upon receipt from the CDS. Upon receipt of new definitions files from the CDS, the GDS shall immediately activate the new definitions.

8.5 Installation of Probing and Vault Equipment

8.5.1 Probing Equipment Installation

The Vendor shall provide onsite hands-on assistance to Lee County IT and LeeTran maintenance departments.

The Vendor shall mount, modify, secure and install, probing unit and all wiring, connectors, and any optional chosen probing equipment on building at current probing location.

The Vendor shall run wiring, connectors, and any additional items needed to the probing location to support and use a new prober at this new probing location.

The Vendor shall provide and install data cable runs from LeeTran's server room to the new Farebox Dump Station, approximately 400 feet. LeeTran's existing vaulting location is to remain active as well.

The Vendor shall verify communications between the prober and CDS, and prober and farebox.

The Vendor shall troubleshoot and provide required assistance to have the prober work with the FCS.

8.5.2 Old Probing Equipment Removal

The Vendor shall provide onsite hands-on assistance to Lee County IT and LeeTran maintenance departments.

The Vendor shall remove from the current probing location any and all wiring, connectors, and other hardware not needed or not being reused by new probing equipment.

The Vendor shall remove any and all mounts and mounting hardware that shall not be needed or used by new probes and probing equipment.

9 Website Requirements

9.1 Website Design

The system provided by the Vendor shall include websites to be used by both the general public and institutions for the distribution of fare media and products, and the management of transit and customer accounts.

9.1.1 Web Design Criteria

All interfaces between the websites and back office systems (e.g., ATP and customer database) shall be the responsibility of the Vendor and shall use the Vendor-provided APIs (see Section 2.3.1: Application Programming Interfaces).

The Vendor shall team or contract with a web design firm or developer with extensive experience developing e-commerce, retail, social media, and transit websites.

The websites shall be built using latest web design and e-commerce best practices, including dynamic design via HTML5, AJAX, and server-side programming languages. The development tools and design for the website shall be subject to LeeTran review and approval during the design review process.

All transmissions of customer data, including username, password, and any customer PII, shall be TLS 1.2 encrypted via the HTTPS protocol.

The websites shall be designed and tested for cross-platform compatibility, including but not limited to:

- Platforms: Windows, Apple, Linux, Unix
- Browsers: Internet Explorer, Safari, Chrome, Firefox, Opera, Mozilla, Edge

The websites shall support three (3) prior browser versions, with the latest specified at the time of Notice to Proceed (NTP).

The Vendor shall work closely with LeeTran's IT and web services teams to develop an approved user interface design. LeeTran shall play a critical role in the website design and testing throughout the implementation.

The Vendor shall provide detailed screen flows depicting "snapshots" of each screen layout arranged as a logical flow chart for LeeTran review and approval during the design review process. The flow charts shall depict all web screens as they shall be configured for revenue service.

The websites shall be compliant with all applicable ADA regulations.

The websites shall be provided in multiple languages, including English, Spanish, and up to three (3) other languages to be identified by LeeTran during the design review process.

All website content and design elements shall be able to be modified by LeeTran. The Vendor shall provide Drupal as the Content Management System needed to perform website updates.

The websites shall be configured with Google Analytics or another web analytics platform to help track website usage.

The Vendor shall be responsible for all website updates, including QA/QC, throughout the term of the operations and maintenance agreement (see Section 7: Back Office).

9.1.2 Website Payment Processing

The websites shall accept credit cards, debit cards, and bank account ACH transfers for payment during fare media and product sales and the setup of autoloading. The public website shall also support the payment, or partial payment, for the purchase of a pass using stored value in same transit account where the pass is being loaded.

The websites shall support split payments where up to two (2) payment methods, including multiple bank cards, shall be able to be used to complete payment for a single sale.

All payments initiated via the websites shall be accepted using e-commerce best practices and processed in a manner that is compliant with the latest PCI standards at the time of Final Acceptance. All payment data shall be encrypted for transmission using 3DES and TLS 1.2, at a minimum.

The websites shall support AVS for bank card payments in a configurable manner that allows the AVS feature to be turned on or off by LeeTran and accommodates acceptance of both U.S. and non-U.S. issued cards.

The websites shall prompt users when a payment is declined and allow entry of an alternate funding source. Failed payments shall be recorded in a separate payment exception file (with denial code).

If a payment authorization is not completed within a configurable time period, or is interrupted, the websites shall cancel the transaction and notify the customer. Any canceled transactions shall be recorded.

9.2 Public Website

The Vendor shall deliver a public website and provide all hardware and software necessary to support website operations, and interfaces to internal and external systems needed to perform the required functions.

9.2.1 General Requirements

The Vendor shall deploy a customer website that allows registered and unregistered customers to purchase fare media and products and perform transit and customer account management functions.

The public website shall allow customers to perform the following functions, at a minimum:

- Purchase new fare media
- Create a new customer account
- View and manage account settings and customer profile
- Register an extended-use card (e.g., transit account)
- Purchase fare products (e.g., stored value and passes)
- Add a funding source
- Set up, modify, and cancel autoload of stored value and passes
- View transit account balance and status information
- View and download sales, usage, and adjustment transaction history
- Initiate a customer service request (e.g., refund request)
- Report a card lost or stolen
- Request an opt-out refund (e.g., close transit account)
- Opt-in and -out of email notifications
- Modify registration data

Final customer website functions shall be determined during the design review process.

Users shall be e-mailed a receipt for some website actions, including all successfully completed sales and the fulfillment of an autoload.

Users shall have the option of opting-out of e-mail notifications.

Specific email notifications shall be determined during the design review process.

The Vendor shall submit a formal end-to-end regression testing plan for review, and have resources assigned to QA/QC for each release.

9.2.2 Account Registration

Adult customers shall have the option of registering a transit account or remaining anonymous. All transit accounts with a reduced fare rider classification shall require registration.

A registered transit account shall be associated with an individual and/or institutional customer account maintained within the CRM system customer database (see Section 7.7: Customer Relationship Management).

Customer data maintained in an individual customer account shall include, at a minimum:

- Name
- Address
- Phone number
- E-mail address
- Username
- Password
- Security questions and answers
- Account PIN

The final list of customer information required for account registration shall be determined during the design review process.

Data maintained in an institutional customer account shall include, at a minimum:

- Institution name
- Administrator name
- Address
- Phone number
- E-mail address
- Administrator username
- Administrator password
- Security questions and answers
- All configuration parameters governing the institution's participation in a special fare program (see Section 4.7: Special Fare Program).

The final list of customer information required for account registration shall be determined during the design review process.

Individual and institutional administrators shall have the option of providing payment information to be stored by the system and available for future one time purchases or for the recurring loading of value (see Section 9.2.3: Autoload). A customer shall be able to store a minimum of two (2) funding sources.

Customer account creation and transit account registration shall be supported by the websites (see Section 13.5.1.2: Websites), TOTs (see Section 5.12: Ticket Office Terminal), and through the call center via the CRM system (see Section 7.7: Customer Relationship Management).

The system shall allow a customer account to be created without associating (e.g., registering) a transit account, and shall allow multiple transit accounts to be registered to the same customer account for consolidated transit account management through all customer service channels.

Transit accounts may be associated with both individual and institutional customer accounts, and may be registered to both an individual and institutional customer at the same time.

Minimal card personalization information (e.g., customer/card name, rider classification, and date of birth) may also be stored securely in the transit account, and/or on the media, to support fare processing and allow for the individual tracking of fare media registered to the same customer.

9.2.3 Autoload

Customers and LeeTran staff shall have the ability to set up fare products (e.g., stored value and passes) for autoload, or to automatically reload based on time or value thresholds. The Vendor shall enable this functionality through the TOTs (see Section 5.12: Ticket Office Terminal), CRM system (see Section 7.7: Customer Relationship Management), and customer and institutional websites (see Section 13.5.1.2: Websites).

Enabling autoload shall require that the associated transit account is registered and that an accepted funding source, such as a credit or debit card, bank account, or transit benefit allocation, is linked to the customer account.

A customer shall be allowed up to two (2) funding sources associated with an autoload, a primary funding source and a secondary funding source, and may split payment between them, or use the secondary funding source as a backup in the event that the primary fails.

The autoload feature shall support both threshold-based triggers (i.e., reloading when the stored value balance, remaining trip balance, or remaining validity period falls below a configurable threshold), and calendar-based triggers (i.e., reloading on a configurable date every month).

All parameters governing threshold and calendar-based autoloads shall be fully configurable by the customer and LeeTran staff, including the enabling or disabling of an autoload, threshold value (e.g., trigger), funding source, and fare product and/or amount to be loaded. Final configuration parameters shall be defined during the design review process.

The account-based nature of the FCS shall allow for autoload payment authorization to occur prior to the loading of any value, and immediate use of the value by the customer once the load occurs. If payment authorization fails, the autoload shall be automatically disabled and the customer notified.

9.2.4 Fare Media Purchase and Registration

The public website shall allow ordering of LeeTran-issued EU fare media to be delivered by mail. Ordering of fare media via the website may require registration of the media (e.g., transit account) at the time the order is placed.

The public website shall allow creation of a new customer account. During creation of a customer account, the website shall capture of all customer registration data (see Section 9.2.2: Account Registration), including the credentials (e.g., username, password) used to access the website. All customer account data shall be stored securely in the customer database (see Section 7.7.2: Customer Database).

During the creation of a new customer account, the website shall provide the ability to register previously issued EU fare media. Fare media (e.g., transit account) registration shall not be required to create a customer account.

Registered customers shall be required to login to the website using a username or e-mail address, and an account password. The use of a username or e-mail address as the primary login credential shall be determined during the design review process.

The website password shall have configurable security requirements, including but not limited to minimum password length, required use of letters/numbers/symbols, and forced password reset after a configurable time period or on demand. Other password reset functionality shall be determined during the design review process.

Registered customers shall have the ability to view and modify registration data at any point in time. Password and PIN data shall be masked when presented on the website.

The website shall support the registration of multiple EU cards (e.g., transit accounts) under a single customer account. Registered customers shall be able to add new cards when logged into the customer website. Customers shall assign each card a nickname, which shall be stored in the transit account and used to differentiate cards registered to the same customer.

9.2.5 Fare Product Purchases

Registered customers shall be able to initiate a load of value (e.g., stored value and passes) via the website using a credit card, debit card, or bank account (ACH) transfer. The website shall have the ability to purchase passes with stored value, and shall support the entry of transit account information and the selection of pass products and pre-defined or custom stored value amounts, subject to configurable minimum and maximum limits.

Registered customers shall have the ability to save and modify funding sources, including credit cards, debit cards, and bank accounts for one-off purchases and autoloading payment. Funding source information shall be stored securely within the customer database in a tokenized form (see Section 7.2.3: Fare Payment).

Registered customers shall be able to enable, disable, and modify the autoloading of stored value and passes (see Section 9.2.3: Autoload). As part of the autoloading setup process, the customer shall select the pass or pre-defined or custom stored value amount to be loaded and the type of autoloading (e.g., threshold or periodic), subject to configurable minimum and maximum limits. Autoloading setup shall require a funding source to be added or selected.

During autoloading setup, the customer shall be able to select a primary and backup funding source. If payment authorization of the primary funding source fails, authorization against the backup funding source shall be attempted. If payment authorization is not received, the autoloading shall be automatically disabled and the customer shall be notified via an e-mail notification.

For one-off purchases and autoloading, the website shall provide customers an option to split payment between a maximum of two (2) funding sources.

9.2.6 Reduced Fare

Senior/Disabled/Medicare and Youth customers with access to reduced, personalized fare media shall be offered all the same website functionality as described in this section, with the exception of the ability to order/purchase reduced fare media.

9.2.7 Account Status and Transaction History

Registered and unregistered customers shall be able to use the website to view transit account balance (e.g., stored value and pass) and status (e.g., rider classification, active or blocked) information by entering a fare media ID.

Transit account balance information shall include the current stored value balance and the state (e.g., active/inactive) and remaining validity (e.g., expiration date or rides remaining) of all passes.

Registered customers shall be able to view no less than two (2) years of prior transaction history, showing all sales, usage, and adjustment transactions. The transaction history shall be viewable and sortable on the website, and able to be downloaded in PDF and Excel formats.

Transaction history shall be further determined during the design review process.

9.2.8 Customer Service

The website shall include general information on use of the system, including an FAQ section, information on where to purchase fare media and value, the cardholder agreement, and general program information and updates.

Customers shall have the option of initiating a customer service request via the website. This action shall automatically generate a request within the CRM system (see Section 7.7: Customer Relationship Management).

The website shall allow registered customers to report a card lost or stolen. This action shall immediately result in the associated fare media being blocked from further use. The customer shall have the option of being mailed a replacement card or purchasing a new card and having the balance transferred. For the mailing of a replacement card, a configurable replacement fee may be charged.

The website shall allow registered customers to close a transit account and request an opt-out refund. This action shall immediately result in the associated fare media being blocked from further use. The operational policies governing the issuance of a refund shall be defined during the design review process.

The website shall include links to the LeeTran website with schedules, fares, and other general transit information.

9.2.9 Mobile-Optimized Website

The Vendor shall provide a mobile-optimized version of the customer website that supports all functionality described in this section.

Customers shall be automatically redirected to the mobile version when accessing the website using a mobile device, but shall have the option to view the full desktop version.

The mobile-optimized version of the website shall support all mobile platforms and browsers, including but not limited to:

- Platforms: Android, iOS, Blackberry, Windows Phone
- Browsers: Safari, Chrome, Firefox, Opera

The website shall support three (3) prior browser versions, with the latest specified at the time of the NTP.

The Vendor shall submit a formal end-to-end regression testing plan for review, and have resources assigned to QA/QC for each release.

9.3 Institutional Website

The Vendor shall deliver an institutional website and provide all hardware and software necessary to support website operations, and interfaces to internal and external systems needed to perform the required functions.

9.3.1 General Requirements

The Vendor shall deploy an institutional website that allows employers, schools, social service agencies, and other institutions to order fare media and administer transit accounts on behalf of participants in special fare programs (see Section 4.7: Special Fare Programs).

The institutional website shall provide the following functions at a minimum:

- Register a new institution (e.g., create a new institutional customer account)
- Add and remove administrators
- Add participants (e.g., transit accounts) to an institutional customer account, both individually and in bulk

- Delete participants (e.g., transit accounts) from an institutional customer account
- Load value (e.g., stored value and passes) to participants' transit accounts, both individually and in bulk
- Block participants' transit accounts (i.e. fare media) and/or use of loaded value
- Perform a card replacement
- Bulk order extended-use (both personalized and non- personalized) and limited-use media
- Make a payment
- View and export order history, invoices, and payment status
- Change password and conduct a password reset for users locked out of an account

Final institutional website functions shall be determined during the design review process.

The website shall include general information on use of the system, including a FAQ section and ways to contact LeeTran staff.

LeeTran shall be able to use the institutional website to act on behalf of program administrators as necessary.

The Vendor shall submit a formal end-to-end regression testing plan for review, and have resources assigned to QA/QC for each release.

9.3.2 Registration

Prior to using the institutional website, institutions shall need to be approved by LeeTran and registered through creation of an institutional customer account.

LeeTran shall use either the institutional website or CRM system (see Section 7.7: Customer Relationship Management) to register an institution and configure all parameters governing the institution's participation in a special fare program (see Section 4.7: Special Fare Programs).

Registration shall capture all institutional customer registration data (see Section 9.2.2: Account Registration), including the credentials (e.g., username, password) used by an institution's administrator to access the institutional website functions.

Following registration, an Institutional Program Administrator from the institution shall be able to login to the institutional website to perform all configured functions.

All data associated with institutional customer accounts shall be stored securely in the customer database (see Section 7.7.2: Customer Database).

9.3.3 Adding and Deleting Participants

Institutional Program Administrators shall be able to add participants (e.g., transit accounts) to their institutional customer account individually using a fare media ID, and through a bulk process using an imported file in a LeeTran-defined format.

When adding participants, the institution shall be able to provide card personalization information (e.g., employee name or ID) that uniquely identifies the participant in possession of the associated fare media. If personalization information is provided, it shall be securely stored in the transit account and serve as a unique identifier separate from customer registration data, should the participant choose to register the card (see Section 9.2.4: Fare Media Purchase and Registration).

Registered and unregistered, including reduced fare, customers with existing fare media shall be able to be added to an institutional customer account as participants.

Institutional Program Administrators shall be able to delete participants from their institutional customer account, individually by selection and in bulk.

9.3.4 Placing Orders

Institutional Program Administrators shall be able initiate the loading of value (e.g., stored value and passes) to participants' transit accounts individually by selection and in bulk.

When adding value to participant accounts, Institutional Program Administrators shall be able to select from the available fare products configured for their account, including products for reduced fare customers as appropriate, and choose whether to initiate a one-time or recurring load (e.g., autoload), on an individual participant basis. The period for recurring loads shall be defined in the institutional customer account configuration.

If their account is configured to allow it, Institutional Program Administrators shall be able to place bulk orders for extended-use and limited-use fare media to be delivered by mail. Bulk sales shall include LU fare media where the associated transit accounts are pre-loaded with value.

When fulfilling a bulk EU fare media order, the system shall automatically generate an import file pre-populated with the fare media IDs to support the addition of participants by the institution.

When fulfilling personalized card orders, the website shall allow for Institutional Program Administrators to enter participant name and/or upload a photo to print on the card.

9.3.5 Payment

Payment terms for institutional customers shall be configured as part of the institutional customer account setup. LeeTran shall be able to configure accounts such that payment is required at the time an order is placed, or to allow the institution to be invoiced based on established payment terms, or allow for the configuration for both.

For institutions where prepayment is required, the institutions shall be required to provide a funding source in the form of a credit card, debit card, or bank account (e.g., ACH). Funding source information shall be stored securely within the customer database in a tokenized form.

For institutional orders where invoicing is configured, an invoice shall automatically be generated by the RMS (see Section 7.5: Revenue Management), posted to the institutional website, and sent electronically to the institution.

The RMS shall track all receivables for institutional customers in the AR module (see Section 7.5.3: Accounts Receivable). LeeTran shall be able to configure credit limits for AR customer accounts, which shall result in the automatic disabling of order privileges within the institutional website when the credit limit is reached or a hold is placed on the account. Credit limits shall be configurable by both dollar amount and time.

Institutional Program Administrators shall be able to view current payment status (e.g., balance due, accrued interest, and due date) and at least 24 months of invoices, and order and payment history, via the institutional website. The invoices, orders, and payment history shall be viewable and sortable on the website, and able to be downloaded in PDF and Excel formats.

The institutional website shall support the administration of transit benefit programs by employers and third-party administrators.

Institutions shall be required to indicate whether loads are being funded using pre-tax dollars. Stored value and fare products purchased using any pre-tax dollars shall be identified as such and segregated within the transit account to ensure compliance with all applicable IRS regulations.

9.4 Required Submittals

The following table displays items that must be submitted in advance of one or more design reviews.

Description	Submittal Due		
	CDR	PDR	FDR
Website Common Design Specifications	X	X	X
Public Website Design	X	X	X
Mobile Website Design	X	X	X
Institutional Website Design	X	X	X

10 Integration Requirements

10.1 Retail Network

A primary distribution channel for fare media and stored value shall be a network of retail merchants. Initially, the retail network shall consist of local libraries, universities, colleges and Publix stores that currently sell LeeTran fare media. The Vendor shall provide the capability to expand the retail network to include additional merchants. Optionally, in the future, the retail network could be “upgraded” to consist of the original network plus other merchant locations that issue prepaid debit cards (e.g., gift cards) and where the POS system is already integrated with at least one (1) prepaid debit card network provider. The retail network shall be managed by a provider experienced in the integration and management of these retail networks. The Vendor shall be responsible for working with the retail network provider to integrate the retail network, including the integration of any retail network provider-furnished POS equipment.

Using the Fare Distribution API, an external retail system shall be able create a transit account and add value to the stored value in a transit account.

The Vendor shall work collaboratively with the retail network provider to provide the necessary equipment, documentation, and services to support the successful completion of all relevant testing phases.

The sale of fare media by a retail merchant shall initiate the automatic creation of a transit account within the FCS.

The transaction data shall be fully compliant with the requirements defined in Section 15.2.1: System Security for the handling of customer PII.

Transaction data elements shall be defined during the design review process. Transaction data elements shall include at a minimum:

- Card type
- Unique card identifier
- Transit account number
- Date and time of transaction
- Transaction type
- Transaction value

- Beginning transit account balance
- Ending transit account balance
- Merchant ID
- Merchant name
- Merchant location

Retail network provisioning and testing shall be completed in coordination with the Vendor to support operation of a fully functional retail network no later than the commencement of revenue service.

The Vendor shall work collaboratively with the retail network provider to develop test scripts that together accurately and completely confirm all features and functionality of the provider’s retail network system.

The Vendor shall work with the retail network provider to incorporate retail network functionality into the LeeTran test facility.

The retail network shall allow a merchant to reverse a transaction prior to authorization of the transaction with the FCS.

Retail network transaction reversals shall result in no charge to the customer. Once a sale is completed by the retail network (i.e., reversal is no longer possible), authorization and provision of refunds shall be the responsibility of LeeTran and the FCS. The time window when a transaction reversal is permitted by the retail vendor shall be established during the design review process.

A LeeTran test facility shall be connected directly to a provider-specified payment processor to fully test the processing of fare cards, including stored value, and/or pass purchases using credit/debit as a form of payment.

The Vendor shall work closely with the retail network provider throughout the Field Integration Test to help resolve issues and implement fixes on the retail network identified during testing.

10.2 CAD/AVL/APC

The Vendor shall be responsible for integration of the DCU with the CAD/AVL/APC system installed on LeeTran vehicles.

The Vendor shall partner with the CAD/AVL/APC vendor(s) and be fully responsible for the CAD/AVL/APC integration, including all labor, hardware, and software costs incurred by both parties to successfully integrate the two (2) systems. Any licensing costs necessary to support the CAD/AVL/APC integration shall be included in the Vendor’s cost proposal. See Appendix A.5 for CAD/AVL/APC information.

The integration shall use the Vendor-provided CAD/AVL/APC Integration API (see Section 2.3.1.8: CAD/AVL/APC Integration API) and shall support single-point logon and the capture of geolocation and trip data.

Single-point logon shall enable the CAD/AVL/APC login and routing data to be captured by the integrated DCU, including but not limited to:

- Operator ID
- Pattern
- Block
- Route
- Run
- Direction

The login and routing data shall be appended to every fare transaction generated by the integrated DCU.

The DCU shall capture geolocation data generated by the CAD/AVL/APC system, including;

- Raw GPS coordinates
- Stop ID

The geolocation data shall be appended to every fare transaction generated by the integrated DCU. The integrated DCU shall also include an embedded GPS receiver and append locally-captured GPS coordinate data to each transaction.

A detailed ICD detailing message formats and contents, procedures, interfaces, and transport protocols shall be provided for the onboard systems integration.

The interface shall occur over the Society of Automotive Engineers (SAE) J1708, SAE J1939, or other acceptable network, and shall include the following commands/data to be transmitted to the CAD/AVL/APC at minimum:

- Log on
- Log off
- Request to Talk (RTT)
- Priority Request to Talk (PRTT)
- Run number
- Driver ID

The final list of commands/data shall be determined during the design review process.

The interface shall occur over the J1708, J1939, or other acceptable network, and shall include the following commands/data to be received from the CAD/AVL/APC at minimum:

- Log on
- Log off
- Change route number
- Change run number
- Run number
- Route number
- Driver ID

The final list of commands/data shall be determined during the design review process.

10.3 Payment Gateway

The Vendor shall integrate with the LeeTran selected payment processor and payment gateway that supports the secure processing of credit and debit payment transactions generated within the system. Bank card payments generated by external systems shall not be processed by the payment processor, but may be integrated in the future using the Vendor-supplied payment API (see Section 2.3.1.3: Fare Payment API).

The Vendor shall be responsible for any system testing and certifications required to process payments through the LeeTran-provided payment gateway and processor provider.

The payment gateway shall use the Vendor-supplied payment API to capture payment transactions from all FCS devices and systems.

The payment gateway shall be used to process bank card payments generated by the following FCS devices/systems:

- Payment validators
- Public website (fare media and value sales)
- Institutional website (fare media and value sales)
- CRM system (fare media and value sales, adjustments, and refunds)

The Vendor shall perform in-system tokenization using a secure, irreversible hash algorithm or similar approach for all open payment card information that it is accepted by the system, during fare payment, fare media and value sales, autoloading processing, and customer service inquiries. Tokenization shall be performed by the payment gateway, and may also be performed by the devices or systems accepting bank card data. No un-tokenized open payment card information, encrypted or otherwise, shall be stored in the database at any time.

The FCS shall not use full credit/debit card numbers for the internal processing and storing of transactions.

The tokenization solution provided by the Vendor shall allow for refunds and tracking of chargebacks without having to store the bank card number.

10.4 Parking (Option)

The Vendor shall propose a solution for access control and fare purchases at LeeTran- or Lee County-managed transit parking facilities. The approach shall utilize as much existing equipment and back office modules as possible.

The parking facilities shall be for transit riders only, and customers may be expected to utilize the same contactless media that shall be used to ride transit. Specific business rules regarding pricing and validity periods shall be configurable through the core back office.

If possible, access control may be implemented with standard validators that interface with a parking-style gate or arm. Any proposed solution shall utilize standard APIs and configuration modules.

Customers may purchase media and/or reload media at TVMs located at parking locations. The TVMs shall be configurable to issue standard fares, or fares unique to parking lots.

All data generated or processed by the parking solution shall be integrated into the larger data warehouse and included in any applicable reports. Such data shall be presented such that parking entries/exits and all sales can be viewed in the same report. Any integration shall use the Vendor-provided APIs as necessary to minimize manual processing.

10.5 Required Submittals

The following table displays items that must be submitted in advance of one or more design reviews.

Description	Submittal Due		
	CDR	PDR	FDR
Retail Network Integration Plan	X	X	X
CAD/AVL Integration Plan	X	X	X
Payment Gateway Integration Plan		X	X
Fare Simplification Plan	X	X	X
Parking		X	X

11 Installation Requirements

Depending on the equipment type (e.g., on-board equipment vs. off-board equipment), the Vendor shall either have primary responsibility for the installation of the equipment, or shall serve a supporting role by providing installation oversight.

Table provides an overview of Vendor installation responsibilities. Where the responsibility is not checked, either LeeTran or a third party shall be responsible for that portion of the installation. Vendor installation roles and requirements are detailed in the subsequent sections.

Table 6. Vendor Equipment Installation Responsibilities

Equipment Type	Vendor Responsibility					
	Installation Guide	Site Survey / Fit Check	Cabling and Hardware	Prototype Installation	Installation Oversight	Physical Installation
SAP	✓	✓	✓	✓		✓
TVM	✓	✓	✓	✓		✓
Inspection/Validation Application	✓			✓	✓	
DCU	✓	✓	✓	✓		✓
TOT	✓	✓	✓	✓		✓
MSD			✓	✓		✓
Back Office Hardware			✓		✓	

11.1 General Requirements

The Vendor shall supply all materials and support required for installation of all new equipment delivered in accordance with these specifications. The Vendor shall supply all labor, supervision, and materials for installation of all back office systems delivered in accordance with these specifications.

The Vendor shall support the installation and testing of all SAPs, DCUs and PIMs on LeeTran vehicles. The Vendor shall provide all cabling and hardware necessary to properly install and secure the equipment in its planned location, and shall support the installation of this equipment.

The Vendor shall provide all mounting brackets, special hardware, electrical and communication wiring and service loops, and terminations/connections required to install all SAPs, DCUs and PIMs onboard vehicles. The Vendor shall support the installation of this equipment.

The Vendor shall install and test all TVMs at LeeTran-designated bus stop locations, as applicable. LeeTran shall provide the necessary power and communications at the device installation locations. The Vendor shall provide all required cabling and hardware necessary to properly install and secure the equipment in its planned location, and shall support the installation of this equipment.

The Vendor shall provide all TVM support structures, such as pedestals and mounting brackets, as needed. The Vendor shall install this equipment. Use of mounting pedestals or stanchions to support TVMs shall be subject to LeeTran review and approval.

The Vendor shall install and test all TOTs at LeeTran ticket offices. LeeTran shall provide the necessary power and communications at the device installation locations. The Vendor shall provide all required cabling and hardware necessary to properly install and secure the equipment in its planned location.

The Vendor shall install and test the MSD. Although the MSD is a laptop, LeeTran shall provide the necessary power and communications for the peripherals. The Vendor shall provide all required cabling and hardware necessary to properly install and secure the peripherals.

The Vendor shall install, configure, and test all back office systems and other necessary software for the LeeTran test facility (see Section 13.3: LeeTran Test Facility) at a location designated by LeeTran. The Vendor shall support the installation, configuration, and testing of all equipment and other necessary hardware at the test facility. LeeTran shall provide the necessary power, communications, and rack space at the installation location. The Vendor shall provide all required cabling and hardware necessary to properly install and secure the equipment in its planned location, and shall support the installation of this equipment.

The Vendor shall support a commissioning test that shall be performed for each installation, and shall define what the test entails. The test requirements shall be provided to LeeTran for review and approval.

Detailed test results shall be recorded to show that each device and system has been inspected and tested in accordance with these specifications by LeeTran, and submitted to the Vendor for review and approval.

11.2 Installation Plan

The Vendor shall provide a detailed installation plan for LeeTran review and approval at FDR, and a final version no later than 120 calendar days prior to the first delivery of equipment.

The installation plan shall describe all relevant aspects of device and system installation, including but not limited to, site and vehicle surveys, antenna testing, prototype installations, site preparation, pre-wiring, equipment and vehicle staging, production installation, quality assurance and control, and scheduling. It shall also detail installation and configuration of all software systems, including the back office, systems, interfaces and web applications, and their respective schedules.

In the installation plan, the Vendor shall provide the power and communication requirements for each piece of equipment and at each install location. The communication requirements shall include a description of the networking equipment necessary at the bus facility to connect the Vendor devices to the LeeTran-provided backbone. These requirements may be revised and submitted to LeeTran following completion of the site surveys (see Section 11.3: Site Surveys).

The installation plan shall include, but is not limited to:

- DCUs
- DCU mounting hardware
- TVMs
- TOTs
- Mobile fare inspection/validation device application
- Back office hardware
- Back office applications and databases
- Web applications
- System interfaces and API configuration
- Test environment hardware and devices
- Spare parts
- Support equipment
- Smart card media

11.3 Site Surveys

The Vendor shall perform detailed site surveys for all vehicle types and equipment and back office install locations, including bus stops, retailers, and other LeeTran locations to identify installation requirements and any existing provisions that may be used to support installation.

Initial vehicle surveys shall be completed as a part of the design review process. As part of FDR, the Vendor shall submit the installation details and specifications for all equipment installations for LeeTran review and approval.

The Vendor shall identify all communication requirements at bus sites, including a description of all networking equipment necessary to connect the Vendor devices to the LeeTran-provided backbone. LeeTran facilities that shall house networking equipment shall be identified during the design review process.

11.4 Prototype Installations

The Vendor, in coordination with LeeTran installation staff, shall perform a prototype installation of the field devices in each of the different field environments in which the equipment shall be installed, including a prototype installation of all bus equipment for each vehicle type.

The prototype installations for each vehicle type in the bus fleet shall help determine the appropriate mounting locations for each piece of equipment, and any mounting bracket requirements not identified during the site surveys.

The DCUs shall be mounted and positioned such that they minimize encroachment on passengers, and do not obstruct the driver's field of vision, including the view of the front door. The prototype installation results shall be documented and submitted to LeeTran for review and approval.

The prototype installations shall be subjected to at least one (1) week of service to ensure the robustness and integrity of the installation design.

All prototype installations are subject to LeeTran review and approval before installation in other locations shall be permitted.

11.5 Onsite Work Requirements

All Vendor and subcontractor employees working within operating rights-of-way and bus divisions shall comply with applicable bus operations rules and procedures, including safety rules and regulations. All onsite personnel engaged in installation activities shall attend LeeTran safety training and briefing sessions before working onsite.

The Vendor shall deliver and execute a safety access plan for all onsite work. Such safe access shall be afforded to construction equipment, vehicles, and personnel in accordance with LeeTran policies and Occupational Safety and Health Administration (OSHA) regulations. All access plans shall be subject to review and approval by LeeTran.

The Vendor shall comply with and be responsible for all regulatory requirements applicable to design, construction, installation, and testing, including the application and granting of all applicable permits.

11.6 Installation Procedures

The Vendor installation procedures shall be in accordance with the approved installation plan and LeeTran rules and guidelines.

The Vendor shall provide a proposed methodology and schedule for back office and system equipment installation and configuration.

The Vendor's proposed installation methodology shall seek to maximize the efficiency with which the installation is performed while minimizing the impact on transit operations.

11.7 Shop and As-Built Drawings

The Vendor shall submit shop drawings used in its manufacturing facility, assembly facility, or shop to fabricate, assemble, and/or install parts of the system, whether manufactured from raw materials or purchased from others in a ready-to-use condition. Shop drawings and their projected delivery dates shall be noted on the master program schedule.

Shop drawings shall be submitted in a format designated by LeeTran no less than 45 calendar days prior to the start of installation for LeeTran review and approval.

The Vendor shall revise and resubmit drawings that have been reviewed by LeeTran and marked "Disapproved" or "Unacceptable for Evaluation". No work indicated by any shop drawings shall be commenced until drawings have been marked as "Approved" or "Approved as Noted."

The Vendor shall document each device installation in the form of an as-built drawing. The as-built documentation shall identify equipment location information, wiring traces, and all additional information needed to maintain the newly-installed infrastructure.

For each vehicle type on which system equipment is installed, the Vendor shall supply as-built drawings showing the routing of all wires and the method and location of all device mounting installations. As necessary, these drawings may include digital photographs of sufficient detail and clarity to convey the necessary information.

All drawings shall contain dimensions, physical details, connections, and other information pertinent to system diagnostics, maintenance, and troubleshooting.

The Vendor shall submit for each set of as-built drawings the following no later than 30 calendar days following each equipment installation:

- One (1) copy on electronic media, in a format approved by LeeTran
- One (1) reproducible computer-aided design-generated hardcopy

Drawings shall reside in the document control system as specified.

A master index of drawings shall be submitted that clearly indicates the organization of the shop and as-built drawings, listed by drawing number. The master drawing index shall also provide cross-references to related drawings, and shall indicate the hierarchy of all drawings and drawing layers.

11.8 Required Submittals

The following table displays items that must be submitted in advance of one or more design reviews.

Description	Submittal Due		
	CDR	PDR	FDR
Installation Plan ⁴			X
Installation Procedures			X
Shop Drawings ⁵			X
As-Built Drawings ⁶			X
Master Index of Drawings ⁷			X

⁴ 120 Calendar Days Prior to Equipment Delivery

⁵ 45 Calendar Days Prior to the Start of Installation

⁶ 30 Calendar Days Following Each Installation

⁷ With Submittal of Each Drawing

12 Training Requirements

12.1 General Requirements

The Vendor shall provide a comprehensive training program to educate and train LeeTran personnel in all details of the payment system, enabling them to properly operate, service, and maintain the system and each of its components throughout its useful life.

The Vendor shall deliver a training plan that proposes the training courses to be delivered to LeeTran. The course curriculum shall include all instruction of LeeTran personnel.

The Vendor shall provide training to the following LeeTran staff, at a minimum: IT and finance professionals, supervisors, maintenance and repair personnel, auditors, planners, field operations and command center personnel, customer service and transit store personnel, managers, and trainers.

The Vendor shall develop and deliver train-the-trainer courses that provide LeeTran training instructors with the necessary instruction to deliver system training in the future without additional Vendor support.

The training program shall include classroom training provided by the Vendor's staff. The Vendor may supplement their training, as appropriate, by allowing OEM representatives to train LeeTran staff on subassemblies and devices.

The Vendor's training program shall include formal and informal instruction with working equipment, manuals, and diagrams as instructional tools.

The Vendor shall assume that LeeTran staff does not have knowledge of any system features. However, the Vendor may assume that maintenance personnel have the basic skills pertinent to their crafts.

Course sizes shall be designed to assure that all trainees have some level of one-on-one training with equipment and software.

Courses shall be limited to a maximum of eight (8) hours per day, and shall accommodate up to 25 students per class.

The Vendor shall provide device training units that enable students to receive hands-on equipment operation and maintenance instruction while in a classroom setting. The training units shall be powered by a standard 120V AC power source.

When appropriate, training shall occur in the field or location of service.

The Vendor may use installed revenue equipment or spare parts as training aids in lieu of mockups and for demonstration and for practical exercises in replacing, testing, disassembly, and assembly of equipment. However, the Vendor shall be responsible for ensuring that such parts are not damaged or modified in any way.

LeeTran shall furnish the following training-related items upon Vendor request:

- Space for classroom lectures and practical training on equipment (location and class times shall be set by LeeTran)
- Projectors, screens, white boards, and similar equipment
- Shop space as needed
- Buses with installed system equipment

Such request(s) shall be made at least two (2) weeks prior to the scheduled training.

The Vendor shall provide video of all training sessions to LeeTran.

The Vendor shall provide records of the training provided on a weekly basis to LeeTran.

All materials used in the training programs, such as training rigs, fare media, manuals, simulators, and drawings, shall become the property of LeeTran upon completion of the training.

12.2 Training Plan

The Vendor shall develop and submit for LeeTran approval a training plan that documents the design of the program for training LeeTran personnel and each course to be delivered.

The training plan shall include at a minimum the following for each course:

- Identification and summary descriptions of the training course, including course lengths
- The methods of training to be used
- Learning objectives and outcomes
- The sequence of activities
- Targeted trainees for each course
- Maximum number of trainees per course
- Methods and criteria for evaluating performance, including an objective grading system to report progress of trainees during the training
- Resources required, such as equipment, shop space, video recorders, etc.

The number of training sessions (i.e. classes) for each course must be indicated in the Pricing Form.

A training schedule shall be included in the Vendor's training plan. The schedule shall consider the sequence of training, hours of instruction, trainee availability, limitations on course sizes, and venue for the training.

The training plan shall address the Vendor's approach for training LeeTran trainers to deliver training subsequent to the Vendor's involvement. It shall describe the Vendor's approach, resources, and hours required, and any training aids that might be included.

12.3 Training Materials

The Vendor shall provide all necessary training materials for the delivery of each course discussed in the training plan.

At a minimum, the following training materials shall be provided by the Vendor:

- Course agenda and objectives
- Resources and facilities required for the course
- Detailed lesson plans or outlined presentations
- Pre- and post-training assignments
- Instructions for using any audiovisual support and equipment
- Student discussion guides and handouts
- All relevant manuals
- Quick reference guides
- Operational system equipment
- Computer-based presentations

Training documentation shall be separate from the operation and maintenance manuals (see Section 12.5: Manuals), but may reference those manuals.

The Vendor shall provide hard-copies of the training materials for all expected attendees, plus five (5) spare copies.

Draft training materials shall be submitted at FDR. Final training materials shall be submitted to LeeTran at least 30 calendar days before training classes are scheduled to begin. All documentation and training material shall be submitted in an electronic form specified by LeeTran.

Training materials shall be updated as required during the course of instruction to reflect the installed system.

During the term of the warranty and operations and maintenance agreement (see Section 19: Operations and Maintenance Agreement), the Vendor shall provide updated course instruction and materials resulting from any significant system hardware or software changes.

LeeTran reserves the right to edit and reproduce portions or all of the training materials for internal use. If the Vendor produces an update or new training aids (e.g., video recordings, manuals, etc.) within two (2) years following the completion of the training, LeeTran shall receive copies of the updated material at no cost for use in LeeTran training programs.

12.4 Training Courses

The Vendor shall provide the training courses in **Table** and provide all course content and training materials in LeeTran-approved format.

Table 7. Training Courses

Training Course	Description
Field Maintenance and Servicing	All LeeTran maintenance personnel who may be required to perform scheduled maintenance and support activities shall attend a training course and participate in field work alongside Vendor personnel prior to System Acceptance. This course and fieldwork shall provide the employee all knowledge necessary for operation, troubleshooting, maintenance, repair, component change-out, and scheduled maintenance of all field devices.
Shop Repair	A selection of mechanics and electricians who shall perform the periodic overhaul, remedial repair, and adjustment of system components shall be given a comprehensive instruction course in the operation, troubleshooting, maintenance, repair, and overhaul of the equipment.
Operation, Configuration, and Administration	Supervisory personnel who shall manage system equipment and service technicians shall receive specialized training in the operation, configuration, and administration of the devices. This class shall provide instruction on those activities that are limited to the administrative and maintenance logins of the field equipment, as well as activities governing the configuration of the devices.

Training Course	Description
Back Office User Training	<p>Personnel who shall use the back office systems shall be trained in the use of all application programs and functions provided by the system. The Vendor 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. This training shall include at a minimum:</p> <ul style="list-style-type: none"> • General back office user procedures • Status monitoring functions • Device configuration parameters • Device management functions • Fare set management • Hotlist management • Media inventory management • Generation of all standard reports • Bankcard authorization operations and configuration • Backup data retrieval procedures • Interfaces with other systems
Back Office Accounting	<p>Those management personnel who shall perform accounting and financial management shall receive specialized training in use of the RMS and financial reporting. Using sample data created from testing or other sources, RMS data and reports shall be generated from the system and used to explain the resulting output.</p>
Back Office Administration	<p>Systems personnel who shall be responsible for administration and maintenance shall be trained in all aspects of system administration to ensure optimal performance, as well as correct minor system problems. Content shall include at a minimum:</p> <ul style="list-style-type: none"> • Backup and restore • Disaster recovery • Load balancing configuration • User administration • Networking configurations • Interfaces with other LeeTran computer systems • Merchant acquirer* interface • Anti-virus definition updates
Report and Query Generation and Customization	<p>The Vendor shall instruct advanced users and administrators in use of the reporting system and data warehouse design and query generation, including use of the report writer tool.</p>
Support Systems and Special Tools	<p>The Vendor shall provide training on the use, operation, and maintenance of all support systems and special tools.</p>
Website Administration	<p>The Vendor shall provide training on the website administrative functions. The course shall include at a minimum:</p> <ul style="list-style-type: none"> • Discussion of the underlying website design and linking to other sites • Instruction on how to configure all pages of the website • Review of all procedures to modify database tables that affect website content • Demonstration on how to monitor the website status and operating conditions

Training Course	Description
Customer Service Training	<p>The Vendor shall provide customer service training on all aspects of the system that shall be visible to and used by the public, and the tools that those LeeTran staff shall employ. The course shall cover at minimum:</p> <ul style="list-style-type: none"> • All fare products, policies, and transaction types • TOT/MSD functionality and user interfaces • CRM system functionality and user interfaces • Use of the customer website • General account management features and functions

* The definition of a merchant acquirer is as follows. An average retailer wishes to accept credit and debit cards from a number of card schemes. A merchant acquirer is typically a bank that shall provide the following services to the retailer:

- Provide a single interface to the scheme for all card related matters
- Card authorizations
- Recovering money from the card issuing bank
- Club card checks
- Pay all the scheme and issuer fees on behalf of the merchant
- Act as an intermediary in the event of card claims, returns, and refunds.

Essentially, the merchant acquirer acts like a large switch protecting the merchant from having to understand all the detail of all the different card schemes, (VISA, Maestro, etc.).

12.5 Manuals

In addition to training materials and instruction, the Vendor shall provide instruction manuals on how to manage, operate, and maintain the entire FCS on an ongoing basis. The manuals shall include detailed documentation for all equipment, systems, and software.

12.5.1 Manual Content and Format

Manuals shall contain all text, step-by-step procedures, illustrations, drawings, block diagrams, schematics, parts lists, troubleshooting guides, and repair and replacement procedures needed to allow LeeTran to operate, maintain, diagnose, and repair all equipment and systems.

All manuals shall be written in clear and concise English, shall use English and/or metric units of measurement, and shall be written to assume the reader has no more than an 8th grade education.

Care shall be taken to provide easily understood explanations and step-by-step instructions with cross-references to all drawings, diagrams, and photographs.

Block diagrams, illustrated parts breakdowns, and schematic drawings shall be used to facilitate descriptions of assemblies and the relationships of components, subsystems, and systems.

Electrical wiring diagrams and other diagrams necessary for operation of the equipment shall be provided. No single diagram shall show more than one (1) system, or parts thereof, and diagrams shall be complete and legible in all respects.

Device and software manuals shall include the following content at a minimum:

- General field equipment familiarization material
- Location, function, and operation of all controls and indicators
- Field equipment setup, login, and shutdown procedures
- Symptoms, diagnostic methods, and procedures for isolating minor faults

- Description of all user messages and enunciations

Manuals related to repair, maintenance, and installation shall provide all information needed for troubleshooting service failures, performing equipment installations and replacements, and for performing preventative maintenance for each component, including general servicing and inspecting.

Manuals related to back office operation and maintenance shall be presented in terms that are meaningful to users. They shall include functional explanations and descriptions of each application program and its use. Step-by-step procedures shall be provided that explain how each parameter is configured and the effects obtained by varying each parameter. All user guidance, alarms, and error messages shall be described, along with the steps necessary for recovery from error.

Operating instructions shall describe procedures to be followed as a result of system restarts or failures. The documents shall contain sufficient information to enable the user to restart or reconfigure the system and analyze diagnostic data dumps.

Disaster recovery procedures shall be clearly specified in sufficient detail to consider all possible scenarios. Recovery instructions shall describe detailed procedures to be followed in the event that system recovery is needed. Detailed data backup and recovery procedures shall be provided.

The Vendor shall submit an illustrated parts catalog including all installation hardware, wiring assemblies, and Lower Line-Replaceable Units (LLRUs). Each listed part in the illustrated parts catalog shall be referenced by the Vendor using an assigned part number and, where applicable, OEM part number.

The illustrated parts catalog may be a subset of the maintenance materials.

All manuals shall be submitted in hard copy and electronic format.

Documentation provided in electronic file format shall include:

- Manuals and illustrated parts catalogues shall be provided in PDF format and in a modifiable electronic format (MS Word)
- CAD files shall be provided in PDF format
- Schematic drawings shall be provided in PDF format

Electronic files shall be able to be deployed individually, or hosted on a server to allow multiple users to access the same data. Information shall not be encrypted and shall be developed and delivered using standard authoring tools such as MS Word, Excel, Visio and PowerPoint, or Adobe Acrobat.

One (1) complete set of documents shall be provided to LeeTran 90 calendar days prior to the start of acceptance testing.

Information gathered during installation and acceptance testing, and throughout term of the warranty and operations and maintenance agreement, shall be incorporated into the manuals for submittal to LeeTran.

Revisions to the manuals shall be recorded on a control list in the front of each document. The list shall be issued with each revision and shall show the date of each revision and the page reference. The Vendor shall maintain all updated lists for each document. LeeTran shall review and comment on each manual submission as required.

Sensitive information that is not to be distributed to all departments shall be contained in a separate document marked “Confidential.” The nature of this information shall be mutually agreed upon between the Vendor and LeeTran.

12.5.2 Required Manuals

The manuals in **Table** shall be required at a minimum. The complete set of documentation shall be submitted by the Vendor and approved by LeeTran during the design review process. Additional manuals may be requested by LeeTran.

Table 8. Required Manuals

Device and Software Manuals
Operating Instruction Manual
Preventative Maintenance Manual
Corrective / Field Maintenance Manual
Shop Repair and Overhaul Manual
Parts Manual
Software and Programming Manual
Software Source Code Manual
User Quick Reference Guides
Field Maintenance Quick Reference Guides
OEM Manuals – As supplied
Back Office Manuals
Administrator’s Manual
User’s Manual
Fare Engine, System Configuration, and Business Rule Management Manual
Customer Relationship Management System Operations Manual
Monitoring Management Operations Manual
Revenue Management System Operations Manual
Data Warehouse Design and Database Structure Manual
Reporting System Operations Manual
OEM Manuals - As supplied
Support System Manuals
Operations and Maintenance Manual
OEM Manuals - As supplied
Website Manuals
Customer Website Design and Administration Manual
Institutional Website Design and Administration Manual

12.6 Required Submittals

The following table displays items that must be submitted in advance of one or more design reviews.

Description	Submittal Due		
	CDR	PDR	FDR
Training Plan		X	X

Description	Submittal Due		
	CDR	PDR	FDR
Training Materials			X
Manuals		X	X

13 Testing Requirements

The Vendor shall plan for, perform, monitor, and document all tests required to prove acceptable design and delivery of the system, including all components and subsystems, and the integrated system as a whole. The Vendor shall furnish system equipment that meets the criteria specified for all tests.

The Vendor shall begin no portion of system testing unless all design reviews and testing prerequisites have been successfully completed and approved in writing by LeeTran. In the event that some elements of the system are rolled out prior to complete system deployment, all testing phases shall be completed in their entirety for each phase of deployment.

The testing shall be completed in three (3) phases: Factory Testing, Integration Testing, and Acceptance Testing. The test phases and individual tests of which those phases are comprised are summarized in **Table** and described in more detail in the following sections.

Table 9. Testing Overview

Testing Phase	Test	Purpose	Condition for Completion
Factory	1. First Article Configuration Inspection (FACI)	Inspect equipment hardware before line production.	Must pass prior to start of equipment production.
	2. Factory Acceptance Test (FAT)	Inspect equipment hardware and software before line production.	Must pass prior to start of equipment production.
	3. Production Acceptance Test (PAT)	Inspect each piece of equipment after production.	Must pass for each piece of equipment.
Integration	4. Functional Unit Test (FUT)	Test each system component individually before integration.	Tests for all devices and back office systems are successful.
	5. System Integration Test (SIT)	Test the integrated system in a lab environment.	Successful integrated system functional test in lab setting.
	6. Field Integration Test (FIT)	Install integrated system in field and test functional requirements.	Successful integrated system functional test after field installation.
Acceptance	7. Pilot	To test system functionality with limited users in phases.	Each successive phase with increasing use cases must pass.
	8. System Acceptance Test (SAT)	Test that complete system fulfills performance requirements.	Requirements fulfilled for settling period (number of transactions or time elapsed).
	9. Final Acceptance	Accept fully functioning system and complete installation.	System is fully operational, all contractual conditions are met, and all issues resolved.

13.1 General Requirements

All system components and subsystems shall be tested individually and in integrated environments to ensure that they meet all technical and functional requirements in these specifications.

Testing shall incorporate all requisite integration with existing LeeTran systems as described in these specifications.

The Vendor shall provide all labor and materials required for system testing, including but not limited to closed-loop fare media and bank cards, and all support services and testing facilities required to stage, inspect, and test all hardware and software being supplied.

All tests and inspections shall be documented by the Vendor, and monitored and signed off by LeeTran or its representatives, as well as by the Vendor or its representatives.

The Vendor shall test and verify that it can successfully utilize LeeTran-provided communications networks for deployment of the system as designed.

Any and all hardware or software not passing inspection or test shall be replaced or otherwise corrected by the Vendor and retested.

The Vendor shall establish a LeeTran test facility as specified in Section 13.3: LeeTran Test Facility no later than the commencement of integration testing, specified in Section 13.5: Integration Testing.

Prior to the start of any formal testing, the Vendor shall conduct “dry- run” testing to identify and resolve any issues that arise before formal testing commences.

Successful completion of each phase of testing shall be subject to LeeTran approval based on approved test criteria.

13.2 Test Documentation

13.2.1 Inspection and Test Plan

The Vendor shall submit a draft inspection and test plan for LeeTran review and approval during the design review process, and shall submit a final inspection and test plan to be used in connection with all inspections and tests described in this specification no less than 30 calendar days prior to the start of any testing.

The inspection and test plan shall include a detailed schedule indicating the sequence of each test, where and when each test shall take place, and the number of Vendor-provided staff covering each test.

The inspection and test plan shall cover all Vendor, equipment supplier, and subcontractor inspections and tests to be performed, including those performed under the Vendor’s QA/QC program (see Section 16.3.7: Quality Assurance and Control).

The inspection and test plan shall include plans for each factory and integration test defined in this section, including:

1. First Article Configuration Inspection (FACI)
2. Factory Acceptance Test (FAT)
3. Production Acceptance Test (PAT)
4. Functional Unit Test (FUT)
5. System Integration Test (SIT)
6. Field Integration Test (FIT)

Acceptance testing shall be described in a separate acceptance test plan.

The inspection and test plan shall detail the number and range of tests, as well as the criteria for acceptance of each phase of testing. All performance measurement procedures and acceptance criteria, including the number

and type of failures allowed in each phase of testing, shall be subject to LeeTran review and approval. The plan shall also include any LeeTran-specified requirements identified during PDR.

The inspection and test plan shall identify any requirements that the Vendor intends to meet by any means other than the testing process described in this specification.

The inspection and test plan shall include volume or stress testing for applicable devices that simulates peak ridership and transaction volumes. LeeTran may provide updated transaction volume projections for use in the inspection and test plan at design review.

No inspections or tests shall be performed until the Vendor has received LeeTran approval of the inspection and test plan and the associated schedule.

13.2.2 Inspection and Test Procedures

The Vendor shall prepare and submit to LeeTran a detailed procedure for each inspection and test to be performed.

Detailed inspection and test procedures shall be submitted to LeeTran for review and approval a minimum of 30 calendar days prior to the corresponding test, unless otherwise specified herein.

The Vendor shall conduct no inspection or test until approval of the corresponding test procedure has been granted by LeeTran.

Detailed inspection and test procedures shall include mapping or references to the design documents and functional requirements related to the test.

Inspection and test procedures shall include detailed test scripts for each test case to be performed as part of the test. Test scripts shall include test case setup instructions and preconditions, step-by-step instructions for performing the test, and expected results for each step.

A re-test shall be performed for any failed test cases and for system components requiring adjustment, repair, or replacement as a result of the testing, up to and including the entire system, if deemed necessary by LeeTran.

Detailed inspection and test procedures shall be delivered for each factory and integration test defined in this section, including:

1. FCI
2. FAT
3. PAT
4. FUT
5. SIT
6. FIT

LeeTran reserves the right to develop additional test procedures, and include ad-hoc test cases to be performed by the Vendor or other designated third-parties, during all phases of testing.

13.2.3 Inspection and Test Reports

The Vendor shall submit a written report for each inspection and test that is performed, including copies of all data generated during the test, for LeeTran review and approval.

Inspection and test reports shall include the detailed test scripts from the associated procedures noting any exceptions to the stated test conditions, recording all relevant setup and configuration information (e.g., fare media serial numbers and device IDs), and marking each step as passed or failed.

Inspection and test reports shall include detailed test results, including all transaction data generated, detailed failure descriptions and resolution, modifications or repairs pertaining to the components or systems being tested, and any re-test results.

All transaction data generated during testing shall be submitted in Excel format to allow for simple storage and analysis by LeeTran.

Detailed inspection and test reports shall be delivered for each factory and integration test defined in this section, including:

1. FACI
2. FAT
3. PAT
4. FUT
5. SIT
6. FIT

Reports shall be submitted to LeeTran for review and approval within 10 calendar days of the completion of any test.

No phase of testing shall be considered complete until the associated report is approved by LeeTran.

13.2.4 Test Waivers

If a component or subsystem is considered by LeeTran to be identical or substantially similar in design and configuration to equipment previously deployed in other applications with similar or more stringent environments, specific tests of that system component may not be necessary. To obtain a waiver, the Vendor shall provide a formal request to waive testing for each applicable component or subsystem.

If the Vendor desires a waiver of testing, the Vendor shall submit required information for each applicable component or subsystem 60 calendar days prior to the date of planned testing.

A request to waive testing shall include the following information:

- List of the locations and quantities of previously installed equipment, including duration of revenue service
- Description of all relevant differences between the other installation locations and those described in this specification
- Description of all relevant differences between the previously installed equipment and the components being provided to meet the requirements of these specifications
- Test results for all relevant tests that have been conducted on the equipment
- Reliability data for the equipment, as verifiable through the purchasers
- Proposed cost credit to the contract for granting the waiver of testing

Based on the submitted data, LeeTran shall determine whether requirements for testing shall be waived.

Specific testing requirements for each system component shall be considered individually, and waivers shall be issued on an individual test and component basis; it is possible LeeTran may grant a waiver for certain tests while others shall still be required.

No waivers shall be granted for the integration or acceptance testing of the components or system.

13.3 LeeTran Test Facility

LeeTran shall identify and provide a secure facility for the placement of a Vendor-furnished test facility where LeeTran and Vendor may test system hardware and software. LeeTran shall be responsible for providing and maintaining network communications to the test facility. The Vendor shall provide all maintenance support for the test facility equipment, systems, and interfaces through Final Acceptance, and maintain the test facility software configuration throughout the term of the warranty and operations and maintenance agreement (see Section 19: Operations and Maintenance Agreement).

The Vendor shall update LeeTran test facility software as necessary to maintain a fully mirrored environment of the Vendor's test facility.

The test facility shall include a separate back office, including the account-based transaction processor and all specified support systems, which fully replicates the production environment. The test facility back office hardware shall be identical to the production system hardware, but shall not require the system redundancy specified in Section 7.10: System Hosting and Disaster Recovery.

The test facility shall include at least two (2) units of every equipment type deployed within the system, including any existing equipment (e.g., CAD/AVL/APC system) that is integrated with the new FCS. LeeTran shall be responsible for maintaining the configuration of any test facility equipment that is not provided by the Vendor.

The LeeTran test facility shall be fully installed and configured prior to the commencement of integration testing and shall include at a minimum:

- Fully integrated back office with ATP and all support systems (i.e., CRM system, configuration management, monitoring management, MIMS, RMS, data warehouse, reporting system, and hosting)
- LeeTran-provided Bus-In-A-Box (BIB) with an integrated CAD/AVL/APC system
- Two (2) TVMs (and all major internal components/modules)
- Two (2) TOTs
- Two (2) mobile fare inspection/validation devices
- Two (2) MSDs
- Two (2) internet-connected PCs configured to access customer and institutional websites, and all web-based back office tools (e.g., CRM tool, device configuration management, monitoring management, and reporting system)
- Bill note acceptor (BNA) test station
- Coin acceptor test station

With the exception of factory testing, all specified formal and all laboratory-based testing shall be conducted in the LeeTran-provided test facility.

The LeeTran test facility shall have the ability to connect directly to the merchant acquirer or any other processing entity to fully test the processing of credit and debit transactions.

The Vendor shall provide all special tools, documentation, and test and inspection equipment necessary for troubleshooting, testing, repairing, and calibrating all devices and modules in the LeeTran test facility, down to the LLRUs.

13.4 Factory Testing

13.4.1 First Article Configuration Inspection

The purpose of FACI is to confirm that the first unit of each equipment type that is manufactured or procured by the Vendor meets the hardware configuration and quality requirements in these specifications. FACI shall be conducted at the Vendor's facilities.

LeeTran shall be notified no less than 60 calendar days prior to the commencement of FACI; subsequently, the Vendor shall be advised regarding LeeTran's attendance.

The Vendor shall deliver all data, including the latest drawings, specifications, quality documentation, and test procedures required for adequate inspection of the first article system components a minimum of 30 calendar days prior to FACI.

FACI shall take place at the point of assembly, after manufacture or procurement of the first production units for each of the system components: DCUs, TVMs, TOTs, the inspection/validation device application, mobile sales devices, and the back office, including all subsystems.

FACI shall verify that the production units comply with these specifications, including design configuration and drawings as approved during FDR, or the latest revision thereof.

At FACI, LeeTran shall have the right to inspect any and all of the units produced to date.

Expectations for the quality of workmanship for the future production of components shall be established at FACI.

Documentation of quality inspections performed at subcontractor facilities or of the Vendor's quality inspections of components manufactured by others shall be available for LeeTran review at FACI.

No additional production units shall be manufactured or procured by the Vendor until FACI has been approved by LeeTran.

13.4.2 Factory Acceptance Test

The purpose of the FAT is to demonstrate that the system components to be furnished meet the human factors, environmental, and maintainability requirements contained in this specification. In the event that the Vendor has already conducted similar tests on identical or nearly identical equipment, LeeTran may, but is not obligated to, accept the results of those tests as satisfying some or all of the requirements in this section (see Section 13.2.4: Test Waivers).

Successful completion of FACI, including LeeTran approval of all inspection reports, is a pre-requisite for the commencement of FAT.

The Vendor shall prepare and submit FAT test procedures within 21 calendar days following the completion of FACI for review and approval by LeeTran.

System components to be tested in FAT shall be from the first run of production units, and may be chosen by LeeTran. Once chosen, the units may not be modified without the express consent of LeeTran. Once a particular series of tests begins on a particular unit, it shall be completed on that unit.

FAT shall be conducted by the Vendor at the Vendor's facility or at a subcontractor's facility designated by the Vendor. The Vendor shall provide all necessary supplies for FAT.

LeeTran shall, at its discretion, assign staff or representatives to witness and/or periodically audit the FAT progress.

Human factors testing shall demonstrate device compliance with the general design requirements in Section 18: Design Reviews and component requirements identified in the Section 5: Stand-alone Processor (SAP) Requirements.

Environmental testing shall demonstrate compliance with the environmental requirements contained in the Section 17.7: Operating Environment.

Maintainability testing shall demonstrate compliance with the maintainability requirements set forth in Section 17.6: Maintainability and Serviceability.

If the Vendor has already conducted substantially similar tests to those described herein, the Vendor shall submit the procedures and results of those tests to LeeTran for consideration at least 60 calendar days prior to the scheduled FAT (see Section 13.2.4: Test Waivers).

The Vendor shall be responsible for maintaining reports of all tests conducted throughout FAT, showing each test conducted and the test results. The reports shall be submitted to LeeTran at the conclusion of FAT for review and approval.

Results not meeting specified requirements shall be fully documented and explained by the Vendor, and a corrective action plan shall be submitted.

Successful completion of FAT shall be a prerequisite for the manufacturing of production system components.

LeeTran may delay delivery of any system components until FAT procedures are successfully completed and approved.

If at any time after FAT results have been approved a design change is made, the performance of the modified system components shall be demonstrated as conforming to this specification and the test results shall be resubmitted for LeeTran approval.

13.4.3 Production Acceptance Test

The purpose of the PAT is to demonstrate that each piece of equipment manufactured or procured by the Vendor is operational and meets the design and quality requirements described in these specifications.

The Vendor and its subcontractors shall perform a PAT on each system component at the point of manufacture as an integral part of their QA/QC program prior to each shipment.

The PAT process shall verify, and the Vendor shall certify, that all system components contain the correct materials, are assembled properly, and function all in accordance with these specifications. Testing shall include validation against established performance metrics.

The PAT process shall verify that each unit is produced to at least the same quality level as the unit presented for FACI and FAT.

At a minimum, and as applicable, these tests shall test the following functions:

- General device operation and performance in all modes
- Data generation and transfer
- Alarms generation and transmittal
- User interface control and display

The Vendor shall update PAT procedures based upon experience gained from subsequent testing and/or system component operation. Test procedures shall be expanded to focus on areas that prove to be, or have historically been, troublesome.

The Vendor shall be responsible for maintaining complete reports of all PATs that are performed. The reports shall note any failures, subsequent corrective measures, and retests.

All reports shall be submitted to LeeTran upon completion for review and approval.

LeeTran may choose to observe, participate in, conduct, or repeat testing on any item to confirm the validity of the Vendor's test procedures and results. LeeTran may also perform, at its discretion, ad-hoc tests to ensure the quality of the system components. The Vendor shall provide appropriate access to support ad-hoc testing, if required.

Successful completion of a PAT on all equipment shall be a prerequisite for installation of that equipment at LeeTran facilities.

13.5 Integration Testing

13.5.1 Functional Unit Test

The purpose of the FUT is to demonstrate in a controlled laboratory environment that each of the system components and associated software furnished by the Vendor meet all functional requirements contained in these specifications prior to full system integration.

Successful completion of component-level software development and installation of production equipment in LeeTran test facility (see Section 13.3: LeeTran Test Facility) are pre-requisites for the commencement of the FUT process.

All FUT testing shall be conducted by the Vendor at the LeeTran test facility in the Lee County region.

FUT procedures shall be submitted to LeeTran for review and approval at least 60 calendar days prior to the scheduled FUT.

FUT functional and cycling tests shall demonstrate all base functions of the system components.

All device interfaces with the back office necessary to perform FUT may be simulated if the interfaces or back office software are not ready to be tested.

All media to be used in FUT shall be provided by the Vendor. The Vendor shall document, inventory, and track media usage during testing. Contactless media shall be the same or similar to those planned for revenue service.

LeeTran shall, at its discretion, assign staff or representatives to witness and/or audit the FUT process.

The Vendor shall be responsible for maintaining complete reports of all FUTs that are performed, showing each test conducted and the test results.

Results not meeting specification requirements shall be fully documented and explained by the Vendor, and a plan for corrective action shall be submitted.

All test reports shall be submitted to LeeTran at the conclusion of the FUT process for review and approval.

If at any time after FUT results have been approved and a design change is made, the performance of the modified system components shall be demonstrated as conforming to these specifications and the test results shall be resubmitted for LeeTran approval.

13.5.1.1 Devices

The FUT for devices shall cover the SAPs, DCUs, TVMs, TOTs, the inspection/validation device application, mobile sales devices, and shall include the tests described in this section. Successful completion of the testing requires no failures or discrepancies in the functionality agreed to at FDR.

The Vendor shall complete functional tests for all devices to verify the proper performance and operation of the devices. The Vendor and LeeTran shall jointly develop the structure, timing, and pass/fail criteria of the FUT.

After completing the device functional testing, the Vendor shall conduct device cycling tests, which shall consist of performing transactions using all media and transaction types.

Cycle testing shall be comprised of at least:

- 4,000 transactions each for SAPs, DCUs, and TVMs
- 2,000 transactions for TOTs and mobile sales devices

Subsequent to successful completion of the FUT process, the Vendor shall conduct an environmental cycling test. The environmental cycling test shall subject each type of device to a scaled down cycling test under the environmental extremes specified in the Section 17.7: Operating Environment to demonstrate the capability of the device to operate successfully under these conditions.

13.5.1.2 Back Office and Websites

The FUT for the back office tools and websites shall include the tests described in this section. Successful completion of the testing requires no failures or discrepancies in the functionality agreed to at FDR, and 100 percent accuracy of all data exchanges and display.

The Vendor shall complete functional tests for the back office tools and websites, which shall demonstrate and verify all functions described in these specifications, including review of all user-accessible screens and commands.

The Vendor shall conduct load testing on all relevant systems, including the websites, to ensure that the systems are capable of handling significant usage.

The Vendor shall conduct a comprehensive security assessment, including penetration testing, of the public and institutional websites with an independent third party.

Any required interfaces to external systems to demonstrate this functionality may be simulated.

The Vendor shall generate samples of all available reports as compliant with the designs approved at FDR for review and approval by LeeTran.

13.5.2 System Integration Test

When the FUT process has been successfully completed, the Vendor shall conduct a SIT. The SIT shall confirm, in a controlled laboratory environment, that when installed the fully integrated system shall perform, operate, and communicate as required.

The SIT is intended to demonstrate all device functionality and back office operation, monitoring, and reporting functions described in these specifications with full integration of the devices and back office, including all support systems. The SIT shall also test communications and data transmission over LeeTran and third-party networks, as required to complete the tests. With successful completion of the SIT, all software and configuration files shall be “frozen,” and the Vendor shall make no changes without LeeTran authorization.

The FUT process for all components and systems shall be completed and approved prior to commencement of the SIT.

All SIT testing shall be conducted by the Vendor at the LeeTran test facility in the Lee County region.

Prior to the SIT process, the Vendor shall complete setup of the LeeTran test facility, including the installation and configuration of all system components, the test facility back office, workstations required for back office operation, and all integration required in these specifications. The Vendor shall connect fare collection equipment to additional equipment or simulators, as necessary, to create a functional model of the system.

The Vendor shall submit detailed SIT procedures to LeeTran for review and approval no later than 60 calendar days prior to commencement of the SIT process. A software installation plan and system configuration diagram for LeeTran test facility shall be submitted as part of the SIT procedures.

For the SIT, the test system shall be provisioned with test data simulating the system’s operational databases under full operational load. Full operational load shall be defined in the SIT procedures, and approved by LeeTran prior to commencement of the SIT.

The Vendor shall conduct a series of detailed transactions and other operations that shall fully emulate a broad spectrum of usage and operating scenarios in sufficient quantity to ensure the validity of the test results. The Vendor shall provide a list of operating scenarios as part of the SIT procedures for LeeTran review and approval.

At a minimum, the SIT procedures shall include:

- 10 days of continuous testing of all system components, during which the components shall be operational 24 hours a day
- A minimum of 500 transactions at each system component type, including DCUs, TVMs, TOTs, the inspection/validation device application, and mobile sales devices, testing all transaction types
- A minimum of 100 transactions each performed through the CRM system, customer website, and institutional website, testing all available functions, payment types, and all passes in the tariff
- All alarm and boundary conditions tested at a minimum of 50 times each

Specifics of the SIT testing shall be included in the SIT procedures to be reviewed and approved by LeeTran.

The Vendor shall conduct data transmission testing during the SIT process to demonstrate, exercise, and verify transaction processing and data uploads from all devices, and the download of configuration data to each of the various device types. The Vendor shall confirm proper data transfer rates between all devices and systems.

The SIT shall demonstrate monitoring, configuration, and control of all field devices using the configuration management and monitoring management tools.

The SIT shall include database accuracy testing, which shall demonstrate the accuracy between the AUT (application under test) and the relational database in which application-generated data are stored. The testing shall also demonstrate atomicity, consistency, isolation, and durability of the database.

The SIT shall include a full system audit and settlement test, which shall demonstrate the flow of all transactions through the system with the appropriate reporting, accounting, and settlement calculations demonstrated.

The LeeTran test facility shall be connected directly to the merchant acquirer or any other processing entity to fully test the processing of purchases through all sales channels supporting credit/debit sales.

LeeTran shall, at its discretion, assign staff or representatives to witness and/or augment the SIT process. This could include providing ad-hoc test scripts to be undertaken by the Vendor and witnessed by LeeTran.

During the SIT, all software modifications shall be reviewed, demonstrated, tested, and approved by LeeTran. The Vendor shall record version information for all software modules including the date and time the software was created, size of each file, and version number.

The Vendor shall provide detailed test reports and “as-tested” software documentation at the conclusion of the SIT process for LeeTran review and approval.

13.5.3 Field Integration Test

Upon completion of the SIT process and initial field installation activities, the Vendor shall conduct a FIT wherein all devices, back office systems, websites, interfaces, and all other aspects of the system are exercised in what shall become the production environment. The FIT shall demonstrate that the system is ready to enter the acceptance testing phase.

Installation of the system components at LeeTran’s properties shall commence upon approval of the SIT. The entire production back office and at least 10% of the total install base for each type of equipment shall be fully installed and configured prior to the commencement of the FIT.

All FIT testing shall be conducted by the Vendor in the production environment in the Lee County region.

The Vendor shall submit detailed FIT procedures to LeeTran for review and approval no later than 60 calendar days prior to commencement of the FIT process. Pre-and post-installation checklists and test reports shall be included for all installed equipment as part of the FIT procedures.

For the FIT, the production system shall be provisioned with test data simulating the system’s operational databases under full operational load. Full operational load shall be defined in the FIT procedures, and approved by LeeTran prior to commencement of the FIT process.

Similar to the SIT, the Vendor shall conduct a series of detailed transactions and other operations in the FIT that shall fully emulate a broad spectrum of usage and operating scenarios in sufficient quantity to ensure the validity of the test results. All functional characteristics of the installed system components at each location shall be tested to ensure operation of the components as specified, including interfaces with the back office and integration with LeeTran systems.

At a minimum, the FIT procedures shall include:

- 20 days of continuous testing of all system components, during which the components shall be operational 24 hours a day
- A minimum of 500 transactions at each system component type, including DCUs, TVMs, TOTs, the inspection/validation device application, and mobiles sales devices, testing all transaction types
- A minimum of 100 transactions each performed through the CRM system, customer website and institutional website, testing all available functions, payment types, and all passes in the tariff
- All alarm and boundary conditions tested at a minimum of 50 times each

Final transaction volumes and specifics of the FIT shall be included in the FIT procedures to be reviewed and approved by LeeTran.

The FIT procedures shall identify and describe all necessary tests to verify proper installation and interfacing of the system components across all system facilities.

The Vendor shall conduct data transmission testing during the FIT process to demonstrate, exercise, and verify transaction processing and data uploads from all devices, and the download of configuration data to each of the various device types. The Vendor shall confirm proper data transfer rates between all devices and systems.

The FIT shall demonstrate monitoring, configuration, and control of all field devices using the configuration management and monitoring management tools.

The FIT shall include database accuracy testing, which shall demonstrate the accuracy between the AUT and the relational database in which application-generated data are stored. The testing shall also demonstrate atomicity, consistency, isolation, and durability of the database.

The FIT shall fully test all system redundancy measures and successfully demonstrate execution of the disaster recovery plan.

The FIT shall include a full system audit and settlement test, which shall demonstrate the flow of all transactions through the system with the appropriate reporting, accounting, and settlement calculations demonstrated.

The system shall be connected directly to the merchant acquirer or any other processing entity to fully test the processing of purchases through all sales channels supporting credit/debit sales.

LeeTran witnessing and participation shall be required for the successful completion of the FIT process. This could include providing additional test scripts to be undertaken by the Vendor and witnessed by LeeTran.

The Vendor shall submit all FIT reports to LeeTran for approval at the conclusion of the FIT process.

A 30-day settling period shall commence upon approval of the FIT reports.

LeeTran may, at its sole discretion, conduct additional ad-hoc testing during the 30-day settling period. Ad-hoc testing may include limited "friendly user" testing.

Installation of system devices may continue to occur throughout the 30-day settling period, but all devices shall be installed and tested prior to the start of acceptance testing.

13.6 Acceptance Testing

Acceptance testing shall include a pilot and the SAT. Both phases of testing shall be described in detail in an acceptance test plan developed jointly with LeeTran and delivered by the Vendor.

13.6.1 Pilot

Following the 30-day settling period, LeeTran shall conduct a 90-day pilot with one (1) or more stages using a limited and controlled user population to exercise all system functions, fare products, and policies. Pilot testing shall be planned with the Vendor and included as part of the Master Program Schedule.

At least 60 calendar days prior to the scheduled start of the pilot, the Vendor shall submit an acceptance test plan developed jointly with LeeTran that includes the structure, timing, and measurement criteria for conducting and evaluating the pilot.

The pilot shall not commence until the FIT has been approved and the subsequent 30-day settling period has passed.

All test data shall be purged from the system prior to the start of the pilot.

The Vendor shall commence reporting on all system performance requirements defined in the Section 14: Performance Measurement at the start of the pilot.

The pilot shall be designed to exercise all system functions, fare products, and policies in a phased approach. Successive phases shall not be undertaken until the previous phase has been completed successfully.

The Vendor shall be responsible for supporting all elements of the pilot including, but not limited to system and equipment maintenance, media distribution, funds settlement, reporting, and customer support.

Volume and stress testing shall occur during the 90-day pilot and shall include at a minimum the successful processing of an equivalent of 22 days of transactions at projected peak volumes. Transaction volumes and how they shall be generated shall be detailed in the acceptance test plan.

During the pilot period, LeeTran and the Vendor shall meet no less than two (2) times per week to discuss progress, issues, and results. The Vendor shall provide written status reports against established measurement criteria.

Each pilot stage shall undergo analysis, review, and approval of data integrity and system performance by LeeTran before moving to the next pilot stage. All critical issues shall be recorded and corrective actions taken prior to completion of the pilot.

If all phases are completed successfully, the pilot duration shall be no longer than 90 days.

The pilot shall continue for its scheduled duration unless a critical failure or failures cause suspension of the pilot (see Section 14.2.5: Critical Failures). When a critical failure has been resolved, the pilot shall resume for a duration determined by LeeTran, up to and including a full 90-day period.

13.6.2 System Acceptance Test

When the pilot is complete, the Vendor shall commence the SAT, which shall verify that the system and all provided equipment meet the system performance requirements specified in Section 14: Performance Measurement prior to Final Acceptance.

The SAT shall commence upon successful completion of the pilot.

The SAT shall be performed in the production environment with all components, subsystems, and networks completely operational, online, and in service.

The Vendor shall submit any revisions necessary to the acceptance test plan as a result of the pilot at least 10 calendar days prior to the commencement of the SAT for LeeTran review and approval.

The SAT shall be comprised of two (2) consecutive 30-day periods in which all system components shall meet or exceed all performance requirements defined in Section 14: Performance Measurement. The acceptance test plan shall describe in detail how the Vendor shall measure and report on each of the performance requirements throughout the SAT.

The level of system use during the SAT shall be decided by LeeTran and included in the acceptance test plan, and may range from a group of friendly users to unrestricted public use.

The Vendor shall be responsible for supporting all elements of the SAT, including but not limited to system and equipment maintenance, media distribution, funds settlement, reporting, and customer support.

If the performance requirements defined in these specifications are not attained during any one of the 30-day periods, the SAT shall be extended a minimum of 90 days to allow for two (2) consecutive 30-day periods in which the requirements are met.

The Vendor shall identify and implement remedial action at no cost to LeeTran in the event that a system component does not meet the specified performance requirements during the SAT.

During the SAT, LeeTran and the Vendor shall meet no less than two (2) times per week to discuss progress, issues, and results. The Vendor shall provide formal reports on system performance at the end of each 30-day period.

Periodically during SAT, LeeTran shall audit the reports generated by the system to confirm the accuracy and completeness of the information presented. All event records shall be reviewed and compared to known events such as door openings, alarms, and power outages.

Within 10 business days following the completion of the SAT, the Vendor shall provide all testing data, reports, and other testing information to LeeTran for review and approval.

13.6.3 Final Acceptance

Final acceptance shall designate the beginning of revenue service and the start of the warranty term (see Section 19.1: Warranty) for each phase of the implementation. Achievement of the Final Acceptance milestone shall be based upon the successful completion of the SAT and delivery of all contract-required work, equipment, and documentation, and is subject to written approval from LeeTran. LeeTran shall issue a certificate upon approval of the Vendor's request for Final Acceptance.

The Vendor shall submit a request for Final Acceptance upon completion of the SAT and determination that all work has been completed in accordance with these specifications.

Final Acceptance shall be contingent on satisfying all of the following conditions for each phase of the implementation. LeeTran shall grant Final Acceptance only when:

- The SAT has been successfully completed and approved by LeeTran
- All system devices are delivered, installed, and operational
- All back office systems and software, including all required reports and the data warehouse, are installed and fully functional
- All websites are live and fully functional
- All spare parts have been delivered
- Initial batches of fare media have been delivered and accepted by LeeTran
- All requisite contract deliverables, including all design documentation, have been delivered to LeeTran and accepted
- The disaster recovery plan has been successfully demonstrated and approved by LeeTran
- All required training has been provided and accepted by LeeTran
- All required intellectual property has been delivered to LeeTran
- Final resolutions to all identified critical issues (as classified by the Failure Review Board; see Section 14.2.2: Failure Review Board) are fully implemented and accepted by LeeTran

Once all requirements have been met, the Vendor may submit a formal request for Final Acceptance. LeeTran shall respond to the request within 10 business days.

Final acceptance for each phase of the implementation shall represent the formal start of revenue service and start of the warranty term.

13.7 Required Submittals

The following table displays items that must be submitted in advance of one or more design reviews.

Description	Submittal Due		
	CDR	PDR	FDR
Inspection and Test Documentation		X	X
LeeTran Test Facility Design	X	X	X
Factory Test Plan			X
Integration Test Plan			X
Acceptance Test Plan			X

14 Performance Measurement

The Vendor shall meet all the performance requirements contained within individual equipment and back office sections of these specifications in addition to those described throughout this section. The performance requirements described in this section are Key Performance Indicators (KPIs), all of which shall be measured and reported on by the Vendor starting at acceptance testing, and used as the primary criteria for the passing of the SAT and granting of Final Acceptance. The KPIs shall be measured and reported on by the Vendor throughout the operations and maintenance agreement, and failure to meet these requirements shall result in an assessment against the monthly operations payments made to the Vendor.

14.1 Key Performance Indicators

14.1.1 Equipment

14.1.1.1 Reliability

Equipment reliability shall be calculated as an equipment failure rate:

$$\text{Equipment Reliability} = \frac{\text{\# of Chargeable Failures}}{\text{\# of Active Pieces of Equipment}}$$

Chargeable failures are defined in Section 14.2.3: Chargeable Failures. Active pieces of equipment are defined as those deployed for customer and LeeTran use in the production environment, and do not include spares or test equipment.

KPI #	Device	Requirement	Measurement Period	Base Assessment
14.1.1.1-1	SAP	< 5%	Calendar Month	10%
14.1.1.1-2	Driver Control Units	< 5%	Calendar Month	10%
14.1.1.1-3	Ticket Vending Machines	< 20%	Calendar Month	10%
14.1.1.1-4	TOTs	< 10%	Calendar Month	10%

14.1.1.2 Accuracy

Equipment accuracy shall be based on comparing the quantity and value (where available) of transactions generated by the devices, as recorded within the device audit registers, to those received by the back office:

$$\text{Equipment Accuracy} = 1 - \frac{(\text{Equipment Audit Register Transaction Count} - \text{Back Office Transaction Count})}{\text{Equipment Audit Register Transaction Count}}$$

Both the transaction count and value calculations (where applicable) shall exceed the KPI requirement in order to pass.

KPI #	Device	Requirement	Measurement Period	Base Assessment
14.1.1.2-1	SAP	> 99.99%	Calendar Month	15%
14.1.1.2-2	Driver Control Units	> 99.99%	Calendar Month	15%
14.1.1.2-3	Ticket Vending Machines	> 99.99%	Calendar Month	20%
14.1.1.2-4	TOTs	> 99.99%	Calendar Month	20%
14.1.1.2-5	Inspection/Validation Devices	> 99.99%	Calendar Month	15%

14.1.2 Back Office

14.1.2.1 Accuracy

Back office accuracy shall be determined based on any incident where a device or back office generated transaction is recorded incorrectly within the associated system.

KPI #	System	Requirement	Measurement Period	Base Assessment
14.1.2.1-1	Account-Based Transaction Processor	< 2 incidents	Calendar Month	30%
14.1.2.1-2	Configuration Management	< 2 incidents	Calendar Month	20%
14.1.2.1-3	Revenue Management System	< 2 incidents	Calendar Month	30%
14.1.2.1-4	Data Warehouse	< 2 incidents	Calendar Month	20%
14.1.2.1-5	Monitoring Management	< 2 incidents	Calendar Month	20%
14.1.2.1-6	Media Inventory Management	< 2 incidents	Calendar Month	20%
14.1.2.1-7	Customer Relationship Management System	< 2 incidents	Calendar Month	20%
14.1.2.1-8	Reporting System	< 2 incidents	Calendar Month	20%
14.1.2.1-9	Website	< 2 incidents	Calendar Month	20%

14.1.2.2 Availability

Back office availability shall be calculated based on the total out-of-service hours for the associated system:

$$\text{Back Office Availability} = 1 - \frac{\text{Out-of-Service Hours for the Back Office System}}{\text{Total Operating Hours for the Back Office System}}$$

Out-of-service hours are defined as all hours during which the system is not in a fully operational (non-degraded) state as a result of a chargeable failure, and include all time necessary to respond and repair. Scheduled maintenance hours are excluded from the calculation. Total operating hours are defined as the number of hours in a day (24) multiplied by the number of days in the month of measurement.

KPI #	System	Requirement	Measurement Period	Base Assessment
14.1.2.2-1	Account-Based Transaction Processor	> 99.99%	Calendar Month	30%
14.1.2.2-2	Configuration Management	> 99.99%	Calendar Month	20%
14.1.2.2-3	Revenue Management System	> 99.99%	Calendar Month	20%
14.1.2.2-4	Data Warehouse	> 99.99%	Calendar Month	20%
14.1.2.2-5	Monitoring Management	> 99.99%	Calendar Month	20%
14.1.2.2-6	Media Inventory Management	> 99.99%	Calendar Month	20%
14.1.2.2-7	Customer Relationship Management System	> 99.99%	Calendar Month	20%
14.1.2.2-8	Reporting System	> 99.99%	Calendar Month	20%
14.1.2.2-9	Hosting Provider	> 99.99%	Calendar Month	30%
14.1.2.2-10	Website	> 99.99%	Calendar Month	20%

14.1.3 Operations

14.1.3.1 Server Authorization Rate

Server authorization rate shall be the percentage of transactions that are authorized by the ATP within the required definition of near real-time (see Section 2: System Architecture):

$$\text{Server Authorization Rate} = \frac{\text{Number of Server Authorized Transactions}}{\text{Number of Server Authorized Transactions} + \text{Number of Device Authorized Transactions}}$$

Transactions that occur when a device is offline are excluded from the calculation.

KPI #	Transaction Type	Requirement	Measurement Period	Base Assessment
14.1.3.1-1	On-board SAP	> 90%	Calendar Month	15%
14.1.3.1-2	TVM Validator Transactions	> 90%	Calendar Month	15%
14.1.3.1-3	Inspection/Validation Device Transactions	> 75%	Calendar Month	15%

14.1.3.2 Maintenance Response Time

Maintenance response time shall be determined based on the average time for the Vendor to respond to any maintenance incident reported by LeeTran or through the back office monitoring management tool that requires attention:

$$\text{Maintenance Response Time} = \frac{\text{Total Time to Respond to Reported Maintenance Incidents}}{\text{Number of Maintenance Incidents Requiring Attention}}$$

All incidents determined to require attention are to be included in the calculation, whether or not a failure is found or chargeable.

KPI #	Incident Type	Requirement	Measurement Period	Base Assessment
14.1.3.2-1	Account-Based Transaction Processor	0.5 hours	Calendar Month	20%
14.1.3.2-2	Configuration Management	2 hours	Calendar Month	10%
14.1.3.2-3	Revenue Management System	1 hours	Calendar Month	10%
14.1.3.2-4	Data Warehouse	1 hours	Calendar Month	10%
14.1.3.2-5	Monitoring Management	1 hours	Calendar Month	10%
14.1.3.2-6	Media Inventory Management	2 hours	Calendar Month	10%
14.1.3.2-7	Customer Relationship Management System	1 hours	Calendar Month	10%
14.1.3.2-8	Reporting System	1 hours	Calendar Month	10%
14.1.3.2-9	Hosting Provider	0.5 hours	Calendar Month	20%
14.1.3.2-10	Website	1 hours	Calendar Month	10%
14.1.3.2-11	System Outages	0.25 hours	Calendar Month	5%

14.1.3.3 Report Generation

Report generation shall be based on any incident where a canned report takes more than five (5) minutes to be generated. The requirement is based on report queries limited to one (1) year of historical data.

KPI #	Report Type	Requirement	Measurement Period	Base Assessment
14.1.3.3-1	Canned Report Generation	< 2 incidents	Calendar Month	10%

14.2 Performance and Failure Definition

14.2.1 General Requirements

The Vendor shall be responsible for measuring performance against all KPIs. LeeTran shall have access to the same performance measuring tools, and reserves the right to audit the measurement tools or process at any time.

System performance shall be measured using the data generated by the system and stored in the data warehouse. Data generated manually shall be used when it is the only option for tracking an activity associated with a particular KPI (e.g., response time).

The Vendor shall automate the capture of all necessary data and KPI calculation wherever possible. For validation purposes, LeeTran shall have full access to the source data and code used to perform the calculations.

The Vendor shall commence performance measurement during the pilot and continue to perform this activity throughout the operations and maintenance agreement.

14.2.2 Failure Review Board

A Failure Review Board (FRB) shall be established to determine, in the event of a dispute, which equipment and back office failures shall be chargeable against the performance KPIs. The FRB shall also assess the severity of failures during acceptance testing in order to make a determination on the successful completion of the pilot and SAT, the granting of Final Acceptance, and whether any fleet defects exist.

The FRB shall be established during the 30-day settling period prior to acceptance testing to evaluate equipment and back office failures, as well as other system issues, throughout acceptance testing.

The acceptance test plan submitted by the Vendor shall include a proposed FRB structure and system performance review process.

At a minimum, the FRB shall be comprised of LeeTran's project manager, or a designated representative, and the Vendor's lead engineer.

The members of the FRB shall attempt to settle any disputes based on the requirements in these specifications, and shall use best judgment in any scenarios where the requirements are silent or unclear.

LeeTran's project manager shall make the final and binding decision on any disputes that remain unsettled by the FRB after a period of 10 business days.

The FRB shall be responsible for the review and approval of the acceptance test plan, and shall agree to the criteria for the execution and approval of the acceptance test phases.

During acceptance testing, the FRB shall meet no less than weekly.

The FRB shall review all failures and other system issues that arise during the pilot and SAT to assess their severity (see Section 14.2.5: Critical Failures) and impact on the completion of these test phases.

Following both the pilot and SAT, the FRB shall make a recommendation on whether to approve or extend these test phases. Final discretion for the approval of acceptance testing and the granting of Final Acceptance shall reside with LeeTran.

Following Final Acceptance, the FRB shall continue to meet monthly for the remainder of the operations and maintenance agreement. During this time, the FRB shall be responsible for reviewing system performance and settling any disputes around measurement of the KPIs.

14.2.3 Chargeable Failures

A chargeable failure is a hardware or software malfunction where the delivered equipment or systems fail to perform or perform in a way that does not meet the requirements in these specifications.

Chargeable failures count against the system performance KPIs (see Section 14.1: Key Performance Indicators).

Chargeable failures include, but are not limited to, the following:

- A malfunction that prevents the system component from performing its designated function, or meeting the performance criteria, when used and operated under the environmental and operational conditions stated in these specifications
- A malfunction that might cause a threat to customers, employees, or others
- An occurrence that does not cause the system component to become entirely inoperable, but requires some form of maintenance attention to restore normal function
- Any occurrence where data is not successfully transmitted between elements of the system
- Software updates or fixes that adversely affect the operation or performance of the system
- Scheduled maintenance or repair activities that adversely affect the operation or performance of the system

The following specific conditions, at minimum, shall be considered chargeable failures in any components or systems delivered:

- Software anomalies and bugs (every incident of a software anomaly or bug causing a malfunction shall be considered a failure)
- Hardware failures that are not clearly a result of conditions outside the requirements of this specification
- Failures of mounting hardware
- Data storage failures, including those due to the disk space provided
- Partial or complete failure of a passenger display
- Failure to accurately read and/or process a card
- Failure to accurately issue fare media
- Failure to properly register and report any transactions
- Data download/upload failure
- Event or alarm transmission failure
- Unexpected shutdown of equipment or a system
- All maintenance requiring module replacements

Under mutual agreement, the FRB shall classify additional failures as chargeable or non-chargeable as required.

Chargeable failures shall affect the reliability, accuracy, and availability KPI calculations.

14.2.4 Non-Chargeable Failures

A non-chargeable failure is a malfunction caused by a condition external to the system component under consideration. A non-chargeable failure is not expected to be encountered during normal and correct operation of the system components.

Non-chargeable failures include, but are not limited to, the following:

- Mishandling of equipment or back office system components
- Any failures caused by externally-applied stress conditions outside of normal operating conditions and in excess of the requirements in these specifications
- Failures caused by incorrectly-exercised operating, maintenance, or repair procedures performed by LeeTran where correct procedures have been delivered by the Vendor (failures resulting from any maintenance or repair performed by the Vendor shall be chargeable)
- Failure caused by vandalism
- Communications failures beyond the control of the Vendor
- Downtime due to scheduled maintenance
- Dependent failures as a result of a non-chargeable failure

All other failures shall be considered relevant and chargeable unless determined to be non-chargeable by the FRB.

Non-chargeable failures shall not affect the reliability, accuracy, and availability KPI calculations.

14.2.5 Critical Failures

During the pilot and SAT, the FRB shall evaluate failures to establish their severity as critical or non-critical. Critical failures shall need to be resolved in order to approve the test phase and, in some cases, may result in an extension of the test phase.

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.

At a minimum, critical failures shall include incidents that produce a major or substantial business impact, or impact to normal operations, such as:

- Loss of revenue or added expense
- Significant negative customer experience
- Limited or loss of access to a back office application
- System operation at a degraded level, such that normal business operations cannot be conducted
- Application or system experiencing continual or repeated issues

At a minimum, non-critical failures shall include incidents that produce little or no business impact, or impact to normal operations, such as:

- Minor customer inconvenience
- System operating at a degraded level such that normal business operations are minimally impacted

14.3 Performance Reporting

The Vendor shall be responsible for reporting on performance against all KPIs on a monthly basis, at a minimum.

The Vendor shall create canned reports that can be run, viewed, and downloaded by LeeTran using the reporting system (see Section 7.9: Reporting System). These reports shall not count toward the custom reports to be defined by LeeTran.

At a minimum, the following reports shall be provided:

- Device reliability
- Device accuracy
- Device availability
- Back office accuracy
- Back office availability
- Server authorization rate
- Maintenance response time

The reports shall be generated without manual data entry by the Vendor, wherever possible.

The reports shall include tables and graphical charts showing the current and historical performance of each device under measurement.

The reports shall include a calculation of any assessments in the current month based on current and prior performance (see Section 14.4: Assessment).

The Vendor shall commence performance reporting during the pilot and continue to perform this activity throughout the operations and maintenance agreement.

14.4 Assessment

Assessments shall result from a failure to meet any KPIs identified as having an associated assessment (see Section 14.1: Key Performance Indicators).

A failure shall result in the percentage in the “Base Assessment” column being deducted from the monthly operations and maintenance agreement payments.

A failure to meet the same KPI for two (2) or more months in a row after a full failure has been reached shall constitute a persistent failure and result in a multiplier being applied to the assessment percentage.

The assessment multiplier shall increase by a factor of one (1) for each month that a KPI is not met, up to the full value of the associated maintenance payment (e.g., if a KPI is not met two months in a row, the assessment shall be doubled in the second month; if a KPI is not met three (3) months in a row, the assessment shall be tripled in the third month).

Successfully meeting a KPI shall end a persistent failure and reset the assessment multiplier.

The total assessment applied to a maintenance payment shall not exceed the full amount of the maintenance payment in that month.

Assessments shall not be carried over from month to month.

The Vendor shall be responsible for reporting on assessments in the system performance reports (see Section 14.3: Performance Reporting) and shall deduct assessments directly from any invoices submitted to LeeTran.

14.5 Required Submittals

The following table displays items that must be submitted in advance of one or more design reviews.

Description	Submittal Due		
	CDR	PDR	FDR
Performance Measurement Plan		X	X

15 Mobile Ticketing (Optional)

The Vendor shall provide a Mobile Ticketing Option (MTO) that includes a mobile device application to purchase/validate fares and a back office to manage the solution. The MTO shall integrate with the core FCS back office components and other modules as necessary.

15.1 Mobile Ticketing System Architecture

The MTO shall be developed and implemented under open architecture principles, complying with applicable communication, security, ADA, and accessibility standards, as well as allowing subsequent addition of functionality and unrestricted access to data.

15.1.1 Open Architecture

The MTO system shall be designed and implemented using an open architecture to provide flexibility as technology and LeeTran needs change.

The open architecture shall apply to the mobile ticketing application, system interfaces, and transaction formats used for the management, distribution, and inspection of fares.

There is a preference for the use of open source and cloud-based infrastructure and applications.

The Vendor shall develop, publish specifications for, and implement the use of APIs to support all system functions and interfaces between components.

The APIs, data formats, and associated specifications shall become the property of LeeTran or provided under an unrestricted, royalty-free license.

Each API shall be developed using modern architecture and formats (e.g., REST/JSON). The specific architecture and format shall be identified and agreed upon during the design review process.

The Vendor shall demonstrate use of the APIs as part of system testing and acceptance.

The Vendor (and, if appropriate, mobile ticketing subcontractor) shall perform API-specific testing, which shall be witnessed and validated by LeeTran representatives. Any changes to the APIs as a result of testing shall result in the API specifications being updated by the Vendor.

15.1.2 Compatibility

The MTO Application (App) shall be developed for both Android and iOS mobile platforms.

Operating System (OS) support shall include the current and the previous two (2) versions of the Android and iOS operating systems released at the time of design review.

The MTO App code shall be portable to alternative mobile phone platforms if LeeTran decide to support other platforms in the future.

LeeTran prefers the App to be developed using native development tools per OS.

As new OS versions and security updates are released, the Vendor shall provide updates that shall ensure compatibility and up-to-date security.

15.1.3 Environment

The MTO shall be able to operate within the varying indoor/outdoor environmental and lighting conditions associated with buses and bus stops.

In geographic areas without cellular service reception, or where service is intermittent, the App shall be able to purchase and display fares, and validate a fare electronically.

The MTO shall be scalable and extensible to support growth based on increasing customer adoption of the system.

The content of the MTO shall be able to be viewed in the App in English and Spanish.

All graphics and logos shall be in accordance with the graphics standards employed by and subject to approval by LeeTran.

The MTO shall be architected and designed to allow customer purchases in 15 seconds or less (initial purchase/account set-up may take longer) under normal cellular data connectivity conditions.

15.2 Mobile Ticketing Security

15.2.1 System Security

Data security for the App shall ensure that all data are safeguarded from unauthorized access or use, and programs are protected from any known cyber-attack or computer virus.

The MTO shall be able to detect and report any attempts to gain access to the system, whether authorized or unauthorized.

All personal and financial data, as well as the transmission of said data, shall be safeguarded from unauthorized access or use through the employment of strong encryption methodologies; e.g., AES, 3DES (officially known as the Triple Data Encryption Algorithm, or TDEA), etc., or similar technologies.

Measures shall be taken to ensure that any data stored on external devices, including users' mobile devices, shall not compromise any components of the MTO.

Further, the MTO shall employ ongoing fraud detection and monitoring through real-time analysis of MTO activity. These techniques shall help protect the data system from unknown cyber-attacks or computer viruses.

All data transmission between any parts or components of the MTO, as well as other outside servers shall be secured using Secure Socket Layers (SSL). SSL certificates shall be acquired from known and reputable certifying authorities.

Any key data that are stored on devices shall be encrypted using a high level of encryption (256-bit or higher); e.g., AES.

Username, passwords, and any other security credentials shall never be transmitted or stored as unencrypted text.

Passwords shall be stored using a high-level encryption; e.g., 3DES or AES, and should be both salted and hashed as per the U.S. Department of Defense regulations.

All data transactions, records, events, and alarms shall include identifiers for date, time, location, user, device, as well as other information required for the type of data being recorded.

The underlying technology of the MTO shall be kept up to date and all security issues shall be addressed as they arise. As applicable and as part of the ongoing MTO support, OS updates, software patches, bug notifications, and refinements to address identified security issues shall be provided.

Barcode images or other validation techniques (NFC, Bluetooth, etc.) shall be secured via encryption or another method to ensure the integrity of issued tickets, and the system shall utilize various features to minimize the risk of fraudulent tickets.

The MTO shall contain a variety of security features to allow applicable personnel to identify easily any visually invalid, expired, or fraudulent mobile tickets. The Vendor shall provide potential alternatives to help mitigate the risk of customers making on-board purchases or waiting to activate tickets upon the presence of inspection staff.

The transmission of all non-public data between the vendor devices, portals, and the MTO back end shall use HTTPS.

Within 24 hours of system downtime or discovery of a security breach, the Vendor shall notify the LeeTran Project Manager and/or designated Security Manager. Within five (5) days of the incident, the Vendor shall submit a detailed report to LeeTran that contains the scope of the problem, cause, and actions taken to prevent it from occurring again.

15.2.2 PCI Security

The MTO shall be implemented and operated in a PCI-compliant manner at all times. This may include utilizing architectures that minimize or eliminate the system being subject to the scope of PCI.

The entire MTO, all MTO applications that process payments, and all communications and computer systems comprising the entire MTO shall be fully compliant with all applicable PCI standards, guidelines, information supplements, etc., at the time of design approval (www.pcisecuritystandards.org). The Vendor shall provide, as part of recurring software maintenance, continual updates to maintain compliance as new versions of the PCI security standards are published.

The Vendor shall identify and notify LeeTran of any changes to the standards, which are instituted between the time of the NTP and implementation, and certify that its software meets these requirements.

The Vendor shall furnish documentation not more than 60 days after the NTP to provide full details for compliance with all aspects of applicable current PCI standards. Documentation shall include a statement acknowledging Vendor responsibility for securing cardholder data and a copy of the Vendor's Data Security Incident Response plan. The Vendor shall provide a third-party security assessment/validation by an authorized QSA.

If the Vendor's design removes certain components (e.g., customer application, Back Office systems, etc.) from the scope of the PCI, the Vendor shall furnish applicable documentation as part of its submission not more than 60 days after the NTP.

The Vendor shall notify LeeTran immediately in the event of any breach, or suspected breach, of system data.

The Vendor shall be responsible for demonstrating that all hardware and software are PCI DSS compliant, and for providing appropriate PCI DSS testing and certification of the system. In general, the approach to PCI DSS compliance shall include the practice of avoiding the storage of PII and bank card data on field devices whenever possible, and only storing or transmitting these data in an encrypted form.

The MTO hardware shall be fully capable of accepting contactless bank card payments in a PCI DSS and Contactless EMV-compliant manner.

15.2.3 Privacy

All customer PII data, as well as the transmission of PII data, shall be safeguarded from unauthorized access or use through the employment of strong encryption methodologies; e.g., AES, TDEA, etc., or similar technologies.

PII data shall be transmitted and stored separately from the fare transaction database. PII information shall not be associated or linked to sales or usage data in standard reports or data exports.

The mobile ticketing vendor shall describe a privacy policy and discuss the handling of PII.

All privacy elements shall comply with LeeTran privacy policies.

15.3 Mobile Ticketing Design

The MTO App shall employ a user interface that is based on industry-accepted user interface design standards, and consider ergonomics, human factors, and graphic design best practices to assist in development of the application layout and interaction.

The user display, instructions, and selection keys of the App shall be easy to read, understand, and use. All text shall have a high contrast color to its background to ensure easy legibility.

The App shall be designed to provide quick and easy customer-initiated transactions.

All selection keys and other hyperlinks in the App shall be accessible and responsive.

Screen layouts shall be constructed to minimize the likelihood that a user shall activate the incorrect key or more than one key with one touch.

The App shall follow the common user experience guidelines and adhere to LeeTran branding requirements. A common set of screens and style guides shall be used across all supported OSs.

The App shall follow the latest ADA and accessibility guidelines for each OS. Examples include the following but are superseded by the latest guidelines available at time of development:

- iOS apps:
 - Designing for iOS - <https://developer.apple.com/library/ios/documentation/userexperience/conceptual/mobilehig/>
 - iOS Developer Accessibility overview – <https://developer.apple.com/accessibility/>
 - Accessibility Programming Guide for iOS – https://developer.apple.com/library/ios/documentation/UserExperience/Conceptual/iPhoneAccessibility/Introduction/Introduction.html#//apple_ref/doc/uid/TP40008785
 - iOS screen reader accessibility verification – <https://developer.apple.com/library/ios/technotes/TestingAccessibilityOfiOSApps/TestingtheAccessibilityofiOSApps/TestingtheAccessibilityofiOSApps.html>
- Android apps:
 - Android Design - <http://developer.android.com/design/index.html>
 - Follow resources in the Android Developer Accessibility overview – <http://developer.android.com/guide/topics/ui/accessibility/index.html>

The App's interface shall allow customers to easily view all of their fare products. Order precedent rules, to be defined during the design review process, shall determine which fare products are used first and under which scenarios.

Customers shall be able to select their fare and rider type via drop down menus. Multiple quantities of different rider and ticket types shall be able to be purchased in one transaction.

All customer facing interfaces shall be designed to adhere to the aesthetic standards of LeeTran. All designs shall be submitted for review and approval.

15.3.1 ADA

The MTO App and all customer interfaces shall be in compliance with ADA standards. The system equipment shall comply with the most recent version of the ADA Accessibility Guidelines (ADAAG) at the time of Final Acceptance.

The Vendor shall submit documentation for review and approval, with descriptions and drawings of how each customer-facing device and system shall achieve ADA compliance.

The application shall be compliant with the Web Content Accessibility Guidelines (WCAG) 2.0 standard for usability.

15.4 Mobile Ticketing Distribution

The Vendor shall be responsible for offering and maintaining the MTO App in the appropriate app stores for both the iOS and Android mobile operating systems.

The Vendor shall be responsible for designing and developing the store content utilizing artwork and branding supplied and approved by LeeTran.

All submission and approval timelines shall be identified by the Vendor and approved by LeeTran prior to App submission.

LeeTran reserves the right to submit the MTO App under LeeTran-owned App store accounts.

The Vendor shall be responsible for making the MTO App available without using LeeTran resources or servers, and maintain updates during the duration of the contract.

15.5 Mobile Ticketing Features

15.5.1 Fare Products and Policy

The MTO App shall initially support all current fare products, and permit the addition, deletion, and modification of fare products by authorized LeeTran personnel through back office tools.

The App shall also support all current rider types and fare policies in the core fare structure specification (see Section 4: Fare Structure). The MTO system shall include the ability to accommodate other Reduced Rider Classifications specified in Section 4: Fare Structure.

The default fare set shall be associated with transit accounts that have an Adult rider classification. Additional rider classifications shall be able to be defined and associated with unique fare sets.

Rider classifications shall be able to be modified manually, or automatically based on customer date of birth or the granting of a temporary classification with a configurable end date.

Fare pricing shall be able to be configured based on the mode being travelled (e.g., bus or Passport). LeeTran shall be able to add new modes or participants (e.g., parking and bike share) with unique fare pricing as needed and without additional development.

The MTO shall support premium pricing for certain types of service (e.g., express bus). Service-based fare pricing shall be able to be configured for a single route or groups of routes.

The MTO shall support location-based fares, or the ability to price fares based on the location of payment (e.g., bus at specific stop locations). Location-based fare pricing shall be able to be configured based on the geolocation information captured from the MTO App.

The MTO shall support fare pricing based on the time of day and day of week (e.g., peak and off-peak fares). Peak/off-peak fare pricing shall be able to be configured for specific fare classifications, modes, and service types, and put into effect at all times or on a scheduled basis (e.g., every weekday).

The MTO shall support the offering of discounted fares on a temporary and permanent basis, up to and including the offering of free fares. Discounted fare pricing shall be able to be configured for specific fare media types, rider classifications, modes, service types, and routes, and put into effect indefinitely or for a defined period.

The MTO shall support stored value (or electronic cash) and fare capping, which shall limit charging of stored value above a predetermined configurable limit. The implementation of stored value/capping shall be determined during the design review process.

The Vendor shall work with LeeTran during the design review process to develop and submit a preliminary business rules document that describes the fare structure configuration to be deployed at launch. The final fare structure configuration shall be defined and documented no later than 90 calendar days before the start of acceptance testing.

15.5.2 Payment Processing

The payment methods that shall be accepted include Visa, MasterCard, American Express, Discover, and electronic benefits, as well as preloaded debit cards.

The App shall have the capability to accept other payment methods (PayPal, Google Pay, etc.) if desired by LeeTran.

For customers making payments with electronic benefits, they shall be able to use two (2) payment methods for a transaction.

Transactions shall be processed through a Vendor-provided gateway, and the Vendor shall be responsible for the development, testing, and certification of the interface to the acquirer/processor.

The MTO shall enable a nightly deposit of funds into LeeTran specific bank accounts.

LeeTran shall receive a transaction file of the transaction data every day for all payment transactions.

Customers shall automatically receive their receipt after purchase via email and/or SMS.

Refunds can be processed through the back office directly back to the original card used to make the purchase, if the transaction meets LeeTran fare policy rules.

The MTO shall use tokenization for all cardholder data. This shall include strong SSL for web interfaces and Internet Protocol Security (IPsec), Secure Shell (SSH) network protocol, and Pretty Good Privacy (PGP) encryption for Financial Institution interfaces.

The Vendor shall provide system diagrams for payment processing, including all gateways and processors used, and to document all fees.

15.5.3 Ticket Features

The MTO App shall initially support all existing fare products and pass types, and permit the addition, deletion, and modification of fare product parameters, including validity periods, business rules, and activation conditions.

When new fare products are added/removed by the agency, they shall be available on customer's apps within 72 hours of publication.

Customers can have more than one fare product on their mobile device at a time, and shall be able to navigate quickly and easily between them.

The App shall include the ability to upload photo IDs in order to verify reduced fare eligibility and other special programs. The ID/photo shall be accessible from the ticket view to show the bus/Passport operator.

Ticket design shall follow standards and best practices for mobile accessibility.

Ticket purchase and validation can occur offline.

Unused fare products shall automatically expire after a certain number of programmable days. LeeTran shall have the ability to adjust the expiration date. Customers shall receive a notification on their device and/or an email a configurable number of days before the expiration of their unused fare product(s).

Mobile fare products initially purchased shall not be immediately validated for riding. Customers shall have to scan the fare product at the SAP to make it valid. Upon activation, the relevant pass information, rider type, fraud prevention animation, and expiration information shall be displayed.

For the first three (3) minutes (or configurable period) after validation, unique features shall be visible, indicating a recently validated ticket, in order to deter customers from waiting for the presence of inspection staff to purchase and/or validate. The state of the ticket shall always be apparent on the ticket.

The MTO App shall be able to validate purchased tickets in an offline mode, and accommodate areas with intermittent or unavailable cellular coverage.

An active user account can only be active on one mobile device at a time. If the user of an active account attempts to sign in on a new phone, the MTO App shall prompt them that the account is already active on another phone, and the customer must transfer his account to the new phone via the app.

Customers may purchase multiple fare products in a single transaction. The products can be used individually or in groups. For example, after purchasing six (6) tickets, the customer can activate one ticket one day; three tickets another day; and then two tickets a different day.

15.5.3 Ticket Validation

The validation screen shall include standard proof of payment information including but not limited to pass type, activation date/time, expiration date/time, rider class, and other relevant fraud prevention information.

The validation screen shall also display a unique 2D barcode (Aztec or QR) for validation by SAPs. Animation shall continue to run in the background while viewing the barcode. If the screen is not at 100% brightness, it shall go to that setting to allow efficient scanning and then return to the previous brightness setting afterwards.

SAPs shall be able to validate fare products presented via the MTO App with no interaction from operators. It shall not require that LeeTran personnel touch customer devices. The response time from reading of the MTO barcode by the SAP to display of the result shall not exceed one (1) second.

The 2D barcode shall be dynamically generated and shall have the ability to automatically “refresh” periodically to prevent duplication or fraud. Information in the barcode shall be enough to verify electronically that the ticket is valid for travel. Possible data elements to embed in the barcode include but are not limited to:

- Account ID
- Account status
- Product type
- Rider class
- Activation time/date
- Expiration time/date
- Geolocation (latitude/longitude)

If the customer has more than one active ticket at a time, one scan can access information for all of the tickets, if necessary.

The system shall have a means to detect when the fare product is activated and be able to filter out multiple usages (e.g., the pass is opened multiple times at the same geographic location and within a short [configurable] time frame).

The MTO App shall support other forms of validation technology, including ISO 18092 (NFC) and Bluetooth Low Energy (BLE).

The Vendor must demonstrate NFC and Bluetooth validation capabilities and describe potential benefits and limitations.

The electronic validation technology shall be transparent to the customer and shall not require selection or additional complexity in the user interface.

15.5.4 Fraud Prevention

The App shall display unique animation(s) designed for LeeTran with interactive features to minimize the risk of fraudulent tickets through screenshots or other means. For additional protection, other elements of design (color, text, etc.) shall be dynamic.

At minimum, the mobile ticketing application shall support dynamic generation of barcodes and real-time validation of fares to prevent duplication or sharing of tickets.

The MTO shall support configurable rules to prevent the sharing of fares and accidental payments through passback, or a configurable time period in which a transit account shall not be accepted for payment at a device after an initial tap. Passback protection shall be able to be configured by fare product and rider classification, and shall be configurable in the back office.

All fraud prevention tools shall comply with agency security standards in addition to PCI and ADA compliance regulations.

In order to prevent misuse, an active user account can only be active on one mobile device at a time. If the user of an active account attempts to sign in on a new phone, the MTO App shall prompt them that the account is already active on another phone, and the customer must transfer his account to the new phone via the customer website.

15.6 Mobile Ticketing Customer Tools

15.6.1 Rider Tools

Rider tools in the MTO App shall include but are not limited to:

- Trip planning with option to use device's GPS for current location (The trip planner shall include features to provide a rich customer experience. Results of the trip plan shall include information about the fare required for that trip, and allow customers to purchase the fare.)
- Service disruption and security alerts
- Ability to sign up for custom alerts (agency, line, etc.)
- System maps and schedules available offline for bus system

Customers can view contact information for LeeTran, including customer service, law enforcement, app feedback, etc.

The App shall allow the customer to view an FAQ, App settings, terms and conditions, and device information.

If customers have to type in route names, the App shall use predictive text for suggestions.

The ability to include couponing, event branding, and advertisements in the App shall be possible. The Vendor should address how it could manage these possible features.

The App shall allow customers to provide feedback for the MTO App and suggestions for future improvements.

The MTO App shall also give customers access to customer service contact information.

15.6.2 Account Tools

The MTO App shall allow customers to transfer their account from one phone to another in case of a lost or new phone. All purchased fare products and transaction history shall transfer to the new phone and the old phone account shall be disabled.

The MTO App shall allow customers to manage their customer accounts and shall support the following functions, at a minimum:

- Create a new customer account
- View and manage account settings and customer profile
- Purchase fare products (e.g., stored value and passes)
- Add a funding source
- View transit account balance and status information
- View and download sales, usage, and adjustment transaction history
- Initiate a customer service request (e.g., refund request)
- Request an opt-out refund (e.g., close transit account)
- Opt-in and -out of email notifications
- Modify registration data
- Final MTO functions shall be determined during the design review process.

15.7 Mobile Ticketing Special Programs

15.7.1 Reduced Fares

The MTO App shall support the registration and purchase of reduced fares including Senior, Disabled, Youth, and other concession fares.

Reduced fare purchases may require an initial registration of the user account to validate eligibility before reduced fare purchases are allowed. For example, a senior customer shall have to input his unique Senior ID number in order to validate that his account is eligible to purchase reduced fares in the MTO App. Once used, that ID number can no longer be used to register another account.

The agency may provide a list of eligible reduced fare ID numbers in standard table format. The MTO back office shall store these eligible IDs and assign them to active accounts as they are registered. Once a valid ID number is used, it may not be used to activate another reduced fare account.

Eligible reduced fare IDs may be checked against other customer information to prevent fraud. For example, a senior ID may be associated with a customer phone number. If the mobile phone uses a different phone number, the App may choose to prevent the registration of that account as reduced fare. Verification of such customer information shall be determined during the design review process.

Depending on the reduced fare ID number, the App shall enable the purchase of the corresponding reduced fare. For example, if a valid college ID number is associated with a user account, that account shall have the capability to purchase college products.

The reduced fare registration process can occur during initial account creation or after the account has already been created.

Any personalization data, including name, photo, group name, expiration date, and other information, shall be uploaded during the reduced fare account registration process.

Once the account is registered as a reduced fare account, it shall maintain that status until an expiration date or other configurable parameter is met.

LeeTran staff shall have to ability to verify, remove, transfer, and create reduced fare IDaccounts through the back office. Bulk creation of reduced fare accounts shall be possible by uploading a spreadsheet database or files with reduced fare registration information.

15.7.2 Institutional Programs

The MTO shall support special fare programs, or institutional programs, with unique fare distribution channels, fare products, and business rules.

The MTO shall support the current range of special fare programs offered by current and future programs, including but not limited to:

- Paratransit (e.g., LeeTran Access) program
- U-Pass and other college programs
- Department of Education (DOE) and other school (K-12) programs
- Corporate and employer programs
- Government and military programs
- Social service agency programs

- Partner programs supporting transit-related services, including parking, bike share, and tourist transportation
- Special fare programs and their associated fare media, fare products, and business rules shall be defined during the design review process

Rider classifications associated with unique fare pricing shall be supported for special fare programs.

At a minimum, the following configuration parameters shall be supported to govern an institution's participation in special fare programs:

- Program type (e.g., direct load, post-bill, or media order-only)
- Available fare products and pricing
- Fare media and product ordering windows
- Payment type (e.g., prepay or invoice)
- Payment terms

The special fare program configuration parameters shall be set by LeeTran during registration of an institutional customer and shall be stored in the institutional customer account. Special fare programs and their associated fare media, fare products, and business rules shall be defined during the design review process.

Special fare programs shall include post-bill programs where the institution is invoiced based on the participants' actual usage of the system. For these programs, the participants' accounts shall be loaded with an unlimited-ride pass and the system shall calculate the amount due on a monthly basis using ridership data and pricing agreements.

Special fare programs shall include fare sales using pre-tax transit benefits funds. Products loaded through transit benefit programs shall be identified as such and segregated within the transit account to ensure compliance with all applicable IRS regulations.

The MTO shall support the migration of data from any existing databases used for the administration of special fare programs, including data on qualified schools, employers, government agencies, and social service agencies.

15.8 Mobile Ticketing Backend

15.8.1 Back Office

The agency shall have access to the MTO back office to view and analyze data; generate and run reports, audit transactions, manage and configure system parameters, administer and modify policies and products, and other general back office related functions.

The back office shall allow users to create, modify, and delete users as well as grant access to the different features of the back office.

Historical sales and transaction reports, real-time tracking by ticket type, rider type, time, zone, payment method, value, etc., shall be available.

Usage reports for electronic scans of tickets shall include data about geolocation, inspector ID, date/time, status of the ticket, ticket type, ticket ID, and customer ID.

Ticket management functions shall allow users to add, delete, or modify ticket types, tariffs, appearance and animation of tickets, as well as make other adjustments as needed.

The back office shall have the ability to send alerts to different groups for which customers sign-up. These would include line, promotions, etc.

The back office shall have the ability to create loyalty or discount programs.

Certain classes of users shall have access to real-time transaction/sales data in the back office.

Customer Service/Finance users shall be able to view customer transaction history and transaction status, and have the necessary tools to troubleshoot issues and process refunds.

A blocking feature shall be available to allow a customer's phone number to be blocked from using the App to purchase tickets in the future under certain circumstances such as repeated fraud.

The back office shall have the ability for Customer Service and/or Revenue departments to deliver a refund or a complimentary ticket electronically.

The MTO App and SAP audio and visual feedback shall be configurable by the agency utilizing a back office configuration tool. A common tool is preferred.

The MTO back office shall share as many components with the core FCS as possible, with a strong preference for a common back office modules and user interface.

15.8.2 Customer Service

The Vendor shall deploy a CRM module that provides central management for all customer data, customer service tools, and product ordering and refunds. There is preference for a web-based CRM solution.

The core function of the CRM module is to support customer service operations with a tool that provides a full transaction history and enables creation, viewing, and modification of customer service requests.

The CRM tool shall be supported by an isolated customer information database, which shall be fully compliant with all applicable PCI standards and with all agency, state, and local policies for the handling of PII.

The MTO CRM tool shall share as many components with the core FCS as possible, with a strong preference for a common back office modules and user interface.

15.8.3 Reporting

The MTO reporting tool shall share as many components with the core FCS as possible, with a strong preference for a common back office modules and user interface.

Backend reports shall yield the same results in revenue and ridership information regardless of report used; i.e., there shall be no discrepancies amongst any information reported.

The Vendor shall be responsible for providing a set of canned reports to be defined during system design. These reports shall include but are not limited to:

- Ridership reports
- Sales reports
- Financial clearing and settlement reports to ensure sales transactions clearly match transactions in the settlement report
- Maintenance reports
- Device and system performance reports

- Customer service reports
- Exception reports

The Vendor shall provide the ability to report on sales data, including:

- Sales per account
- Sales by Operating System
- Sales by ticket type
- Sales by location
- Sales by time/date stamp
- Sales by payment type

The Vendor shall provide for the ability to report on usage, including:

- Usage by location/route
- Usage by date/time
- Usage by ticket type
- Usage by Operating System
- Usage by account number

The reporting tool shall allow for reconciliation by the agency for all fare products sold and for all products used.

The reporting tool shall produce standard accounting reports that accurately capture deferred and recognized revenue, in both summary and detail formats, for each participating agency.

15.8.4 Hosting

The MTO solution shall be hosted by the core FCS's third-party "cloud" provider.

The third-party hosting provider shall provide all necessary hardware, software, database maintenance, security, technical support, and other hosting support services such that the MTO system is available at all times (24/7/365) per the performance metrics outlined below:

- The MTO shall be available to support all functionality requirements stated herein no less than 99.99% of the time, including scheduled maintenance, as measured over twelve (12) consecutive months, twenty-four (24) hours per day.
- During any single calendar month, the MTO shall remain available no less than 99.9% of the time, twenty-four (24) hours per day.
- Using these availability requirements, the MTO shall suffer cumulative outage times of no greater than sixty (60) minutes over twelve (12) consecutive months, and no more than forty-five (45) minutes in any single calendar month.

The third-party hosting provider shall meet or exceed the performance metrics outlined above.

Failure to meet the hosting performance requirements shall result in a 20% assessment against monthly maintenance fees, commensurate with the core back office performance assessment (see Section 14: Performance Measurement).

Any third-party “cloud” hosting costs shall be transparent and passed through to the agency without significant profit or markup.

15.9 Cash Payments (Mobile Ticketing Option)

The MTO App shall include the ability to pay fares with cash via a network of retailers with existing POS devices.

The cash option shall exist alongside credit/debit payment, and shall launch an interactive map of retail locations where customers can pay with cash.

After cash payment, the retailer POS shall immediately communicate with the back office to add the fare product to the customer account.

The Vendor may partner with a retail network provider or payment processor that currently offers cash payment options on mobile platforms.

All fees associated with cash payments shall be negotiated by and transparent to LeeTran.

15.10 Enhanced Trip Planning (Mobile Ticketing Option)

The Vendor may offer an enhanced trip planning tool that shall integrate with LeeTran scheduling and real-time arrival data.

The trip planning tool shall support open standards integration, including General Transit Feed Specification (GTFS) and GTFS-Realtime (GTFS-RT) data, first and last mile alternatives, wayfinding, etc.

The trip planner may include origin/destination route options with corresponding fare purchase options.

Integration with other transit and first/last mile mobility providers may be included in the enhanced trip planner.

15.11 Closed-Loop Virtual Cards (Mobile Ticketing Option)

The Vendor may offer a closed-loop virtual card that shall integrate with the FCS back office.

The MTO App shall include a payment credential that shall be virtualized on the NFC secure element of the mobile device and shall be supported once it is available in the industry.

The MTO App shall allow a customer to procure a mobile closed-loop credential through in-app provisioning without the need for a physical card. The MTO App shall also enable conversion of a physical credential if a card has already been procured by the customer.

The MTO App shall communicate with the SAPs via ISO/IEC 14443 and the back office to recognize, log, and report on the usage. The customer mobile app shall generate and transmit additional data that enable and support comprehensive reporting and analytics, including mobile platform information and geocoding.

16 Project Management

The Vendor shall establish a robust project management team and project management plan to support development and implementation of the Lee County FCS. The Vendor shall have sufficient project management

resources, ability, and experience to ensure that system design and implementation shall be properly coordinated and managed, and shall be completed on schedule and within budget.

16.1 Project Manager and Lead Engineer

The Vendor's Project Manager (PM) shall possess full authority to render project technical and commercial decisions on behalf of the Vendor. The Vendor's Lead Engineer shall possess a command of the systems and technologies that shall be utilized as part of the implementation, and shall participate in all meetings and preparation of deliverables that include content of a technical nature.

The Vendor shall designate responsible and experienced individuals to serve as the PM and Lead Engineer for the entire term of the contract. Both the PM and Lead Engineer shall maintain close collaboration throughout the project lifecycle.

The PM shall be fluent in English and possess at least seven (7) years of demonstrable, recent, and extensive experience managing electronic payment system projects of similar size and scope as the Lee County project, and that include multiple points of integration with third-party systems and devices.

The Lead Engineer shall be fluent in English and possess at least seven (7) years demonstrable, recent, and extensive experience serving in a lead technical role on electronic payment system projects of similar size and scope as the Lee County project, and that include multiple points of integration with third-party systems and devices.

The designated PM and Lead Engineer shall be subject to LeeTran review and approval.

The Lead Engineer shall be located in the Lee County region to provide daily onsite support beginning no later than 30 calendar days following NTP and continuing through Final Acceptance. Daily onsite support shall not be less than Monday through Thursday from the hours of 8am to 5pm.

The PM shall be located in the Lee County region to provide daily onsite management support from the beginning of Integration Testing (see Section 13: Testing) and continuing through Final Acceptance. Daily onsite support shall not be less than Monday through Thursday from the hours of 8am to 5pm.

Vendor staff consistency is important and key Vendor staff, including the PM and Lead Engineer, shall be assigned to this project throughout its duration, unless contractually released.

Removal or replacement of the PM or Lead Engineer by the Vendor shall require prior approval by LeeTran. The Vendor's request to remove or replace the PM or Lead Engineer shall be made in writing and include the reason for removal or replacement.

In the event that any key Vendor staff - Project Manager, Lead Engineer, Safety Engineer (see Section 16.3.6: Safety Assurance), or Quality Engineer (see Section 16.3.7: Quality Assurance and Control) - is found unacceptable by LeeTran, or needs to be replaced for any reason, the Vendor shall provide a replacement candidate within 30 calendar days. Replacement candidates shall be subject to LeeTran approval.

16.2 Project Meetings

The Vendor shall participate in regular project coordination and status meetings throughout the life of the project. Meeting topics may range from general project status updates to key discussions and decision-making.

16.2.1 Project Kickoff Meeting

The purpose of the project kickoff meeting is to allow all parties to understand the scope and schedule of the project, and to confirm expectations and responsibilities.

No later than 21 calendar days following NTP, the Vendor shall participate in a project kickoff meeting to be held at LeeTran offices.

The Vendor shall work with LeeTran to assemble an agenda for the meeting that covers the following topics at a minimum:

- Introductions of key LeeTran and Vendor points of contact
- Review of project roles and responsibilities
- Review of Vendor's scope of work
- Presentation of draft project baseline schedule
- Discussion of key risks or project concerns

16.2.2 Progress Review Meetings

Progress review meetings shall be held at LeeTran facilities on a monthly basis, at a minimum. Live video or teleconference meetings on a more frequent basis shall occur as required.

The Vendor shall prepare and submit an agenda at least five (5) business days prior to all progress review meetings for review and approval by LeeTran.

The topics to be discussed and reviewed shall include, but are not limited to:

- Minutes of the prior progress review meeting
- Updated master program schedule
- Updated Contract Data Requirements List (CDRL)
- Updated CDRL submittal list and schedule
- Updated action item log
- Updated issues list
- Progress since last meeting
- Issues arising since last meeting, including: design status, fabrication problems, product delivery problems, schedule slippages, and problems arising from proposed changes and other circumstances that 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 summary
- Contract budget, milestone payment, and invoice status and schedule
- Any needed corrective measures to maintain the project schedule
- Assessment, review, and update of the safety assurance program
- Assessment, review, and update of the risk management plan and risk register
- Any other issues related to the project

The discussion topics may vary depending on project needs and priorities. LeeTran may introduce new topics not listed here.

The Vendor shall prepare and submit to LeeTran a monthly progress report that addresses the following topics and serves as the agenda for the progress review meeting:

- Review and status of actions from previous meetings
- Updated master program schedule showing progress against the baseline schedule
- Status of all current key activities, upcoming activities, issues, and corrective actions
- Update of all identified project risks and the actions taken toward mitigating those risks, and an

- updated risk register
- Updated CDRL indicating current status of each CDRL element

The progress report may vary depending on project needs and priorities. LeeTran may request other items not listed here.

The Vendor shall be responsible for documenting minutes for all monthly progress review meetings, and submitting those minutes for LeeTran review within three (3) business days following each meeting.

16.2.3 Project Coordination Meetings

The purpose of project coordination meetings is to provide a standing forum for items and topics to be discussed, and decisions that need to be made that cannot be held until monthly progress reviews. Other ad-hoc meetings may also be necessary to facilitate project delivery.

Project coordination meetings shall be held on a weekly basis, at a minimum.

The Vendor shall prepare and submit an agenda at least two (2) business days prior to all coordination meetings for review and approval by LeeTran.

The Vendor's Lead Engineer shall be present during all coordination meetings. The Vendor's PM and other designated staff may participate remotely in weekly project coordination meetings as required. The Vendor shall have a videoconferencing application for those participating remotely.

The Vendor's Lead Engineer, PM, and other designated staff shall participate as required in other ad-hoc meetings to facilitate project coordination and decision-making.

The Vendor shall be responsible for documenting minutes for each coordination and ad-hoc meeting, and submitting those minutes for LeeTran review within three (3) business days following each meeting.

16.3 Project Management Plan

The Vendor shall submit a comprehensive project management plan (PMP) that details project organization, including schedule, risk, safety, quality, and change management, and all other aspects of the project specified in this section.

The PMP shall be submitted no later than 21 calendar days following NTP, and shall be subject to LeeTran review and approval.

The PMP shall include but is not limited to the following elements:

- Organization chart identifying key project personnel and contact information
- Master program schedule, identifying key program milestones and activities
- Schedule for all project design and manufacturing elements that require LeeTran approval
- Project meeting schedule
- Methodology to control program schedule, scope, cost, and risk
- Project risk management processes and risk register, including identified project risks and actions required to mitigate them
- Transition and change management processes and procedures
- Safety processes and procedures
- Quality assurance processes and procedures to ensure that the requirements of the contract are being met
- Subcontractor management and communications
- Document and Master Issues List (MIL) control processes and procedures (see Section 16.3.9: Document

- Control and Section 16.3.10: Master Issues List), including version and traceability controls
- Configuration management processes and procedures for all submittals and subsequent revisions

Additional elements of a PMP may be proposed or requested, but the PMP shall meet the requirements in this section at a minimum.

16.3.1 Master Program Schedule

The master program schedule shall identify all program activities and key milestones, along with expected and actual completion dates.

The master program schedule shall be cost-loaded and developed using Microsoft Project, Primavera, or LeeTran-approved equivalent.

The Vendor-developed master program schedule shall be incorporated into the LeeTran-maintained program schedule.

The listing of activities in the master program schedule shall be in sufficient granularity and detail to identify all predecessor and dependent activities, including the activities of other entities that impact the Vendor's delivery of the system.

The master program schedule approved by LeeTran shall become the baseline schedule, against which subsequent schedule updates shall show performance.

The master program schedule shall designate intermediate program milestones and target dates to track ongoing performance.

The Vendor shall update the master program schedule on a monthly or more frequent basis as requested by LeeTran and submit the updated schedules for LeeTran review and approval.

16.3.2 Scope Management

As part of the PMP, the Vendor shall provide a scope management plan that shall guide how project scope shall be defined, documented, verified, managed, and controlled by the project management team. This plan shall include:

- Scope definition: A process to prepare detailed project scope statements based on the preliminary project scope
- Creation of a Work Breakdown Structure (WBS): A process that establishes how the WBS shall be maintained and approved
- Scope Verification: How formal verification and acceptance of the completed project deliverables shall be obtained
- Scope Control: A process to control changes to project scope directly linked to integrated change control (see Section 16.4: Change Control)

16.3.3 Cost Management

As part of the PMP, the Vendor shall include a cost management plan that clearly defines how the costs of the project shall be managed throughout the project lifecycle.

The cost management plan shall set the format and standards by which the project costs are measured, reported, and controlled. It shall identify who is responsible for managing costs and who has the authority to approve changes to the project or its budget.

The cost management plan shall also specify how cost performance is quantitatively measured and detail cost report formats, frequency, and to whom they are presented.

16.3.4 Risk Management

The PMP shall include a risk management plan that describes the processes that the Vendor shall follow to identify and manage potential risks that threaten to increase project costs, lengthen the project schedule, or compromise project performance.

The Vendor shall ensure that the risk management plan addresses risk planning, risk identification, risk analysis, and risk control. It shall be reviewed and updated on a monthly basis at a minimum, or as requested by LeeTran.

The processes that the Vendor shall follow for mitigating risk from the project shall be identified, along with the processes for identifying, evaluating, and reporting (i.e., to LeeTran) future risks.

The processes for developing and implementing corrective action plans to lessen the impact an unexpected event has on the project shall be identified, as shall the process for returning the project to steady state.

The Vendor shall maintain a comprehensive program risk register comprised of data fields including, but not limited to: Risk Title, Risk Statement, Risk Owner, Risk Status, Risk Consequence, Probability Score, Impact Score, Initial Risk Rating, Current Risk Rating, Mitigation Approach, Mitigation Status, and Due Date. Regular updates to the risk register shall occur as part of scheduled project meetings.

16.3.5 Transition and Change Management

The Vendor shall include a transition and change management plan as part of the PMP for review and approval by LeeTran.

The Vendor shall detail a transition plan from current operations to the new system for LeeTran, as well as for external stakeholders and the public.

The transition and change management plan shall document critical changes to program stakeholders, as well as change management and risk mitigation procedures.

The transition and change management plan shall document the transition process, including any additional, temporary, or special equipment and/or staffing requirements.

16.3.6 Safety Assurance

The Vendor shall include a safety assurance plan as part of the PMP that identifies all safety processes and procedures for review and approval by LeeTran.

The safety assurance plan shall identify and document safety risks, owners, and mitigation plans throughout the project, and shall be reviewed and updated on a monthly basis, at a minimum, or as requested by LeeTran.

The Vendor shall designate an experienced Safety Engineer to be responsible for safety assurance over the entire term of the contract.

The designated Safety Engineer shall be subject to LeeTran approval.

The Safety Engineer shall document, review, and approve all system safety analyses to ensure that all hazards are adequately identified and their impact is eliminated or controlled.

The Safety Engineer shall verify that all Vendor staff is trained in LeeTran-required safety policies and procedures, and that those procedures are followed to the satisfaction of LeeTran.

16.3.7 Quality Assurance and Control

As part of the PMP, the Vendor shall establish, implement, and maintain an effective QA/QC program to manage, control, and document the work performed, and ensure that it complies with the requirements of the contract.

The Vendor shall designate an experienced Quality Engineer responsible for quality assurance over the entire term of the contract.

The designated Quality Engineer shall be subject to LeeTran approval.

As part of the PMP, the Vendor shall establish, implement, and maintain a QA/QC program governing the work performed by the Vendor, as well as all subcontractors.

The QA/QC program shall include written descriptions of quality assurance and control policies and procedures, including the procedures that the Vendor shall follow to ensure that controls and detailed documentation are maintained throughout software development and configuration changes.

The QA/QC program shall contain a collection of all forms to be used for the documentation of quality control activities, which ensure compliance of materials, processes, personnel, and products with the applicable specifications.

The QA/QC program shall at minimum include procedures for the following activities:

- Surveillance over all work, including by subcontractors, to ensure compliance with all contract requirements
- Verification of compliance, including audit; discrepancy identification, notification, and control; and corrective action
- Evaluation and assessment of subcontractors' QA/QC programs
- Provision of technical documentation, drawings, specifications, handbooks, manuals, data flow diagrams, and other technical publications for the new system and supplied equipment
- Design control and version management for changes to documents, drawings, data, and specifications
- System software development (consistent with IEEE Standard 730 or equivalent ISO 9001 standards for software quality assurance)
- Equipment handling, inventory, storage, and delivery
- Factory inspection and testing
- System integration testing
- Installation testing
- Calibration/verification of measuring equipment
- System configuration management
- Qualification and certification for all personnel performing work under the contract

The Vendor shall use the defined quality assurance procedures as an integral part of its design development and review process.

The Vendor shall identify design variances from contract requirements and document and report variances to LeeTran before equipment procurement, fabrication, or installation.

The QA/QC program shall define methods of designing for, achieving, and maintaining quality. If damage, defect, error, or inaccuracy is found in any provided equipment or work, LeeTran shall have the right to reject or require corrective action to bring the work into compliance with the contract requirements. The Vendor shall bear all costs incurred in correcting rejected equipment or work.

The Vendor shall not commence performance of any design or manufacturing work until LeeTran has approved the QA/QC program.

16.3.8 Subcontractor Management

The PMP shall include a subcontractor management plan outlining all activities to be performed by subcontractors and procedures for organizing and communicating with subcontractors.

The Vendor shall provide all necessary plans, specifications, and instructions to its subcontractors and suppliers to enable them to properly perform their work.

The Vendor shall ensure that subcontractors and suppliers are informed of all applicable requirements in this specification and that appropriate engineering and project management tools are utilized for coordination and communication.

The Vendor shall have all subcontractors and suppliers available when required for meetings, testing, and resolution of design deficiencies, production problems, and similar situations. During all phases of the project, LeeTran shall have access to all subcontractors.

The subcontractor management plan shall include activities to be performed by Disadvantaged Business Enterprises (DBEs), and other recognized subcontractor categories, as defined by the U.S. Department of Transportation. It shall identify the contract revenues to be allocated to such firms and the means of encouraging, tracking, and controlling DBE participation throughout the project.

The subcontractor management plan shall include procedures and processes to be followed for the replacement of any subcontractors throughout the duration of the contract.

16.3.9 Document Control

The PMP shall include a communications management and document control plan outlining who is responsible to deliver and respond to various communications, who receives which communications, and how and when communications shall be delivered.

The Vendor shall ensure that stakeholder communication needs are understood. This includes determining what communication products shall be exchanged over the course of the project (e.g., status updates, meeting minutes, reports, deliverables, etc.).

The Vendor shall store and maintain all program documents, manuals, meeting materials, submittals, and correspondence in an editable electronic form with a LeeTran-provided document control system to provide robust and secure document control, as per the terms of the contract. The LeeTran-provided document control system shall be set up with appropriate access configuration within 21 days of NTP.

Program documents shall be categorized and numbered within the document control system according to an established document control scheme.

16.3.10 Master Issues List

The Vendor shall maintain an electronic MIL for the ongoing tracking and management of project issues and action items.

MIL items shall be identified and updated at design review meetings, project coordination meetings, progress review meetings, and on an ad-hoc basis.

The MIL shall track the following attributes for each entry, at a minimum:

- Item number
- Date opened
- Requesting party
- Description
- Required action
- Assigned party
- Status (open/closed/in progress/deferred/etc.)
- Date closed

Other attributes may be required by LeeTran. No action items shall be assigned to LeeTran without LeeTran's knowledge and consent.

16.4 Change Control

Throughout the contract, the Vendor shall implement and maintain a change control process that encompasses the entire system, including all Vendor- and subcontractor-supplied equipment and software. To maximize the efficiency of the design process, the Vendor and LeeTran shall mutually agree upon a date for design freeze, after which the change control process shall go into effect. The date shall be chosen to reflect a point in time when the design of the system is substantially complete.

The Vendor and subcontractors shall not be required to submit every in-process change to LeeTran for review and approval prior to the design freeze date. This does not, however, relieve the Vendor and subcontractors from meeting any other submittal requirements in these specifications.

16.4.1 Change Control Process

The Vendor's change control process and procedures shall be documented in a change control plan and shall include provisions for LeeTran review and approval of all changes.

Hardware and software changes, and updates to approved documents, drawings, and data, shall be controlled through Engineering Change Requests (ECRs).

ECRs shall include documentation describing the reasons for and effects of the change, and shall be submitted to LeeTran for review and approval.

Accompanying each ECR for proposed software changes shall be comprehensive software release notes containing the following information, at a minimum:

- A description of the change, including identification of ticket number addressed by the change
- Affected equipment and modules
- Impacts/consequences of not accepting the change
- List of the software modules updated by the release, including file names, version numbers, sizes, and checksums
- List of all defects corrected, including references to LeeTran correspondence, where applicable

- List of all new features included, including identification of expected impact on system, users, and LeeTran
- List of all features to be tested
- Copies of all applicable test procedures
- Risk assessment
- Complete installation instructions, including steps to verify proper installation and to uninstall the updates, if necessary
- Complete build instructions
- List of software tools used
- Back-out procedures if the software fails to update
- System monitoring plan to assess performance after deployment

Other software release note elements may be requested by LeeTran.

Upon approval of the ECR, the Vendor shall install the proposed software change in the LeeTran test facility to undergo verification of new features and fixes, as well as regression testing. Upon successful verification, LeeTran shall authorize the Vendor to deploy the software change according to an approved deployment plan.

Following equipment installation, approved ECRs shall generate Field Modification Instructions (FMI) that describe the process to update installed equipment and systems. FMIs shall require LeeTran review and approval prior to implementation.

An FMI shall include the following, at a minimum:

- Cover sheet
 - Unique FMI number
 - Title of FMI
 - Equipment/systems affected, including spare parts (quantity, model, serial number)
 - Implementation location
 - Signoff provisions for implementation
- Procedure
 - Step-by-step implementation process
 - Inspection procedure
 - Testing procedure
- Supporting documentations
 - Underlying ECR(s)
 - Affected documents and drawings, including any change to manuals and catalogs

The Vendor shall be responsible for all FMIs, even if the FMI is not performed directly by the Vendor. The Vendor shall approve subcontractor FMIs before submitting them to LeeTran.

The Vendor shall be responsible for maintaining an engineering change status report that lists all changes, their submittal/approval status, implementation status, and expected/actual completion dates.

16.4.2 Hardware and Software Versioning

Throughout the performance of this contract, the Vendor shall adhere to the hardware and software quality and version control procedures submitted and approved as part of the QA/QC program described in the Section

16.3.7: Quality Assurance and Control. The version identifiers for all provided hardware and software shall be unique.

After completing an approved hardware update, the Vendor shall submit an updated listing of the serial numbers and versions of the affected hardware components in a LeeTran-approved format. This listing shall include the date that the revision was applied to each item.

Throughout the hardware warranty period (see Section 19.1: Warranty), the Vendor shall maintain accurate records of the versions of all serialized components, including all spare parts in inventory and shall track all equipment taken from spares so that it can be replaced by the Vendor.

16.5 Required Submittals

The following table displays items that must be submitted in advance of one or more design reviews.

Description	Submittal Due		
	CDR	PDR	FDR
Project Management Plan ⁸	X	X	X
Change Control Plan		X	X

17 Design Requirements

17.1 Service-Proven Design

Software and hardware provided under this contract shall be designed to provide a minimum useful life of 12 years.

The system design shall be service-proven. As service-proven, or derived from a service-proven design, the system design shall meet all of the following criteria:

- Has been deployed and met system acceptance requirements at a minimum of one (1) transit agency with a bus system with TVMs
- Has been deployed and met system acceptance at a minimum of one (1) transit agency with a bus vehicle fleet
- Has been deployed and successfully integrated frontend equipment with a back office system at a minimum of one (1) transit agency
- Has been deployed and achieved a level of reliability, accuracy, and availability consistent with the performance requirements in these specifications at a minimum of one (1) transit agency

DCUs and associated onboard equipment shall be nearly identical in design and construction to a model deployed and in revenue service (i.e., in use and passed system acceptance) at a minimum of one (1) transit agency.

Proposed TVMs shall be nearly identical in design and construction to a model deployed and in revenue service (e.g., in use and passed system acceptance) at a minimum of one (1) transit agency.

Proposed TOTs shall be nearly identical in design and construction to a model deployed and in revenue service (i.e., in use and passed system acceptance) at a minimum of one (1) transit agency.

⁸ NTP + 21 Calendar Days
LeeTran Fare System Specifications

To establish a design as service-proven, the Vendor shall submit specific details of the design's application history, certified by current users of the equipment.

The Vendor may offer, for approval, a design that is largely unchanged from a service-proven design, but which varies slightly in design or manufacture to meet the requirements of these specifications, including newer generations of service-proven equipment. The Vendor shall show, in detail, what has been changed and why such changes shall not adversely affect operation or maintenance in the planned environment.

17.2 Non-proprietary Technology

At the time of delivery, equipment and all associated components and software shall not contain non-standard, prototype, obsolete, or discontinued products. Any hardware or software components that have an end-of-life within this project timeline shall include replacement plans to be executed at the Vendor's cost.

Software applications and devices shall be built using COTS components where possible, and custom software and hardware modules only if necessary.

The system shall be designed using open standards for software design, communications protocols, fare media, and other relevant design components. The system shall adhere to all open architecture requirements in Section 2: System Architecture.

Smart card media shall be available for competitive purchase from multiple U.S. sources. The Vendor shall provide the specifications and associated documentation necessary to support the future procurement of smart card media from third parties.

The system shall have a modular design for all relevant components. These modules shall support field replacement to return a device to service in minimal time in the event of a failure. The system shall also permit upgrades and configuration changes without requiring component replacement or redesign.

All devices, components, parts, modules, assemblies, and subassemblies provided shall be fully interchangeable among those of the same type without the need to make adjustment for proper compatibility.

The system shall be designed so that incorporating technology upgrades may be done with no or minimal redesign of components, modules, software, or other work.

The system shall adhere to all of the general system requirements in Section 2: System Architecture.

17.3 Supply and Availability

The Vendor shall furnish equipment and materials from the manufacturers identified in the Vendor's submittals, unless otherwise approved.

If it is found that approved sources do not furnish a uniform product, or if the product from such source proves unacceptable per the requirements in these specifications, the Vendor shall, at no additional expense to LeeTran, take any and all steps necessary to furnish acceptable materials.

The Vendor shall select and supply devices, components, parts, modules, assemblies, and subassemblies, as well as software and other essential elements of the system, based on projected availability and long-term OEM support commensurate with the required useful life of the system.

All devices, components, parts, modules, assemblies, and subassemblies shall be available for purchase for a minimum of 12 years from Final Acceptance.

If any vital device, component, part, module, assembly, or subassembly, or support for OEM software, is being discontinued or obsoleted by the Vendor or OEM, the Vendor shall notify LeeTran a minimum of 90 calendar days prior to the last available date of purchase or support.

The Vendor shall work with LeeTran to find or develop a suitable replacement for any device, component, part, module, assembly, subassembly, or software that is obsoleted by the Vendor or OEM. If the Vendor chooses to obsolete any Vendor-provided equipment or software within 12 years from Final Acceptance, all hardware and software development costs necessary to support a replacement shall be borne by the Vendor.

17.4 Materials and Workmanship

All components of the system shall be constructed of the highest quality materials suitable for production-level use in the intended environment over the required useful life of the system. The Vendor shall use only new components conforming to the requirements of these specifications and approved by LeeTran. This does not preclude use of recycled materials in the manufacture of new components.

The Vendor shall be responsible for all materials and workmanship. It is the Vendor's responsibility to design, select, and apply all materials necessary to meet the requirements of these specifications. If alternate materials are offered following selection, it is the responsibility of the Vendor to demonstrate that the alternate materials are equivalent to the proposed materials, and to obtain LeeTran approval for the substitution prior to any implementation.

All system provided equipment shall be free from safety hazards and shall be designed to comply with relevant Underwriters Laboratories (UL) standards. All interior and exterior surfaces shall be free from sharp edges, protrusions, exposed wires, or other hazards.

17.5 Software Design Principles

The Vendor shall supply all necessary software applications and shall design and configure all device and back office software applications for optimal system performance. The Vendor shall install all software that is necessary for system operation and to successfully meet the operational and performance requirements in these specifications.

System software shall incorporate the following design elements, at a minimum:

- Be developed using a non-proprietary, hardware architecture-independent programming language
- Compiled with a commercially-available compiler and commented in English
- Include provisions for setting and verifying date and time, with automatic adjustments for leap year and daylight savings time
- Be fully integrated with the operating system to support all required functions of the applications in both a networked and a stand-alone environment
- Not utilize or employ hard coding of configuration parameter values, except where expressly permitted
- Be fully debugged, documented, and include all approved revisions introduced up to the time of Final Acceptance
- Be portable to other software platforms or languages where possible
- Utilize object-oriented programming or equivalent programming methodology that encourages software reuse and minimizes development time

System software shall incorporate the following controls, at a minimum:

- Allow for the distribution of software modifications to all system devices from the back office without field intervention or component replacement

- Be fully version-controlled, with the ability to revert to a previous software version or fork
- Support audit of activity to show when and what changes were made from version to version
- Be designed using best practices that allow for OS and database patches and upgrades to be applied with minimal testing

System software shall incorporate the following diagnostic capabilities, at a minimum:

- Sample all input conditions at rates sufficient to detect and remedy all unsafe or damaging conditions in the shortest possible time
- Perform self-diagnostic routines and respond promptly and predictably to detected faults
- Respond predictably when powering up or recovering from power interruptions
- Permit thorough interrogation of all input, output, and internal conditions by external diagnostic equipment
- Provide error codes that contain easily understood explanatory text and include the manner in which the error can be corrected

Software upgrades shall be centrally managed and fully tested prior to installation. The system shall be able to roll-back to previous software versions without adversely impacting operations.

All third-party software shall be at the latest commercial release at the time of FDR. If a release candidate is pending, LeeTran shall review and approve the version that shall be deployed.

17.6 Maintainability and Serviceability

System equipment shall provide reliable operation over its design life, and shall be designed to require minimal scheduled and unscheduled maintenance.

The interior of the system equipment shall be designed to allow easy and safe access. Adequate space shall be available to insert keys; grasp, lift, and turn internal components; and remove and replace components, connections, and consumables. As appropriate, guides, rails, tracks, handles, and captive fasteners shall be provided to facilitate module installation and removal.

Any component or module that must be lifted (except for cash containers when full) shall not weigh more than 20 pounds. Any exceptions to this weight limitation shall be subject to LeeTran approval.

For ease of service and replacement, all electrical connections between components and subassemblies shall be established by means of connectors that allow rapid removal of a component or subassembly. Plug-in connectors shall be equipped with strain relief to prevent damage to cables and connectors.

Components requiring frequent adjustment or maintenance shall be conveniently located and designed to facilitate access and adjustment utilizing tool-free techniques wherever possible. The replacement of field devices or components shall be quick and secure.

Automatic diagnostic test routines (and equipment if necessary) shall be included to aid in troubleshooting malfunctions. These test routines shall provide the ability to isolate defects down to the LLRU.

All devices shall have clear labels and symbols that at a minimum indicate safety warnings, servicing steps, and wiring connections.

No more than one (1) person shall be required to perform corrective maintenance on an individual piece of equipment.

The Vendor shall provide documentation during PDR that defines:

- Preventative Maintenance frequency for all system devices based upon time and transactions
- A list of all Preventative Maintenance tasks to be performed, including a brief description of the work, and any parts, materials or other components required
- Time required to complete each defined Preventative Maintenance task
- Which Preventative Maintenance tasks require tools to complete, and which can be performed as “fingertip maintenance”

The time for entry into a device, removal and replacement of the device or a device module, and restoration of the device to an operating condition shall take no longer than the following:

- SAP – seven (7) minutes
- DCU – seven (7) minutes
- TVM – 20 minutes
- TOT – 15 minutes

During PDR, the Vendor shall provide documentation that clearly defines maintenance tasks that can and cannot be completed onsite within these time parameters.

17.6.1 Component Identification

The Vendor shall develop and submit for LeeTran review and approval an equipment identification and labeling plan that identifies how the deployed FCS shall comply with the requirements in this section.

All equipment shall be permanently identified with a manufacturer or supplier name, part number, and serial number.

The Vendor shall assign unique serial numbers to equipment and modules, enabling tracking of components for maintenance, repair, and warranty, and to provide sufficient identification to analyze failures.

The serial numbering scheme and format shall be submitted for LeeTran review and approval. Where possible, serial numbers for like components shall be sequential.

Serial numbers shall be engraved on metal labels that are riveted in place or attached by another approved permanent method.

All equipment shall be labeled in duplicate with unique barcode labels to further facilitate tracking.

Labels shall be placed in areas where they are likely to avoid wear and fading. The location of the serial number labels and barcodes shall be chosen for readability and scanning without disassembly of equipment or components.

The visible serial number and barcode shall match the Electronic Serial Number (ESN) in all instances where an ESN is assigned to a device.

At a minimum, the following equipment shall have serial numbers applied:

- DCUs
- TVMs (and all major internal components/modules)
- TOTs
- Mobile Sales Devices
- Back Office Hardware
- Test Environment Devices

Within 30 calendar days following FDR approval, the Vendor shall furnish a list of the items that shall be serialized for LeeTran review and approval.

Serial numbers of all components shall be presented to LeeTran in the form of an MS Excel spreadsheet (or equivalent) included with the shipment of all equipment and modules.

17.7 Operating Environment

17.7.1 Shock and Vibration

Onboard equipment, including driver control units, shall be designed, built, and installed for the harsh, high shock and vibration operating environment in which the system components shall be installed. Operation of the fare collection equipment in this environment shall not in any way impair equipment performance throughout the required useful life of the system.

All system components shall be designed to withstand structure-borne stresses and vibrations caused by the motion of buses and trains, daily customer use, passing of trains or other vehicles, and emergency braking of fully-loaded trains.

All system components, including all interior-mounted components and assemblies, shall resist horizontal shocks of up to 6 g (where “g” is the earth’s gravitational constant, or 9.81 meters per second squared) and up to 1.2 g in the vertical axis for a duration of up to 12 ms without permanent deformation or failure.

There shall be no failure of mounts or decrease in operational performance of any system components under conditions simulated by a sinusoidal sweep vibration test at a sweep rate of one-half octave per minute, from 5 Hz to 200 Hz to 5 Hz, at a peak vibratory acceleration of 0.25 g for a minimum of 50 cycles when applied to each of the three (3) axes and repeated continuously for five (5) complete cycles. If any assembly or component is a source of vibration, measures shall be taken to dampen the vibration. Efforts shall be taken to critically dampen any resonant frequencies that may exist in the mounted structures.

All system components and mounts shall be sufficiently constructed to comply with local codes regarding stability of structures and contents in earthquakes, high velocity wind (up to 60 miles per hour), and other natural phenomenon.

Onboard equipment, including driver control units and mobile fare validation/inspection devices, shall pass the following shock and vibration tests:

- IEC 60068-2-27
- IEC 60068-2-64

17.7.2 Climate Conditions

17.7.2.1 On-board Equipment

Onboard equipment, including driver control units and mobile fare validation/inspection devices, shall be protected to prevent degradation in performance from exposure to moisture or dust raised by inclement weather or interior cleaning. Operation of the fare collection equipment in this environment shall not in any way impair equipment performance throughout the required useful life of the system.

The onboard equipment provided by the Vendor shall be able to operate and not suffer any degradation in performance under the following environmental conditions:

- Storage temperature: 0°F to +140°F
- Operating temperature: 40°F to 125°F ambient
- Thermal shock: Up to 50°F in 1 hour, non-condensing

- Relative humidity: 5-100%, non-condensing
- Airborne dust: up to 180 micrograms per cubic meter, with iron and salt particles
- Sunlight: direct sunlight, radiation loading of up to 789J/sec/m²
- Inclination: 0° to 20° off vertical
- Rainfall: 10 inches over 12 hours
- Water/solvents: IEC529 to level Ingress Protection 54 (IP54) or equivalent
- Pollution: various forms of native air pollution
- Other operational conditions: water spray, industrial cleaning solvents, and mud on system components from cleaning vehicle floors and walls

The onboard equipment shall be designed to be resistant to liquid ingress caused by driving rain, or by splashed water or cleaning chemicals, such as would occur during routine equipment and vehicle cleaning.

The onboard equipment shall be tested and certified to operate under the environmental conditions specified in SAE J1455 and all standards contained therein.

The onboard equipment shall meet the following flammability requirements:

- UL 94 V-O
- UL HB

Means shall be provided to detect failure of any cooling device and provide for a controlled shutdown of the system components and generation of a maintenance event.

The onboard equipment shall be either immune to or protected from the damaging effects of visible spectrum and ultraviolet radiation. Internal components that may be either damaged or affected operationally when exposed to direct sunlight shall be protected from exposure during maintenance activities without requiring specific action by maintenance personnel.

17.7.2.2 Ticket Office Equipment

TOTs shall be designed to be installed in LeeTran facilities and office locations. Operation of the equipment in this environment shall not in any way impair equipment performance throughout the required useful life of the system.

Means shall be provided to detect failure of any cooling device and provide for a controlled shutdown of the system components and generation of a maintenance event.

17.7.3 Electrical

17.7.3.1 Power and Voltage Requirements

The Vendor shall design, supply, install, test, and commission all internal system components necessary to provide the required electrical power to the Vendor-supplied equipment.

Electrical power shall be obtained from existing power sources and shall be filtered, transformed, converted, battery-stored, and distributed by the Vendor as required, including all necessary connections and terminations.

Primary power shall be provided by LeeTran at equipment installation locations, and may not be clean or isolated at the voltage levels required by the Vendor-supplied equipment. Any necessary conditioning of the primary power, or addition of line interface filters or power supplies, shall be the responsibility of the Vendor, and to the greatest extent possible, shall be performed within the equipment enclosures.

All system components operating off of line voltage shall be designed to operate with a plus or minus 10% fluctuation in voltage without any damage or interruption.

In the event of a loss of electrical power, all equipment shall complete any transaction in process, retain all data, and shutdown in an orderly manner. The equipment shall return to full operational status after a power failure without manual intervention or adversely affecting the integrity of stored data.

Onboard equipment, including driver control units, shall be designed to operate reliably from a vehicle's direct current power source, which shall be either 12 volts or 24 volts of direct current (VDC).

The onboard equipment shall be protected against damage or data loss under the following conditions:

- Voltage fluctuations
- Reverse polarity of the input voltage
- Temporary voltage variations (0 to 50 V)
- Over-current draw
- Stray currents

The onboard equipment power supply shall include adequate filters and components to regulate the bus-supplied voltage and render it devoid of power spikes and noise. Provisions shall include elimination of power fluctuations caused by fluorescent lights, coach alternators, air conditioning units, radio communication units, and other systems characteristic of a bus environment.

Adequate protection against transient power surges shall be incorporated to the extent necessary to prevent damage to the electronic components of the equipment.

Power sensing shall be incorporated into equipment power supplies to cause the devices to switch off automatically if the supply voltage increases or decreases to levels beyond the voltage tolerance.

All system components shall retain any information stored in non-volatile memory under any conditions of the supplied power.

17.7.3.2 Electrical Noise Requirements

The Vendor shall ensure system equipment shall operate without being affected by or causing electromagnetic interference (EMI).

All system components shall include protection against external EMI and Radio Frequency Interference (RFI) emissions, as well as internal conductive or inductive emissions.

All system components shall conform to the following requirements:

- Federal Communications Commission (FCC) Part 15, Subpart B Class A (Conducted emissions), pertaining to conducted susceptibility
- FCC Part 15, Subpart B Class A (Radiated emissions), pertaining to radiated susceptibility

Equipment shall not emit measurable EMI or RFI that produces harmful interference with any other onboard devices or systems, including GPS and magnetic compass readings, and shall comply with the following standards:

- IEC 1000-4-6 (EN61000-4-6) pertaining to conducted susceptibility
- IEC 6100-4-3 (EN61000-4-3) pertaining to radiated susceptibility
- IEC 6100-4-2 (EN 6100-4-2) pertaining to electrostatic discharge

Operation of the equipment shall not be affected by the electromagnetic fields generated by local high voltage power distribution lines at distances as close as 50 feet.

Onboard equipment, including driver control units, shall be unaffected by interference from fluorescent lights, coach alternators, air conditioning units, radio communication units, and other systems characteristic of a bus environment.

Equipment communications shall not interfere or be impacted by the use of established frequencies, including but not limited to:

- Audio frequencies for railroad-highway crossing approaches and island circuits, and electrical lock circuits
- Audio frequency code overlay for Air Traffic Control (ATC) systems
- Signal power

The Vendor shall certify the electromagnetic compatibility of system components to be furnished. The Vendor shall provide the results of interaction analysis and testing of each system component with regard to frequency distribution, amplitude, and harmonic content for review and approval during the design review process.

17.7.3.3 Grounding

All equipment enclosures, chassis, assemblies, panels, switch boxes, and terminal boxes shall be grounded. Protective grounding shall be provided to ensure that exposed metal on all system components is connected to a common ground point.

The Vendor shall meet safety requirements for the grounding that conforms to the National Electric Code (NEC) and UL, SAE and local codes where applicable.

The Vendor shall provide certification that all system components furnished have been tested to meet applicable UL criteria.

Documentation citing UL certification or acceptable test results shall be provided for review and approval during the design review process.

System equipment shall be equipped with GFCI circuit breakers, which include a “push to test” button, visible indication of a tripped condition, and ability to detect an earth leakage current of approximately 5 milliamperes in accordance with UL 1053 and California Energy Commission (CEC) standards.

17.8 Licensing and Data Ownership

LeeTran shall own all data generated by the equipment, systems, and software delivered under this Contract. LeeTran shall be able to freely access and distribute all data free of charge. LeeTran shall retain ownership of all data in perpetuity with no restrictions or additional cost.

All documentation described in these specifications shall become the property of LeeTran, or provided under a perpetual license to enable internal use and distribution to third-parties at no additional cost.

All system and software interfaces shall be defined and documented, and shall be provided to LeeTran under a perpetual license to enable internal use and distribution to third-parties at no additional cost.

All open architecture APIs, libraries, and Intellectual Property, including data exchange formats and algorithms, shall be provided to LeeTran under a perpetual license to enable internal use and distribution to third-parties at no additional cost.

17.9 Software Escrow (Option)

Optionally, the Vendor shall provide pricing to place in escrow firmware and software source code and documentation (in an editable electronic format) for all equipment and systems delivered. Escrow deposits shall be in accordance with a master escrow agreement between the Vendor and a mutually agreed to software escrow company, and shall be performed following successful completion of Integration Testing, System Acceptance Testing and Final Acceptance.

Firmware and software source code to be placed in escrow shall include all application firmware and software for system components not provided under an open source license, as well as any firmware and software developed for embedded microprocessors that are integrated into any system components.

Deposited firmware and software documentation shall include:

- General description and operation
- Architecture and basic program functions
- Data flow information
- Annotated source code listing, with comments and descriptions pertaining to each module sufficient to allow an experienced programmer to understand the code
- Detailed memory map
- Input/output map
- Licensing information for open source modules

The Vendor shall also place into escrow:

- A licensed copy of all software tools such as debuggers, assemblers, and compilers, needed to convert the supplied source code into an executable form used by the target devices and systems
- Configuration documentation necessary to setup the development environment used to generate the executables
- Procedures necessary to transfer the executable code to the operational system
- Hardware devices, such as erasable programmable read-only memory (EPROM) programmers, and their accompanying firmware and software tools, necessary to transfer executable programs onto any storage devices used by embedded microprocessors

The Vendor shall maintain the materials in escrow for no less than 10 years from the beginning of the operations and maintenance agreement. The Vendor shall prepay for escrow services for this entire duration. Costs associated with the extension of the escrow agreement shall be included in the extensions for the operations and maintenance agreement (see Section 19: Operations and Maintenance Agreement).

During the term of the operations and maintenance agreement, the Vendor shall ensure that all software and documentation in escrow is kept current and synchronized with the currently deployed system. The Vendor shall make software escrow deposits with all updated source code and documentation no less than annually.

The conditions for the release of software from escrow shall include, but are not limited to:

- Beneficial use by LeeTran
- Enhancement or modification of system functionality by LeeTran
- Integration or interface with another system by LeeTran
- Termination or breach of contract
- Re-assignment of the contract to another vendor
- Default or bankruptcy of the Vendor

The final conditions for escrow release shall be determined during the design review process and reflected in the master escrow agreement.

Escrow contents shall immediately be obtainable and usable by LeeTran should the material in escrow be released under the terms of the master escrow agreement.

The Vendor shall submit for LeeTran review and approval during the design review process an escrow management plan that includes at a minimum the following:

- A complete inventory of the items to be deposited into escrow
- Escrow agent name, location, and account ID
- Plan for ensuring that the escrow account always contains the most current source code and documentation
- Escrow deposit procedures and frequency
- Escrow inspection and verification processes
- Conditions for the release of software from escrow

17.10 ADA Compliance

All equipment, software, and customer interfaces shall be in compliance with Americans with Disabilities Act (ADA) standards to maximize ease of use. The system equipment shall comply with the most recent version of the ADAAG at the time of Final Acceptance.

The Vendor shall submit for review and approval at PDR, documentation with descriptions and drawings of how each customer-facing device and system shall achieve ADA compliance.

17.11 Code and Regulation Compliance

The Vendor shall design the system to be compliant with relevant standards, laws, and regulations to ensure that the system:

- Presents no safety hazards for customers and LeeTran employees
- Shall withstand the rigors of the environments in which the equipment shall be installed, and the public use to which it shall be subjected
- Provides for the secure storage and transmittal of data
- Is designed using state-of-the-art methods to maximize quality
- Satisfies federal, state, and other requirements for ergonomics and usability

The list of applicable codes, laws, ordinances, statutes, standards, rules, and regulations shall include, but is not limited to, the items below. The latest revisions in effect at the time of Final Acceptance shall apply.

- ADA
- ADAAG
- Advanced Encryption Standard
- ANSI X9.24, Financial Services Retail Key Management
- European Norm EN55022, Emissions standards for Conformité Européene (CE) marking
- European Norm EN55024, Immunity standards for CE marking
- FCC Part 15 Class B – Radio Frequency Devices
- Federal Information Processing Standardization (FIPS) 140-2
- IEEE 802.11 b/g/n standard for wireless data communications
- IEEE 802.11i standard for wireless data network security
- International Electrotechnical Commission Standard 529 (IEC529)
- ISO/IEC 7810, Identification Cards – Physical Characteristics
- ISO 9001
- ISO/IEC-8583 – Financial transaction card originated messages
- ISO/IEC 14443 Parts 1 through 4 – Contactless Smart Card Standard

- ISO/IEC 18092 / ECMA-340, Near Field Communication Interface and Protocol-1
- ISO/IEC 21481 / ECMA-352, Near Field Communication Interface and Protocol-2
- National Electrical Code (NFPA 70)
- National Electrical Manufacturers Association Publication 250-2003
- National Electrical Safety Code (ANSI C2)
- National Fire Protection Association (NFPA 130)
- NCITS 322-2002, American National Standard for Information Technology – Card Durability Test Methods
- Occupational Safety and Health Administration (OSHA)
- Payment Card Industry Data Security Standards (PCI-DSS)
- Payment Card Industry Payment Application Data Security Standards (PA-DSS)
- SAE J1113-13 Electrostatic Discharge
- SAE J1455 Vibration and Shock
- UL Standard 60950, “Information Technology Equipment – Safety”
- World Wide Web Consortium, Mobile Web Application Best Practices
- Web Content Accessibility Guidelines WCAG 2.0

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

17.12 Required Submittals

The following table displays items that must be submitted in advance of one or more design reviews.

Description	Submittal Due		
	CDR	PDR	FDR
System Hardware and Software Design Plan	X		
Maintenance Plan		X	X
Environmental Compliance Plan		X	X
Software and Documentation Licensing Plan	X	X	X
Escrow Management Plan		X	X
ADA Compliance Plan		X	X

18 Design Reviews Requirements

Three (3) formal design review phases shall be undertaken during the project to develop and describe the technical design that shall satisfy the requirements in these specifications. For each design review phase, the Vendor shall submit a set of documentation, hardware samples, and software demonstrations to LeeTran for review and approval. The requirements in this section describe the criteria for execution and approval of each design review phase.

18.1 General Requirements

Formal design reviews shall be conducted to evaluate design progress, as well as the technical, functional and programmatic adequacy of the design in meeting the requirements in these specifications.

The Vendor shall submit a design review plan for LeeTran review and approval within 30 calendar days of NTP. This plan shall describe the scope, schedule, and deliverable format for each of the formal design reviews.

The Vendor shall conduct three (3) formal design reviews:

- CDR
- PDR
- FDR

The requirements for each design review phase are described in this section.

Design reviews shall consist of the following activities at a minimum:

- A design review package shall be submitted by the Vendor and reviewed by LeeTran and consultant staff
- A MIL shall be created following the review and shall be provided to the Vendor
- A formal design review meeting, or series of meetings, shall be held between the Vendor and LeeTran staff, where the Vendor shall explain the design and LeeTran shall confirm compliance with the applicable requirements. Where possible, issues shall be resolved during the design review meetings
- All issues discussed during the meetings shall be documented. LeeTran shall determine the appropriate action to close an issue, considering where the project is in the overall design
- If required, the Vendor shall resubmit the design review package, or parts of the package, to address the issues identified during LeeTran review and subsequent design review meeting
- The design review package shall be approved upon LeeTran's determination that there are no critical open issues remaining in the MIL for that design phase

Other design review activities may be requested by LeeTran throughout the design review process.

Each design review package shall include documents in a searchable electronic format (e.g., PDF, DOC) that shall be shared via LeeTran-provided document control system (see Section 16.3.9: Communications Management and Document Control), and at least one (1) reproducible hard copy.

The Vendor shall submit design review packages that include all required CDRLs and supporting documentation at least 21 calendar days prior to each formal design review meeting.

LeeTran shall provide comments on the design review packages at least seven (7) calendar days prior to each formal design review meeting.

Design review meetings shall occur in the Lee County region with the Vendor project manager, lead engineer, and all relevant technical staff attending in person. The specific location shall be identified by LeeTran, and a teleconference phone number shall be available for remote participation where permitted.

The Vendor and/or LeeTran may establish suitable confidentiality and nondisclosure agreements associated with design review submittals.

18.2 Conceptual Design Review (CDR)

The objectives of CDR are to acquaint LeeTran with the Vendor's intended system design, resolve any open items related to external system interfaces, and provide the basis for proceeding with PDR.

The CDR package shall be submitted within 45 calendar days of NTP.

At a minimum, CDR shall include the following:

- Confirm the structure of the Vendor's management team and the scope of any subcontractors
- Provide preliminary specifications for all equipment described in these specifications
- Provide narrative descriptions of the major systems and subsystems proposed by the Vendor

- Provide system block diagrams identifying all interfaces between system components, including external systems that shall not be provided by the Vendor but shall interface with the system
- Describe the responsibilities and schedule for completion of detailed system interface definitions
- Provide a software conceptual design, including software block diagrams for key system components
- Confirm the Vendor's understanding of the intended operations and maintenance environment
- Identify key information and decisions required from LeeTran.

In addition to the items listed above, specific submittals shall be required as part of CDR. The CDR submittals are identified in the Required Submittals sections of these specifications.

If resubmittal of all or part of the CDR package is required, the Vendor shall provide the revised documents within seven (7) calendar days following completion of the formal design review meetings.

18.3 Preliminary Design Review (PDR)

The objectives of PDR are to review progress of the system design and evaluate compliance of the completed design and work in progress with the requirements of these specifications. The Vendor is encouraged to categorize PDR information into logical topics for organized review and discussion.

The PDR package shall be submitted within 60 days of CDR approval.

PDR shall represent approximately 75% completion of the total technical and operational system design.

PDR may be conducted as a series of meetings in the Lee County region relevant to the topics being discussed. Where possible, the formal PDR meetings shall be limited to confirmation of previously reviewed and approved-in-principle submittals, as well as the resolution of open items.

At a minimum, PDR shall include the following:

- Schedule compliance review and discussion of variances or delays
- Detailed hardware and software specifications for all Vendor-supplied devices, including power diagrams, functional block diagrams, mounting arrangements, and installation methods
- Detailed software flow charts for all back office systems
- Complete customer and operator user interface specifications, flow charts, and messages for all Vendor-supplied devices and systems, including accommodations for all boundary and error conditions
- Detailed interface and communication specifications for all internal and external system interfaces
- Detailed specifications for all configuration control systems
- Detailed specifications for access control systems supporting back office operations
- Detailed descriptions of system backup and recovery procedures
- List of special tools and diagnostic test equipment needed for maintenance of each Vendor-supplied device and system

In addition to the items listed above, specific submittals shall be required as part of PDR. The PDR submittals are identified in the Required Submittals sections of these specifications.

If resubmittal of all or part of the PDR package is required, the Vendor shall provide the revised documents within 14 calendar days following completion of the formal design review meetings.

18.4 Final/Critical Design Review

The objective of FDR is to finalize the detailed system design that satisfies all of the requirements in these specifications.

The FDR package shall be submitted within 60 days of PDR approval.

FDR shall represent 100% completion of the detailed system design with production specifications and drawings ready for release.

Data submitted for PDR shall be updated to a level of detail consistent with a completed design and resubmitted as part of FDR.

At a minimum, FDR shall include the following:

- Schedule compliance review and discussion of variances or delays
- Assembly drawings for all Vendor-supplied devices, down to the LLRUs
- Electrical schematic drawings for all Vendor-supplied devices
- Preliminary “as-built” drawings and prototypes for all device mounting configurations
- Final system architecture drawings
- Detailed software specifications for all back office systems with software module descriptions in a narrative format and data flow diagrams to the lowest level of decomposition
- Detailed specifications for all APIs supporting frontend and back office operations
- Detailed specifications for all system transaction formats
- Detailed descriptions of all message formats and data elements for device and system events and alarms
- Interface control documentation for all systems and subsystems
- Complete data dictionary and detailed database design documentation, including all tables, views, and materialized views for all database schemas in the system, in electronic format (e.g., ER Studio)
- Documentation of database programming features including, but not limited to: queries, query formats, triggers, jobs, functions, and procedures

In addition to the items listed above, specific submittals shall be required as part of FDR. The FDR submittals are identified in the Required Submittals sections of these specifications.

FDR shall include a review of the spare parts required to support the system. The Vendor and LeeTran shall jointly review the spare parts listed in the contract and reallocate, delete, and add parts as necessary.

If resubmittal of all or part of the FDR package is required, the Vendor shall provide the revised documents within 14 calendar days following completion of the formal design review meetings.

18.5 Required Submittals

The following table displays items that must be submitted in advance of one or more design reviews.

Description	Submittal Due		
	CDR	PDR	FDR
Design Review Plan ⁹	X	X	X
Conceptual Design Review Package ¹⁰	X		
Preliminary Design Review Package ¹¹		X	
Final Design Review Package ¹²			X

19 Operations and Maintenance Agreement

⁹ NTP + 30 Calendar Days

¹⁰ NTP + 45 Calendar Days

¹¹ 60 Calendar Days Following CDR Approval

¹² 60 Calendar Days Following PDR Approval

The Operations and Maintenance Agreement consists of: Warranty, Back Office Operations, Software Maintenance, and Equipment Maintenance. The responsibilities of the Vendor are summarized in **Table** and described in more detail in the following sections.

Table 10. Operations and Maintenance Overview

Operations and Maintenance	Vendor Responsibility
Warranty	<ul style="list-style-type: none"> • Hardware defects • Software defects • Bug fixes • Patches • Security updates • Hardware and software (fixes and patches) testing support • All personnel, labor, tools, materials, shipping charges, replacements, and other costs associated with warranty activities
Back Office Operations	<ul style="list-style-type: none"> • Performance monitoring • Transaction processing and monitoring • Overseeing operation of all support systems • Application and configuration testing support • QA/QC for website releases • System configuration (on-call) • Fare set testing/deployment (on-call) • Support report updates/ad-hoc data requests (on-call)
Software Maintenance	<ul style="list-style-type: none"> • Custom software updates • Device firmware updates • Third-party device firmware updates • Database software updates • Operating system updates • API maintenance and updates • Antivirus updates • License renewal • Software updates • Software patches • Security updates • All software testing and deployment (lab and field environments) • Software and firmware maintenance • Change log maintenance • Response to system outages and software defects/malfunctions
Equipment Maintenance	<ul style="list-style-type: none"> • Maintenance and support prior to system acceptance • Equipment maintenance plan • LeeTran-requested support (on-call)

19.1 Warranty

The Vendor shall provide a one (1) year warranty that begins upon the granting of Final Acceptance by LeeTran.

The warranty shall cover both hardware and software for:

- SAPs
- TVMs
- DCUs
- TOTs

- Mobile Fare Inspection/Validation Device Application
- Mobile Sales Devices
- All back office components and modules
- All other hardware and software components delivered as part of the FCS.

The Vendor shall warrant that all equipment, computer systems, and software provided for the system, including those components warranted by third-party suppliers, shall be free from defects in operation, material, and workmanship under normal operating use. Remedial work to correct deficiencies shall include the repair or replacement of equipment, components, devices, and/or materials.

The warranty shall cover the following:

- Repair or replacement of all equipment or systems required as a result of an identified hardware defect
- Software updates or re-writes required to repair all identified software defects or bugs, and apply all necessary patches or security updates released by the Vendor or third-party software providers throughout the term of the warranty
- All labor associated with hardware and software testing and deployment, both in the lab and field environments, needed to support warranty activities.

The Vendor shall provide a new component or subsystem if a particular component or subsystem was repaired or replaced three (3) times for the same failure.

If, during the warranty term, the rate of failure of any component or device exceeds 10% of the mean quantity installed, a “fleet defect” shall be declared, and the entire quantity of such components or devices shall be considered defective.

If a fleet defect is declared, the Vendor shall undertake and complete a corrective work program to replace all components of that type with new (not refurbished) components. The repair schedule and procedures shall be subject to LeeTran review and approval. All items replaced under these terms shall be warranted for at least one (1) year after replacement.

A fleet defect shall be considered resolved when the installed components are determined to meet or exceed all of the KPI requirements, and upon LeeTran approval.

The Vendor shall be responsible for all personnel, labor, tools, materials, shipping charges, and other costs associated with the activities listed as part of this Warranty section throughout the warranty term. Such costs shall be deducted from operations and maintenance payments.

Any system component repaired or replaced under terms of warranty shall be warranted for at least six (6) months, or the remaining duration of the original warranty, whichever is longer.

Following completion of the warranty term, should there be warranty work to complete, the warranty shall be extended to provide equal coverage for each piece of equipment.

The warranty shall not apply to any equipment that has been damaged by any person other than the Vendor or Vendor’s assignee.

Environmental conditions described in these technical specifications shall be considered normal operating conditions for this system and shall not qualify for exclusion.

LeeTran shall be held blameless for damages resulting from inadequate or inaccurate training of LeeTran personnel and/or incomplete operating manuals, maintenance manuals, electrical and electronic schematics, mechanical diagrams, or software documentation.

In the event that the Vendor fails to comply promptly with warranty requirements, LeeTran shall, upon written notice to the Vendor, have the right to deduct the cost of LeeTran's prevailing labor and material costs for repairing a defect from any compensation due, or coming due, to the Vendor. In the event the Vendor has been paid in full, the Vendor shall agree to compensate LeeTran for the costs incurred in the case that warranty requirements have not been fulfilled and LeeTran is forced to repair defects.

Spare modules used by the Vendor during the warranty term shall be replaced at no cost to LeeTran. All modules and component costs due to defects as outlined in 19.1 shall be at the Vendor's cost. The Vendor shall maintain sufficient spare sub-assemblies, modules, and components to meet the system availability requirements through the conclusion of the warranty.

The Vendor shall follow proper LeeTran security procedures for gaining access to field equipment and facilities, and shall not engage in such procedures without having received LeeTran-provided training. The Vendor shall not modify or repair any equipment in revenue service without the approval of the project manager or a LeeTran-authorized representative.

During the entire warranty term, any and all repairs, adjustments, or replacements of equipment by the Vendor shall be documented by the Vendor within a LeeTran-provided maintenance management system.

The Vendor shall develop a warranty plan outlining processes and procedures to be implemented to meet all specified warranty requirements. A draft of the warranty plan shall be submitted at FDR and a final version shall be provided a minimum of 30 calendar days prior to the start of any warranty term.

The warranty shall include all the software maintenance requirements in Section 19.3: Software Maintenance Requirements.

19.2 Back Office Operations

The Vendor shall be responsible for performing select back office operations and software support throughout the term of the operations and maintenance agreement.

The Vendor shall provide back office operations services under an operations and maintenance agreement for ten (10) years beginning at Final Acceptance.

The Vendor shall provide an option for two (2) additional five (5) year extensions (up to 10 years total) of the operations and maintenance agreement.

Under the operations and maintenance agreement, the Vendor shall be responsible for the following activities:

- Monitoring system performance and health
- Ensuring timely and accurate processing of transactions
- Overseeing operation of all back office support systems
- Application and configuration testing support
- QA/QC for website releases

The Vendor shall allow LeeTran staff to shadow all operations and support activities throughout the operations and maintenance agreement.

Software shall be maintained under the operations and maintenance agreement and include all required updates to the APIs and associated specifications provided by the Vendor.

All third-party software shall be maintained at the most current or previous version at no additional charge throughout the term of the operations and maintenance agreement, so long as it does not involve a major rewrite of the Vendor's software.

Throughout the term of the operations and maintenance agreement, the Vendor shall meet the associated system performance requirements in Section 14: Performance Measurement.

Failure to meet the specified requirements shall result in deductions from the monthly operations and maintenance payments made to the Vendor. Deductions shall be based on the level of performance and impacted by persistent failures, as specified in Section 14: Performance Measurement.

The operations and maintenance agreement shall include all the software maintenance requirements specified in Section 19.3: Software Maintenance Requirements.

The operations and maintenance agreement shall include on-call technical staff labor rates to develop and deploy enhancements or other features requests outside this scope, to be used by LeeTran on an as-needed basis. Rates shall be in effect for the entirety of the operations period. Tasks for which LeeTran may require on-call assistance include, but are not limited to, the following:

- Troubleshooting system configuration, and making configuration changes
- Testing and deployment of fare set or configuration changes, both in the lab and field environments
- Supporting report updates and ad-hoc data requests in excess of the 50 canned reports to be developed in coordination with LeeTran during the design review process and the first year of this agreement (see Section 7.9: Reporting System)

19.3 Software Maintenance

During the specified term of the back office operations agreement (see Section 7: Back Office Operations), and during any optional extensions exercised by LeeTran, the Vendor shall provide software and firmware maintenance services described in this section. When referred to in this section, the term "software" is understood to include all software and firmware provided by the Vendor and third-party suppliers under contract with the Vendor.

The Vendor shall provide preventative and corrective software maintenance to support system operations while meeting the performance standards set forth in these specifications.

Software maintenance shall include:

- Custom software updates
- Device firmware updates
- Third-party device firmware updates
- Database software updates
- Operating system updates
- API maintenance and updates
- Antivirus updates
- License renewal
- Software updates required to fix all identified software defects or bugs throughout the term of the agreement
- Application of all necessary patches or security updates released by the Vendor or third-party software providers
- All software testing and deployment, both in the lab and field environments

- Software and firmware maintenance
- Other activities needed to maintain system operations and meet the performance standards set forth in these specifications

Performance of software maintenance activities shall be completed in a manner that does not disrupt or degrade system operations, to the fullest extent possible.

The Vendor shall make corrections and modifications to the system software in coordination with LeeTran staff. Serious issues (e.g., any error that causes system reliability or availability to fall below stated requirements) shall be corrected immediately.

Software and firmware updates shall be clearly documented and submitted in advance of deployment for LeeTran review and approval.

Software and firmware deployment shall be scheduled and planned with LeeTran. Advance notification shall be provided, and approval granted by LeeTran, for all software maintenance activities requiring interruption of service or system operations.

As standard practice when repairing deficiencies and releasing device or back office system fixes or upgrades, the Vendor shall prepare and run regression testing scripts to test that each build delivered to the test environment does not result in any issues with the devices and systems currently in operation, including those that are not being updated. Any regression issues shall be documented as deficiencies and resolved accordingly.

If the condition requiring correction affects the operation of other system components, then the Vendor shall provide repair or replacement of the system components that fail, regardless of whether the warranty term has expired for those components.

Vendor shall maintain a change log of all changes that are performed, and provide this change log to LeeTran on a mutually agreed-upon schedule. The change log shall be sufficiently detailed to allow LeeTran to determine when any feature was added or modified, and the scope of the change.

The Vendor shall provide phone number(s) and e-mail account(s) for the reporting of software defects or malfunctions, and system outages, 24 hours a day, seven (7) days a week.

During the warranty and operations and maintenance term, the Vendor shall respond to reports of system outages within the time defined in the Section 14.1.3.2: Maintenance Response Time. A fully-qualified service representative shall be onsite any day of the week within 24 hours after being contacted by LeeTran staff, if it is determined that a physical presence is needed to resolve the identified issue.

During the warranty and operations and maintenance term, the Vendor shall respond to a report of any software defect or malfunction within the time defined in Section 14.1.3.2: Maintenance Response Time. A fully-qualified service representative shall be onsite within 24 hours after being contacted by LeeTran staff, if it is determined that a physical presence is needed to resolve the identified issue.

19.4 Equipment Maintenance

LeeTran shall be the primary performer of maintenance for all field equipment. However, the Vendor shall support maintenance activities as needed, and shall design the equipment to minimize maintenance labor, material costs, and FCS downtime.

The vendor is responsible for all equipment maintenance and support prior to system acceptance. This period shall serve as field training for LeeTran staff who shall be responsible for equipment maintenance upon system acceptance.

On-call technical staff rates provided in Section 19.2: Operations shall apply to any assistance requested by LeeTran for equipment maintenance-related support after system acceptance. Rates shall be in effect for the entirety of the operations period.

The Vendor shall provide an equipment maintenance plan sufficiently detailed to permit LeeTran to allocate manpower and resources to the maintenance and servicing of the FCS, and shall be scaled as necessary to reflect varied requirements over the anticipated service life of the system.

The equipment maintenance plan shall provide reference to the appropriate preventative maintenance requirement and service reliability performance standard.

Preventative maintenance activities shall not require more than five (5) minutes per device (excluding back office components) to perform and shall not be required more often than once every 30 days or on a configurable number of minimum transactions (to be defined during the design review process), whichever occurs first. Preventative maintenance activities shall include but are not limited to:

- Inspection of indicators
- Tightening of fasteners
- Housing maintenance
- Surface cleaning
- Replacement of consumables
- Prompting self-diagnostic programs

Upon completion of service actions, each component or device shall automatically perform a self-diagnostic check and ensure that all components are properly operating before resuming operations.

The device or component shall perform the same diagnostic testing (at minimum) at reset or power-up as after completion of service actions.

Device reset shall not be required for routine maintenance or for normal revenue servicing.

The Vendor shall prepare and submit to LeeTran a recommended list of spare modules and parts to support the installed field equipment. This list shall:

- Be grouped by equipment, for each module, part, and plug-in PC card assembly
- Provide complete ordering and procurement information for each item, or reference a catalog for this information
- Contain at least the following information for each item:
 - Item name
 - Description
 - Rating (if applicable)
 - Current price
 - Original manufacturer's name
 - Part number
 - Revision number
 - Drawing reference number
 - Country of origin

Recommended quantities shall be provided based on expected usage or based on a percentage of the installed base, with justification provided for the recommended quantities or percentage.

LeeTran shall purchase spare parts at the end of warranty based on the contracted price and the Vendor's recommendations.

During warranty, LeeTran shall monitor actual usage against the Vendor's recommendations. Should actual usage in revenue service differ from the Vendor's recommendations by greater than 50 percent, the Vendor shall provide justification for the difference.

The Vendor agrees to allow LeeTran to procure parts at prices listed in the price proposal for a minimum of one (1) year from completion of warranty.

The Vendor shall list separately those spare parts that the Vendor plans to utilize for warranty and maintenance support of equipment prior to system acceptance.

During the Vendor warranty and maintenance support, the Vendor shall return the same serial number module/component/part, or new item, back to LeeTran, even when using LeeTran's spare parts.

All LeeTran-owned spares used by the Vendor shall be made whole and brought back to 100% successful operation within one (1) week of Vendor access.

The Vendor shall maintain an adequate inventory of spare parts for all the equipment furnished for the FCS for 10 years after final acceptance. In the event that the Vendor fails to furnish these parts within 60 days after receipt of order, the Vendor shall notify LeeTran to arrange suitable replacements. Exceptions to the nominal delivery time shall be stated in the Spare Parts List. This arrangement shall include providing sufficient information to allow LeeTran to procure the parts affected.

19.5 Required Submittals

The following table displays items that must be submitted in advance of one or more design reviews.

Description	Submittal Due		
	CDR	PDR	FDR
Warranty Plan ¹³			X
Operations Plan ¹⁴			X
Maintenance Plan ¹⁵			X
			X

¹³ 30 Calendar Days Prior to the Start of Warranty

¹⁴ 30 Calendar Days Prior to the Start of Operations

¹⁵ 30 Calendar Days Prior to the Start of Maintenance

Attachment 1: Pictures of LeeTran Vehicle Interiors

Eldorado 31-Foot Fixed-Route Buses



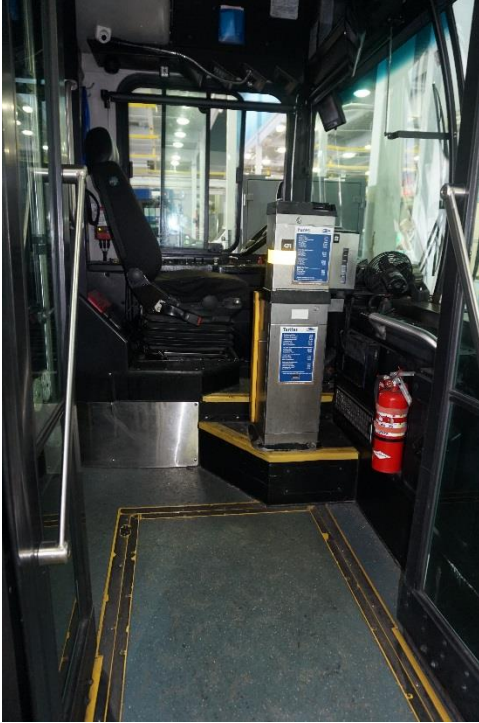
Gillig 35- and 40-Foot Fixed-Route Buses



Hybrid 29-Foot Fixed-Route Buses



Hybrid 35- and 40-Foot Fixed-Route Buses



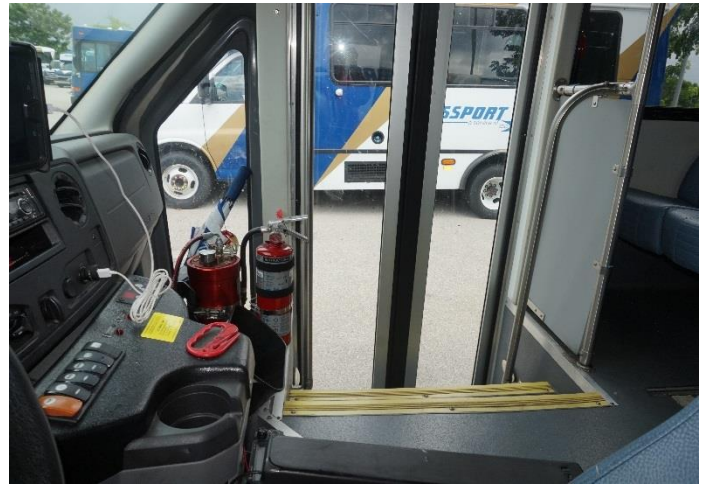
Fixed-Route Trolleys



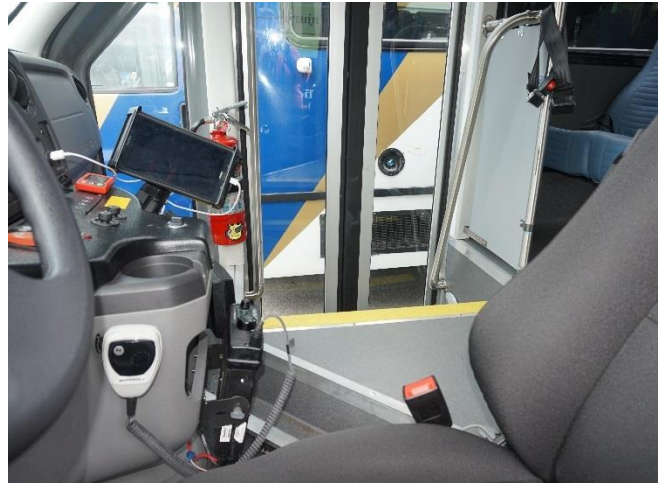
Passport (Paratransit) Big Propane Vehicles



Passport (Paratransit) Small Propane Vehicles



Passport (Paratransit) New Ford Vehicles



Passport (Paratransit) Small Ford Vehicles



Passport (Paratransit) Chevrolet Vehicles



A.1 Appendix– Summary of Equipment Quantities

Quantities shown below have been pre-populated in the Cost/Pricing Forms.

Additional detail/information related to current bus fleet inventory and configurations, TVM installation locations, and fare media design can be found in the prior Attachment 1 as well as the Appendices that follow.

HARDWARE/SOFTWARE/EQUIPMENT/MEDIA

Item No.	Item	Number Required
1	Farebox	68
2	Portable Probe	2
3	Cash/Credit Card TVM	5
4	Test Bench	1
5	Training	2
6	Back Office/Central System	1
7	Smart Card (Year 1 quantity)	2,000
8	Paper Ticket (Year 1 quantity)	81,760
9	Interface to CAD/AVL/APC	1
10	Point of Sale Terminal	4
11	Ticket Office Terminal	5
12	Mobile Payment (with no transaction fees)	1
13	Fixed Vault	2
14	Portable Vault	2
15	Project Management, Design, Testing and Documentation	1
16	POS Software License and Support	1
17	Smart Card Handheld Validator	4
18	TVM Services	1
19	Wireless Local Area Network (LAN) Access Points and Data Transfer Software	1

A.2 Appendix– Current Fare Media Designs

1 TRIP PASS

lee tran
Your Ride Is Here
239-533-8726
www.rideleetrans.com

**Adult Fare
\$1.50**

1 TRIP PASS

lee tran
Your Ride Is Here
239-533-8726
www.rideleetrans.com

Complimentary

ALL DAY PASS

lee tran
Your Ride Is Here
239-533-8726
www.rideleetrans.com

**Adult Fare
\$4.00**

7 DAY PASS

lee tran
Your Ride Is Here
239-533-8726
www.rideleetrans.com

**Adult Fare
\$15.00**

12 TRIP PASS

lee tran
Your Ride Is Here
239-533-8726
www.rideleetrans.com


**Adult Fare
\$13.50**

31 DAY PASS

lee tran
Your Ride Is Here
239-533-8726
www.rideleetrans.com

**Adult Fare
\$40.00**


Student
7
DAY **PASS**



Your Ride Is Here
239-533-8726
www.rideletran.com

Discount Fare
\$12.00


Student
12
TRIP **PASS**



Your Ride Is Here
239-533-8726
www.rideletran.com

Discount Fare
\$8.75

Student
31
DAY **PASS**



Your Ride Is Here
239-533-8726
www.rideletran.com

Discount Fare
\$26.00

Senior/Disabled
7
DAY **PASS**



Your Ride Is Here
239-533-8726
www.rideletran.com

Discount Fare
\$11.00


Senior/Disabled
12
TRIP **PASS**



Your Ride Is Here
239-533-8726
www.rideletran.com

Discount Fare
\$8.50

Senior/Disabled
31
DAY **PASS**



Your Ride Is Here
239-533-8726
www.rideletran.com

Discount Fare
\$23.00

ADA

\$3.00
SINGLE TRIP
TICKET

PASSPORT
a service of *lee tran*

239-533-0300
www.rideleetran.com

Non-refundable

Trolley
ALL
DAY **PASS**

lee tran
Your Ride Is Here
239-533-8726
www.rideleetran.com

Regular Fare
\$2.00

Trolley
3
DAY **PASS**

lee tran
Your Ride Is Here
239-533-8726
www.rideleetran.com

Regular Fare
\$4.00

B

A.3 Appendix – Fare Media Quantities

Fares	FY 17/18	Quantity	FY 16/17	Quantity
Fare Regular	889,009	592,673	941,481	627,654
Senior Citizens Fares	71,674	95,565	70,427	93,902
Beach Trolley Fares	143,640	191,520	148,701	198,268
Monthly Passes Regular	297,114	7,428	369,443	9,236
All Day Pass Regular	510,859	127,715	546,144	136,536
Other Fares	162,323		148,888	
Paratransit Fares	340,397	113,466	316,834	105,611
Student Fares	14,148	18,864	18,473	24,631
Weekly Pass Reg	69,291	4,619	90,018	6,001
12 Trip Regular	34,480	2,554	54,935	4,069
Senior/Disabled Weekly Pass	6,206	564	7,604	691
Senior/Disabled Monthly	122,013	5,305	134,599	5,852
Senior/Disabled 12-Trip	24,884	3,828	29,009	4,463
Trolley 3 Day Pass	6,773	1,693	7,978	1,994
All Day Trolley Pass	13,303	6,651	13,512	6,756
Student Monthly	37,372	1,495	68,466	2,739
Student Weekly	11,828	986	14,092	1,174
Student 12 Trip	4,603	682	7,689	1,139
Beach Trolley Dis Senior	18,795	37,591	17,209	34,418
Beach Trolley Dis Student	710	1,420	1,142	2,283
Total Fares	3,649,657	1,214,620	3,822,443	1,267,418

A.4 Appendix – Stop Information for TVM Location

Rosa Parks: power and network exist

Beach Park and Ride: power and network exist

Edison Mall Station: power and network exist

Cape Coral Transfer: power and network exist

New site - South Area Transfer Station: not yet built, power and network shall exist

A.5 Appendix – Bus Types

Quantity	Model	Series	CAD/AVL Model
1	2001 Gillig low floor (29 ft)	103-300-0004	Clever
2	2007 Gillig low floor (35 ft)	103-300-0004	Clever
4	2008 Gillig low floor (40 ft)	103-300-0004	Clever
7	2010 Gillig low floor (35 ft)	103-300-0004	Clever
4	2016 Gillig low floor (35 ft)	103-300-0004	Clever
6	2016 Gillig low floor (40 ft)	103-300-0004	Clever
3	2010 Gillig low floor (35 ft)	103-300-0004	Clever
2	2011 Gillig low floor (40 ft)	103-300-0004	Clever
1	2012 ELDORADO E-Z RIDER (31 ft)	103-300-0004	Clever
5	2013 Gillig low floor (29 ft)	103-300-0004	Clever
11	2013 Gillig low floor (35 ft)	103-300-0004	Clever
6	2013 Gillig low floor (40 ft)	103-300-0004	Clever
1	2012 Gillig low floor (35 ft)	103-300-0004	Clever
7	2011 Classic Startran trolley (35 ft)	103-300-0004	Clever
2	Gillig low floor trolley (35 ft)	103-300-0004	Clever