

**Greater Portland Transit District  
(METRO)**

**Request for Proposals**

**AUTOMATED FARE PAYMENT AND COLLECTION  
SYSTEM**

**RFP #2019-004**

**Specifications and Proposal Requirements**

**March 29, 2019**

**GREATER PORTLAND TRANSIT DISTRICT (METRO)  
REQUEST FOR PROPOSALS**

**AUTOMATED FARE PAYMENT AND COLLECTION SYSTEM  
RFP #2019-004**

METRO is soliciting proposals from qualified companies to design, install and maintain a next generation system of software and hardware that allows for electronic payment of transit fares, including reloadable smart cards and mobile application. The system will be account based, using an open architecture that is flexible, scalable and secure. The selected system is expected to be tested, accepted, fully deployed and operational no later than September 1, 2019.

METRO is issuing this RFP on behalf of itself and two other transit organizations that are partnering with METRO in this effort, City of South Portland Bus Service and Biddeford-Saco Shuttlebus-ZOOM.

Proposals for the above project, submitted to Greater Portland Transit District, 114 Valley Street, Portland, Maine 04102, and identified with the name of the company submitting the proposal, this RFP number and project title, will be received until **2:00 p.m. EST on Wednesday, May 8, 2019**. All proposals shall be submitted electronically with all information required, as described in these Specifications. Electronic receipt of proposals will be acknowledged by METRO via email reply.

**NOTE: Firms must be registered** with METRO, in order to submit proposals and to receive addendum information, by emailing [lshaw@gpmetro.org](mailto:lshaw@gpmetro.org). Proposals from vendors not registered with METRO may be rejected. All proposals shall include the attached forms and are to remain open for sixty (60) days after their opening. Late proposals will be rejected.

There will be a **MANDATORY PRE-PROPOSAL MEETING, via teleconference, on Monday, April 8, at 1:30 p.m. EST**. Please call in using 510-474-0630.

All questions shall be directed in writing to METRO, via email at [lshaw@gpmetro.org](mailto:lshaw@gpmetro.org), and be received no later than Tuesday, **April 9, at 4:00 p.m. EST**. Questions received after this time will not be addressed. Responses that substantially alter these specifications will be issued in the form of a written addendum to all registered firms on or about April 12, 2019, and will become part of the RFP. Oral explanations or interpretations given before the award will not be binding.

METRO reserves the right to revise or amend the RFP, including the specifications, at any time prior to the proposal deadline. If METRO determines that an addendum may require significant changes in the preparation of proposals, it may in its sole discretion extend the proposal deadline, which will be communicated through an addendum.

**NOTE:** To the extent allowed by law, all proposals will be kept confidential throughout the selection process. Following announcement of an award decision, all submissions in response to this RFP will be considered public records available for public inspection pursuant to State Law. In the event a request is made to produce any proposal, METRO will notify the bidder that it will produce the proposal unless the bidder takes steps it deems necessary to prohibit production. METRO will not undertake to determine whether any proposal or part of any proposal is confidential or otherwise protected from disclosure.

**This project is funded in part by the Federal Transit Administration, and is therefore subject to federal procurement and contracting requirements. Firms should familiarize themselves with these requirements. Federal Requirements for Third-Party Contracting is a summary of requirements and attached to this RFP for reference.**

**Proposals must include completed Proposal forms, including CERTIFICATION FORMS, and sub-contract and DBE listing. Also, please note that pre-payment or down payments are not allowed under FTA regulations.**

**Insurance.** The successful bidder shall be required to provide evidence of least the following coverage and limits of insurance from a company authorized to issue insurance in Maine, and shall name METRO as additional insured on all except Workers Compensation.

- A. Commercial General Liability Insurance (Death, Bodily Injury and Property Damage, including Premises and Operations, Completed Operations, and Contractual Liability covering the indemnification contained herein): \$1,000,000 combined single limits per occurrence, \$2,000,000 aggregate, where applicable.
- B. Business Automotive Liability Insurance: Not less than \$1,000,000 per occurrence for bodily injury and property damage combined.
- C. Workers' Compensation: Workers' compensation—statutory; employer's liability--\$500,000 per occurrence
- D. Umbrella or Excess Liability Insurance: \$1,000,000.

**Indemnification.** By submitting a proposal, the bidder agrees to indemnify and hold harmless METRO and its officers, agents and employees, including consultants, from and against any and all liabilities, damages, claims, demands, liens, encumbrances, judgments, awards, losses, costs, expenses, and suits or actions or proceedings, including attorney's fees arising out of or resulting from the submittal, evaluation, award, or other performance of any acts or omissions concerning this RFP and contract award, if any, including any negligent acts or omissions of METRO.

**Letter of Credit for Contract.** By submitting a proposal, the bidder agrees to provide METRO with a Letter of Credit (LOC) in an amount equal to the total proposed for the first full year, including hardware costs. This LOC will remain in effect through June 30, 2020, after full implementation and acceptance. If acceptance occurs before that date, the LOC may be released at the discretion of METRO.

METRO is exempt from Maine state sales and use taxes on all materials to be incorporated in the work. Said taxes shall not be included in the proposal. It is the custom of METRO to pay its bills within 30 days after completion and acceptance of the work, and the receipt of properly documented invoices for that work covered under the contract. In submitting applications under these specifications, applicants should take into account all discounts, both trade and time, allowed in accordance with this payment policy and quote a net price. As required by Federal Law, and in keeping with good practice, the contractor agrees to pay each and any subcontractor for satisfactory performance of its work no later than thirty days from the receipt of each payment the prime contract received from METRO. Any delay or postponement of payment from the above referenced timeframe may occur only for good cause following written approval of METRO. This clause applies to both DBE and non-DBE subcontracts.

**This RFP does not commit Metro to enter into a contract, to pay any costs incurred in the preparation of a proposal nor to procure or contract for the goods and services. By submitting a proposal in response to this RFP, the bidder agrees, if selected as the successful firm, to be bound by the terms, conditions, and requirements of the attached Scope of Work, the Form of Contract, and the Federal Requirements for Third-Party Contracting.**

**Protest Procedures.** Any concerns arising out of this RFP and any contract award, including evaluation and selection, protests of awards, disputes, and claims relating to the selection process and contract award, will be resolved by METRO in accordance with the following protest procedures.

1. Pre-award Protests must be made in writing, supported by sufficient information to enable the protest to be fairly evaluated, within the time periods set forth in sub-sections 2 and 3, below.
2. Any protest to the terms, conditions, or specifications set forth in a bid or RFP must be submitted to GPTD's Finance Director, acting as the Procurement Officer, within 7 calendar days after the issuance of a bid or RFP. All such protests will be considered by the Finance Director, whose decision is final, and no further appeal will be considered.
3. GPTD will notify bidders of its award decision by a written notice of the recommended award. Any bidder or proposer whose bid or proposal has not lapsed may protest the award decision on any ground arising from its evaluation of proposals or its award decision, but not on any ground specified in sub-section 1 related to Pre-award Protests, above. Any such protest must be submitted to the Procurement Officer within 7 calendar days after written notice of the recommended award. All such protests will be considered by a Protest Review Board. A written decision from the Protest Review Board stating the grounds for allowing or denying the protest shall be transmitted to the protestor and the bidder or proposer recommended for award. A decision of the Protest Review Board is final, and no further protest or appeal will be considered by the GPTD or its Board of Directors.
4. A respondent may file a protest with the FTA in accordance with the FTA's appeals process for reviewing protests of procurement decisions, as noted in See FTA Circular 4220.1F, as may be amended from time to time. GPTD will report any protests in this section to FTA as a communication.

**Reservation of Rights.** METRO reserves the right to waive any informalities or irregularities, or reject any or all proposals should METRO deem, in its sole discretion, that it is in the best interest of METRO to do so. METRO reserves the right to substantiate the qualifications, capability to perform, availability, and past performance record of any firm submitting a proposal.

- A. METRO reserves the right to cancel the procurement in whole or in part, at its sole discretion, at any time before the Contract is fully executed.
- B. METRO reserves the right to reject any or all proposals, to undertake discussions with one or more bidders, and to accept that proposal which, in its judgment, shall be most advantageous to METRO, considering price and other evaluation criteria.
- C. METRO reserves the right to make an award to a bidder without conducting any written or oral discussions with any bidders.

## **SUBMISSION REQUIREMENTS**

Proposals must include information that allows METRO to understand and evaluate, using the Selection Criteria, the firm's ability to provide and complete the work required under this RFP. This includes, at a minimum, the following.

1. Provide a list of all the individuals and firms (including subcontractors, if any) that will be involved in the performance of services, and the expertise and qualifications of all key team members assigned to the work. Identify the project manager who will be working directly with METRO, who shall be responsible for any and all goods and services included in the proposal, performed or supplied by the bidder and subcontractors.
2. Describe your firm's approach to this project, including understanding of the goals. Outline how you would manage the work to meet the implementation deadline.
3. Documentation showing technical capacity to deliver goods and services according to the Scope of Work attached to this RFP.
4. Completed Requirements Traceability Matrix.
5. Evidence proving the ability to obtain a Bank Letter of Credit in an amount equal to the total proposed for the first full year, including hardware costs.
6. Describe prior and present projects that substantiate your firm's, and any subcontractors' ability to develop, install, and maintain software and hardware for automated fare payment and collection.
7. References and contact information for similar projects.
8. Cost Proposal. Pricing must be submitting using the enclosed pricing sheet in the Proposal Forms.
9. All completed and signed mandatory forms attached to this RFP.

## **SELECTION PROCESS**

Proposals will be evaluated by a Selection Committee using the following selection criteria, which may include interviews with some or all proposers. The Committee may perform preliminary scoring of proposals and choose to interview the top scoring company or companies, after which a final scoring will be made.

Contract shall be awarded to the responsible firm whose proposal, complying with conditions and requirements provided in this Specifications and Proposal Requirements package and bid form, is considered by METRO to be the best solution for its needs. The successful firm will enter into a contract that is substantially in the form attached to the RFP, and also agree to enter into maintenance agreement(s) for the system.

Discussions and negotiations may be carried out any time after proposals are submitted solely upon initiation by METRO. However, METRO may select a proposal for contract award without any discussions or negotiations.

## ***Selection Criteria***

- 1. System Design and Operation** **35%**  
Proposed design elements, functional aspects, proven system success, operational stability and overall ability to meet the goals and requirements outlined in the Scope of Work.
  
- 2. Price Proposal** **30%**  
Basis for calculation using the Price Form included in the RFP will be as follows:
  - Line 6 - Total Equipment Costs for the Base System
  - Line 19 - Total Other Capital Costs for the Base System
  - Line 24 x 5 Years of Annual Software System Costs for the Base System
  - Line 25 x 1.5 Years of Annual Hardware Maintenance for the Base System
  
- 3. Experience and References** **25%**  
Successful experience with design and implementation of similar systems, including customer satisfaction and delivery within time and budget constraints. Individual experience of team members who would be assigned to this project.
  
- 4. Project Understanding** **10%**  
Understanding of project elements and of industry environment. Project plan and timeline.

## **ATTACHMENTS:**

### Attachment A: Proposal Forms

Attachment A1: Declaration and Certification

Attachment A2: Pricing Sheet

Attachment A3: Subcontractors and Suppliers

Attachment A4: Certification regarding Debarment, Suspension, Other Ineligibility, and Involuntary Exclusion

Attachment A5: Certification of Compliance with Buy America Requirements

Attachment A6: Certification of Restrictions on Lobbying

Attachment A7: Requirements Traceability Matrix

Attachment B: Scope of Work

Attachment C: Concept of Operations

Attachment D: FTA Third Party Contracting Requirements

**PROPOSAL FORMS  
COMPLETE AND RETURN THE FOLLOWING PAGES**

The UNDERSIGNED hereby declares and certifies that:

- (1) The Undersigned is authorized to bind the company named below to the proposal submitted, including the Cost Proposal, and any Contract awarded;
- (2) The Undersigned or the company is not involved in any agreement to pay money or other consideration for the filing of this proposal or the execution of the Contract to be awarded, other than to an employee of the company;
- (3) There has been no attempt by the Undersigned or the Company to discourage any potential proposer from submitting a proposal;
- (4) The proposal is made without any connection with any other entity submitting a proposal for the same. The Undersigned has read and understands all terms and conditions as outlined herein, including all applicable federal and state laws and regulations, and the proposal is made in accordance with same;
- (5) Any person(s) employed by METRO who has direct or indirect personal or financial interest in this proposal, or in any profits which may be derived therefrom, has been identified and the interest disclosed by separate attachment. (Please include in your disclosure any interest which you know of.)

The Undersigned certifies or affirms the truthfulness and accuracy of the contents of the statements submitted on or with this certification and understands that a false certification is a criminal act and in violation of 18 U.S.C. 1001. **The Undersigned hereby acknowledges and agrees, that if selected, the Company shall enter into a contract with METRO in accordance with this proposal and the requirements set forth in the RFP.**

This Proposal acknowledges the receipt of Addenda No.: \_\_\_\_\_

COMPANY NAME: \_\_\_\_\_  
(Individual, Partnership, Corporation, Joint Venture)

AUTHORIZED SIGNATURE: \_\_\_\_\_ DATE: \_\_\_\_\_  
(Officer, Auth. Individual, Owner)

PRINT NAME & TITLE: \_\_\_\_\_

ADDRESS: \_\_\_\_\_

\_\_\_\_\_

TELEPHONE: \_\_\_\_\_ EMAIL: \_\_\_\_\_

FEDERAL TAX I.D. NUMBER: \_\_\_\_\_

***NOTE: All proposals must bear the handwritten signature of a duly authorized member or employee of the organization making the proposal.***

## ATTACHMENT A2

**THIS DOCUMENT MUST BE COMPLETED AND SUBMITTED WITH PROPOSAL**

### PRICING SHEET

Please submit proposed pricing for all required equipment, other capital costs, and recurring fees. Price proposals will be compared to determine the total cost of ownership (TCO) over five years (anticipated initial duration of agreement). TCO will be determined by summing the following amounts from the price proposal:

- Line 6 - Total Equipment Costs for the Base System
- Line 19 - Total Other Capital Costs for the Base System
- Line 24 x 5 Years of Annual Software System Costs for the Base System
- Line 25 x 1.5 Years of Annual Hardware Maintenance for the Base System

All cells in the tables below with a yellow background are expected to be filled in by the proposer.

#### Equipment Costs - Base System (METRO + Shuttlebus/ZOOM)

| Line | Item                         | Quantity | Price per Unit | Extension |
|------|------------------------------|----------|----------------|-----------|
| 1    | Validators                   | 80       | \$             | \$        |
| 2    | Operator Consoles            | 80       | \$             | \$        |
| 3    | Installation Parts           | 72       | \$             | \$        |
| 4    | Installation                 | 72       | \$             | \$        |
| 5    | Smart Cards                  | 20,000   | \$             | \$        |
| 6    |                              |          | <b>Total</b>   | \$        |
| 7    | Additional Validators        | 1        | \$             | \$        |
| 8    | Additional Operator Consoles | 1        | \$             | \$        |
| 9    | Additional Smart Cards       | 1,000    | \$             | \$        |

#### Equipment Costs - South Portland (Option)

| Line | Item               | Quantity | Price per Unit | Extension |
|------|--------------------|----------|----------------|-----------|
| 10   | Validators         | 8        | \$             | \$        |
| 11   | Operator Consoles  | 8        | \$             | \$        |
| 12   | Installation Parts | 8        | \$             | \$        |
| 13   | Installation       | 8        | \$             | \$        |
| 14   | Smart Cards        | 1,000    | \$             | \$        |
| 15   |                    |          | <b>Total</b>   | \$        |



## ATTACHMENT A2

### Other Capital Costs - Base System (METRO + Shuttlebus/ZOOM)

| Line | Item   | Cost      |
|------|--|-----------|
| 16   | Software Customization                             | \$        |
| 17   | Training   | \$        |
| 18   | 3 Year Warranty (to begin after system acceptance) | \$        |
| 19   | <b>Total</b>                                       | <b>\$</b> |

### Recurring System Costs (Annual)

Please describe and quantify costs associated with ongoing operations & maintenance. These may be in the form of monthly fixed fees, a per transaction fee, percentages of transactions withheld as a fee, a combination, or by another method. It is assumed that all credit/debit card processing fees are included unless otherwise described. Please clearly state whether bank card transaction fees are included.

### Recurring System Costs - Base System (METRO + Shuttlebus/ZOOM)

| Line | Item  | Anticipated Annual Quantity | Price per unit               | Extension |
|------|---|-----------------------------|------------------------------|-----------|
| 20   | Fixed Monthly Fees  | 12 Months                   | \$ /Month                    |           |
| 21   | Per bank card transaction fee                             | 200,000 transactions        | \$ /Transaction              |           |
| 22   | Per ride transaction fee                                  | 1,600,000 rides             | \$ /Ride                     |           |
| 23   | Percentage of bank card transactions processed            | \$2,000,000                 | % of \$ Volume               |           |
| 24   |   |                             | <b>Software Annual Total</b> | <b>\$</b> |
| 25   | Monthly Hardware Maintenance (after the warranty expires) | 12 Months                   | \$ /Month                    |           |

**ATTACHMENT A2**

**Recurring System Costs - South Portland (Option)**

| <b>Line</b> | <b>Item</b>   | <b>Anticipated Annual Quantity</b> | <b>Price per unit</b>        | <b>Extension</b> |
|-------------|---|------------------------------------|------------------------------|------------------|
| 26          | Per bank card transaction fee                             | 15,300 transactions                | \$ /Transaction              |                  |
| 27          | Per ride transaction fee                                  | 172,000 rides                      | \$ /Ride                     |                  |
| 28          | Percentage of bank card transactions processed            | \$153,000                          | % of \$ Volume               |                  |
| 29          |   |                                    | <b>Software Annual Total</b> | <b>\$</b>        |
| 30          | Monthly Hardware Maintenance (after the warranty expires) | 12 Months                          | \$ /Month                    |                  |

# ATTACHMENT A3

THIS DOCUMENT MUST BE COMPLETED AND SUBMITTED WITH PROPOSAL

## SUBCONTRACORS AND SUPPLIERS

|   | Name of Product Supplier or Subcontractor | Product Supplied or Work Performed | Expected \$ Value | DBE Yes/No |
|---|---|------------------------------------|-------------------|------------|
| 1 |   |                                    |                   |            |
| 2 |   |                                    |                   |            |
| 3 |   |                                    |                   |            |
| 4 |   |                                    |                   |            |
| 5 |   |                                    |                   |            |
| 6 |   |                                    |                   |            |
| 7 |   |                                    |                   |            |

**ATTACHMENT A4**

**THIS DOCUMENT MUST BE COMPLETED AND SUBMITTED WITH PROPOSAL**

**CERTIFICATION REGARDING DEBARMENT, SUSPENSION,  
OTHER INELIGIBILITY, AND INVOLUNTARY EXCLUSION**

The Respondent, \_\_\_\_\_, certifies, by submission of this proposal, that neither it nor its principals or subcontractors is presently debarred, suspended, proposed for debarment, declared ineligible, or involuntarily excluded from participation in this transaction by any Federal Department or Agency.

The Respondent agrees to comply with the requirements of 2 CFR Part 180, Subpart C, as adopted and supplemented by U.S. DOT regulations at 2 CFR Part 1200, while this Request for Proposals (“RFP”) is pending and throughout the period of any contract that may arise from this RFP. The Respondent further agrees that it and its affected subcontractors will provide immediate written notice to Greater Portland Transit District (“GPTD”) if at any time the Respondent learns that his/her subcontractor’s certification was erroneous when submitted or has become erroneous because of changed circumstances.

By submitting this proposal and affixing a signature below, the Respondent certifies that the above statement is a material representation of fact upon which reliance is placed by GPTD. If it is later determined that the Respondent knowingly rendered an erroneous certification, in addition to other remedies available to the Federal Government, GPTD may terminate this transaction for cause of default.

If the Respondent is unable to certify to any of the statements in this certification, the Respondent shall attach an explanation to this certification.

**The Respondent certifies or affirms the truthfulness and accuracy of the contents of the statement submitted on or with this certification and understands that the provisions of 31 U.S.C. §§ 3801-3812 are applicable thereto.**

\_\_\_\_\_  
Signature of Authorized Official

\_\_\_\_\_  
Date

\_\_\_\_\_  
Printed Name of Authorized Official

\_\_\_\_\_  
Title

\_\_\_\_\_  
Company Name

**ATTACHMENT A5**

**THIS DOCUMENT MUST BE COMPLETED AND SUBMITTED WITH PROPOSAL**

**CERTIFICATION OF COMPLIANCE WITH BUY AMERICA REQUIREMENTS**

The Undersigned certifies or affirms the truthfulness and accuracy of the contents of the statements submitted on or with this certification and understands that a false certification is a criminal act and in violation of 18 U.S.C. § 1001.

**Certification of Compliance**

The Undersigned hereby certifies that it shall comply with the requirements of 49 U.S.C. 5323(j)(2)(C) and 49 C.F.R. 661.11, subsequent amendments to those regulations that may be promulgated, and any applicable implementing guidance that FTA may issue, unless a waiver has been granted by FTA or the product is subject to a general waiver. The Undersigned further certifies that it shall comply with FTA directives to the extent those directives are consistent with SAFTEA-LU, “Moving Ahead for Progress in the 21st Century” (MAP-21), 23 U.S.C. § 101.

\_\_\_\_\_  
Signature of Authorized Official

\_\_\_\_\_  
Date

\_\_\_\_\_  
Printed Name of Authorized Official

\_\_\_\_\_  
Title

\_\_\_\_\_  
Company Name

**Certification of Non-Compliance and Waiver Qualification**

The Undersigned hereby certifies that it cannot comply with the requirements of 49 U.S.C. § 5323(j), as amended, but may qualify for an exception to the requirement pursuant to 49 U.S.C. § 5323(j)(2), as amended, and regulations in 49 CFR Part 661.7.

\_\_\_\_\_  
Signature of Authorized Official

\_\_\_\_\_  
Date

\_\_\_\_\_  
Printed Name of Authorized Official

\_\_\_\_\_  
Title

\_\_\_\_\_  
Company Name

THIS DOCUMENT MUST BE COMPLETED AND SUBMITTED WITH PROPOSAL

CERTIFICATION OF RESTRICTIONS ON LOBBYING  
49 CFR PART 20

The Contractor certifies, to the best of his or her knowledge and belief, that:

1. No Federal appropriated funds have been paid or will be paid, by or on behalf of the undersigned, to any person for influencing or attempting to influence an officer or employee of an agency, a Member of Congress, an officer or employee of Congress, or an employee of a Member of Congress in connection with the awarding of any Federal contract, the making of any Federal grant, the making of any Federal loan, the entering into of any cooperative agreement, and the extension, continuation, renewal, amendment, or modification of any Federal contract, grant, loan, or cooperative agreement.
2. If any funds other than Federal appropriated funds have been paid or will be paid to any person for making lobbying contacts to an officer or employee of any agency, a Member of Congress, an officer or employee of Congress, or an employee of a Member of Congress in connection with this Federal contract, grant, loan, or cooperative agreement, the undersigned shall complete and submit Standard Form--LLL, "Disclosure Form to Report Lobbying," in accordance with its instructions [as amended by "Government wide Guidance for New Restrictions on Lobbying," 61 Fed. Reg. 1413 (1/19/96). Note: Language in paragraph (2) herein has been modified in accordance with Section 10 of the Lobbying Disclosure Act of 1995 (P.L. 104-65, to be codified at 2 U.S.C. 1601, *et seq.*)]
3. The undersigned shall include **the language of this certification in** the award documents for **all subcontracts**, that shall certify and disclose accordingly.

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.

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

\_\_\_\_\_  
Signature of Authorized Official

\_\_\_\_\_  
Date

\_\_\_\_\_  
Printed Name of Authorized Official

\_\_\_\_\_  
Title

\_\_\_\_\_  
Company Name

## **ATTACHMENT A7**

### **THIS DOCUMENT MUST BE COMPLETED AND SUBMITTED WITH PROPOSAL**

#### **REQUIREMENTS TRACEABILITY MATRIX**

The Requirements Traceability Matrix is an Excel document (attached to this RFP) that lists all of the requirements for this project. Vendors must fill out the Requirements Traceability Matrix in its entirety and mark each requirement as “meets”, “partially meets”, or “does not meet”.

Not meeting or partially meeting specific requirements will not disqualify a proposer. For any requirements marked as “partially meets” or “does not meet,” please provide notes including alternative methods of meeting the client’s needs, if available. METRO will expect all requirements marked as “meets” to be delivered under the contract.

This Matrix will be used throughout the length of the project to measure the selected vendor’s compliance with the METRO contract.

## SCOPE OF WORK

# 1 Introduction

## 1.1 Project Background

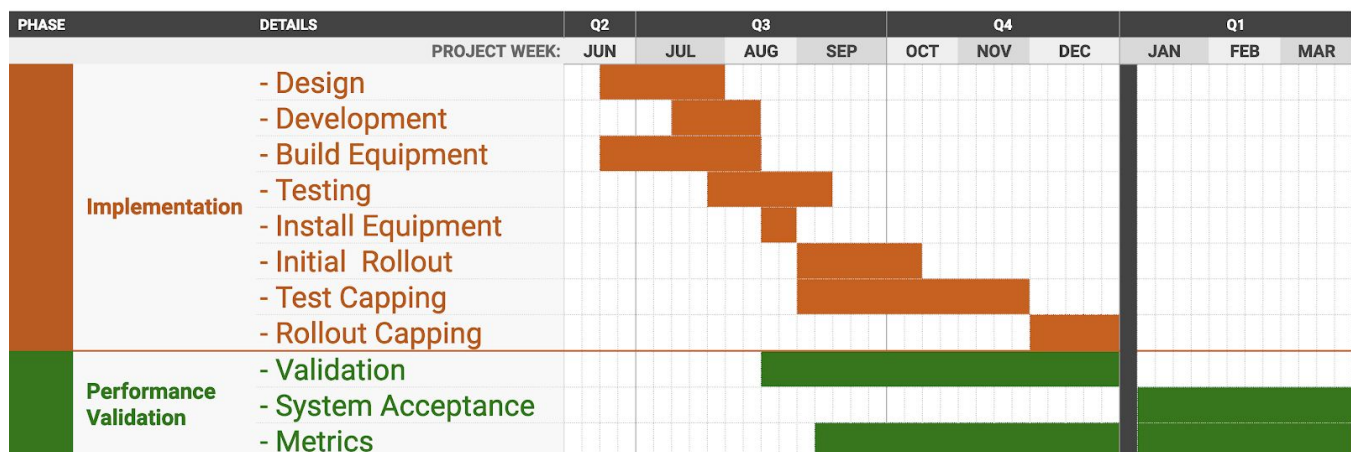
METRO provides fixed-route bus service throughout the Greater Portland region in Maine to nearly two million riders each year. METRO’s current fare collection system (see Section 1.6) is over 20 years old and requires replacement. METRO is procuring a next-generation fare collection system that will utilize next generation technologies, is flexible in providing for new services and payment options, is scalable in expansion of existing services and system upgrades, and provides security for the agency and public while improving the customer experience.

For the new system, METRO wants to implement a next-generation fare collection system that will leverage reloadable smart cards, a mobile application, and a strong retail network to ensure access to system benefits. The new fare collection system will be account-based, built upon a central back office that manages accounts, calculates fare payments, and processes all transactions based on established business rules. The system will support multiple media types including smart cards and smartphones. Fare media will serve as a credential for a back office account. On-board validators, which will validate smartcard and smartphone fare media, will communicate with the central back office in order to perform fare validation and exchange transaction data. The new fare collection system will be implemented using an open architecture approach, allowing for integration with outside systems and future expansion.

## 1.2 Project Timeline

A notional schedule for the project follows. This schedule applies to all participating agencies.

### METRO Project Timeline



### Project Phasing

- See section 2.3



## 1.3 Project Goals

METRO has identified the following strategic objectives as part of this project:

### Agency

- Increase transit system usage, market penetration, and fare revenue
- Lower the total cost of system ownership
- Reduce the use of cash as a form of payment
- Improve access to data and analytics for planning
- Allow easy scalability for service expansion and additional partner transportation agencies (including ADA Paratransit services)
- Improve flexibility by implementing a scalable open architecture system that is able to adapt and evolve
- Support unlimited expansion of institutional pass programs
- Leverage existing smart card/gift card networks for METRO fare card distribution
- Minimize or eliminate the involvement of the bus operator in the fare payment process
- Improve safety and security of bus operators and riders by reducing the use of cash and reducing conflict situations

### Customers

- Improve (i.e. simplify and accelerate) the customer experience in terms of payment options and steps to making payment
- Shift the accessibility of discounts to rides taken versus dollar spent (i.e. fare capping)
- Improve equity in the cost of using transit

## 1.4 Participating Entities

METRO operates a fleet of 44 buses, including 16 Gilligs, 13 Orions, four Arbocs and 11 New Flyers. All the buses are standard transit coaches or body-on-chassis style buses. METRO is in the process of replacing six Orion coaches with six new New Flyer coaches.

The regional transit partners operate a mixture of cutaway, transit, and long distance coaches. The Biddeford-Saco-Old Orchard Beach Transit Committee Shuttle Bus dba Shuttlebus/ZOOM operates a fleet of 22 vehicles, including 4 El Dorados, 4 Orions, 4 New Flyers, 1 MCI, 1 BlueBird, 6 Duponts, 1 Ford Trolley, and 1 Freightliner Trolley. South Portland Bus Service operates a fleet of seven vehicles.

## 1.5 Roles and Responsibilities

The vendor shall be responsible for ensuring the performance of the back office system, the customer interfaces, the vendor-provided field devices, the METRO garage WiFi, and for the end-to-end performance of transactions on vendor-provided field devices. The vendor shall also prototype installation for on board equipment installations for all fleet types.

METRO and its partners shall be responsible for installing all on board equipment. METRO and its partners shall also be responsible for first-line field equipment repair, replacement, and commissioning and card inventory management and distribution.

## 1.6 Current Fare Collection Solution

METRO's current fare collection system utilizes GFI Cents-a-Bill registering fareboxes and a probing/vaulting system to collect cash fares and paper single-ride tickets. Out of an anticipated CY2018 \$2.1 million annual fare revenue, approximately 40% of fares were expected to be paid using cash and will be collected by these fareboxes. After over 20 years of heavy use, the system has reached its end of life and requires replacement.

Shuttlebus/ZOOM uses Diamond drop boxes throughout their fleet.

METRO sells paper passes at eleven local grocery store locations, METRO administrative headquarters, the METRO Pulse downtown transit center, and a number of community and government offices throughout its service area. Shuttlebus/ZOOM and South Portland Bus Service have very limited ticket and pass distribution outlets.

## 1.7 Current Fare Policy, Structures, and Pricing

There are a number of partner agencies who are expected to join the new electronic fare payment system. An overview of the partner's current fare structures and METRO's proposed fare structure are below. Please note that Shuttlebus/ZOOM is looking to eliminate its zone structure alongside implementation of this new fare collection system.

### METRO Fare Structure

| Local Service                                     |           |         |             |
|---|-----------|---------|-------------|
| Rider Category                                    | Base Fare | Day Cap | Monthly Cap |
| Full Fare   | \$2.00    | \$6.00  | \$60.00     |
| Reduced Fare<br>(Senior/Disabled/Medicare, Youth) | \$1.00    | \$3.00  | \$30.00     |
| Breez Service                                     |           |         |             |
| Rider Category                                    | Base Fare | Day Cap | Monthly Cap |
| Full Fare   | \$4.00    | \$12.00 | \$120.00    |
| Reduced Fare<br>(Senior/Disabled/Medicare, Youth) | \$2.00    | \$6.00  | \$60.00     |

### South Portland Bus Service Fare Structure

| Local Service                              |           |                |              |
|--|-----------|----------------|--------------|
| Rider Category                             | Base Fare | 10-Ride Ticket | Monthly Pass |
| Full Fare                                  | \$1.50    | \$13.50        | \$45.00      |
| Reduced Fare<br>(Senior/Disabled/Medicare) | \$0.75    | \$6.75         | N/A          |
| Student Fare                               | \$1.25    | \$11.25        | N/A          |

## Shuttlebus/ZOOM Fare Structure

| Shuttlebus Local                           |           |                |                                  |                |
|--|-----------|----------------|----------------------------------|----------------|
| Rider Category                             | Base Fare |                | Monthly Pass                     |                |
| Full Fare                                  | \$1.50    |                | \$30.00                          |                |
| Reduced Fare<br>(Senior/Disabled/Medicare) | \$0.75    |                | \$25.00                          |                |
| Student Fare                               | \$1.50    |                | \$25.00                          |                |
| Inter-City / Portland                      |           |                |                                  |                |
| Zone                                       | Base Fare |                | 10-Ride Ticket                   |                |
| Travel thru All Zones                      | \$5.00    |                | \$40.00                          |                |
| Travel within Zone 1                       | \$1.50    |                | N/A                              |                |
| Travel into/out of Zone 2                  | \$3.00    |                | \$25.00                          |                |
| Travel within Zone 3                       | \$1.50    |                | N/A                              |                |
| ZOOM Turnpike Express                      |           |                |                                  |                |
| Rider Category                             | Base Fare | 10-Ride Ticket | Monthly<br>Commuter Card         | Quarterly Pass |
| Full Fare                                  | \$5.00    | \$1.20         | \$120.00                         | \$300.00       |
| UNE Nor'easter Bus                         |           |                |                                  |                |
| Rider Category                             | Base Fare |                |                                  |                |
| General Public                             | \$1.50    |                |                                  |                |
| UNE Student Fare                           | Free      |                |                                  |                |
| Seasonal Trolleys                          |           |                |                                  |                |
| Rider Category                             | Base Fare | After 6pm      | Thursday Night Fireworks Special |                |
| General Public                             | \$1.00    | \$2.00         | \$1.00                           |                |

METRO, South Portland Bus Service, and Shuttlebus/ZOOM all offer free transfers to their riders when they are transferring between the same type of service. METRO explicitly limits these transfers to travel in the same direction, i.e. transfers are not allowed to be used for a round trip under the current system.

METRO and its regional partners have a number of existing agreements with regards to interagency transfers. METRO and South Portland Bus Service currently cross-honor their transfers, Monthly Passes, and 10-Ride Tickets. Shuttlebus/ZOOM and South Portland Bus Service cross-honor transfers as well within the greater Portland service area.

## 1.8 Procurement Plan

This procurement will select a single vendor to design, develop and install the system. Project funding includes federal funds and therefore the selected bid will need to be Buy America compliant. The initial contract will be for five years with one five-year option for renewal.

The contract will include:

- The fare collection system
- The mobile application
- Validators and operator consoles for the fleet plus 10% spares
- Integration with a retail partner for loading cash
- The initial batch of smart cards
- A monthly, per transaction or percentage of value based fee
- Processing of all transactions will be included
- All bank card fees will be included
- Software system maintenance will be included
- Mobile application maintenance will be included
- Card readers for all agencies

Support under the contract will include:

- Hardware support during system acceptance
- Three year warranty beyond system acceptance at a fixed price
- Hardware support after the expiration of the warranty at an annual price
- Additional smart cards at a preset unit price
- Additional onboard units at a preset unit price
- Specifications for METRO to procure smart cards elsewhere if they choose

There will be one contract for mobile/smart card/back end/hardware.

New fareboxes will be procured in a separate procurement.

## 2 Project Approach

### 2.1 Project Management

The selected vendor shall provide a robust project management team and project management plan to support development and implementation of the new fare collection system. The vendor's plan for managing the project shall clearly demonstrate an appropriate allocation of project management resources that have the ability and experience to ensure that system design and implementation will be properly coordinated and managed, and will be completed on schedule and within budget. The vendor shall provide tools to manage tasks, schedule, risk, change, and the other items listed in this section that are required to manage the project.

The vendor shall designate responsible and experienced individuals to serve as the Project Manager (PM) and Lead Engineer for the entire term of the contract. Both the PM and Lead Engineer will maintain close collaboration with the METRO team throughout the project lifecycle.

The vendor shall provide a plan for regular project meetings with METRO that will help coordinate project activities, facilitate decision-making, and provide status/updates on all elements of the project throughout the life of the project.

The vendor shall submit a Project Management Plan (PMP) shortly following Notice to Proceed (NTP) that details at a minimum project organization, master schedule, and how project scope, cost, risk, safety, quality, project changes, and other key aspects of the project will be managed by the vendor.

## 2.2 Design Reviews and Approvals

Three formal design review phases will be undertaken during the project to develop and describe the technical design that will satisfy the needs in this scope of work. For each design review phase (Conceptual, Preliminary, and Final), the vendor shall submit a set of documentation, hardware samples, and software demonstrations to the Agencies for review and approval. The requirements in this section describe the criteria for execution and approval of each design review phase.

| Requirements Number | Requirement  |
|---------------------|--|
| 2.2-1               | The vendor shall conduct three design reviews for the system: Conceptual Design Review (CDR), Preliminary Design Review (PDR), and Final Design Review (FDR).  |
| 2.2-2               | At a minimum, the Conceptual Design Review will include: <ul style="list-style-type: none"> <li>• Confirm the vendor's management team and the scope of supply of sub-suppliers</li> <li>• Provide narrative descriptions of the system proposed by the vendor</li> <li>• Identify information needs and decisions required from METRO</li> <li>• Review the system conceptual design, including block diagrams and features</li> </ul>  |
| 2.2-3               | At a minimum, the Preliminary Design Review will include: <ul style="list-style-type: none"> <li>• Detailed technical descriptions of the system's major components, allowing a thorough understanding of the implementation of the proposed system</li> <li>• Drawing of user interface arrangements</li> <li>• Software system-level flow charts</li> <li>• Software data backup and recovery procedures</li> </ul>  |
| 2.2-4               | Preliminary design review activities will include the following: <ul style="list-style-type: none"> <li>• Vendor shall submit preliminary design review (PDR) design documents to METRO for review.</li> <li>• Preliminary design review meeting(s) will be held with the Contractor where the Contractor shall explain the design and METRO will confirm and provide feedback on the information.</li> <li>• Where possible, issues will be resolved during the design review meetings.</li> <li>• If necessary, vendor shall re-submit updated PDR documents for METRO review and approval that incorporate needed changes identified during the reviews.</li> </ul> |

|       |   |
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| 2.2-5 | <p>Final design review (FDR) activities will include the following:</p> <ul style="list-style-type: none"> <li>• Vendor shall develop and submit FDR design documents to METRO for review that document additional design details and address all remaining design decisions.</li> <li>• Final design review meeting(s) will be held with the Contractor where the Contractor shall explain the final design.</li> <li>• Where possible, any remaining issues will be resolved during the design review meetings.</li> <li>• If necessary, Contractor shall re-submit updated FDR documents for METRO review and approval that incorporate needed changes identified during the reviews.</li> </ul> |
| 2.2-6 | <p>FDR will include but not be limited to the following:</p> <ul style="list-style-type: none"> <li>• Detailed system architecture diagrams</li> <li>• Data architecture and data flow diagrams</li> <li>• Complete database schema and data dictionary</li> <li>• Full mockups of mounting hardware for all fleet types</li> <li>• Detailed software specifications for all newly developed software required by the system, with software module descriptions in a structured narrative format.</li> </ul>  |

## 2.3 Implementation and Transition Plans

The new fare system will be installed in phases, to allow the capping system to be fully tested before rollout.

### Initial Rollout

Following testing, the onboard equipment will be installed. After the equipment is installed a series of progressively larger public tests will take place. Typically these include beta testing, friendly user testing, and a soft launch. Following success in all of these phases the new system will be fully launched with every feature except for capping. This will include the mobile application, smart cards, the retail network and the institutional program.

While institutional customers will be able to load passes onto smart cards, individual customers will only be able to load value into their accounts and purchase the base fare. For this reason, existing sales of paper passes will not be discontinued.

### Capping Rollout

Following initial rollout, the capping calculation engine will be operational in the back office, and data flags will be set in rider accounts to indicate when they have reached the capping threshold, but free rides will not be granted. Initial testing will be completed by examining the data to make sure that the flag is being set correctly.

Once the capping calculation has passed the initial testing, capping will undergo a similar set of rollout tests: beta, friendly user, soft launch and full launch. During the friendly user or soft launch test phases, free rides could be enabled for all capped riders, just not announced to the general public. For full launch, capping will be announced and promoted.

## Farebox Replacement

During the fare system implementation, METRO will procure new fareboxes to replace the existing Cents-a-bills. These fareboxes will be simple, non-registering drop boxes that will not have keys for fare type and will not collect data. They may be replaced at any time during the project. They will be procured before the new New Flyer coaches arrive so that they can be installed before those coaches are put into service. Additionally, it makes sense, if possible to replace the fleet all at once so that there are not two vaulting systems in use at once. Operators will key cash and token transactions on the new operator consoles rather than the fareboxes.

| Requirements Number | Requirement  |
|---------------------|--|
| 2.3-1               | METRO and the transit partner agencies will be responsible for installing all on board equipment   |
| 2.3-2               | The vendor shall provide installation instructions and training for installation of board equipment on all fleet types   |
| 2.3-3               | The vendor shall prototype installations for on board equipment installations for all fleet types  |
| 2.3-4               | The vendor shall specify, following prototyping, the physical interfaces for network communications and power for on board equipment for all fleet types. Commonality is desirable.            |
| 2.3-5               | The vendor shall be responsible for supplying any custom hardware required for on board equipment installation for all fleet types in sufficient quantities to install readers on all vehicles |

## 2.4 Testing

The vendor shall be responsible for a test plan which will be approved by METRO. Test phases will include factory testing of the onboard equipment, integration testing in both lab and field environments and acceptance testing. The final system acceptance tests will begin on full system launch and last for at least six months until final system acceptance is granted.

| Requirements Number | Requirement   |
|---------------------|---|
| 2.4-1               | All system components and subsystems will be tested individually and in integrated environments to make sure that they meet all technical and functional capabilities in the specifications.  |
| 2.4-2               | Sixty (60) days prior to the commencement of testing, the vendor shall deliver a final test plan to METRO for review; modification, if necessary; and approval.   |
| 2.4-3               | The vendor shall be responsible for a test plan which will be approved by METRO. Test phases will include factory testing of the on board equipment, integration testing in both lab and field environments and acceptance testing. The final system acceptance tests will begin on full system launch and last for at least six months until final system acceptance is granted. |
| 2.4-4               | All tests and inspections will be documented by the vendor and monitored and signed off by METRO or their representatives.  |

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|-------|--|
| 2.4-5 | The purpose of unit testing is to demonstrate in a controlled laboratory environment that each of the system components and associated software furnished by the vendor meets all capabilities through final design, prior to full system integration. Successful completion of component-level software development, and demonstration of production equipment on METRO premises are prerequisites.   |
| 2.4-6 | <p>When unit testing has been successfully completed, the vendor shall conduct integration testing in which all devices, back office applications, website, cash loading and smart card distribution network, interfaces, and all other aspects of the system are exercised. Integration testing is needed to confirm that when installed, the fully integrated system will perform, operate, and communicate as required in a controlled laboratory environment.</p> <p>With successful completion and approval of integration testing, all software and configuration files will be “frozen,” and the vendor will make no changes without METRO authorization. Upon METRO approval, field testing of the system components may commence.</p> |
| 2.4-7 | The vendor shall conduct all field testing, including beta, friendly user and soft rollout using the production system.  |
| 2.4-8 | Acceptance testing is the final phase of testing. Acceptance testing will be performed in the production environment with all components, subsystems, and third-party networks completely functional, operational, online, and in service. Following the completion of any acceptance testing, the vendor shall provide all testing data, reports, and other testing information to METRO for review and approval.   |

## 2.5 Training

The vendor shall provide training material and a single session of for each training area. In the field, operators will need to be trained to use the keys on the new operator console instead of the farebox. Training will also need to cover how to handle various scenarios, particularly if credentials are declined by the system. Maintenance staff will also require training on the installation and necessary first line maintenance of the equipment. It is expected that training will also include administrative training for system management (e.g., website, back office, user security, etc.). The system will include a bus-in-a-box (BIB) that enables students to receive hands-on equipment operation and maintenance instruction while in a classroom setting.

| Requirements Number | Requirement   |
|---------------------|---|
| 2.5-1               | The vendor shall provide training and user guides to be used by customer service representatives and the customer service center.                   |
| 2.5-2               | The vendor shall provide training to METRO employees regarding how to perform any maintenance activities the new system may require.                |
| 2.5-3               | The vendor shall provide training to METRO employees for administration and system management (e.g. website, back office, user security) functions. |



|       |   |
|-------|---|
| 2.5-4 | The vendor shall provide training to METRO employees regarding how to perform proper installations of any equipment associated with the new system.   |
| 2.5-5 | The vendor shall provide a device training unit or bus-in-a-box (BIB) that enables students to receive hands-on equipment operation and maintenance instruction while in a classroom setting. The training BIB needs to be configured to replicate METRO’s specific deployed configuration including validator(s) and operator console. |

### 3 System Design & Architecture

The new fare collection system will be account-based, built upon a central back office that manages accounts, calculates fare payments, and processes all transactions based on established business rules. The system will support multiple media types including smart cards and smartphones. Fare media will serve as a credential for a back office account. On-board validators, which will validate smartcard and smartphone fare media, will communicate with the central back office in order to perform fare validation and exchange transaction data. The new fare collection system will be implemented using an open architecture approach, allowing for integration with outside systems and future expansion.

#### 3.1 Common Design Requirements and Guidelines

METRO is seeking a proven system at the core. While elements will need to be developed to meet the specific needs of the project, the main back office and field components will already be in use in a similar transit fare collection system. Proven components that have not been used together before are acceptable.

The system will be sized such that the total number of possible accounts, and total concurrent use of accounts, will at a minimum support 200 percent of the current ridership figures for the region and scalable to support up to 400 percent of the anticipated peak processing load. Current ridership for the region is over 2.5 million annual unlinked trips.

Onboard equipment, including operator consoles and onboard validators, will be designed to be installed on transit vehicles with environmental conditions described in this section. Operation of the fare collection equipment in this environment will not in any way impact the performance of the system.

The vendor-supplied systems will include the supply and conditioning of power as needed, as described in the requirements below.

The vendor shall ensure that equipment, including system components, includes protection from electrical noise as described in the requirements below.

The agencies shall own all data that is generated from the system. The vendor shall allow, under perpetual license to the agencies, the use of all open architecture interfaces, libraries, documents, and Intellectual Property (IP) for internal use and distribution to third-parties at no additional cost to the agencies.

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 agency employees
- Will withstand the rigors of the environments in which the equipment will be installed, and the public use to which it will 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

Applicable codes, laws, ordinances, statutes, standards, rules, and regulations include, but are not limited to, the list below. The latest revisions in effect at the time of Final System Acceptance will apply.

- Americans with Disabilities Act (ADA)
- Americans with Disabilities Act Accessibility Guidelines (ADAAG)
- Advanced Encryption Standard
- ANSI X9.24, Financial Services Retail Key Management
- European Norm EN55022, Emissions standards for CE marking
- European Norm EN55024, Immunity standards for CE marking
- FCC Part 15 Class B – Radio Frequency Devices
- FIPS 140-2
- IEEE 802.11 a/b/g/n standard for wireless data communications
- IEEE 802.11i standard for wireless data network security
- IEEE 802.11-2016
- 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)
- Society of Automotive Engineers SAE J1113-13 Electrostatic Discharge
- Society of Automotive Engineers 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 will apply.

The security design of the system (and all sub-components, APIs, and other interfaces) will reflect the recommended controls outlined in relevant best practices frameworks, including (but not limited to) ISO 27002:2013, NIST 800-53 and PCI-DSS (version 3.2 or current at the time of deployment).

| Requirements Number | Requirement  |
|---------------------|--|
| 3.1-1               | Onboard equipment, including onboard validators and operator consoles, will be designed, built, and installed for the harsh, high shock and vibration operating environment in which the system components will be installed. Operation of the fare collection equipment in this environment will not in any way impair equipment performance throughout the required useful life of the system.   |
| 3.1-2               | Onboard equipment, including onboard validators and operator consoles will 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 will not in any way impair equipment performance throughout the required useful life of the system.   |
| 3.1-3               | All system components, including all interior-mounted components and assemblies, will resist horizontal shocks of up to 6 g (where “g” is the acceleration of gravity at sea level, or 9.81 meters per second squared) and up to 1.2 g in the vertical axis for a duration of up to 12 milliseconds (ms) without permanent deformation or failure.   |
| 3.1-4               | There will 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 axes and repeated continuously for five (5) complete cycles. If any assembly or component is a source of vibration, measures will be taken to dampen the vibration. Resonant frequencies that may exist in the mounted structures will be critically dampened. All corrective measures must be approved by METRO. |
| 3.1-5               | Onboard equipment, including onboard validators and operator consoles, will pass the following shock and vibration tests: <ul style="list-style-type: none"> <li>• IEC 60068-2-27</li> <li>• IEC 60068-2-64</li> </ul>   |

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| 3.1-6  | <p>The onboard equipment provided by the vendor will be able to operate and not suffer any degradation in performance under the following environmental conditions:</p> <ul style="list-style-type: none"> <li>• Storage temperature: -22° to +150°F</li> <li>• Operating temperature: -15°F to 140°F ambient</li> <li>• Thermal shock: Up to 50 degrees F in 1 hour, non-condensing</li> <li>• Relative humidity: 5-100%, non-condensing</li> <li>• Airborne dust: up to 180 micrograms per cubic meter, with iron and salt particles</li> <li>• Sunlight: direct sunlight, radiation loading of up to 789J/sec/m2</li> <li>• Inclination: 0° to 20° off vertical</li> <li>• Rainfall: 10 inches over 12 hours</li> <li>• Water/solvents: IEC529 to level IP54 or equivalent</li> <li>• Pollution: Vog (e.g. sulfur dioxide-laden air) and other forms of native air pollution</li> <li>• Other operational conditions: water spray, industrial cleaning solvents, and mud on system components from cleaning vehicle floors and walls</li> </ul> |
| 3.1-7  | <p>The onboard equipment will be either immune to or protected from the damaging effects of visible spectrum and ultraviolet radiation.</p>  |
| 3.1-8  | <p>The onboard equipment will be tested and certified to operate under the environmental conditions specified in Society of Automotive Engineers (SAE) J1455 and all standards contained therein.</p>  |
| 3.1-9  | <p>Onboard equipment, including onboard validators and operator consoles, will be designed to operate reliably from a vehicle’s direct current power source, which will be 12 volts of direct current (VDC).</p>   |
| 3.1-10 | <p>All system components operating off of line voltage will be designed to operate with a plus or minus 10% fluctuation in continuous voltage without any damage or interruption.</p>  |
| 3.1-11 | <p>In the event of a loss of electrical power, field equipment will complete any transaction in process, retain all data, and shutdown in an orderly manner. The equipment will return to full operational status after a power failure without manual intervention or adversely affecting the integrity of stored data.</p>   |
| 3.1-12 | <p>All equipment will be protected against damage or data loss under the following conditions:</p> <ul style="list-style-type: none"> <li>• Voltage fluctuations</li> <li>• Reverse polarity of the input voltage</li> <li>• Temporary voltage variations (0 to 25 V)</li> <li>• Over-current draw</li> <li>• Stray currents</li> </ul>  |
| 3.1-13 | <p>The onboard equipment power supply will include adequate filters and components to regulate the bus-supplied voltage and render it devoid of power spikes and noise. Provisions will include elimination of power fluctuations caused by fluorescent lights, coach alternators, coach startup (cranking), air conditioning units, radio communication units, and other systems characteristic of a bus environment.</p>   |

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| 3.1-14 | Adequate protection against onboard transient power surges, as determined during system design and testing, will be incorporated to the extent necessary to prevent damage to the electronic components of the onboard equipment.  |
| 3.1-15 | Power sensing will be incorporated into onboard equipment power supplies to cause the devices to switch off automatically if the supply voltage increases or decreases to levels beyond the voltage tolerance.   |
| 3.1-16 | The vendor shall ensure that equipment, including system components, includes protection from electrical noise as described in the capabilities below.   |
| 3.1-17 | 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 design review.  |
| 3.1-18 | The vendor shall confirm system equipment will operate without being adversely affected by or causing electromagnetic interference (EMI).  |
| 3.1-19 | All system components will include protection against external EMI and radio frequency interference (RFI) emissions, as well as internal conductive or inductive emissions.  |
| 3.1-20 | <p>All system components will conform to the following capabilities:</p> <ul style="list-style-type: none"> <li>• FCC Part 15, Subpart B Class A (Conducted emissions), pertaining to conducted susceptibility</li> <li>• FCC Part 15, Subpart B Class A (Radiated emissions), pertaining to radiated susceptibility</li> </ul>  |
| 3.1-21 | <p>Equipment will not emit measurable EMI or RFI that produces harmful interference with any other onboard or station devices or systems, including Global Positioning System (GPS) and magnetic compass readings, and will comply with the following standards:</p> <ul style="list-style-type: none"> <li>• IEC 1000-4-6 (EN61000-4-6) pertaining to conducted susceptibility</li> <li>• IEC 6100-4-3 (EN61000-4-3) pertaining to radiated susceptibility</li> <li>• IEC 6100-4-2 (EN 6100-4-2) pertaining to electrostatic discharge</li> </ul> |
| 3.1-22 | Onboard equipment, including onboard validators and operator consoles, will be unaffected by interference from fluorescent lights, coach alternators, air conditioning units, radio communication units, and other systems characteristic of a bus environment.  |
| 3.1-23 | All equipment enclosures, chassis, assemblies, panels, switch boxes, and terminal boxes will be grounded. Protective grounding will be provided to make sure that exposed metal on all system components is connected to a common ground point.  |
| 3.1-24 | The vendor shall meet safety capabilities for the grounding that conforms to the National Electric Code (NEC) and UL, SAE and local codes where applicable.  |
| 3.1-25 | 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 will be provided for review and approval during design review.   |
| 3.1-26 | System equipment will be equipped with Ground Fault Circuit Interrupter (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.   |

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| 3.1-27 | The connection between the front-end devices and back office will be over a routable IP network. Where required, the connections will be secured using Transport Layer Security (TLS) and strong encryption, such as TDEA or AES. All data sent via the internet will be TLS-encrypted using the HTTPS protocol. Any IP communications must not preclude components of the system utilizing IPv6. |
| 3.1-28 | The onboard validator and operator console will connect to the mobile access router via Ethernet.   |
| 3.1-29 | Onboard validators will connect with onboard mobile network to access the back office system.   |
| 3.1-30 | The onboard modules will be able to communicate over Ethernet and TCP/IP, at a minimum. The communication interface to be used will be determined during design review and must provide adequate support for all system capabilities and integrations. Additional communication standards may be used such as SAE Vehicle communications standards (such as J1708/1939), Bluetooth, USB, etc.     |
| 3.1-31 | The vendor shall provide a wireless Local Area Network (WLAN) based on the 802.11 family of standards for polling buses and transmitting data between the onboard equipment and the system back office. On-bus equipment must be capable of communicating with the vendor installed WLAN.   |
| 3.1-32 | METRO shall be responsible for the design, installation, and testing of the garage wired local area networks, providing an ethernet interface to the vendor installed garage WLAN. METRO shall supply appropriate 110volt power for the WLAN equipment installed by the vendor.   |
| 3.1-33 | The system will comply with all ADA and Maine state requirements including the design and accessibility guidelines associated with each operating system. Languages identified in METRO's Limited English Proficiency (LEP) Plan are French, Arabic, and Somali.  |

## 3.2 System Architecture

The next system will be an open architecture, account-based system with key system interfaces built using APIs published by the vendor.

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

### General Architecture

The system will be account-based; *i.e.*, built on a central back office designed and implemented by the vendor that manages accounts, calculates fare payments based on established business rules, and processes all transactions. The centralized back office will be the system of record and take priority over any other systems/media that may hold account information. The account-based system will support multiple media types, which will serve as a credential for a back office account. Centralized fare processing will reduce the need

for complex field validation devices, and enable integration with other systems. Fare data may be stored on fare media for specific functions, but the central system will take precedence for fare calculations and enforcement.

### Network

Wherever possible, field transactions will be processed within hundreds of milliseconds so that data is available virtually immediately. No communications network (particularly wireless networks) can provide true real-time communications and even very low latency near real-time communications networks can be disrupted periodically due to issues with coverage, capacity or temporary usage.

METRO has a physical network, connected to the internet, routing IP over ethernet. This includes connections to the edge of the garage space. There is not currently WiFi in the garage that can be used by this project. As a part of this project, the vendor will be expected to install a WiFi network in the garage for use in relaying system updates. More information on expectations for the garage WiFi network can be found in section 5.1.3 Offboard Equipment.

Shuttlebus/ZOOM and South Portland Bus Service (if included) have WiFi available in their garages which is routable to the internet and can be used to download system updates to vehicles.

METRO has onboard mobile data routers that can be used to communicate with the back office over the internet. The routers will use cellular data services to provide the internet connection. Connection to the routers will be by Ethernet RJ45. The onboard communications infrastructure will support communication with the back office to validate fare payments. The onboard network connection will also be used to provide each validator with regular updates to the list of cards with valid passes. This will ensure that, even with no cellular service, transactions will be properly processed.

Onboard routers are:

37 - Cradlepoint IBR1700 (<https://cradlepoint.com/products/cor-ibr1700>)

8 - Cradlepoint IBR1100 (<https://cradlepoint.com/products/cor-ibr1100-series>)

The new buses will receive IBR1700s moved from the Orions they are replacing

The routers connect to the Verizon 4G LTE network and route IP to the Internet.

Shuttlebus/ZOOM and South Portland Bus Service (if included) have WiFi available on their vehicles, which is routable to the internet and can be used to download system updates to vehicles.

### Offline Provisions

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 will support offline operations and risk mitigation techniques that limit fraud, provide accurate and timely account information, and control risk. Alternative methods of processing (store and forward, local approvals) will be used to support times and locations that real-time may not be available for a short period of time.

## System Hosting

Vendors may propose either a hosted or cloud-based infrastructure. Whichever approach is proposed, all KPIs concerning up-time, recovery capabilities, and response times will remain the same. The proposed architecture will be presented and approved during design review.

| Requirements Number | Requirement   |
|---------------------|---|
| 3.2-1               | METRO will not host the new fare collection system. The system could be offered as Software as a Service or hosted through a “cloud” based hosting service (AWS, Rackspace, etc.) subject to approval by METRO. All transactional data will be owned and accessible by METRO. |
| 3.2-2               | If cloud based or hosted, transferring data between systems will be by a secure protocol.   |
| 3.2-3               | The vendor shall provide a system that offers sufficient availability to protect against data loss and system failure.  |

## 3.3 System Components

### 3.3.1 Hardware

#### *Onboard Payment Validator*

The onboard payment validator is a customer-facing device used to validate fare media and accept fare payment. Validators will be installed near bus entry front doors for convenience and accessibility.

The payment validators will include a contactless smart card reader that supports reading of all ISO 14443 Type A and B compliant card formats (e.g., the entire MIFARE product line) and HID 15693 cards. The validators must also be capable of accepting payment by smartphone via barcode or NFC-presentation as available. The validators will be able to be updated via firmware to support new card formats in the future. The validators and/or the operator consoles (discussed below) will have WiFi (installed as part of this system implementation) for communication with the back office while in the garage. Communication in the field will occur using the existing onboard routers’ cellular connection.

Payment validation and the deduction of account value will occur when fare media are tapped on a payment validator. Upon presentation, the validator will determine the appropriate fare based on the defined tariff, ride history (including fare accumulation for fare capping), the presence of any institution-specific fare products, and other attributes contained in the account such as discount eligibility. For both authorized and denied transactions, the payment validator will provide visual and audible feedback, including the capability to display information on the fare charged and remaining account balance.

Payment validators will be a ruggedized form factor to resist vandalism and allow operation within the harsh onboard transit environment. They will also operate over a wide ambient temperature range, will be readable in



nighttime and direct sunlight conditions, and will be ADA compliant. The validators will be easily removed and replaced by authorized maintenance personnel. Replaced devices will automatically be programmed with their new location (e.g., vehicle number) and have their assigned location automatically updated in the appropriate back office application.

*Operator Console*

An operator console will be installed in each vehicle to display fare payment results directly to the bus operator. This will include the type of media presented (e.g. mobile, smart card, USM ID, etc.). The operator console will also serve as an input device for the operator to tally operational data such as customers with bicycles or wheelchairs and when a cash fare or paper pass is used. At least ten input keys are required.

All transactions, including smart card, mobile app, and cash boardings as well as events that don’t add to ridership counts such as wheelchair and bicycle loadings, will include GIS data and be sent to the back office in a single data stream for reporting and analysis.

For both authorized and denied transactions, the operator console will provide visual feedback similar to the payment validator, which may include information on the fare charged and the rider category associated with the account being used for payment.

The operator console will integrate with METRO’s onboard Clever CAD/AVL system. This integration will provide the fare collection system with operator, route, run, and geolocation over a J1708 serial connection. The operator consoles and/or the validators will have GPS in case of a failed connection to the CAD/AVL system and for METRO’s partner agencies that may not have CAD/AVL on board.

Operator consoles will be a ruggedized form factor to allow operation within the harsh onboard transit environment. They will also operate over a wide ambient temperature range and will be readable in nighttime and direct sunlight conditions. Operator consoles will be easily removed and swapped by authorized maintenance personnel with limited or no programming necessary to assign swapped devices to their new location.

*Offboard Equipment*

METRO has a single garage, located in Portland, for all buses. As a part of this project, the vendor will install a WiFi network in METRO’s garage for use in relaying system updates. The vendor will be responsible for designing, building, and testing the network. The WiFi network will be covered under the system hardware warranty and maintenance agreements.

| Requirements Number | Requirement   |
|---------------------|---|
| 3.3.1-1             | The validators will support basic validation of contactless (ISO 14443) smartcards.   |
| 3.3.1-2             | The validators will support basic validation of third-party issued ISO 14443 and HID 15693 cards as identifiers for METRO transit accounts. |
| 3.3.1-3             | The mobile validator can be mounted on a variety of surfaces and poles, in order to satisfy ADA and operational requirements.               |
| 3.3.1-4             | The validator will have ADA-compliant visual and audible indicators that provide  |

|          |   |
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|          | distinctive messages for approval or denial of all fare media validations and validator status.   |
| 3.3.1-5  | The validator display will convey transaction price, account balance, and other pertinent information.  |
| 3.3.1-6  | An operator console will be provided which will interface with the onboard validator and display fare validation results to the bus operator.   |
| 3.3.1-7  | The operator console will allow the operator to tally operational data such as customers with bicycles or wheelchairs, and when a cash fare or fare upgrade is paid.  |
| 3.3.1-8  | The mobile operator console will integrate with the onboard CAD/AVL system for location, bus, route, operator, and time stamp information.  |
| 3.3.1-9  | The vendor shall be responsible for integration of the operator console with METRO's existing Clever CAD/AVL to support transfer of work status information (route/run/trip) and geolocation data over a J1708 serial connection. |
| 3.3.1-10 | The validators and/or operator consoles will have WiFi capabilities for communications with the back office while in the garage.  |
| 3.3.1-11 | The validators and/or operator consoles will have GPS capabilities.   |
| 3.3.1-12 | The on board hardware will be capable of in-field communication with the back office using the existing onboard router's cellular connection.   |

### 3.3.2 Software

#### *Back Office*

The system's back office will maintain all accounts and perform fare calculation and validation for all fare payments. The back office will enable the following system functions to occur:

- Creation of new accounts
- Association of accounts with third-party issued media
- Maintenance of account balances
- Loading of value to accounts
- Fare calculation for fare payments, including capping calculations
- Inquiry of account balances and transaction history

The back office is the system of record for all transactions and is responsible for recording all transactions received against an account and updating the account balance accordingly.

The back office will also perform all activities related to financial settlement and reconciliation. The vendor shall be responsible for settling all bank card transactions on the web or the mobile app. The vendor shall deduct any transaction fee (inclusive of any bank card fees) and deposit the remainder into METRO's demand account on a daily basis. Similarly, the retail network provider will be responsible for depositing any net proceeds of cash payments into METRO's demand account on a regular basis.

Each of the participating transit agencies will have access to the system's back office through a web management interface. Username and password access will allow them to see and manage only their portion of the system. They will be allowed to:

- Set their fares by service

- Include their fares in fare capping calculations (or not)
- Honor capped accounts, or accounts that are riding free because of capping (or not)
- Report on usage from their vehicles
- Receive error reports from their vehicles

### *Reporting*

Data generated by the system will be stored in a vendor-managed database. Any data collected, processed, and transmitted by the system are the sole property of METRO and will not be shared or distributed without METRO's express permission. METRO will retain access to all the data, except PII data, directly and in perpetuity.

The system will provide reporting functionality that will interface with the database to generate canned standard operational reports, allow ad-hoc querying of the database via SQL in real time, and provide for data downloads for offline custom report creation. Standard reports will include but are not limited to ridership and sales reports. In addition, reconciliation reports will be available from the system which will enable METRO to reconcile the proceeds received to value loaded and rides taken using the fare system.

### *User Access Management*

Access to the back office system will be controlled through a password-controlled interface and strict access privileges. The system will provide for configurable, role-based user access so that users will only have access to the data and functionality (e.g. edit vs. read only) they have been granted permissions to. METRO will have the ability to manage these roles within the system.

### *Onboard Payment Validator Application*

The onboard payment validators must be capable of downloading lists of valid accounts and of uploading transactions completed while offline to the back office when communication is restored. The list of valid accounts will be used to check the validity of third-party issued cards, such as those presented by USM students and MMC employees; new valid lists may be provided as frequently as hourly.

Fare payment validation can occur in real-time or near real-time depending on vendor capabilities and preference. When fare media is presented, the system can use the communications provided by the on-board routers to get validation from the back office if transaction time is under a METRO configurable threshold. Alternatively, account balances and whitelists can be maintained on the validators and transactions approved without back office approval. This would require the system to regularly publish account updates to the back office to keep accounts up to date.

### *Mobile Application*

A primary component of the new system will be a mobile application that allows users to purchase METRO's base fare pass using their smartphone or other device and then use the device to display valid fare payment on board using barcodes, NFC, or another form of electronic validation. The application will be available to both Android and iOS users and will be made available and maintained by the vendor from each platform's public app store.

The mobile application will also act as an account management application for account holders using either their smartphone or a smart card for payment. Both smartphone and smart card users will be able to use the mobile application to perform basic account management tasks including:

- Loading of value and fare products to accounts
- Inquiry of account balance, transaction history, and progress towards caps

Additional details regarding the ticket functionality of the mobile application are available in Section 5.2 Mobile Ticketing.

### *Websites*

The Vendor will be responsible for the design, development, and deployment of two websites, one for use by individual customers and one for institutional management. The websites will be designed to be user friendly, accessible to the ADA community, and multilingual. The vendor will also include the ability for METRO to maintain and update the website content.

The customer-facing public website will provide a secure, convenient, and comprehensive portal for transit and customer account management. The website will be the primary means of account management and loading value for many customers. Customers will use one account to manage their account across both the mobile ticketing application and smart cards, including on the website. Using the customer website, customers will have the ability to:

- Register an account
- View account balance, transaction history, and fare capping status
- Add value to their account
- Set-up autoloading to automatically replenish account value either by calendar date or by value threshold
- Use their card number to manage their account (for anonymous customers)

The customer website will be built using modern web design and e-commerce best practices. METRO personnel will be able to make changes to the content presented on the customer website using the CMS.

The institutional website will be a business account web portal for the online management of accounts associated with business account programs. The business account web portal will provide business account program administrators from employers, schools, social service agencies, and other affiliates with the ability to manage the accounts associated with their institution, including the addition and removal of accounts, the loading of value, and reporting.

For large institutional partners such as University of Southern Maine (USM), Maine Medical Center (MMC), Portland Public Schools (PPS) and Southern Maine Community College (SMCC) business account program administrators will also use the business web portal for reporting and management of individual eligible riders. The bulk of their riders though will be managed using a whitelist of valid cards from their employer or university identification cards provided regularly by the institution. The list will be automatically imported by the vendor's system.

Institutional partners will be able to use their own credentials for transit access if the credentials have a unique identifier that the onboard validator can access. Identifiers may include linear barcodes, facility and employee codes on Prox cards, UIDs on Desfire cards or similar unique identifiers. If the institutional partners do not have cards capable of electronic validation, METRO may issue smart cards to institution members. When a third-party card is presented, the onboard validator will read the unique identifier and compare it to the provided list to determine the card's validity. This bulk upload of valid identifiers will be able to occur as frequently as hourly. The vendor is expected to provide the capability to import USM, MMC, and SMCC's bulk uploads as part of the

initial system. The system will support the addition of multiple institutions in the future by METRO.

*Security*

The system vendor will be responsible for developing and maintaining system security. This includes both physical and logical access controls on all back office and field equipment, compliance with the Payment Card Industry/Digital Security Standard (PCI-DSS), and protection of riders’ Personally Identifiable Information (PII). These security activities will be included as part of the ongoing system fees.

The vendor will be responsible for developing and implementing a backup and recovery plan as well as a disaster recovery plan which will be reviewed and approved by METRO.

| Requirements Number | Requirement   |
|---------------------|---|
| 3.3.2-1             | The system will provide the METRO IT department with admin access to perform first level support.   |
| 3.3.2-2             | The system will provide access to accounts as necessary to deal with lost cards, transfer of accounts, merging of accounts, etc.  |
| 3.3.2-3             | The vendor shall provide first line support for customers and for METRO staff.  |
| 3.3.2-4             | The data warehouse will be fully compliant with METRO policies for the handling of customer PII, but may not contain all customer information.  |
| 3.3.2-5             | The system will adhere to all federal and state privacy laws and acts, especially pertaining to PII information.  |
| 3.3.2-6             | The system will include the ability to remove PII from inactive accounts after a set period of time.  |
| 3.3.2-7             | The system will provide user access management via password control for individual users and groups or subsets of users.  |
| 3.3.2-8             | The system will include a user access management tool that will control and configure user access privileges to each module or component of the entire system.  |
| 3.3.2-9             | All data will be held in a standard commercial database satisfactory to METRO and will be accessible by standard commercial SQL query tools for which the vendor supplies METRO with the schema. Data that is encrypted at the reader level, if any, will be encrypted according to the standards established for those media and will not be de-encrypted at any point.  |
| 3.3.2-10            | The system will have a reliable and properly structured database solution that follows industry standards.  |
| 3.3.2-11            | The vendor will provide documentation for current version of database/application schema including field level descriptions.  |
| 3.3.2-12            | As part of implementation, the vendor shall deliver a full data dictionary and schema for the data warehouse. METRO shall have read-level access for unlimited users to the data warehouse through a secure connection. This interface will provide the capability to query the database directly, export data in a variety of formats, and establish a connection to a third-party reporting tool for use in custom reporting. |

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| 3.3.2-13 | The system will include a reporting module that interfaces to the data warehouse.   |
| 3.3.2-14 | All data generated will be stored in a central data warehouse. The data warehouse will collect data from all back office modules to provide a central source for METRO reporting.   |
| 3.3.2-15 | Any reports generated by the system will be the sole property of METRO and will not be shared or distributed without METRO's express written permission.  |
| 3.3.2-16 | The system will support the capability for custom data analytics tools, reporting front ends, and database querying.  |
| 3.3.2-17 | The system will be capable of providing canned reports as soon as the data is transmitted from the devices.   |
| 3.3.2-18 | The financial application will include a robust reporting tool that generates canned and custom reports. The reporting tool will allow the viewing, running, and scheduling of predefined reports, as well as the creation of custom reports.   |
| 3.3.2-19 | The system will support METRO's use of custom data analytics tools, reporting front ends, and database querying.  |
| 3.3.2-20 | METRO shall retain ownership of all system data in perpetuity.  |
| 3.3.2-21 | METRO shall own any data generated by the systems and software delivered under this contract, regardless of the license structure. METRO shall be able to freely access and distribute all data free of charge.   |
| 3.3.2-22 | The data warehouse will provide online access to detailed transaction information for analysis for no less than 60 months following the date that a transaction is generated.   |
| 3.3.2-23 | Raw data about activity will always be available via SQL query on a real time basis.  |
| 3.3.2-24 | The system will supply METRO with metrics that the agency can use to analyze and improve service, including usage patterns and geolocational information. The reports will make usage patterns anonymous.   |
| 3.3.2-25 | The back office will report on all fees charged during purchasing.  |
| 3.3.2-26 | The system will employ backend fraud detection capabilities, such as velocity checking.   |
| 3.3.2-27 | The vendor shall be responsible for maintaining the system's fraud control capabilities for the duration of the contract.   |
| 3.3.2-28 | The system will enable the suspending of accounts or phone numbers.   |
| 3.3.2-29 | Activated passes will be non-transferable.  |
| 3.3.2-30 | Security-sensitive information will be submitted separately, outside of the normal document deliverables process, and in accordance with procedures to be jointly developed between the vendor and METRO. Security-sensitive information will include: <ul style="list-style-type: none"> <li>• Information that would allow an individual to create, duplicate, skim or counterfeit fare media</li> <li>• Information that would allow an individual to overcome security features or interlocks intended to prevent access to sensitive information</li> <li>• Information that would allow an individual to divert revenue, whether electronic or cash, from the system</li> </ul> |
| 3.3.2-31 | The mobile app will offer two step verification as an option to users.  |
| 3.3.2-32 | The system will be sized such that the total number of possible accounts, and total concurrent use of accounts, will at a minimum support 200% of current ridership figures   |

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|          | (4,000,000).   |
| 3.3.2-33 | The system will support autoload and other techniques to automatically refill value based on time or amount.   |
| 3.3.2-34 | The system will allow for the purchase of value through a website that can be sent to the purchasing customer's account or to other accounts.  |
| 3.3.2-35 | All payment hardware and software will be PCI-DSS certified and capable of passing a PCI-DSS audit.  |
| 3.3.2-36 | The system will be fully compliant with the latest industry security standards, including PCI, EMV, PII, tokenization, and latest encryption standards.  |
| 3.3.2-37 | The vendor shall be responsible for ensuring that the system as delivered is compliant with regulatory standards such as Payment Card Industry Data Security Standards (PCI-DSS) , and with all METRO, local, state, and federal privacy policies, laws, and acts for the handling of Personally Identifiable Information (PII) throughout the life of the contract. |
| 3.3.2-38 | The system will collect all sales and usage data from purchase to alighting (if available). Personally Identifiable Information (PII) will be separate and secure.   |
| 3.3.2-39 | Fare payment validation from the back office will occur within a METRO configurable threshold between 500 milliseconds and one second.   |
| 3.3.2-40 | The vendor shall collect and provide payment type used during purchasing.  |
| 3.3.2-41 | The system will allow for mobile products to be purchased on the website.  |
| 3.3.2-42 | The system will provide the ability for METRO to update key content elements of the customer facing website (text, products, templates).   |
| 3.3.2-43 | The system will have the flexibility to support METRO fare changes without software modifications. All fare changes will be through fare table and other configuration changes.  |
| 3.3.2-44 | The vendor shall provide a content management system (CMS) so that METRO can maintain and update the website.  |
| 3.3.2-45 | The onboard payment validators will be capable of downloading and storing lists of valid user identifications (UIDs) for checking the validity of third-party issued cards.  |
| 3.3.2-46 | The system will include an institutional website portal. Institutions granted permission by METRO will be able to administer and manage their members' transit accounts using the institutional website portal.  |
| 3.3.2-47 | Institutions will be able to use the institutional website portal to update accounts as participants enter or leave the institution.   |
| 3.3.2-48 | For larger institutions, it will be possible to perform account management activities in bulk and automatically based on their existing access control pass systems.   |
| 3.3.2-49 | All system and user interfaces will comply with section 508 of the Rehabilitation Act of 1973, which includes the Web Content Accessibility Guidelines (WCAG) 2.0, and meet or exceed all ADA requirements.  |
| 3.3.2-50 | The customer website and mobile app will be designed to be user friendly and accessible to current and potential riders and METRO employees. The system will comply with the most recent version of the Americans with Disabilities Act Accessibility Guidelines (ADAAG) at the time of Final System Acceptance.   |

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| 3.3.2-51 | The mobile application will allow for dynamic generation of barcodes and real-time validation of accounts.  |
| 3.3.2-52 | Closed-loop Near Field Communications (NFC) payment using the system's closed loop smart card format may be integrated into the mobile payment application when technically feasible.   |
| 3.3.2-53 | The mobile app will communicate with the validators and back end system to recognize, log, and report on the usage.   |
| 3.3.2-54 | Account validation will be able to occur when the mobile device is not internet connected.  |
| 3.3.2-55 | The website and mobile app will have a common login (i.e. username and password combination).   |
| 3.3.2-56 | METRO's resources or servers will not be required to offer or maintain the app in the app store.  |
| 3.3.2-57 | The mobile app will be available in the app stores, offered and maintained by the vendor.   |
| 3.3.2-58 | Mobile app QR codes will be ISO/IEC 18004 compliant.  |
| 3.3.2-59 | The customer will be able to display the credential on the device and the credential in a wallet or passbook. Both options will be available whether or not the device is connected to a wireless or cellular network.        |
| 3.3.2-60 | Information available in the mobile app will include the remaining validity (e.g., expiration time) of base fare.   |
| 3.3.2-61 | The mobile app and customer website will display account value and capping status.  |
| 3.3.2-62 | The mobile app and websites will have functionality for self service password resets.   |
| 3.3.2-63 | The mobile app and customer website will provide functionality to link to other METRO and third-party apps, trip planners, and websites. The links will be configurable by METRO.   |
| 3.3.2-64 | The mobile app will be tested and support the latest operating systems on the Android and iOS platforms on the day that the OS is released to the general public.   |
| 3.3.2-65 | The vendor shall be responsible for the look and feel of the mobile app and website, based on the guidelines set by METRO.  |
| 3.3.2-66 | The mobile application will support the current and three prior full release versions of the Android mobile operating systems as well as the current and two prior iOS mobile operating systems for the life of the contract. |
| 3.3.2-67 | The mobile app and websites will work quickly and efficiently. The website will be dynamic and responsive depending on the viewing device and browser.  |
| 3.3.2-68 | The mobile app will be compatible with phones distributed through the Lifeline Assistance Program.  |
| 3.3.2-69 | Login Password will be masked when presented on the mobile app and website.   |
| 3.3.2-70 | The mobile app and websites will include configurable instructions on use, including frequently asked questions, and a mechanism for users to provide feedback.   |
| 3.3.2-71 | The mobile app and customer website will make it easy for customers to add value to their account.  |



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| 3.3.2-72 | The look and feel of the mobile app and websites will be streamlined and modern and have a clean, simple design.  |
| 3.3.2-73 | The design of instructions and graphics in the mobile app and websites will minimize glare and other effects of sunlight and ambient lighting.  |
| 3.3.2-74 | The display, instructions, and selection keys of the mobile app and websites will be easy to read, understand, and use.   |
| 3.3.2-75 | The mobile app and websites will be Americans with Disabilities Act compliant, particularly with regard to the user interface.  |
| 3.3.2-76 | All mobile and website text will have a high contrast color to its background to ensure legibility and ADA compliance.  |
| 3.3.2-77 | The system will provide screen layouts that minimize the likelihood that a user will activate the incorrect key.  |
| 3.3.2-78 | The mobile app and websites will follow the current design and accessibility guidelines for each operating system. This includes VoiceOver capabilities.  |
| 3.3.2-79 | The mobile app will provide security measures, including use of QR code, to enable visual and optical inspection of mobile pass.  |
| 3.3.2-80 | Whether the mobile application is a shared application that users can use across multiple transit agencies or a bespoke, I branded or 'white labeled' application, the vendor shall be responsible for maintenance of the application in the appropriate app stores.  |
| 3.3.2-81 | The system will accept Credit, including Visa/MC/AMEX/Discover, Debit cards, Prepaid debit cards, transit benefit cards including TRANServe, Temporary Assistance for Needy Families (TANF) cards, mobile wallets, PayPal, and cash networks.   |
| 3.3.2-82 | The system will accept the TRANServe federal transit benefits card and TANF EBT cards. Vendor must identify as a Transit Authority through their Merchant Category Code. The following Merchant Category Codes are accepted by the TRANServe Debit Card: 4789 (Transportation Services), 4131 (Bus Lines), 4011 (Railroads), 4111 (Commuter Transport, Ferries), 4112 (Passenger Railways). |
| 3.3.2-83 | The system will support returns or refunds.   |
| 3.3.2-84 | The vendor shall be responsible for any system testing and certifications required to process payments.   |
| 3.3.2-85 | The vendor shall be responsible for all bank card processing integration tasks.   |
| 3.3.2-86 | The system will maintain payment records to support the auditing of all payments processed, and to support payment dispute and chargeback resolution.   |
| 3.3.2-87 | The vendor shall provide a monthly invoice or reconciliation report detailing a breakdown of all fees withheld (e.g. bank card processing fees, chargeback fees, etc.).   |
| 3.3.2-88 | The vendor shall be responsible for settling all bank card transactions on the web or the mobile app. They will deduct their transaction fee (inclusive of any bank card fees) and deposit the remainder into METRO's demand account on a daily basis.  |

### 3.4 System Integration Services

The system will be designed for expansion and integration. This will include integration with a network for adding cash to accounts and purchasing smart cards at locations throughout METRO's and partners' service areas, the ability to add additional transit partners beyond those included in this contract in the future, and the ability to integrate with additional non-transit services.

#### Cash Loading and Smart Card Distribution Network

Access to the benefits of the new electronic fare collection system will be enhanced by a robust network of locations that will enable customers to obtain smart cards and to use cash load value to their accounts. In addition to providing a wider distribution network for smart cards, this integration will improve access to the new fare collection system for un- and underbanked individuals. Customers will be able to present a credential for their account (e.g. their smart card or the mobile ticketing application), pay cash, and have the value added to the account immediately.

METRO is open to any solution that meets this functional need for providing a robust network of locations for riders to load cash to their transit accounts and purchase smart cards. To support this network, the vendor could provide an API that will allow retailers' existing point of sale systems unidirectional access to customers' accounts. Using the API, retailers will be able to add value to the appropriate account using a smart card or the mobile ticketing application as a credential. The API will be capable of returning a message indicating whether the value load was successful or not. The vendor could also provide their own software and hardware that facilitates cash loading to locations through the METRO and partner service areas.

Ideally, this cash loading and smart card distribution network solution will build on METRO's and its partners' existing retail network solutions, the backbone of which is the METRO Pulse Station, Shaw's grocery stores, and Hannaford Supermarkets.

#### Onboard Integration

The operator console will integrate with METRO's onboard Clever CAD/AVL system. This integration will provide the fare collection system with operator, route, run, and geolocation over a J1708 serial connection. The operator consoles and/or the validators will have GPS in case of a failed connection to the CAD/AVL system and for METRO's partner agencies that may not have CAD/AVL on board.

#### Transit Partner Integrations

The system will include METRO's regional transit partners. These partners include the following regional transit bus services:

- South Portland Bus Services
- Shuttlebus/ZOOM

The transit partner agencies will have access to the system through a web management interface. Username and password access will allow them to see and manage only their portion of the system. They will be allowed to:

- Set their fares by service

- Include their fares in fare capping calculations (or not)
- Honor capped accounts, or accounts that are riding free because of capping (or not)
- Report on usage from their vehicles
- Receive error reports from their vehicles

As a passenger boards and presents their credential to a validator it will identify the account and determine if the rider can ride. This calculation will include whether the fare paid counts towards the cap and whether the account is already capped and therefore rides free. Because transit partners are likely to have more rural areas with possibly poor network connectivity, the validator will be capable of making an offline decision.

Some transit partners will have CAD/AVL or stop annunciation systems capable of passing route/run and GIS information to the onboard fare system. Others will not, or may choose not to pay for the required integration. If this information is not gathered from other systems the fare system will include latitude/longitude in the transaction data that is recorded in the back office.

All system revenues will be deposited into a single financial account managed by METRO. Transfer agreements and any exchange of funds based on transfers will be handled outside the system, but these transfer calculations will be supported by the data collected by the system and by the reporting functionalities of the system.

### Other Integrations

The system will allow for future integrations with other regional transportation partners. These include:

- Amtrak Downeaster
- Casco Bay Ferries
- Concord Coach
- Greyhound Bus Service

Because these partners vary in their fare collection methods, the integrations will vary. Some of the agencies have hand held barcode scanners already in use either by ticket sellers or collectors. Depending on the business agreement with METRO, the mobile application could present a barcode which allows passage or which grants a discount. For other agencies, the mobile app or the website could generate a discount code or a visual ticket.

Integration with parking companies could also be handled in this manner.

| Requirements Number | Requirement   |
|---------------------|---|
| 3.4-1               | The system will have the ability to include METRO’s regional transit partners. These partners include the following regional transit bus services:<br>-South Portland Bus Services<br>-ShuttleBus-Zoom<br>-Regional Transportation Program (Lakes Region Explorer)  |
| 3.4-2               | As a passenger boards a transit partner and presents their credential to a validator it will identify the account and determine if the rider can ride. This calculation will include whether the fare paid counts towards various caps and whether the account is already capped and therefore rides free. Because transit partners are likely to have more rural areas with possibly poor network connectivity, the validator will be capable of making an offline decision. |

|       |  |
|-------|--|
| 3.4-3 | South Portland (and Casco Bay Islands Transit District) shares METRO's CAD/AVL system capable of passing route/run and GIS information to the on board fare system. Others do not. When this information is not gathered from other systems, the fare system will include latitude/longitude in the transaction data that is recorded in the back office.  |
| 3.4-4 | The vendor shall be responsible for integrating with the Clever CAD/AVL system for all transit partners for the purpose of capturing route/run and GIS information.  |
| 3.4-5 | Revenues from the system will be transferred to METRO on a daily basis. Revenue allocation among the participating agencies will be handled by METRO outside the system but will be supported by the data collected by the system and the system's reporting capabilities. The vendor will work with METRO to ensure the proper reporting is available to facilitate transit agency revenue allocation.  |
| 3.4-6 | The system will be able to report on transfers between agencies.   |
| 3.4-7 | The system will enable cash paying customers to use cash to add value to their transit account at a variety of locations throughout the system's service area.   |
| 3.4-8 | Customers will be able to present a credential for their transit account at a retail outlet or other location in the system service area (e.g. their smart card or the mobile application), pay cash, and have the value added to the account immediately.   |
| 3.4-9 | To support the cash loading and smart card distribution network, the vendor shall provide an API that will allow unidirectional access to customers' transit accounts. Using the API, devices at the locations in the network will be able to add value to the appropriate transit account using a smart card or the mobile application as a credential. The API will be capable of returning a message indicating whether the value load was successful or not. |

## 4 Fare Policy

Portland METRO's new fare policy will be designed to leverage the capabilities of their new fare collection technology system to create a more equitable and seamless experience for the rider. Though METRO will transition to a fare policy built on fare capping following the implementation of this system, METRO expects that the new fare technology system will preserve the ability to return to a more standard fare structure in the future if desired. Under the new system, METRO will accept cash, a mobile device, a smart card, or a token as forms of payment.

METRO's partners, Shuttlebus/ZOOM and South Portland Bus Service (option), will use similar fare structures and policies without identical fares. The system will support each agency establishing separate fare pricing.

| Requirements Number | Requirement   |
|---------------------|---|
| 4-1                 | <p>The fare system will support fare pricing, including multiple distinct base fares, that are fully configurable by agency based on the following parameters at a minimum:</p> <ul style="list-style-type: none"> <li>• Rider category</li> <li>• Mode</li> <li>• Service type</li> <li>• Route</li> <li>• Day and time</li> <li>• Discounts</li> </ul> <p>These fare pricing parameters will also govern whether an additional fare payment must be made upon boarding.</p> |

## 4.1 Fare Capping Overview

Fare capping is a new pricing strategy used by public transit agencies where riders “cap out” at the price of a pass, and METRO plans to implement this pricing strategy using its new fare system. Under the fare capping strategy, a METRO rider will pay the appropriate fare each time they board a vehicle – as determined by the type of service they are using and the type of rider they are (e.g., full fare rider vs reduced fare rider) – until they hit a fare “cap”. A fare cap is the maximum price a rider is expected to pay to use METRO’s services within a specified time period. After a rider hits a fare cap, they will no longer need to pay a fare to board METRO for the remainder of the time period. For instance, if monthly capping were implemented within METRO’s current fare structure, riders would pay per boarding for each of their trips up through their 30th trip, because a monthly pass costs 30x the base fare. Starting with a rider’s 31st trip, that trip and each subsequent boarding would be free for the rest of the calendar month. Note that customers will be expected to tap-on at all boardings, even if a fare does not need to be paid because they have hit a fare cap.

METRO’s fare caps will be calendar-based, as opposed to rolling. Though METRO will not determine the specific fare caps to be implemented under the new system until the system design phase, the most common fare caps established by transit agencies are daily, weekly, or monthly.

For fare capping to be effective, this fare structure requires a continuous exchange of information between METRO and its customers. A rider needs to know at any point in time how much they have spent on fares within the past day, week, or month, for example, and how much more money they must spend in what time period to hit each of the fare caps. The website and mobile app included as part of the new fare system should facilitate this exchange of information in a way that is easily accessed and interpreted by the rider. A rider should be able to use their username and password to login to the website or the mobile app and view a dashboard that shows them their account and their progress towards the various fare caps.

The boarding experience should ideally also serve as a key point of information exchange between a rider and METRO regarding fare capping status, though this is not required. If possible though, the rider should receive some indication each time they board as to whether they have not met, just met, or already met a fare cap. If they have just met or already met a fare cap, the system should indicate which cap was met or which cap was being used to enable the rider to board for free. If this onboard method of information exchange is employed, METRO and the vendor will work together to make sure the capping indicators create a positive rider experience

and do not slow or otherwise negatively affect the boarding process.

METRO’s partners, Shuttlebus/ZOOM and South Portland Bus service (optional), will also implement fare capping. The system will support fare capping across participating agencies provided the agencies have the same capping price threshold. If the capping price thresholds are different across agencies, the system will not be expected to cap across them.

| Requirements Number | Requirement   |
|---------------------|---|
| 4.1-1               | The system will support separate fare cap price thresholds for different services, different rider categories, and different agencies. This could include a single multiple that is applied to all base fares to establish the relevant caps. |

## 4.2 Fare Structure

The system will support a fare capping-based fare structure. Note that the system will not need to support a structure where both the fare capping and rolling pass functionalities are activated at the same time in an effort to simplify the system’s back-end requirements.

METRO will have the ability to set multiple fare cap time periods, each with their own capped price threshold. For instance, METRO will be able to designate a day fare cap, a weekly fare cap, and/or a monthly fare cap if they so choose.

| Requirements Number | Requirement  |
|---------------------|--|
| 4.2-1               | The system will support fare capping. Riders will pay per boarding up until a capping threshold; at this point, riders will no longer be charged for their boardings for the remainder of the specified time period.   |
| 4.2-2               | The system will support the setting of multiple fare cap time periods, each with their own capped price threshold. Fare cap time periods will be configurable for anywhere from 1 to 366 days. The capping time periods will be calendar-based, not rolling. |
| 4.2-3               | The system will support fare capping across participating agencies provided the agencies have the same capping price threshold. If the capping price thresholds are different across agencies, the system will not be expected to cap across them.           |

## 4.3 Base Fares & Transfers

The base fare for payments made with electronic fare media will be a time-based pass. METRO will have the ability to configure this base fare pass to be valid for anywhere between 60 and 180 minutes, and the base fare validation period can be distinct for different service types (e.g., METRO can set a 90-minute base fare for Local service and a 120-minute base fare for Breez service). The holder of a base fare pass will be entitled to use METRO’s system without additional payment for the time length of the pass, though there may be restrictions

on which services are included in the base fare; more information on these possible restrictions is included under Service Types & Upgrades. There will be no directional restrictions on the base fare.

It is the intention that riders paying with cash will only be entitled to a single boarding upon payment of the base fare. This is subject to change based on the outcomes of the public input process and an equity review. A rider using a token to board will also only be entitled to a single boarding.

No transfers will exist under the fare capping structure; instead of transfers, the system will use a time-based pass for the base fare.

| Requirements Number | Requirement   |
|---------------------|---|
| 4.3-1               | The system will be capable of issuing time-based passes as the base fare. These passes will be configurable by METRO to be valid for anywhere between 60 and 180 minutes. |

## 4.4 Fare Products

Under the intended fare capping structure, the only fare product technically available to the public will be the base fare. For riders using the electronic fare payment system, the base fare will be paid using stored value loaded to the rider’s account. However, as stated above, METRO will also have the ability to set multiple fare capping time periods, each with its own price thresholds. All capping time periods will be calendar-based, not rolling from first tap/use. Fare capping price thresholds that are reached for shorter time periods will be applicable towards longer time period fare capping price thresholds. For example, if a rider were to reach a day pass fare cap, this capped value would apply towards that month’s monthly fare capping price threshold.

| Requirements Number | Requirement  |
|---------------------|--|
| 4.4-1               | The system will use stored value loaded to the rider's transit account to pay the base fare. Vendors can decide whether this payment will be made before boarding through the purchase of a base fare pass or upon boarding by presenting an account credential (preferred). |

## 4.5 Service Types & Upgrades

METRO currently offers two services types: Local and Breez. Breez is considered a premium service and is priced higher than Local service. Riders using each fare payment type under the new system will have different experiences transferring between Local and Breez services.

Smart card users wishing to transfer from a Local to a Breez bus within the validity period of their base fare will need to pay the difference between the Local base fare and the Breez base fare using the stored value in their account upon boarding the Breez bus. Smart card users wishing to transfer from a Breez to a Local bus within the validity period of their base fare will not need to pay an additional fare upon boarding the Local bus; the

Breez base fare gives them access to the lower-priced Local service.

How mobile ticketing users will be treated during the Local to Breez service upgrade process will depend upon the solution the vendor proposes for mobile ticketing fare payments, i.e. whether the rider presents their account credential and the fare is deducted directly from their account (preferred) or the rider purchases the base fare pass from their account balance:

- If the vendor proposes the former, then the upgrade experience for mobile ticketing users will be analogous to smart card users.
- If the vendor proposes the latter, mobile ticketing users will need to know ahead of time whether or not they plan to transfer between Local and Breez services during the time period that the base fare is valid. If they do plan to use both services, the rider will need to purchase a Breez base fare on their mobile device prior to boarding any bus. The Breez base fare gives them access to both services. Under this mobile ticketing setup, mobile ticketing users will not be able to purchase an upgrade to the Breez service if they have mistakenly already purchased a Local base fare and used it to board a Local bus. Instead, and unlike a smart card user, they will have to purchase a separate Breez base fare to then board a Breez bus.

Cash riders will have to pay the base fare each time they board a bus. They will pay the Local base fare upon boarding Local buses and will pay the Breez base fare upon boarding Breez buses. There will be no transfer offered between buses and/or services to cash riders.

Token riders must present a token each time they wish to board a bus. As with cash riders, there will be no transfer offered between buses and/or services. METRO may choose to use distinct tokens for Local versus Breez services. This will be determined at a later date.

The way cash and tokens will be handled within the system from a policy perspective is subject to change based on input from the public outreach process METRO is currently conducting around the new fare collection system and proposed fare changes.

Related to fare capping, METRO will be able to make a number of distinctions between the two services within the fare structure and therefore the fare collection system. The agency will be able to choose different validity periods for the time-based pass that serves as the base fare for Breez and Local services, i.e. 90 minutes for Local and 120 minutes for Breez. METRO will also be able to price Local and Breez base fares and fare caps differently to reflect Breez's premium status. For example, under the new fare system, METRO would be able to continue charging \$1.50 for the Local base fare and \$3.00 for the Breez base fare and would be able to implement a Local monthly fare cap of \$45 (30 x \$1.50) and a Breez monthly fare cap of \$90 (30 x \$3.00). As a general rule, the fare caps will be priced at the same multiple, just based on the distinct base fares. For fare structure coherency and to facilitate rider understanding of the system, a rider's fares will accumulate to the same caps (e.g. daily and/or monthly) across both services.

### 4.6 Rider Categories

The fare system will support the recognition of various rider categories, and METRO will be able to assign different discounts to each rider category if so desired. This discount will apply to the base fare and may also apply to any capping thresholds METRO chooses.

Under the current system, METRO has three rider categories: full fare, reduced fare, and youth fare.



Reduced fare riders are entitled to a 50% discount off of the full fare. METRO currently issues Reduced Fare Cards to individuals who fall into at least one of the following categories:

- Disability eligible through Veteran's Association (with copy of Qualifying letter)
- Medicare Card Holder (Red, White, and Blue card, not MaineCare)
- Person with Disabilities (with supporting medical documentation)
- Recipient of SSI / SSDI benefits (with copy of Qualifying letter)
- Senior aged 65 plus (with valid photo ID including birth date)

Riders ages 6 to 18 qualify for the youth fare and are currently entitled to a 33% discount off of the full fare. Youth fare riders, upon implementation of the proposed fare change, will be entitled to a 50% discount off of the full fare. With this change, youth will become a subset of the general “reduced fare” category, simplifying METRO’s fare structure. Riders below the youth fare threshold (i.e., children ages 5 and younger) can ride for free with a fare-paying adult.

Reduced fare riders will be able to choose between the mobile app and a personalized reduced fare smart card for their electronic fare payment media; they will have access to reduced fare benefits on both media forms. The main difference in enforcement between the two electronic fare payment media will be that reduced fare riders with a reduced fare smart card will not be required to prove their eligibility upon boarding, but reduced fare riders with a mobile app payment will need to verify their eligibility with the operator. This gives reduced fare customers a choice as to whether or not they want their enforcement to occur on board or off board.

Discount fare riders who wish to pay with cash or tokens will not need to be registered for a METRO-approved discount fare account. However, METRO may ask that these riders carry an alternate form of proof of eligibility for their discount fare that can be used for fare enforcement purposes in line with today’s current enforcement policies and practices. Also, these discount cash riders will have to pay their discount fare upon each boarding and will not have access to the time pass base fare.

### 4.7 Social Service Agencies

METRO will distribute tokens to social service agencies to facilitate their clients’ participation in the new fare system. Tokens will be available through these distribution channels and also to the general riding public through METRO sales locations. While METRO does not currently employ tokens, tokens offer social service agencies a reliable, simple way to confer transit benefits to their clients. Tokens also offer METRO a contract fare medium that is easy to administer and cheap to distribute to these agencies. No other fare media, current or proposed, meet these criteria as well as tokens do. Using tokens for social service agencies and nonprofits will also provide METRO with a better idea of how these entities’ clients use the METRO system as token use and collection are tracked, keeping in mind that there will be some, likely limited, public use of tokens as well.

Social service agencies will also be able to distribute base fares and/or stored value to their clients through the new electronic fare payment system. Under this system, a social service agency will pay METRO for any base fares and stored value that they send out. The details of how and when these payments are made will be decided during the system design phase. METRO expects vendors to propose how they will meet this functional need within their proposals.

Tokens and the distribution of base fares and/or stored value to electronic accounts are intended to meet the shorter-term needs of social service agencies’ clients, such as getting to a job interview or a medical

appointment.

For clients with longer-term needs, social service agencies will be able to anonymously load stored value to clients’ accounts. Details regarding this method of social service agency transit benefit distribution will be determined during the system design phase.

| Requirements Number | Requirement  |
|---------------------|--|
| 4.7-1               | The system will support the distribution of individual base fares or stored value to rider accounts by social services or other groups using a means such as SMS texting or codes. |
| 4.7-2               | The system will support the loading of stored value by a third party to its members' transit accounts.   |

## 4.8 Institutional Pass Programs

The new fare technology system will support METRO’s existing institutional pass programs with the University of Southern Maine (USM), Southern Maine Community College (SMCC), Portland Public Schools (PPS), and Baxter Academy.

METRO and the selected vendor will work with these institutions to help them transition to the new fare system; the new system will require their members to use a smart card to participate in the institutional pass program. Under the new system, these institutions will be able to load institution-specific passes to their participants’ accounts. Institution-specific passes will be passes that grant a passholder access to METRO’s system for a programmable period of time. Institutions will be able to work with METRO to determine the duration of their institution-specific pass. Further details regarding the institution-specific passes will be defined during the system design phase.

The institutions will be responsible for administering and managing their participants’ accounts using the institutional website portal. Using the institutional website portal, institutions will be able to add passes with specific expiration dates to their managed accounts and update accounts as participants enter or leave the institution. For larger institutions, it will be possible to perform these activities in bulk and automatically based on their existing access control pass systems. More information on this is available in the Operations section of this document.

The new fare system will help METRO shift as much of the administrative burden of these pass programs to the participating institutions as possible. There may, however, be cases where METRO wants to maintain administration of certain institutions in house, so the new system will be flexible enough to facilitate this situation as well.

The new system will also support expansion of the institutional pass program model to new institutions. When a new institution begins a pass program, they will be able to work with METRO to determine the specifications of their institution-specific pass product. The new institutions will also be able to conduct account management activities through the institutional website portal.

| Requirements Number | Requirement  |
|---------------------|--|
| 4.8-1               | <p>The system will support the loading of institution-specific products to smart cards. These institution-specific products, when loaded to an account, will give the account holder access to the transit system. The products' validity period will be fully configurable by METRO in coordination with the applicable institution (e.g., the product could be scheduled to expire at the end of a semester). The system access granted by the passes will be configurable based on the following parameters at a minimum:</p> <ul style="list-style-type: none"> <li>• Agency</li> <li>• Mode</li> <li>• Service type</li> <li>• Route</li> <li>• Day and time</li> </ul> |
| 4.8-2               | <p>Institutions will be able to use the institutional website portal to add their institution-specific product(s) to their managed accounts.</p>   |
| 4.8-3               | <p>The new system will support expansion of the institutional pass program model to new institutions.</p>  |

## 4.9 Employer Pass Programs

METRO will use its new electronic fare payment system to support the launch of an employer pass program. Employers who wish to participate will enter into a contract with METRO for an all-in insurance program. Within this employer pass program, METRO shall be able to choose whether participating organizations are (1) pre-billed for their participation based on all individuals eligible to use the program, regardless of whether or not they actually use transit, or (2) post-billed based on actual ridership.

A pre-billed all-in insurance pricing scheme assumes that members who already use transit will continue to do so and that some members will never use transit. But, because they are all included in the program, the price paid for non-users subsidizes the cost of providing service to existing or new users. In other words, pricing is based on the number of eligible participants and provides discounts, much like an insurance policy, relative to what it would cost if all members used transit on a regular basis.

A post-billed all-in insurance pricing scheme relies on actual ridership data to determine the number of trips taken by members of an organization on some sort of regular basis, typically monthly or annually. When pricing the rides taken using these programs, many transit agencies use the adult full fare or the adult average fare. Transit agencies that wish to use an average adult fare instead of their adult full cash fare to price their programs have come up with different ways to estimate this price. For accurate estimates of the average fare paid, substantial data is needed, especially since this average fare price must be updated on a regular basis and so program contract pricings should be as well.

Pricing both types of all-in programs is very challenging without good data on actual usage rates. METRO expects the new fare payment system will help the agency get the data necessary to right-price their employer pass program contracts. METRO shall be able to analyze ridership data for each organizational participant in the employer pass program. For those organizations that are post-billed, this data will provide the information necessary for billing based on actual ridership. For those organizations that are pre-billed, this data will help

METRO determine a proper price to charge per individual based on the ridership levels of individuals within the organization who do use their transit access benefits. METRO should be able to use system data to update prices on a regular basis.

For its electronic fare payment all-in programs, METRO expects the organizations will be generally responsible for managing their headcount and list of participants through a special employer website portal that enables an organization to remove someone who is no longer affiliated with their organization or to request to add a new individual. Having the organizations manage their accounts should help minimize the administrative burden on METRO. Since pricing may also be based on actual ridership data, each organization will have an incentive to deactivate cards as soon as possible to minimize paying for unauthorized trips.

### 4.10 Fare Apportionment

METRO shall be in charge of distributing fare revenue amongst the participating agencies with the support of the electronic fare collection system's data. Once daily, the vendor shall sweep all fare revenues collected by the system to a bank account of METRO's choosing. METRO will work with the partner agencies to determine how often they will perform the fare apportionment from this bank account.

The system will provide report data that show the percentage of ridership and revenue on each participating agency's system over a period of time selectable by METRO staff. Based on these percentages, the reports will also show the amount of money that should be apportioned to each agency. These reports should include revenue effects of fare capping. The vendor shall work with METRO during design review to detail the specific design of these fare apportionment reports and the information included within them.

## 5 Fare Media

The system will accept both smart cards and mobile phones as fare media to be electronically validated upon boarding of buses.

### 5.1 Smart Cards

The new electronic fare collection system will accept closed-loop smart cards. Three major categories of smart cards will be accepted: METRO-issued smart cards for individuals, METRO-issued smart cards for institutions, and third-party issued cards.

The system will accept METRO-issued contactless ISO 14443 compliant smart cards that are linked to accounts and may be used to pay for base fare passes in much the same way as in the mobile ticketing application. Base fare passes purchased will accumulate to daily and monthly caps. Customers will simply present their smart card associated with an account with value and the fare will be deducted. The same account will be used to manage both smart cards and mobile ticketing.

METRO will also issue smart cards for institutions such as social service agencies, the local school district, and some employers that can be managed and loaded with value. Business account program administrators will be able to manage their group's cards using an online web portal, discussed in the Websites section.

The system will also be capable of accepting ISO/IEC 14443, HID (Prox or ISO/IEC 15693) compliant employer or university identification cards or cards with unique barcodes as identifiers for METRO accounts. METRO is already in discussions with the University of Southern Maine and Maine Medical Center to ensure the new

system is capable of accepting their cards. The process for accepting these cards is discussed in more detail under Websites.

METRO will have the ability to customize the discount fare smart cards; this customization can but does not have to include the rider’s name, the rider’s photo, and the name of the applicable discount fare program. Each discount fare smart card will be tied to a specific discount fare account into which the cardholder can load value.

The vendor shall provide an initial batch of 10,000 smart cards to METRO as part of this procurement. Future orders of smart cards could be made through a contract option with the selected vendor or separate, competitive procurement.

| Requirements Number | Requirement  |
|---------------------|--|
| 5.1-1               | The vendor shall supply 200 smart cards before field testing begins and 9,800 before go live. The vendor shall provide pricing for future cards. Card encoding and printing will be agreed on by METRO and the vendor during negotiations. |

## 5.2 Mobile Ticketing

The new fare collection system will also accept payment in the form of mobile ticketing. Users will be able to use a vendor-provided mobile application to purchase METRO’s base fare pass using their smartphone or other device and then use the device to display valid fare payment on board using barcodes, NFC, or another form of electronic validation. The mobile application will be available to both Android and iOS users and will be made available and maintained by the vendor from each platform’s public app store.

The ticketing functionality of the mobile application will only be for individual riders - members of institutions and other groups will not be able to get their organization-specific fare products through the mobile application. The only fare product that will be available through the mobile ticketing application is METRO’s base fare pass, a time-based pass discussed in more detail in the Fare Policy section. Base fare passes purchased through the mobile ticketing application will accumulate to caps. METRO is open to either a solution where customers purchase the base fare pass from their account balance or a solution where an account credential is presented and the fare is deducted directly from their account balance, though METRO has a strong preference for the latter form of fare payment. The primary method for validating mobile tickets will be through barcodes displayed on smart phones to an optical reader on the onboard validator. The system will also be capable of accepting closed-loop NFC payment, such as through card emulation, in the future as NFC-enabled phones become more widely used and this capability is made more accessible to vendors.

Additional details regarding the mobile application are available in Section 3.3.2 Software.

## 5.3 Future Expansions

In future phases, METRO may be interested in the system accepting open payments utilizing a variety of fare media and additional payment options such as Apple Pay, Google Wallet, contactless credit cards, etc. METRO would also like to explore payment linkages with trip planners and TNCs in the future.

## 6 Additional Capabilities

METRO is interested in learning more about the additional capabilities of vendor's systems beyond the requirements outlined within this scope of work above. Please include in your response to this RFP any additional system capabilities you believe would be of interest to METRO and the regional agencies. Please note that the presence of additional capabilities is not a requirement, and vendors will not be directly penalized if their systems do not include additional capabilities beyond those asked for in the requirements.

The following areas of additional capabilities are of particular interest to METRO for later phases of this project.

### 6.1 Integrations

METRO and the regional partners are interested in a number of potential integrations. Please describe any integration(s) between your system and transit trip planners as well as any integration(s) your system will support with additional services such as rideshare, bike share, and parking. Please also tell us how your system would integrate in the future with the other (non-transit) regional partners, including:

- Amtrak Downeaster
- Casco Bay Ferries
- Concord Coach
- Greyhound Bus Service

### 6.2 Future Payment Options

In the future, METRO may wish to accept open loop or direct bank card payments onboard. Please describe any ability your system has to accept open payments.

### 6.3 Fare Structure Capabilities

In the case that METRO decides against a fare capping structure in the future, please describe your current capabilities for implementing period passes and a more standard fare structure and set of fare policies using your technology.

## 7 Operation and Maintenance Services

### 7.1 Operations and Maintenance Model

Once built, the system will be operated and maintained for METRO and the transit partners by the selected vendor.

#### Hosting

METRO will not host the new fare collection system. Instead the system will use a cloud-based service that can meet strict performance and scalability requirements. The proposed fare collection solution will be an off-premise (not hosted by METRO) solution where the vendor is responsible for hosting and maintaining the

software. The system could be Software as a Service (SaaS), in which every agency's data is stored in the same database, but each agency's data is accessible only to themselves, or hosted, in which every agency is treated separately with individual instances of software, databases, and servers.

Vendors may propose either model. A total cost of ownership comparison will be conducted to compare the two options, should METRO receive bids for both option types.

### Software Maintenance

Software Maintenance will be the responsibility of the vendor and the price will be included in the annual system fees. This includes upgrades and bug fixes for the back office, web site and mobile application as well as hardware, OS and security upgrades on the hosted platform.

Different vendors provide mobile apps in different models. Some offer a single application that users can use across multiple transit agencies and some provide individual branded or 'white labeled' apps for each agency. Vendors will be allowed to propose either but will be responsible for maintenance of the application under either model.

The selected vendor will be responsible for maintaining the firmware on the operator console and validator as a part of the ongoing fees.

METRO will be responsible for maintaining the firmware on all other onboard equipment including the mobile access routers and the CAD/AVL system.

### Equipment Maintenance

METRO will be responsible for field checking equipment, including ensuring that power and network connections are operational. If the equipment still fails, they will replace it with a spare and send it to the vendor for repair or replacement. There will be a service level agreement (SLA) to cover turnaround times for the equipment to be repaired or replaced.

### Card Fulfillment

Due to the nature of the fare media proposed for the new fare system, METRO will only need to be involved in the distribution of smart cards and token fare media; riders are expected to use their own mobile devices for mobile ticketing.

Tokens will be distributed by METRO directly to social service agencies. Social service agency partners will be able to place token orders with METRO by calling or emailing the appropriate METRO staff.

For smart cards, fulfillment services will be provided to produce, print, encode, distribute, and track smart cards across different channels. Smart cards will be fulfilled and distributed through several channels, including but not limited to:

- METRO service centers
- Retail merchants
- Mail center

Card distribution and replacement cards will be handled by METRO. Retail channels will also distribute cards given to them by METRO. Distribution of cards will not require special equipment as account values will be held in the back office and not on the cards.

Riders seeking to obtain discount-fare smart cards (e.g. youth cards, senior cards, or disabled cards) will need to visit a METRO service center and bring with them the appropriate documentation to verify their discount rider category status. METRO staff will then print a new smart card with any necessary information on it and link the card to a discount fare account, which will confer upon the cardholder all benefits associated with their specific discount rider category. If an individual is unable to visit a METRO service center in person to complete this process, they will need to contact Customer Service and work with METRO staff to explore options for mailing or emailing in the necessary documentation or for sending a representative to the service center in their place.

### Financial Settlement

The selected vendor will be responsible for settling all bank card transactions on the web or the mobile app. They will deduct their transaction fee and deposit the remainder into METRO's demand account on a daily basis. Bank card fees can, at the proposing vendors' option be included in the transaction fee.

Similarly, the retail network provider will be responsible for depositing any net proceeds of cash payments into METRO's demand account on a regular basis.

Reconciliation reports will be available from the system which will enable METRO to reconcile the proceeds received to value loaded and rides taken using the fare system.

### Data Management and Reporting

METRO will have full access to all data collected, processed, and transmitted by the system. METRO will be able to query the database by SQL in real time in addition to being able to download data selections and canned reports.

### Customer Service

Some vendors offer front line customer support, in which a rider will call the vendor when they need help with the system. Others only offer second level support where the first call would come in to METRO. Vendors will be allowed to propose either option and their responses will be evaluated in light of the option they propose.

### Payment Processing

Bank funding including credit cards and debit cards will be processed through a single payment gateway managed by a merchant bank or third-party payment processor. The gateway will support the processing of bank cards through the website and mobile app

The payment gateway will be compliant with all appropriate security standards and the current version of PCI-DSS. The system will support full transaction-level reconciliation of all bank card funds processed through the system, including those accepted for customer account orders. Settlement data from the bank card processor or merchant bank will be downloaded by METRO. This will allow for full settlement traceability to the back office applications. The system will automatically handle non-payment and chargeback transactions, generating the appropriate reports to correct account balances as necessary.

### Security

The vendor will be responsible for the system's handling of fraud, disaster recovery and system security including PCI-DSS throughout the duration of the contract.



| Requirements Number | Requirement   |
|---------------------|---|
| 7.1-1               | The vendor shall provide necessary technical support to METRO for the system.   |
| 7.1-2               | Performance of software maintenance activities will be completed in a manner that does not disrupt or degrade system operations, to the fullest extent possible.  |
| 7.1-3               | The vendor shall provide application and payment processing services in accordance with an appropriate Service Level Agreement (SLA) to be agreed with METRO prior to contract award.   |
| 7.1-4               | Software maintenance will be the responsibility of the system vendor, and the price will be included in the ongoing system fees. This includes upgrades and bug fixes for the back office, website, and mobile application as well as hardware, OS, and security upgrades on the hosted platform.   |
| 7.1-5               | Whether the mobile application is a shared application that users can use across multiple transit agencies or a bespoke, I branded or 'white labeled' application, the vendor will be responsible for maintenance of the application in the appropriate app stores.   |
| 7.1-6               | The vendor shall be responsible for maintaining the firmware on the Operator console and validator as a part of the ongoing fees.   |
| 7.1-7               | Software maintenance will include custom software updates, third-party device firmware updates, database software updates, operating system updates, API maintenance and updates, antivirus updates, license renewal, and other activities needed to maintain system operations and meet the performance standards set forth in this SOW. |
| 7.1-8               | The vendor shall provide preventative and corrective software maintenance to support system operations while meeting the performance standards set forth in this SOW.   |
| 7.1-9               | The vendor shall make corrections and modifications to the system software in coordination with METRO staff. Serious issues (i.e., any error which causes system reliability or availability to fall below stated capabilities) will be corrected immediately.  |
| 7.1-10              | 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.   |
| 7.1-11              | The vendor shall make every attempt to fix software problems impacting revenue collection within two (2) hours of being reported.   |
| 7.1-12              | The vendor and METRO shall agree on an appropriate course of action if a third-party software provider goes out of business, or if maintenance updates for third-party software degrades performance of the vendor's system.  |
| 7.1-13              | Software to be maintained will include all required updates to the APIs and associated specifications provided by the vendor.   |
| 7.1-14              | All third-party software will be maintained at the most current or previous version at no additional charge throughout the term of the contract, so long as it does not involve a major rewrite of the vendor's software.   |

|        |  |
|--------|--|
| 7.1-15 | The vendor shall provide timely response to requests for software enhancements (customizations) by METRO that are not covered by the warranty or contract. Enhancements include modifications to the software that add capabilities and improve or change software functions that are not modifiable using the system configuration parameters defined in this SOW.        |
| 7.1-16 | During the warranty, the vendor shall ship replacement modules within one business day of receipt of any field equipment returned for repair/replacement.  |
| 7.1-17 | METRO shall be responsible for field checking equipment, including ensuring that power and network connections are operational. If the equipment still fails, they will replace it with a spare and send it to the vendor for repair or replacement. There will be a service level agreement (SLA) to cover turnaround times for the equipment to be repaired or replaced. |
| 7.1-18 | METRO shall be able to remove value from or add value to a specific account.   |
| 7.1-19 | The vendor may propose either front line support, in which customers call the vendor for issues with the mobile app or website or secondary response in which the customers call METRO and METRO will bring issues to the vendor as needed. Proposals and pricing will be compared with consideration for which approach the vendor has proposed.                          |
| 7.1-20 | Card distribution and replacement cards will be handled by METRO. Retail channels will also distribute cards given to them by METRO. Distribution of cards will not require special equipment as account values will be held in the back office and not on the cards.  |

## 7.2 Performance Measurement

To be successful, implementation of the new fare collection system must include measurement of the success of the project. Metrics should be established and used to measure the overall project as well as each project phase from planning to post launch operations. The metrics should align with METRO’s strategic goals. More metrics are better. Potential metrics that should be considered:

- Rider and community satisfaction
- System usage and penetration by fare media type
- Regional agency satisfaction
- Budget and schedule adherence
- Agency resources required for implementation and operation
- Up time and time between failures
- Percentage of transactions completed within the transaction window
- Additional institutional contracts
- Fare recovery
- Retail network utilization (number of transactions, revenue from those transactions)

## **CONCEPT OF OPERATIONS**

### **1 Document Introduction**

The Concept of Operations (ConOps) documents stakeholder viewpoints and input, and provides a basis for translating those factors into specific technical system requirements. The document discusses qualitative aspects of the system, such as who will operate the various components and how the fare system will work to meet the needs that have been identified through previous strategy work and stakeholder workshops. The document also describes user needs and how those needs have been captured. The ConOps can serve as a guiding document for the project, articulating a common vision of the new system that can be communicated to all of the people who will be involved in the acquisition and implementation of the new system. Finally, the ConOps serves as the basis for defining the detailed system requirements that will be assembled into specifications for procurement of the system components.

The ConOps includes a preliminary draft of technical requirements for the system. The next phase of the project will include workshops that focus on refining and prioritizing the specific technical elements for the system specifications.

The ConOps is above all, conceptual; thus this document does not include details on when the elements and characteristics described herein will be implemented. It will be imperative to revisit each of these components as the project progresses and as the industry and technology change.

Since the Concept of Operations describes how the system is expected to operate in its intended environment, it can be used throughout the project to support the validation of the system design and configuration, and can inform training and user and maintenance manuals.

### **2 Project Overview**

METRO provides fixed-route bus service throughout the Greater Portland region in Maine to nearly two million riders each year. METRO's current fare collection system utilizes GFI Cents-a-Bill registering fareboxes and a probing/vaulting system to collect cash fares and paper single-ride tickets. Out of an anticipated CY2018 \$2.1 million annual fare revenue, approximately 40% of fares were expected to be paid using cash and will be collected by these fareboxes. After over 20 years of heavy use, the system has reached its end of life and requires replacement.

For the new system, METRO wants to implement a next-generation fare collection system that will leverage reloadable smart cards, a mobile application, and a strong retail network to ensure access to system benefits. METRO envisions transitioning to an account-based, open architecture system that is flexible, scalable, and secure while providing improvements to the customer experience. If successful, this project will improve the customer experience, improve equity, reduce the use of cash, decrease fare transaction time, and improve access to data for use in reporting and planning.

## 3 Concept for the New System

The new fare collection system will be account-based, built upon a central back office that manages transit accounts, calculates fare payments, and processes all transactions based on established business rules. The system will support multiple media types including smart cards and smartphones. Fare media will serve as a credential for a back office account. On-board validators, which will validate smartcard and smartphone fare media, will communicate with the central back office in order to perform fare validation and exchange transaction data. The new fare collection system will be implemented using an open architecture approach, allowing for integration with outside systems and future expansion.

## 4 Operational Environment

### 4.1 Modes of Service

METRO operates a fleet of 44 buses, including 16 Gilligs, 13 Orions, four Arbocs and 11 New Flyers. All the buses have fareboxes (GFI Cents-a-bill) and are standard transit coaches or body-on-chassis style buses. METRO is in the process of replacing six Orion coaches with six new New Flyer coaches. The regional transit partners operate a mixture of cutaway, transit, and long distance coaches. There is also a ferry service operated by a private entity and intercity rail operated by Amtrak in the Portland, ME region.

### 4.2 Physical Environment

METRO has a single garage, located in Portland, for all buses. Portland is a seaside town and has high exposure to salt. Portland regularly experiences extreme cold and snow during the winter.

### 4.3 Network Environment

METRO has a physical network, connected to the internet, routing IP over ethernet. This includes connections to the edge of the garage space. There is not currently WiFi in the garage that can be used by this project. As a part of this project, the vendor will be expected to install a WiFi network in the garage for use in relaying system updates. More information on expectations for the garage WiFi network can be found in section 5.1.3 Offboard Equipment.

METRO has onboard mobile data routers that can be used to communicate with the back office over the internet. The routers will use cellular data services to provide the internet connection. Connection to the routers will be by Ethernet RJ45. The onboard communications infrastructure will support communication with the back office to validate fare payments. The onboard network connection will also be used to provide each validator with regular updates to the list of cards with valid passes. This will ensure that, even with no cellular service, transactions will be properly processed.

Onboard routers are:

- 37 - Cradlepoint IBR1700 (<https://cradlepoint.com/products/cor-ibr1700>)
- 8 - Cradlepoint IBR1100 (<https://cradlepoint.com/products/cor-ibr1100-series>)

- New buses will be IBR1700s moved from the Orions they are replacing

The routers connect to the Verizon 4G LTE network and route IP to the Internet.

## 5 System Components

### 5.1 Hardware

#### 5.1.1 Onboard Payment Validator

The onboard payment validator is a customer-facing device used to validate fare media and accept fare payment. Validators will be installed near bus entry front doors for convenience and accessibility.

The payment validators will include a contactless smart card reader that supports reading all ISO 14443 Type A and B compliant card formats (e.g., the entire MIFARE product line) and HID 15693 cards. The validators must also be capable of accepting payment by smartphone via barcode or NFC-presentation as available. The validators will be able to be updated via firmware to support new card formats in the future. The validators and/or the operator consoles (discussed below) will have WiFi (installed as part of this system implementation) for communication with the back office while in the garage. Communication in the field will occur using the existing onboard routers' cellular connection.

Payment validation and the deduction of account value will occur when fare media is tapped on a payment validator. Upon presentation, the validator will determine the appropriate fare based on the defined tariff, ride history (including fare accumulation for fare capping), and the fare products and other attributes contained in the transit account such as discount eligibility. For both authorized and denied transactions, the payment validator will provide visual and audible feedback, including the capability to display information on the fare charged and remaining account balance.

Payment validators will be a ruggedized form factor to resist vandalism and allow operation within the harsh onboard transit environment. They will also operate over a wide ambient temperature range, will be readable in night and direct sunlight conditions, and ADA compliant. The validators will be easily removed and replaced by authorized maintenance personnel. Replaced devices will automatically be programmed with their new location (e.g., vehicle number) and have their assigned location automatically updated in the appropriate back office application.

#### 5.1.2 Operator Console

An operator console will be installed in each vehicle to display fare payment results directly to the bus operator. This will include the type of media presented (e.g. mobile, smart card, USM ID, etc) The operator console will also serve as an input device for the operator to tally operational data such as customers with bicycles or wheelchairs, and when a cash fare or paper pass is used. At least ten input keys are required.

All transactions, including smart card, mobile app and cash boardings as well as events that don't add to ridership counts such as wheelchair and bicycle loadings, will include GIS data and be sent to the back office in a single data stream for reporting and analysis.

For both authorized and denied transactions, the operator console will provide visual feedback similar to the payment validator, which may include information on the fare charged and rider category associated

with the transit account being used for payment.

The operator console will integrate with METRO's onboard Clever CAD/AVL system. This integration will provide the fare collection system with operator, route, run, and geolocation over a J1708 serial connection. The operator consoles and/or the validators will have GPS in case of a failed connection to the CAD/AVL system and for METRO's partner agencies that may not have CAD/AVL on board.

Operator consoles will be a ruggedized form factor to allow operation within the harsh onboard transit environment. They will also operate over a wide ambient temperature range and will be readable in night and direct sunlight conditions. Operator consoles will be easily removed and swapped by authorized maintenance personnel with limited or no programming necessary to assign swapped devices to their new location.

### 5.1.3 Offboard Equipment

As a part of this project, the vendor will install a WiFi network in the garage for use in relaying system updates. The vendor will be responsible for designing, building and testing the network. The WiFi network will be covered under the system hardware warranty and maintenance agreements.

## 5.2 Software

### 5.2.1 Back Office

The system's back office will maintain all transit accounts and perform fare calculation and validation for all fare payments. The back office will enable the following system functions to occur:

- Creation of new transit accounts
- Association of transit accounts with third-party issued media
- Maintenance of transit account balances and fare products
- Loading of value and fare products to transit accounts
- Fare calculation for fare payments, including capping calculations
- Inquiry of transit account balances and transaction history

The back office is the system of record for all transactions and is responsible for recording all transactions received against a transit account and updating the transit account balance.

### 5.2.2 Reporting

Data generated by the system will be stored in a vendor-managed database. Any data collected, processed, and transmitted by the system are the sole property of METRO and will not be shared or distributed without METRO's express permission. METRO will retain access to all the data, except PII data, directly and in perpetuity.

The system will provide reporting functionality that will interface with the database to generate canned standard operational reports, allow ad-hoc querying of the database via SQL in real time, and provide for data downloads for offline custom report creation. Standard reports will include but is not limited to ridership and sales reports.

### 5.2.3 User Access Management

Access to the back office system will be controlled through a password-controlled interface and strict

access privileges. The system will provide for configurable, role-based user access so that users will only have access to the data and functionality (e.g. edit vs. read only) they have been granted permissions to. METRO will have the ability to manage these roles within the system.

### 5.2.4 Onboard Payment Validator Application

As previously mentioned, the onboard payment validators must be capable of downloading lists of valid user identifications (UIDs) and of uploading transactions completed while offline to the back office when communication is restored. The list of valid UID's will be used to check the validity of third-party issued cards, such as those presented by USM students and MMC employees; new valid lists may be provided as frequently as daily over the garage WiFi.

Fare payment validation can occur in real-time or near real-time depending on vendor capabilities and preference. When fare media is presented, the system can use the communications provided by the on-board routers to get validation from the back office if transaction time is under a METRO configurable threshold. Alternatively, account balances and whitelists can be maintained on the validators and transactions approved without back office approval. This would require the system to regularly publish account updates to the back office to keep accounts up to date.

### 5.2.5 Websites

The Vendor will be responsible for the design, development, and deployment of two websites, one for use by individual customers and one for institutional management. The websites will be designed to be user friendly and accessible to the ADA community and multilingual. The vendor will also provide a modern content management system (CMS) that METRO can use to maintain and update the websites.

The customer-facing public website will provide a secure, convenient, and comprehensive portal for transit and customer account management. The website will be the primary means of account management and loading value for many customers. Customers will use one account to manage their account across both the mobile ticketing application and smart cards, including on the website. Using the customer website, customers will have the ability to:

- Register a transit account
- View transit account balance, transaction history, and fare capping status
- Add value to their account
- Set-up autoloading to automatically replenish account value
- Use their card number to manage their transit account (for anonymous customers)

The customer website will be built using modern web design and e-commerce best practices. METRO personnel will be able to make changes to the content presented on the customer website using the CMS.

The institutional website will be a business account web portal for the online management of transit accounts associated with business account programs. The business account web portal will provide business account program administrators from employers, schools, social service agencies, and other affiliates with the ability to manage the transit accounts associated with their institution, including the addition and removal of accounts, the loading of value, and reporting.

For large institutional partners such as University of Southern Maine (USM), Maine Medical Center (MMC), Portland Public Schools (PPS) and Southern Maine Community College (SMZCc) business account program administrators will also use the business web portal for reporting and management of individual eligible riders. The bulk of their riders though will be managed using a whitelist of valid UIDs from their employer or university identification cards provided regularly by the institution. The list will be automatically imported by the vendor's system.

Institutional partners will be able to use their own credentials if the credentials have a unique identifier (bar code or contactless) that the onboard validator can access. If they don't have cards capable of electronic validation, METRO may issue them smart cards. When a third-party card is presented, the onboard validator will read the unique identifier and compare it to the provided list to determine the card's validity. This bulk upload of valid identifiers will be able to occur as frequently as hourly. The vendor is expected to provide the capability to import USM and MMC's bulk uploads as part of the initial system. The system will support the addition of multiple institutions in the future by METRO.

### 5.2.6 Security

The system vendor will be responsible for developing and maintaining system security. This includes both physical and logical access controls on all back office and field equipment, compliance with the Payment Card Industry/Digital Security Standard (PCI-DSS) and protection of riders' Personally Identifiable Information (PII). This will be included as part of the ongoing system fees.

Additionally, the vendor will be responsible for developing and implementing a backup and recovery plan as well as a disaster recovery plan which will be reviewed and approved by METRO.

## 6 Fare Policy

Portland METRO's new fare policy will be designed to leverage the capabilities of their new fare collection technology system to create a more equitable and seamless experience for the rider. Though METRO will transition to a fare policy built on fare capping following the implementation of this system, METRO expects that the new fare technology system will preserve the ability to return to a more standard fare structure in the future. The new system will accept cash, a mobile device, a smart card, or a token as forms of payment.

### 6.1 Fare Capping Overview

Fare capping is a new pricing strategy used by public transit agencies where riders "cap out" at the price of a pass, and METRO plans to implement this pricing strategy using its new fare system. Under the fare capping strategy, a METRO rider will pay the appropriate fare each time they board a vehicle – as determined by the type of service they are using and the type of rider they are (e.g., full fare rider vs reduced fare rider) – until they hit a fare "cap". A fare cap is the maximum price a rider is expected to pay to use METRO's services within a specified time period. After a rider hits a fare cap, they will no longer need to pay a fare to board METRO for the remainder of the time period. For instance, if monthly capping were implemented within METRO's current fare structure, riders would pay per boarding for each of their trips up through their 30th trip, because a monthly pass costs 30x the base fare. Starting with a rider's 31st trip, that trip and each subsequent boarding would be free for the rest of the calendar



month. Note that customers will be expected to tap-on at all boardings, even if a fare does not need to be paid because they have hit a fare cap.

METRO's fare caps will be calendar-based, as opposed to rolling. Though METRO will not determine the specific fare caps to be implemented under the new system until the system design phase, the most common fare caps established by transit agencies are daily, weekly, or monthly.

For fare capping to be effective, it requires a continuous exchange of information between METRO and its customers. A rider needs to know at any point in time how much they have spent on fares within the past day, week, or month, for example, and how much more money they must spend in what time period to hit each of the fare caps. The website and mobile app included as part of the new fare system should facilitate this exchange of information in a way that is easily accessed and interpreted by the rider. A rider should be able to use their username and password to login to the website or the mobile app and view a dashboard that shows them their account and their progress towards the various fare caps.

The boarding experience should ideally also serve as a key point of information exchange between a rider and METRO regarding fare capping status, though this is not required. If possible though, the rider should receive some indication each time they board as to whether they have not met, just met, or already met a fare cap. If they have just met or already met a fare cap, the system should indicate which cap was met or which cap was being used to enable the rider to board for free. If this onboard method of information exchange is employed, METRO and the vendor will work together to make sure the capping indicators create a positive rider experience and do not slow or otherwise negatively affect the boarding process.

## 6.2 Fare Structure

The system will support a fare capping-based fare structure. Note that the system will not need to support a structure where both the fare capping and rolling pass functionalities are activated at the same time in an effort to simplify the system's back-end requirements.

METRO will have the ability to set multiple fare cap time periods, each with their own capped price threshold. For instance, METRO will be able to designate a day fare cap, a weekly fare cap, and/or a monthly fare cap if they so choose.

## 6.3 Base Fare & Transfers

The base fare for payments made with electronic fare media will be a time-based pass. METRO will have the ability to configure this base fare pass to be valid for anywhere between 60 and 180 minutes, and the base fare validation period can be distinct for different service types (e.g., METRO can set a 90-minute base fare for Local service and a 120-minute base fare for Breez service). The holder of a base fare pass will be entitled to use METRO's system without additional payment for the time length of the pass, though there may be restrictions on which services are included in the base fare; more information on these possible restrictions is included under Service Types & Upgrades. There will be no directional restrictions on the base fare.

It is the intention that riders paying with cash will only be entitled to a single boarding upon payment of the base fare. This is subject to change based on the outcomes of the public input process and an equity review. A rider using a token to board will also only be entitled to a single boarding.

No transfers will exist under the fare capping structure; instead of transfers, the system will use a time-based pass for the base fare.

### 6.4 Fare Products

Under the intended fare capping structure, the only fare product technically available to the public will be the base fare. The base fare will be paid using stored value loaded to the rider's transit account. However, as stated above, METRO will have the ability to set multiple fare capping time periods, each with its own price thresholds. All capping time periods will be calendar-based, not rolling from first tap/use. Fare capping price thresholds that are reached for shorter time periods will be applicable towards longer time period fare capping price thresholds. For example, if a rider were to reach a day pass fare cap, this capped value would apply towards that week's weekly fare capping price threshold.

### 6.5 Service Types & Upgrades

METRO currently offers two services types: Local and Breez. Breez is considered a premium service and is priced higher than Local service. Riders using each fare payment type under the new system will have different experiences transferring between Local and Breez services.

Smart card users wishing to transfer from a Local to a Breez bus within the validity period of their base fare will need to pay the difference between the Local base fare and the Breez base fare using the stored value in their account upon boarding the Breez bus. Smart card users wishing to transfer from a Breez to a Local bus within the validity period of their base fare will not need to pay an additional fare upon boarding the Local bus; the Breez base fare gives them access to the lower-priced Local service.

How mobile ticketing users will be treated during the Local to Breez service upgrade process will depend upon the solution the vendor proposes for mobile ticketing fare payments, i.e. whether the rider presents their account credential and the fare is deducted directly from their account (preferred) or the rider purchases the base fare pass from their account balance:

- If the vendor proposes the former, then the upgrade experience for mobile ticketing users will be analogous to smart card users.
- If the vendor proposes the latter, mobile ticketing users will need to know ahead of time whether or not they plan to transfer between Local and Breez services during the time period that the base fare is valid. If they do plan to use both services, the rider will need to purchase a Breez base fare on their mobile device prior to boarding any bus. The Breez base fare gives them access to both services. Under this mobile ticketing setup, mobile ticketing users will not be able to purchase an upgrade to the Breez service if they have mistakenly already purchased a Local base fare and used it to board a Local bus. Instead, and unlike a smart card user, they will have to purchase a separate Breez base fare to then board a Breez bus.

Cash riders will have to pay the base fare each time they board a bus. They will pay the Local base fare

upon boarding Local buses and will pay the Breez base fare upon boarding Breez buses. There will be no transfer offered between buses and/or services to cash riders.

Token riders must present a token each time they wish to board a bus. As with cash riders, there will be no transfer offered between buses and/or services. METRO may choose to use distinct tokens for Local versus Breez services. This will be determined at a later date.

The way cash and tokens will be handled within the system from a policy perspective is subject to change based on input from the public outreach process METRO is currently conducting around the new fare collection technology system and their proposed fare changes.

Related to fare capping, METRO will be able to choose different validity periods for the time-based pass base fare for Breez and Local services. The fare capping time periods will be the same for the two services, but METRO will be able to price the base fares and the fare caps differently to reflect Breez's premium status. For example, under the new fare system, METRO would be able to continue charging \$1.50 for the Local base fare and \$3.00 for the Breez base fare and would be able to implement a Local monthly fare cap of \$45 and a Breez monthly fare cap of \$90.

### 6.6 Rider Categories

The fare system will support the recognition of various rider categories, and METRO will be able to assign different discounts to each rider category if so desired. This discount will apply to the base fare and may also apply to any capping thresholds METRO chooses.

Under the current system, METRO has three rider categories: full fare, reduced fare, and youth fare.

Reduced fare riders are entitled to a 50% discount off of the full fare. METRO currently issues Reduced Fare Cards to individuals who fall into at least one of the following categories:

- Disability eligible through Veteran's Association (with copy of Qualifying letter)
- Medicare Card Holder (Red, White, and Blue card, not MaineCare)
- Person with Disabilities (with supporting medical documentation)
- Recipient of SSI / SSDI benefits (with copy of Qualifying letter)
- Senior aged 65 plus (with valid photo ID including birth date)

Riders ages 6 to 18 qualify for the youth fare and are currently entitled to a 33% discount off of the full fare. Youth fare riders, upon implementation of the proposed fare change, will be entitled to a 50% discount off of the full fare. As such youth will become a subset of the general "reduced fare" category, simplifying METRO's fare structure. Riders below the youth fare threshold (i.e., children ages 5 and younger) can ride for free with a fare-paying adult.

Reduced fare riders will be able to choose between the mobile app and a personalized reduced fare smart card for their electronic fare payment media; they will have access to reduced fare benefits on both media forms. The main difference in enforcement between the two electronic fare payment media will be that reduced fare riders with a reduced fare smart card will not be required to prove their eligibility upon boarding, but reduced fare riders with a mobile app payment will. This gives reduced fare customers a choice as to whether or not they want their enforcement to occur on board or off board.

Discount fare riders who wish to pay with cash or tokens will not need to possess a METRO-issued discount fare smart card. However, METRO may ask that these riders carry an alternate form of proof of eligibility for their discount fare that can be used for fare enforcement purposes. Also, these discount cash riders will have to pay their discount fare upon each boarding and will not have access to the time pass base fare.

### 6.7 Social Service Agencies

METRO will distribute tokens to social service agencies to facilitate their clients' participation in the new fare system. Tokens will only be available through these distribution channels and will not be available to the general riding public. While METRO does not currently employ tokens, tokens offer social service agencies a reliable, simple way to confer transit benefits to their clients. Tokens also offer METRO a contract fare medium that is easy to administer and cheap to distribute to these agencies. No other fare media, current or proposed, meet these criteria as well as tokens do. Using tokens for social service agencies and nonprofits will also provide METRO with a better idea of how these entities' clients use the METRO system as token use and collection are tracked.

Social service agencies will also be able to distribute base fares and/or stored value to their clients through the new electronic fare payment system. Under this system, a social service agency will pay METRO for any base fares and stored value that they send out. The details of how and when these payments are made will be decided during the system design phase. METRO expects vendors to propose how they will meet this functionality need within their proposals.

Tokens and the distribution of base fares and/or stored value to electronic transit accounts are intended to meet the shorter-term needs of social service agencies' clients, such as getting to a job interview or a medical appointment.

For clients with longer-term needs, social service agencies will be able to anonymously load stored value to clients' transit accounts. Details regarding this method of social service agency transit benefit distribution will be determined during the system design phase.

### 6.8 Institutional Pass Programs

The new fare technology system will support METRO's existing institutional pass programs with the University of Southern Maine (USM), Southern Maine Community College (SMCC), Portland Public Schools (PPS), and Baxter Academy.

METRO and the selected vendor will work with these institutions to help them transition to the new fare system; the new system will require their members to use a smart card to participate in the institutional pass program. Under the new system, these institutions will be able to load institution-specific passes to their participants' accounts. Institution-specific passes will be passes that grant a passholder access to METRO's system for a programmable period of time. Institutions will be able to work with METRO to determine the duration of their institution-specific pass. Further details regarding the institution-specific passes will be defined during the system design phase.

The institutions will be responsible for administering and managing their participants' transit accounts

using the institutional website portal. Using the institutional website portal, institutions will be able to add passes with specific expiration dates to their managed accounts and update accounts as participants enter or leave the institution. For larger institutions, it will be possible to perform these activities in bulk and automatically based on their existing access control pass systems. More information on this is available in the Operations section of this document.

The new fare system will help METRO shift as much of the administrative burden of these pass programs to the participating institutions as possible. There may, however, be cases where METRO wants to maintain administration of certain institutions in house, so the new system will be flexible enough to facilitate this situation as well.

The new system will also support expansion of the institutional pass program model to new institutions. When a new institution begins a pass program, they will be able to work with METRO to determine the specifications of their institution-specific pass product. The new institutions will also be able to conduct account management activities through the institutional website portal.

### 6.9 Employer Pass Programs

METRO will include functionalities to support the launch of an employer pass program in their new electronic fare payment system. Under this employer pass program model, employers would enter into a contract with METRO for an all-in insurance program. In an all-in insurance pricing structure, organizations are charged for their participation based on all individuals eligible to use the program, regardless of whether or not they actually use transit.

- These programs are designed specifically to attract riders to transit who may not otherwise choose that transportation option. This is usually accomplished by selling discounted passes to organizations who may then pass all or part of the savings through to their members or offer the passes free as a member benefit.
- The central objective is to attract non-riders to transit with the hopes of encouraging them to become regular riders.
- For electronic fare payment all-in programs, the organization is generally responsible for managing their headcount and list of participants through a special portal that enables the organization to remove someone who is no longer affiliated with the organization or to request to add a new individual. Having the organization manage its account can help minimize the administrative burden on the transit agency. Since pricing may also be based on actual ridership data, each organization has an incentive to deactivate cards as soon as possible to minimize paying for unauthorized trips.
- This pricing scheme assumes that members who already use transit will continue to do so and that some members will never use transit. But, because they are all included in the program, the price paid for non-users subsidizes the cost of providing service to existing or new users. In other words, pricing is based on the number of eligible participants and provides discounts, much like an insurance policy, relative to what it would cost if all members used transit on a regular basis.

- Pricing all-in programs is very challenging without good data on actual usage rates. While historically these programs were priced based on survey data or bus operator keys, they are increasingly priced using smart card data.
- Organizations are typically pre-billed under this model, usually paying in advance for a full year, but agencies can choose to post-bill. Post-billing is more common with all-in programs that charge based on actual ridership as opposed to true all-in insurance programs where organizations pay per member eligible for the service regardless of their use of the system.

When pricing the rides taken by these programs, many transit agencies use the adult full fare or adult average fare. Transit agencies that wish to use an average adult fare instead of their adult full cash fare to price their programs have come up with different ways to estimate this price. For accurate estimates of the average fare paid, substantial data is needed, especially since this average fare price must be updated on a regular basis and so program contract pricings should be as well.

## 7 Fare Media

The system will accept both smart cards and mobile phones as fare media to be electronically validated on boarding of buses.

### 7.1 Smart Cards

The new electronic fare collection system will accept smart cards. Three major categories of smart cards will be accepted: METRO-issued smart cards for individuals, METRO-issued smart cards for institutions, and third-party issued cards.

The system will accept METRO-issued contactless ISO 14443 compliant smart cards that are linked to transit accounts and may be used to pay for base fare passes in much the same way as in the mobile ticketing application. Base fare passes purchased will accumulate to daily and monthly caps. Customers will simply present their smart card associated with an account with value and the fare will be deducted. The same account will be used to manage both smart cards and mobile ticketing.

METRO will also issue smart cards for institutions such as social service agencies, the local school district, and some employers that can be managed and loaded with value. Business account program administrators will be able to manage their group's cards using an online web portal, discussed in the Websites section.

The system will also be capable of accepting ISO/IEC 14443, HID (Prox or ISO/IEC 15693) compliant employer or university identification cards or cards with unique barcodes as identifiers for METRO transit accounts. METRO is already in discussions with University of Southern Maine and Maine Medical Center to ensure the new system is capable of accepting their cards. The process for accepting these cards is discussed in more detail under Websites.

METRO will have the ability to customize the discount fare smart cards; this customization can but does not have to include the rider's name, the rider's photo, and the name of the applicable discount fare program. Each discount fare smart card will be tied to a specific discount fare transit account into which the cardholder can load value.

## 7.2 Mobile Ticketing

A primary component of the new system will be a mobile ticketing application that allows users to purchase METRO's base fare pass using their smartphone or other device and then use the device to display valid fare payment on board using barcodes or NFC. The application will be available to both Android and iOS users and will be made available and maintained by the vendor from each platform's public app store.

The mobile ticketing application will only be for individual riders - members of institutions and other groups will not be able to get their organization-specific fare product through the mobile application. The only fare product that will be available through the mobile ticketing application is METRO's base fare pass, a time-based pass discussed in more detail in the Fare Policy section. Base fare passes purchased through the mobile ticketing application will accumulate to caps. METRO is open to either a solution where customers purchase the base fare pass from their account balance or a solution where an account credential is presented and the fare is deducted directly from their account, though METRO has a strong preference for the latter form of fare payment. The primary method for validating mobile tickets will be through barcodes displayed on smart phones to an optical reader on the onboard validator. The system will also be capable of accepting closed-loop NFC payment, such as through card emulation, in the future as NFC-enabled phones become more widely used.

The mobile ticketing application will also act as an account management application for account holders using a smart card, rather than the mobile ticketing application, for payment. Smart card users will be able to use the mobile ticketing application to perform basic account management tasks including:

- Loading of value and fare products to transit accounts
- Inquiry of transit account balance, transaction history, and progress towards caps.

## 8 Integrations

The system will be designed for expansion and integration. This will include integration with a retail network for adding cash to accounts, the ability to add transit partners and the ability to integrate with additional non-transit services.

### 8.1 Retail Network Application

Access to the benefits of the new electronic fare collection system will be enhanced by a robust retail network that will enable customers to obtain smart cards and to load value to their transit accounts. In addition to providing a wider distribution network for smart cards, a partnership with a retail cash loading provider will improve access to the new fare collection system for un- and underbanked individuals. Customers will be able to present a credential for their transit account (e.g. their smart card or the mobile ticketing application), pay the cashier, and have the value added to the account immediately.

To support this network, the vendor will need to provide an API that will allow retailers' existing point of sale systems unidirectional access to customers' transit accounts. Using the API, retailers will be able to add value to the appropriate transit account using a smart card or the mobile ticketing application as a



credential. The API will be capable of returning a message indicating whether the value load was successful or not.

## 8.2 Transit Partners

The system will have the ability to include METRO's regional transit partners. These partners include the following regional transit bus services:

- South Portland Bus Services
- ShuttleBus-Zoom
- Regional Transportation Program

As the system is developed, these transit partners will be invited to participate. To participate, an agency will be required to purchase onboard equipment from the selected vendor. Additionally, they will need to have mobile access routers installed on board their vehicles and possibly WiFi in the garages.

The transit partner agencies will have access to the system through a web management interface. Username and password access will allow them to see and manage only their portion of the system. They will be allowed to:

- Set their fares by service
- Include their fares in fare capping calculations (or not)
- Honor capped accounts, or accounts that are riding free because of capping (or not)
- Report on usage from their vehicles
- Receive error reports from their vehicles

As a passenger boards and presents their credential to a validator it will identify the account and determine if the rider can ride. This calculation will include whether the fare paid counts towards the cap and whether the account is already capped and therefore rides free. Because transit partners are likely to have more rural areas with possibly poor network connectivity, the validator will be capable of making an offline decision.

Some transit partners will have CAD/AVL or stop annunciation systems capable of passing route/run and GIS information to the onboard fare system. Others will not, or may choose not to pay for the required integration. If this information is not gathered from other systems the fare system will include latitude/longitude in the transaction data that is recorded in the back office.

All system revenues will be deposited into a single financial account managed by METRO. Transfer agreements and any exchange of funds based on transfers will be handled outside the system, but these transfer calculations will be supported by the data collected by the system and by the reporting functionalities of the system.

## 8.3 Other Regional Partners

The system will allow integrations with other regional transportation partners. These include:

- Amtrak Downeaster
- Casco Bay Ferries



- Concord Coach
- Greyhound Bus Service

Because these partners vary in their fare collection methods, the integrations will vary. Some of the agencies have hand held barcode scanners already in use either by ticket sellers or collectors. Depending on the business agreement with METRO, the mobile application could present a barcode which allows passage or which grants a discount. For other agencies, the mobile app or the website could generate a discount code or a visual ticket.

Integration with parking companies could also be handled in this manner.

### 8.4 Additional Transportation Integrations

Many of the fare collection vendors have already created integrations with other transportation options. These include integration with trip planners, Transportation Network Companies (TNCs) such as Lyft and Uber, and bike sharing companies. Vendors will be asked to describe any integrations they have in their proposals.

## 9 Operations

Once built, the system will be operated and maintained for METRO by the selected vendor.

### 9.1 Hosting

METRO will not host the new fare collection system. Instead the system will use a cloud-based service that can meet strict performance and scalability requirements. The proposed fare collection solution will be an off-premise (not hosted by METRO) solution where the vendor is responsible for hosting and maintaining the software. The system could be Software as a Service (SaaS), in which every agency's data is stored in the same database, but each agency's data is accessible only to themselves, or hosted, in which every agency is treated separately with individual instances of software, databases, and servers.

Vendors will be given the option of proposing either model. A total cost of ownership comparison will be conducted to compare the two options, should METRO receive bids for both option types.

### 9.2 Software Maintenance

Software Maintenance will be the responsibility of the system vendor and the price will be included in the annual system fees. This includes upgrades and bug fixes for the back office, web site and mobile application as well as hardware, OS and security upgrades on the hosted platform.

Different vendors provide mobile apps in different models. Some offer a single application that users can use across multiple transit agencies and some provide individual branded or 'white labeled' apps for each agency. Vendors will be allowed to propose either but will be responsible for maintenance of the application under either model.

The selected vendor will be responsible for maintaining the firmware on the operator console and

validator as a part of the ongoing fees.

METRO will be responsible for maintaining the firmware on all other onboard equipment including the mobile access routers and the CAD/AVL system.

### 9.3 Equipment Maintenance

METRO will be responsible for field checking equipment, including ensuring that power and network connections are operational. If the equipment still fails, they will replace it with a spare and send it to the vendor for repair or replacement. There will be a service level agreement (SLA) to cover turnaround times for the equipment to be repaired or replaced.

### 9.4 Card Fulfillment

Due to the nature of the fare media proposed for the new fare system, METRO will only need to be involved in the distribution of smart cards and token fare media; riders are expected to use their own mobile devices for mobile ticketing.

Tokens will be distributed by METRO directly to social service agencies. Social service agency partners will be able to place token orders with METRO by calling or emailing the appropriate METRO staff.

For smart cards, fulfillment services will be provided to produce, print, encode, distribute, and track smart cards across different channels. Smart cards will be fulfilled and distributed through several channels, including but not limited to:

- METRO service centers
- Retail merchants
- Mail center

Card distribution and replacement cards will be handled by METRO. Retail channels will also distribute cards given to them by METRO. Distribution of cards will not require special equipment as account values will be held in the back office and not on the cards.

Riders seeking to obtain discount-fare smart cards (e.g. youth cards, senior cards, or disabled cards) will need to visit a METRO service center and bring with them the appropriate documentation to verify their discount rider category status. METRO staff will then print a new smart card with any necessary information on it and link the card to a discount fare transit account, which will confer upon the cardholder all benefits associated with their specific discount rider category. If an individual is unable to visit a METRO service center in person to complete this process, they will need to contact Customer Service and work with METRO staff to explore options for mailing or emailing in the necessary documentation or for sending a representative to the service center in their place.

### 9.5 Financial Settlement

The selected vendor will be responsible for settling all bank card transactions on the web or the mobile app. They will deduct their transaction fee (inclusive of any bank card fees) and deposit the remainder into METRO's demand account on a daily basis.

Similarly, the retail network provider will be responsible for depositing any net proceeds of cash

payments into METRO's demand account on a regular basis.

Reconciliation reports will be available from the system which will enable METRO to reconcile the proceeds received to value loaded and rides taken using the fare system.

### 9.6 Data Management and Reporting

METRO will have full access to all data collected, processed, and transmitted by the system. METRO will be able to query the database by SQL in real time in addition to being able to download data selections and canned reports.

### 9.7 Customer Service

Some vendors offer front line customer support, in which a rider will call the vendor when they need help with the system. Others only offer second level support where the first call would come in to METRO. Vendors will be allowed to propose either option and their responses will be evaluated in light of the option they propose.

### 9.8 Impacts

Implementation of the system should have little operational impact on the METRO organization. On roll out there might be a slightly higher demand for customer service, and over time there will be lower required maintenance and cash handling, but neither should require the addition of staff.

In the field, operators will need to be trained to use the keys on the new operator console instead of the farebox. Training will also need to cover how to handle various scenarios, particularly if credentials are declined by the system. Maintenance staff will also require training on the installation and necessary first line maintenance of the equipment.

## 10 Validation

The vendor will be responsible for a test plan which will be approved by METRO. Test phases will include factory testing of the onboard equipment, integration testing in both lab and field environments and acceptance testing. The final system acceptance tests will begin on full system launch and last for at least six months until final system acceptance is granted.

## 11 Project Measurement (Metrics)

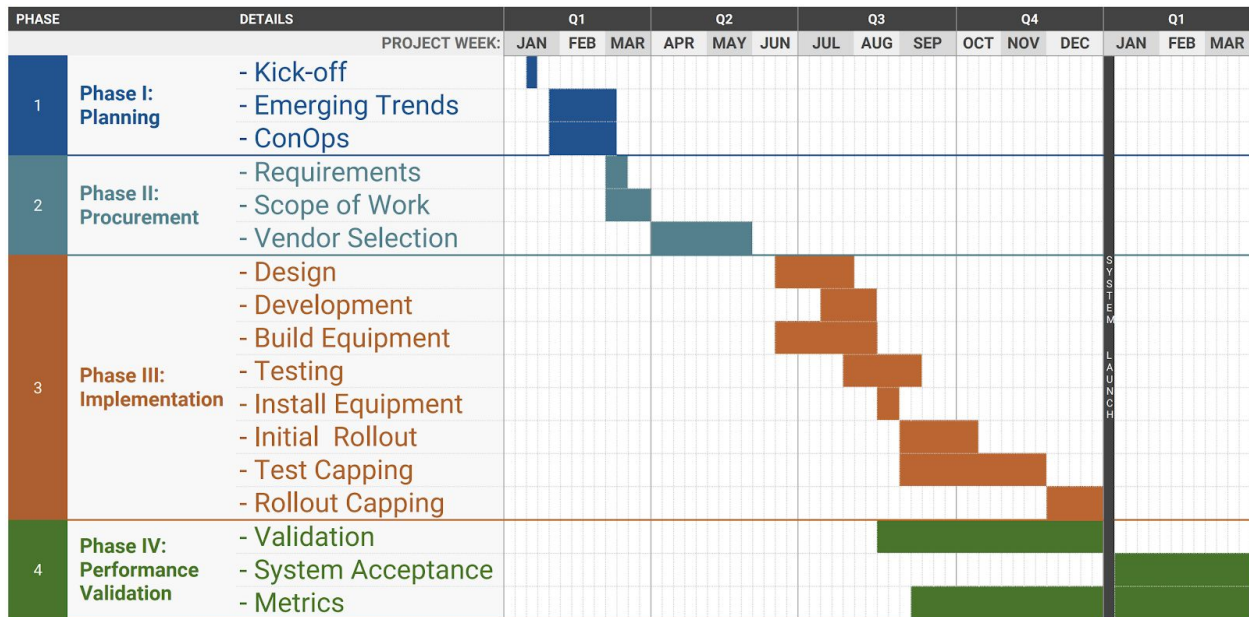
To be successful, implementation of the new fare collection system must include measurement of the success of the project. Metrics should be established and used to measure the overall project as well as each project phase from planning to post launch operations. The metrics should align with METRO's strategic goals. More metrics are better. Potential metrics that should be considered:

- Rider and community satisfaction
- System usage and penetration by fare media type
- Regional agency satisfaction
- Budget and schedule adherence

- Agency resources required for implementation and operation
- Up time and time between failures
- Percentage of transactions completed within the transaction window
- Additional institutional contracts
- Fare recovery
- Retail network utilization (number of transactions, revenue from those transactions)

## 12 Project Schedule

A notional schedule for the project follows:



## 13 Implementation/Transition Plan

The new fare system will be installed in phases, to allow the capping system to be fully tested before rollout.

### 13.1 Initial Rollout

Following testing, the onboard equipment will be installed. After the equipment is installed a series of progressively larger tests will take place. Typically these include beta testing, friendly user testing and a soft launch. Following success in all of these phases the new system will be fully launched with every feature except for capping. This will include the mobile application, smart cards, the retail network and the institutional program.

While institutional customers will be able to load passes onto smart cards, individual customers will only be able to load value into their accounts and purchase the base fare. For this reason, existing sales of paper passes will not be discontinued.

## 13.2 Capping Rollout

Following initial rollout, the capping calculation engine will be operational in the back office, and data flags will be set in rider accounts to indicate when they have reached the capping threshold, but free rides will not be granted. Initial testing will be completed by examining the data to make sure that the flag is being set correctly.

Once the capping calculation has passed the initial testing, capping will undergo a similar set of rollout tests: beta, friendly user, soft launch and full launch. During the friendly user or soft launch test phases, free rides could be enabled for all capped riders, just not announced to the general public. For full launch, capping will be announced and promoted.

## 13.3 Farebox Replacement

During the fare system implementation, METRO will procure new fareboxes to replace the existing Cents-a-bills. These fareboxes will be simple, non-registering drop boxes that will not have keys for fare type and will not collect data. They may be replaced at any time during the project. They will be procured before the new New Flyer coaches arrive so that they can be installed before those coaches are put into service. Additionally, it makes sense, if possible to replace the fleet all at once so that there are not two vaulting systems in use at once. Operators will key cash and token transactions on the new operator consoles rather than the fareboxes.

## 14 Procurement

A single procurement will select a single vendor to design, develop and install the system. The procurement will be based on a request for proposals which will include a functional scope of work. Project funding includes federal funds and therefore the selected bid will need to be Buy America compliant. The initial contract will be for five years with five one year METRO options.

The contract will include:

- The fare collection system
- The mobile application
- Validators and operator consoles for the fleet plus 10% spares
- Integration with a retail partner for loading cash
- The initial batch of smart cards
- A monthly, per transaction or percentage of value based fee
- Processing of all transactions will be included
- All bank card fees will be included
- Software system maintenance will be included
- Mobile application maintenance will be included
- Card readers for all agencies

Support under the contract will include:

- Hardware support during system acceptance

- Three year warranty beyond system acceptance at a fixed price
- Hardware support after the expiration of the warranty at an annual price
- Additional smart cards at a preset unit price
- Additional onboard units at a preset unit price
- Specifications for METRO to procure smart cards elsewhere if they choose

There will be one contract for mobile/smart card/back end/hardware.

New fareboxes will be procured in a separate procurement.

## 15 High Level Cost Estimates

Initial costs for the new system will come in three forms: Non-recurring engineering, capital equipment and METRO-incurred costs.

The selected vendor is unlikely to have all of the features of the system already built and will need to incur engineering and testing costs to implement the additional features that METRO requires. Estimates for these non-recurring engineering or NRE costs are:

- \$25,000-\$50,000 for institutional import and web interface
- \$25,000-\$50,000 for the individual rider web interface
- \$50,000-\$75,000 for capping
- \$50,000-\$75,000 for near real time validator updates

Total NREs are estimated to fall between \$150,000 and \$250,000.

Additional initial costs will include the cost of procuring and installing the onboard systems (validator and operator console) and a new WiFi system for METRO's garage. Similar systems typically cost between \$1,000 and \$1,500 for the onboard equipment and the garage WiFi should be comfortably less than \$1,000, installed. With METRO's fleet of 44 buses, and a 10% spare ratio, this will bring capital equipment costs to between \$49,000 and \$73,000.

The METRO-incurred costs will include time spent managing the project, reviewing design and testing, and training. METRO has also engaged Four Nines Technologies, a consulting firm, to support the project and METRO staff, which will represent an additional source of costs to the METRO.

Ongoing costs for the system will come in two or three forms: monthly fees, transaction fees, and equipment maintenance costs.

While vendors price ongoing costs in different forms, primarily differing on whether there is a monthly minimum, the industry is beginning to coalesce around a transaction fee only model. This model charges a simple percentage on the value processed through the system and is typically inclusive of bank card fees. A typical fee is 10% of the value of the transactions. Assuming that 100% of institutional riders, 90% of monthly passes, 75% of other purchased passes, and 30% of cash riders convert to the new fare system, the system would process just under \$1.5 million in fares annually. That would yield transaction fees of approximately \$150,000 per year.

Equipment maintenance is typically done on a contract basis, starting after the expiration of warranty. Assuming a system acceptance period of 6 months and a warranty of three years, the maintenance fees

would begin 3-½ years after system launch. 15% per year is a typical maintenance fee, which would be between \$7,500 and \$11,000 per year.

## 16 Fare Revenue Estimates

While new fare systems improve the transit riding experience, there are not data to suggest that it directly increases ridership or revenue.

Implementing a policy of fare capping will result in a decrease in revenue. METRO will lose revenue from riders who currently purchase a Monthly Pass even though they do not reach the break-even ridership threshold of 30 trips. Essentially, these riders are paying for more service than they actually consume, possibly because they enjoy the convenience of a Monthly Pass or have another institution or person who purchases the pass for them. The second driver of revenue loss under fare capping comes from riders who used to pay more than the value of a Monthly Pass in cash rides each month, but who are now able to reach the capping threshold. Because of METRO's low monthly pass multiple, this will be the more significant source of revenue loss for METRO under fare capping.

METRO is planning to implement a fare increase in 2019. Based on prior experience and modeling of assumed elasticities, the fare increase is projected to increase overall revenue. In projecting fare revenue, it is important to distinguish the effects of capping and the fare increase.

Based on 2018 projected revenues, capping without a fare increase would be expected to reduce farebox or cash revenue by \$147,694 or -22.57%, monthly pass revenue by \$50,184 or -10.00% and ten ride revenue by \$4,344 or -1.30%.

With the fare increase and capping implemented, farebox or cash revenue is still expected to fall by \$68,155 or -17.14%, monthly pass revenue is expected to increase by \$69,821 or +13.91%, and TenRide trips revenue is expected to increase by \$50,420 or +18.13%. Overall, implementing both fare capping and the fare increase is projected to result in a 2018 revenue increase of \$52,086 or +3.93%.

Similar percentage increases above projections can be expected in future years.

## 17 Requirements

A set of draft requirements sorted by topic was provided in the appendix of the draft ConOps in the form of an Excel document. Four Nines reviewed these with METRO staff during on-site workshops March 6th through 8th. During these workshops, we reviewed the requirements for accuracy and completion. Based on the feedback received, we will finalize the requirements for their inclusion in the formal Request for Proposals and Scope of Work.

**FTA THIRD PARTY CONTRACTING REQUIREMENTS**

- A. Federal Requirements; Changes Thereto.** Contractor shall at all times comply with Federal Transit Administration (“FTA”) Circular 4220.1F, as may be amended from time to time, and all applicable FTA regulations, policies, procedures, and directives, including without limitation those listed directly or by reference in any grant agreement between FTA and GPTD and any standard terms and conditions attached thereto (“Grant Agreement”), as they may be amended or promulgated from time to time during the term of this contract. Contractor’s failure to so comply shall constitute a material breach of this contract. Anything to the contrary herein notwithstanding, all FTA mandated terms and conditions set forth in FTA Circular 4220.1F, as may be amended from time to time, and the Grant Agreement shall be deemed to control in the event of a conflict with other provisions contained in this contract. Contractor shall not perform any act, fail to perform any act, or refuse to comply with GPTD requests which would cause GPTD to be in violation of any FTA terms and conditions. Contractor agrees to include this contract term, as modified to apply to each subcontractor, in each subcontract issued pursuant to this contract.
- B. No Federal Government Obligations to Third Parties.** Contractor acknowledges and agrees that, notwithstanding any concurrence by the Federal Government in or approval of the solicitation or award of the Grant Agreement, absent the Federal Government’s express written consent, the Federal Government shall not be subject to any obligations or liabilities to Contractor or any other person or entity that is not a party to the Grant Agreement. Contractor agrees to include this contract term, as modified to apply to each subcontractor, in each subcontract issued pursuant to this contract.
- C. Conflict of Interest.** By entering into this contract with GPTD to perform or provide work, services, or materials, Contractor has thereby covenanted that it has no direct or indirect pecuniary or proprietary interest, and that it shall not acquire any interest, which conflicts in any manner or degree with the work, services, or materials required to be performed and/or provided under this contract and that it shall not employ any person or agent having any such interest. In the event that Contractor or its agents, employees, or representatives hereafter acquires such a conflict of interest, it shall immediately disclose such interest to GPTD and take action immediately to eliminate the conflict or to withdraw from this contract, as GPTD may require.
- D. False or Fraudulent Statements or Claims.**
1. Contractor acknowledges that the provisions of the Program Fraud Civil Remedies Act of 1986, as amended, 31 U.S.C. §§ 3801-3812, and U.S. Department of Transportation (“DOT”) regulations, “Program Fraud Civil Remedies,” 49 CFR Part 31, apply to Contractor’s activities in connection with this Project. Contractor certifies or affirms the truthfulness and accuracy of each statement it has made, it makes, or it may make in connection with the Grant Agreement or the project for which the contract work is being performed. In addition to other penalties that may apply, Contractor also acknowledges that if it makes a false, fictitious, or fraudulent claim, statement, submission, certification, assurance, or representation to the Federal Government, the Federal Government reserves the right to impose the penalties of the Program Fraud Civil Remedies Act of 1986, as amended, to the extent the Federal Government deems appropriate.
  2. Contractor further acknowledges that if it makes a false, fictitious, or fraudulent claim, statement, submission, certification, assurance, or representation to the Federal Government or includes a false, fictitious, or fraudulent statement or representation in any agreement with the Federal Government in connection with this project or any other Federal law, the Federal Government reserves the right to impose



## ATTACHMENT D

on Contractor the penalties of 49 U.S.C. § 5323(l), 18 U.S.C. § 1001, or other applicable Federal law to the extent the Federal Government deems appropriate.

3. Contractor agrees to include these contract terms, as modified to apply to each subcontractor, in each subcontract issued pursuant to this contract.

### **E. Access to Records.** Contractor agrees to:

1. Provide to GPTD, the FTA Administrator, the U.S. Secretary of Transportation, and the U.S. Comptroller General or their duly authorized representatives access to all records to the extent required by 49 U.S.C. § 5325(g). Contractor agrees to permit any of the foregoing parties to reproduce by any means whatsoever or to copy excerpts and transcriptions as reasonably needed;
2. Maintain all books, records, accounts, and reports required under this contract for a period of not less than three years after the date of termination or expiration of this contract except in the event of litigation or settlement of claims arising from the performance of this contract. In such case, Contractor agrees to maintain same until GPTD, the FTA Administrator, the U.S. Secretary of Transportation, and the U.S. Comptroller General or their duly authorized representatives have disposed of all such litigation, appeals, claims, or exceptions related thereto, or until the end of the regular three-year period, whichever is later, pursuant to 49 CFR Part 18.42.
3. Comply with all applicable State of Maine record retention requirements and applicable provisions of the Maine Freedom of Access Law, 1 M.R.S.A. § 401, *et seq.*
4. Include these contract terms, as modified to apply to each subcontractor, in each subcontract issued pursuant to this contract.

### **F. Civil Rights.** Contractor agrees to comply with all applicable civil rights laws and implementing regulations including, but not limited to, the following:

1. Nondiscrimination in Federal Public Transportation Programs. Contractor agrees to comply, and assures that each subcontractor will comply, with the provisions of 49 U.S.C. § 5332, which prohibits discrimination (including discrimination in employment or business opportunity), exclusion from participation in employment or business opportunity, or denial of program benefits in employment or business opportunity on the basis of race, color, creed, national origin, sex, disability, or age. Contractor further agrees to comply with FTA Circular 4702.1, "Title VI Requirements and Guidelines for Federal Transit Administration Recipients," as amended, to the extent consistent with applicable Federal laws, regulations, and guidance, and other applicable Federal guidance that may be issued.
2. Nondiscrimination—Title VI of the Civil Rights Act. Contractor agrees to, and assures that each subcontractor will, prohibit discrimination based on race, color, or national origin and comply with (i) Title VI of the Civil Rights Act of 1964, as amended, 42 U.S.C. § 2000d *et seq.*, (ii) DOT regulations, "Nondiscrimination in Federally-Assisted Programs of the Department of Transportation—Effectuation of Title VI of Civil Rights Act," 49 CFR Part 21, (iii) U.S. Department of Justice ("DOJ"), "Guidelines for the enforcement of Title VI, Civil Rights Act of 1964," 28 CFR § 50.03, and (iv) all other applicable Federal guidance that may be issued.

## ATTACHMENT D

3. Nondiscrimination on the Basis of Sex. Contractor agrees to comply, and assures that each subcontractor will comply, with Federal prohibitions against discrimination on the basis of sex, including (i) Title IX of the Education Amendments of 1972, as amended, 20 U.S.C. § 1681 *et seq.*; (ii) DOT regulations, “Nondiscrimination on the Basis of Sex in Education Programs or Activities Receiving Federal Financial Assistance,” 49 CFR Part 25; and (iii) Federal transit law, specifically 49 U.S.C. § 5332.
4. Nondiscrimination on the Basis of Age. Contractor agrees to comply, and assures that each subcontractor will comply, with Federal prohibitions against discrimination on the basis of age, including (i) the Age Discrimination in Employment Act, 29 U.S.C. §§ 621-634, which prohibits discrimination on the basis of age; (ii) U.S. Equal Employment Opportunity Commission (“EEOC”) regulations, “Age Discrimination in Employment Act,” 29 CFR Part 1625, which implements the Age Discrimination in Employment Act; (iii) the Age Discrimination Act of 1975, as amended, 42 U.S.C. § 6101 *et seq.*, which prohibits discrimination against individuals on the basis of age in the administration of programs or activities receiving Federal funds; (iv) U.S. Health and Human Services regulations, “Nondiscrimination on the Basis of Age in Programs or Activities Receiving Federal Financial Assistance,” 45 CFR Part 90, which implements the Age Discrimination Act of 1975, and (v) Federal transit law, specifically 49 U.S.C. § 5332.
5. Nondiscrimination on the Basis of Disability. Contractor agrees to comply, and assures that each subcontractor will comply, with the following Federal laws and regulations against discrimination on the basis of disability: (i) Section 504 of the Rehabilitation Act of 1973, as amended, 29 U.S.C. § 794, which prohibits discrimination on the basis of disability in the administration of federally funded programs or activities; (ii) the Americans with Disabilities Act of 1990 (“ADA”), as amended, 42 U.S.C. § 12101 *et seq.*, which requires that accessible facilities and services be made available to individuals with disabilities; (iii) the Architectural Barriers Act of 1968, as amended, 42 U.S.C. § 4151 *et seq.*, which requires that buildings and public accommodations be accessible to individuals with disabilities; (iv) Federal transit law, specifically 49 U.S.C. § 5332, which includes disability as a prohibited basis for discrimination; (v) DOT regulations, “Transportation Services for Individuals with Disabilities (ADA),” 49 CFR Part 37, “Nondiscrimination on the Basis of Disability in Programs and Activities Receiving or Benefiting from Federal Financial Assistance,” 49 CFR Part 27, and “Transportation for Individuals with Disabilities: Passenger Vessels,” 49 CFR Part 39; (vi) Joint U.S. Architectural and Transportation Barriers Compliance Board (“ATBCB”) and DOT regulations, “Americans With Disabilities (ADA) Accessibility Specifications for Transportation Vehicles,” 36 CFR Part 1192 and 49 CFR Part 38; (vii) DOJ regulations, “Nondiscrimination on the Basis of Disability in State and Local Government Services,” 28 CFR Part 35, and “Nondiscrimination on the Basis of Disability by Public Accommodations and in Commercial Facilities,” 28 CFR Part 36; (viii) EEOC regulations, “Regulations to Implement the Equal Employment Provisions of the Americans with Disabilities Act,” 29 CFR Part 1630; (ix) U.S. Federal Communications Commission regulations, “Telecommunications Relay Services and Related Customer Premises Equipment for Persons with Disabilities,” 47 CFR Part 64, Subpart F; (x) ATBCB regulations, “Electronic and Information Technology Accessibility Standards,” 36 CFR Part 1194; (xi) FTA regulations, “Transportation for Elderly and Handicapped Persons,” 49 CFR Part 609; and (xii) all other applicable laws and amendments pertaining to access for seniors or individuals with disabilities, and applicable Federal civil rights and nondiscrimination guidance.
6. Equal Employment Opportunity. Contractor agrees to, and assures that each subcontractor will, (i) prohibit discrimination on the basis of race, color, religion, sex, or national origin and comply with Title VII of the

## ATTACHMENT D

Civil Rights Act of 1964, as amended, 42 U.S.C. § 2000e *et seq.*; (ii) facilitate compliance with Executive Order 11246, “Equal Employment Opportunity,” as amended by Executive Order 11375, “Amending Executive Order 11246, Relating to Equal Employment Opportunity,” 42 U.S.C. § 2000e note, and as further amended by Executive Order 13672, “Further Amendments to Executive Order 11478, Equal Employment Opportunity in the Federal Government, and Executive Order 11246, Equal Employment Opportunity,” by ensuring that applicants for employment are employed and employees are treated during employment without discrimination on the basis of their race, color, religion, national origin, disability, age, sexual origin, gender identity, or status as a parent; and (iii) comply with Federal guidance pertaining to Equal Employment Opportunity laws and regulations, and prohibitions against discrimination on the basis of disability. Contractor further agrees to take affirmative action to ensure that applicants are employed, and that employees are treated during employment, without regard to their race, color, creed, national origin, sex, or age. Such action shall include, but not be limited to, the following: employment, upgrading, demotion or transfer, recruitment or recruitment advertising, layoff or termination; rates of pay or other forms of compensation; and selection for training, including apprenticeship. Contractor further agrees to comply with any implementing requirements that FTA may issue.

7. Contractor agrees to include these contract terms, as modified to apply to each subcontractor, in each subcontract issued pursuant to this contract.

**G. Disadvantaged Business Enterprises.** To the extent authorized by applicable Federal law and regulation, Contractor agrees to, and assures that each subcontractor will, facilitate participation by small business concerns owned and controlled by socially and economically disadvantaged individuals, also referred to as Disadvantaged Business Enterprises (“DBEs”), as follows:

1. Contractor agrees to comply with (i) Section 1101(b) of SAFTEA-LU, “Moving Ahead for Progress in the 21<sup>st</sup> Century” (MAP-21), 23 U.S.C. § 101; (ii) DOT regulations, “Participation by Disadvantaged Business Enterprises in Department of Transportation Financial Assistance Programs,” 49 CFR Part 26, and (iii) Federal transit law, specifically 49 U.S.C. § 5332.
2. Contractor will not discriminate on the basis of race, color, national origin, or sex in the performance of this contract. Contractor agrees to carry out applicable requirements of 49 CFR Part 26 in the administration of this contract and the award and administration of any subcontract issued pursuant to this contract. Failure by Contractor to carry out these requirements is a material breach of this contract, which may result in the termination of this contract or such other remedy as GPTD deems appropriate, which may include, but is not limited to withholding monthly progress payments, assessing sanctions, liquidated damages, or disqualifying Contractor from future bidding as non-responsible.
3. Contractor agrees to include these contract terms, as modified to apply to each subcontractor, in each subcontract issued pursuant to this contract.

**H. Small & Minority Businesses; Women’s Business Enterprises.** Contractor agrees to take all necessary affirmative steps to assure that minority firms, women’s business enterprises, and labor surplus area firms are used when possible. Affirmative steps include: (i) placing qualified small & minority businesses and women’s business enterprises (“SMBWBEs”) on solicitation lists; (ii) assuring that SMBWBEs are solicited whenever they are potential sources; (iii) dividing total requirements, when economically feasible, into smaller tasks or quantities to permit maximum participation by SMBWBEs; (iv) establishing delivery schedules, where

## ATTACHMENT D

requirements permit, that encourage participation by SMBWBEs; and (v) using the services and assistance of the Small Business Administration, and the Minority Business Development Agency of the Department of Commerce. Contractor agrees to include this contract term, as modified to apply to each subcontractor, in each subcontract issued pursuant to this contract.

**I. Debarment and Suspension.** This contract is a covered transaction for purposes of 49 CFR Part 29. Accordingly:

1. Contractor agrees to review, and assures that all subcontractors will review, the U.S. General Services Administration (“GSA”) “System for Award Management,” <https://www.sam.gov>, if required by DOT regulations, 2 CFR Part 1200, and the Excluded Parties Listing System at <http://epls.arnet.gov> before entering into any contracts. Contractor further agrees to and assures that all subcontractors will enter into no arrangement to participate in the development or implementation of this project with any party that is debarred or suspended, pursuant to DOT regulations, “Nonprocurement Suspension and Debarment,” 2 CFR Part 1200; U.S. Office of Management and Budget (“OMB”), “Guidelines to Agencies on Governmentwide Debarment and Suspension (Nonprocurement),” 2 CFR Part 180, including any amendments thereto; Executive Orders Nos. 12549 and 12689, “Debarment and Suspension,” 31 U.S.C. § 6101 note; and other applicable Federal laws, regulations, or guidance regarding participation with debarred or suspended subcontractors. Contractor agrees to comply with said requirements throughout the period of this contract.
2. Contractor certifies that neither it nor its principals or subcontractors is presently debarred, suspended, proposed for debarment, declared ineligible, or involuntarily excluded from participation in this transaction by any Federal Department or Agency.
3. Contractor certifies that the above statement is a material representation of fact upon which reliance is placed by GPTD. If it is later determined that Contractor knowingly rendered an erroneous certification, in addition to other remedies available to the Federal Government, GPTD may terminate this transaction for cause of default.
4. Contractor agrees to include these contract terms, as modified to apply to each subcontractor, in each subcontract issued pursuant to this contract.

**J. Fair Labor Standards.** Contractor agrees to comply, and assures that all subcontractors will comply, with the Fair Labor Standards Act (“FLSA”), 29 U.S.C. § 201, *et seq.*, to the extent that the FLSA applies to employees performing project work involving commerce, and as the Federal Government otherwise determines applicable.

**K. Employee Protections—Wage and Hour Requirements.** Contractor agrees to comply, and assures that all subcontractors will comply, with all applicable Federal laws and regulations providing wage and hour protections for nonconstruction employees, including (i) Section 102 of the Contract Work Hours and Safety Standards Act, as amended, 40 U.S.C. § 3702, and other relevant parts of that Act, 40 U.S.C. § 3701 *et seq.*, and U.S. Department of Labor (“DOL”) regulations, “Labor Standards Provisions Applicable to Contracts Covering Federally Financed and Assisted Construction (also Labor Standards Provisions Applicable to Nonconstruction Contracts Subject to Contract Work Hours and Safety Standards Act,” 29 CFR Part 5. Accordingly, Contractor shall comply with the following contract terms and insert said terms in full in any contract or subcontract, if the contract or subcontract may require or involve the employment of laborers or

## ATTACHMENT D

mechanics and if it is not contemplated that the contract or subcontract will be a contract for supplies, materials, or articles ordinarily available in the open market or any other type of contract exempt from the Contract Work Hours and Safety Standards Act, pursuant to 40 U.S.C. § 3701(b):

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 (1) of this section, the Contractor and any subcontractor responsible therefore shall be liable for the unpaid wages. In addition, 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 work week 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. GPTD 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 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 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. Contractor or subcontractor shall insert in any subcontracts the clauses set forth in paragraphs (1) through (4) of this section and also a clause requiring the subcontractors to include these clauses in any lower tier subcontracts. 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.

**L. Energy Conservation.** Contractor agrees to comply with the mandatory energy efficiency standards and policies within the applicable state energy conservation plans issued in compliance with the Energy Policy and Conservation Act, 42 U.S.C. § 6321 *et seq.*

**M. Environmental Protection.** Contractor agrees to comply with all applicable requirements of the National Environmental Policy Act of 1969 (“NEPA”), as amended, 42 U.S.C. §§ 4321-4335, consistent with Executive Order No. 11514, as amended, “Protection and Enhancement of Environmental Quality,” 42 U.S.C. § 4321 note; FTA statutory requirements on environmental matters, 49 U.S.C. § 5324(b); Council on Environmental Quality regulations on compliance with NEPA, as amended, 40 CFR Part 1500 *et seq.*; joint Federal Highway Administration (“FHA”)-FTA regulations, “Environmental Impact and Related Procedures,” 23 CFR Part 771 and 49 CFR Part 622; and any other applicable State and Federal environmental laws and regulations.

**N. Preference for Recycled Products.** Contractor agrees to provide a competitive preference for products and services that conserve natural resources, protect the environment, and are energy efficient by complying with

## ATTACHMENT D

and facilitating compliance with Section 6002 of the Resource Conservation and Recovery Act, as amended, 42 U.S.C. § 6962, and EPA “Comprehensive Procurement Guidelines for Products Containing Recovered Materials,” 40 CFR Part 247.

**O. Cargo Preference—Use of U.S. Flag Vessels or Carriers.** Pursuant to U.S. Maritime Administration regulations, “Cargo Preference—U.S.-Flag Vessels,” 46 CFR Part 381, to the extent those regulations apply to the project, Contractor agrees to:

1. Use privately owned United States-Flag commercial vessels to ship at least 50% of the gross tonnage (computed separately for dry bulk carriers, dry cargo liners and tankers) involved, whenever shipping any equipment, materials, or commodities pursuant to the Grant Agreement, to the extent such vessels are available at fair and reasonable rates to United States-Flag commercial vessels;
2. Furnish within 20 days following the date of loading for shipments originating within the United States, or within 30 working days following the date of loading for shipment originating outside the United States, a legible copy of a rated, “on board” commercial ocean bill-of-lading in English for each shipment of cargo described in paragraph (1) above to the recipient (through Vendor in the case of a subcontractor’s bill-of-lading) and to the Division of National Cargo, Office of Market Development, Maritime Administration, 400 7th Street, S.W., Washington, D.C. 20590, marked with appropriate identification of the project; and
3. Include these contract terms, as modified to apply to each subcontractor, in each subcontract issued pursuant to this contract when the subcontract may involve the transport of equipment, material, or commodities by ocean vessel.

**P. Fly America.** Contractor agrees to comply with the “Fly America Act,” 49 U.S.C. § 40118, in accordance with GSA regulations, 41 CFR Part 301-10, which provide that 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. If a foreign air carrier was used, Contractor shall submit 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. Contractor agrees to include this contract term, as modified to apply to each subcontractor, in each subcontract issued pursuant to this contract that may involve international air transportation.

**Q. Buy America Provision.** This bid and the resulting contract are subject to the Buy America requirements of 49 USC Section 5323(j) and the Federal Transit Administration’s implementing regulations, found at 49 CFR Part 661. These regulations require, as a matter of responsiveness, that the bidder must submit a completed certification with their bid proposal.

**R. Lobbying Restrictions.** The Contractor agrees to comply with 49 CFR Part 20, “New Restrictions on Lobbying,” imposed by 31, U.S.C. § 1352 (as amended by the Lobbying Disclosure Act of 1995), which states that no Federal appropriated funds, received by the Contractor as part of this agreement, have been paid or will be paid, by or on behalf of the undersigned, to any person for influencing or attempting to influence an officer or employee of an agency, a Member of Congress, an officer or employee of Congress, or an employee of a Member of Congress in connection with the awarding of any Federal contract, the making of any Federal

## ATTACHMENT D

grant, the making of any Federal loan, the entering into of any cooperative agreement, and the extension, continuation, renewal, amendment, or modification of any Federal contract, grant, loan, or cooperative agreement.

If any funds other than Federal appropriated funds have been paid or will be paid to any person for making lobbying contacts to an officer or employee of any agency, a Member of Congress, an officer or employee of Congress, or an employee of a Member of Congress in connection with this Federal contract, grant, loan, or cooperative agreement, the undersigned shall complete and submit Standard Form--LLL, "Disclosure Form to Report Lobbying," in accordance with its instructions [as amended by "Government wide Guidance for New Restrictions on Lobbying," 61 Fed. Reg. 1413 (1/19/96). Note: Language in paragraph (2) herein has been modified in accordance with Section 10 of the Lobbying Disclosure Act of 1995 (P.L. 104-65, to be codified at 2 U.S.C. 1601, *et seq.*)]

This requirement extends to all subcontractors of this agreement, and the Contractor must include this language, and associated certification, in the award documents for all subcontracts. Certification is a material representation of fact upon which reliance was placed when this transaction was made or entered into. Submission of certification is a prerequisite for making or entering into this transaction. 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.