COLUMBUS CONSOLIDATED GOVERNMENT
Georgia's First Consolidated Government

FINANCE DEPARTMENT
PURCHASING DIVISION

100 TENTH STREET, P. O. BOX 1340
COLUMBUS, GEORGIA 31902-1340
706-225-4087, FAX 706-225-3033
BIDLINE 706-225-4536
www.columbusga.org

Date: September 10, 2021

REQUEST FOR BIDS: **RFB NO. 22-0010**	Qualified vendors are invited to submit sealed bids, subject to conditions and instructions as specified, for the furnishing of: **30′ LOW FLOOR TROLLEY BUS (ANNUAL CONTRACT)**
GENERAL SCOPE	The Columbus Consolidated Government of Columbus, Georgia (the City) is seeking vendors to provide 30′ low floor trolley buses to METRA on an "as needed" basis. The City anticipates purchasing approximately 0-3 during Fiscal Year 2022 through Fiscal Year 2025.
DUE DATE	**OCTOBER 6, 2021 – 2:30 PM (Eastern)** Responses must be submitted via DemandStar on or before the due date. A virtual opening will be held during the 3:00 PM hour of the due date. *Responding vendors are not required but are invited to attend the opening.* If you wish to attend the virtual opening, use one of the Microsoft Teams meeting options**:** Click here to join the meeting **Or call in (audio only)** +1 478-239-0725,,855808406# United States, Macon Phone Conference ID: 855 808 406# Find a local number | Reset PIN . ***Note: Columbus Consolidated Government is not responsible for technical issues that may arise during the virtual opening.***
BID SUBMISSION REQUIREMENTS	**See Appendix A for *Submission Requirements, Submission Requirements Checklist, and DemandStar Registration and Submission Instructions*.**
ADDENDA	**IMPORTANT INFORMATION** Any and all addenda will be posted on the Purchasing Division's web page, at https://www.columbusga.gov/finance/purchasing/docs/opportunities/Bid_Opportunities.htm. **It is the vendors' responsibility to periodically visit the web page for addenda before the due date and prior to submitting a bid.**
"NO BID" RESPONSE	Refer to the form on **page 3** if you are not interested in this invitation.

Andrea J. McCorvey
Purchasing Division Manager

IMPORTANT INFORMATION
e-Notification

The City uses the Georgia Procurement Registry e-notification system. You must register with the Team Georgia Market Place/Georgia Procurement Registry to receive future procurement notifications via **http://doas.ga.gov/state-purchasing/suppliers/getting-started-as-a-supplier**.

If you have any questions or encounter any problems while registering, please contact the Team Georgia Marketplace Procurement Helpdesk:

Telephone: **404-657-6000**
Fax: **404-657-8444**
Email: **procurementhelp@doas.ga.gov**

STATEMENT OF "NO BID"

Complete and return this form immediately if you do NOT intend to Bid:

Email: bidopportunities@columbusga.org
Fax: (706) 225-3033, **Attn: Sandra Chandler, Buyer I**
Mail: Columbus Consolidated Government
Purchasing Division
P.O. Box 1340
Columbus, GA 31902-1340

We, the undersigned decline to bid on your **RFB NO. 22-0010**, for **30′ Low Floor Trolley Bus** for the following reason(s):

____Specifications too "tight", i.e. geared toward one brand or manufacturer only (explain below)
____There is insufficient time to respond to the Invitation for Quotations.
____We do not offer this product or service.
____We are unable to meet specifications.
____We are unable to meet bond requirements.
____Specifications are unclear (explain below).
____We are unable to meet insurance requirements.
____Other (specify below)

Remarks: _____

_____

_____

_____

COMPANY NAME: _____

AGENT: _____

DATE: _____

TELEPHONE NUMBER: _____

EMAIL ADDRESS: _____

GENERAL PROVISIONS

THESE GENERAL PROVISIONS SHALL BE DEEMED AS PART OF THE BID SPECIFICATIONS.

The provisions of the Procurement Ordinance for the Consolidated Government of Columbus, Georgia as adopted and amended by Council shall apply to all invitations for bids and award of all contracts and is specifically incorporated herein by this reference. A copy of the ordinance is on file in the Purchasing Division.

1. TERM "CITY". The term "City" as used throughout these documents will mean Consolidated Government of Columbus, Georgia.

2. PREPARATION OF FORM. Bid proposals shall be submitted on the forms provided by the City. All figures must be written in ink or typewritten. Figures written in pencil or erasures are not acceptable. However, mistakes may be crossed out, corrections inserted adjacent thereto, initialed in ink by the person signing the proposal. If there are discrepancies between unit prices quoted and extensions, the unit price will prevail. Failure to properly sign forms, in ink, will render bid incomplete.

3. EXECUTION OF THE BID PROPOSAL. Execution of the bid proposal will indicate the bidder is familiar and in compliance with all local laws, regulations, ordinances, site inspections, licenses, dray tags, etc.

4. BID DUE DATE. The bid submission must arrive in the Purchasing Division on or before the stated due date and time. Upon receipt, bids will be time and date stamped. Bids will remain sealed and secured until the stated due date and time for the bid opening.

5. BID OPENING. Bids shall be opened publicly in the presence of one or more witnesses at the time and place stated in the public notice. The amount of each bid, the bidder's name and such other relevant information as the Purchasing Manager deems appropriate shall be recorded and retained in accordance with Georgia law. The record and each bid shall be open to the public in accordance with Article 3. 301A of the Procurement Ordinance (Public Access to Procurement Information).

6. LATE BIDS. It is the responsibility of the bidder to ensure bids are submitted by the specified due date and time. Bids received after the stated date and time will be returned, unopened, to the bidder. The official clock to determine the date and time will be the time/date stamp located in the Finance Department. All bids received will be time and date stamped by the official clock. The City will not be held responsible for the late delivery of bids due to the U.S. Mail Service, or any other courier service.

7. RECEIPT OF ONE SEALED BID. In the event only one sealed bid is received, no formal bid opening shall take place. First, the Purchasing Division shall conduct a survey of vendors to inquire of "no bid" responses and non-responsive vendors. If, from the survey, it is determined by the Purchasing Division that specifications need revision, the one bid received will be returned, unopened, to the responding vendor, with a letter of explanation and a new bid solicitation prepared. If it is determined that other vendors need to be contacted, the bid due date will be extended, and the one bid received will remain sealed until the new bid opening date. The vendor submitting the single bid will receive a letter of explanation.

If it is determined the one bid received is from the only responsive, responsible bidder, then the bid shall be opened by the Purchasing Division Manager or designee, in the presence of at least one other witness. The single bid will be evaluated by the using agency for award recommendation.

8. RECEIPT OF TIE BIDS. In the event multiple responsive, responsible bidders are tied for the lowest price and all other terms and requirements are met by all tied bidders, the award recommendation shall be resolved in the order of the preferences listed below:

1. Award to the local bidder whose principal place of business is located in Columbus, Georgia.
2. Award to bidder previously awarded based on favorable prior experience.
3. Award to bidder whose principal place of business is located in the State of Georgia.
4. If feasible, divide the award equally among the bidders.
5. If it is not feasible to award equally and only two bidders are tied, perform a coin toss in the presence of the two bidders, either in person or virtually.
6. *If the above preferences are insufficient to resolve the tie, all bid responses will be rejected and the bid will be re-advertised.*

9. RECEIPT OF MULTIPLE BIDS. **Unless otherwise stated in the bid specifications, the City will accept one and only one bid per vendor.** Any unsolicited multiple bid(s) will not be considered. If prior to the bid opening, more than one bid is received from the same vendor, the following will occur: (1) the bidder will be contacted and required to submit written acknowledgment of the bid to be considered; (2) the additional bid(s) will be returned to the bidder unopened. If at the bid opening more than one bid is enclosed in a single bid package, the City will consider the vendor non-responsive and bids will be returned to the bidder.

10. CONDITIONS AND PACKAGING. Unless otherwise defined in the bid specifications, it is understood and agreed that any item offered or furnished shall be new, in current production and in first class condition, that all containers shall be new and suitable for storage or shipment, and that prices include standard commercial packaging.

11. FREIGHT/SHIPPING/HANDLING CHARGES. All freight, shipping, and handling charges shall be included in the bid price. The City will pay no additional charges.

12. CORRECTION OR WITHDRAWAL OF BIDS; CANCELLATION OF AWARDS
Correction or withdrawal of inadvertently erroneous bids before bid opening, or cancellation of awards or contracts based on such bid mistakes, may be permitted where appropriate. Mistakes discovered before bid opening may be modified or withdrawn by written notice received in the Purchasing Division.

After bid opening, corrections in bids shall be permitted only to the extent that the bidder can show by clear and convincing evidence that a mistake of a nonjudgmental character was made, the nature of the mistake and the bid price actually intended. After bid opening, no changes in bid prices or other provisions of bids prejudicial to the interest of the City or fair competition shall be permitted. In lieu of bid correction, a low bidder alleging a material mistake of fact may be permitted to withdraw its bid if the mistake is clearly evident on the face of the bid document but the intended correct bid is not similarly evident, or if the bidder submits evidence which clearly and convincingly demonstrate that a mistake was made.

All decisions to permit correction or withdrawal of bids or to cancel awards of contracts based on bid mistakes will be supported by the Purchasing Manager's written determination.

13. ADDENDA AND INTERPRETATIONS. If it becomes necessary to revise any part of this bid, a written addendum will be provided to all bidders. The City is not bound by any oral representations, clarifications, or changes made to the written specifications by City employees, unless such clarification or change is provided to the bidders in written addendum form from the Purchasing Officer. Bidders will be required to acknowledge receipt of the addenda (if applicable) in their sealed bid proposal. The vendor may provide an initialed copy of each addendum or initial the appropriate area on the bid form (pricing page). Failure to acknowledge receipt of the addenda (when applicable) will render bid incomplete. **It is the bidder's responsibility to ensure that they have received all addenda.**

14. BID RECEIPT AND EVALUATION. Bids shall be unconditionally received without alteration or correction except as authorized in the City's Procurement Ordinance. Bids shall be evaluated based on requirements set forth in the Invitation for Bid, which may include criteria to determine acceptability such as inspection, testing, quality, workmanship, delivery, and suitability for a particular purpose. Those criteria that will affect the bid price and be considered in evaluation for award shall be objectively measurable, such as discounts, transportation cost, and total or life-cycle costs. The specifications presented in the Invitation for Bids shall represent the evaluation criteria. No other criteria may be used to evaluate bids.

15. TIME FOR CONSIDERATION. Bids must remain in effect for at least sixty (60) days after date of receipt to allow for evaluation.

16. BID SECURITY
(1) Requirement for Bid Security. Bid security shall be required for all competitive sealed bids for construction contracts when the price is estimated by the Purchasing Manager to exceed $25,000. Bid security shall be a bond provided by a surety company authorized to do business in the State, or other form satisfactory to the City. Such bonds may also be required on construction contracts under $25,000 or other procurement contracts when circumstances warrant.

(2) Amount of Bid Security. Bid security shall be in an amount equal to at least five percent (5%) of the bid amount.

(3) Rejection of Bids for Noncompliance with Bid Security Requirements. When the invitation for Bids requires security, noncompliance with such requirement shall force rejection of a bid.

(4) Withdrawal of Bids. If a bidder is permitted to withdraw its bid before award as provided in Section 3-108 Subsection (G) (Competitive Sealed Bidding – Correction or Withdrawal of Bids: Cancellation of Awards), no action shall be had against the bidder or the bid security.

17. CONTRACT PERFORMANCE AND PAYMENT BONDS
(1) When Required: Amounts. When a construction contract is awarded in excess of $25,000, the following bonds or security shall be delivered to the City, and shall be binding on the parties upon the execution of the contract:

a. a performance bond satisfactory to the City executed by a surely company authorized to do business in the State, or otherwise secured in a manner satisfactory to the City, amounting to one hundred percent (100%) of the price specified in the contract; and

b. a payment bond satisfactory to the City executed by a surety company authorized to do business in the State or otherwise secured in a manner satisfactory to the City, to protect all persons supplying labor and material to the contractor or its subcontractors for the performance of the work provided for in the contract, amounting to one hundred percent (100%) of the price specified in the contract.

At the discretion of the Purchasing Manager, this same condition may be placed on awards of any amount.

(2) Authority to Require Additional Bonds. Nothing in this Section shall be construed to limit the authority of the City to require a performance bond or other security in addition to the bonds, in circumstances other than the circumstances described in Subsection (1) above.

18. SUBCONTRACTING. Should bidder intend to subcontract all or any part of the work specified, name(s) and address(es) of sub-contractor(s) must be provided in bid proposal (use additional sheet if necessary). The bidder shall be responsible for

subcontractor(s) full compliance with the requirements of the bid specifications. **THE COLUMBUS CONSOLIDATED GOVERNMENT WILL NOT BE RESPONSIBLE FOR PAYMENTS TO SUBCONTRACTORS.**

19. DISQUALIFICATION OF BIDDERS AND REJECTION OF BIDS. Bidders may be disqualified and rejection of bid proposals may be recommended by the City for any (but not limited) to the following reasons:

(A) Receipt after the time limit for receiving bid proposals as stated in the bid invitation.
(B) Any irregularities contrary to the General Provisions or bid specifications.
(C) Unbalanced unit price or extensions.
(D) Unbalanced value of items.
(E) Failure to use the proper forms furnished by the Consolidated Government.
(F) Failure to complete the proposal properly
(G) Omission of warranty, product literature, samples, acknowledgment of addenda or other items required to be included with bid proposal.
(H) Failure to properly sign forms in ink.

The City reserves the right to waive any minor informality or irregularity. The City reserves the right to reject any and all bids.

20. BRAND NAMES "OR EQUAL". Whenever in this invitation any particular material, process and/or equipment are indicated or specified by patent, proprietary or brand name of manufacturer, such wording will be deemed to be used for the purpose of facilitating description of the material, process and/or equipment desired by the City. It is not meant to eliminate bidders or restrict competition in any bid process. Any manufacturers' names, drawings, trade names, brand names, specifications and/or catalog numbers used herein are for the purpose of description and establishing general quality levels. Bidders may propose equivalent equipment, services or manufacturer. Any proposal that is equivalent to or surpasses stated specifications will be considered. Determination of equivalency shall rest solely with the City. **Please Note: Due to existing equipment, specific manufacturers may be required to facilitate compatibility.**

21. ASSIGNMENT OF CONTRACTUAL RIGHTS. It is agreed that the successful bidder will not assign, transfer, convey or otherwise dispose of the contract or its right, title or interest in or to the same, or any part thereof, without previous consent of the City and any sureties.

22. DISCOUNTS. Terms of payments offered will be reflected in the space provided on the bid proposal form. Cash discounts will be considered net in the bid evaluation process. All terms of payment (cash discounts) will be taken and computed from the date of delivery of acceptable material or services, or the date of receipt of the invoice, whichever is later.

23. TAXES. The City is exempt from State Retail Tax and Federal Excise Tax. Tax Exemption No. GA Code Sec. 48-8-3. Federal ID No. 58-1097948.

24. FEDERAL, STATE AND LOCAL LAWS. All bidders will comply with all Federal, State, and Local laws and ordinances, relative to conducting business in Columbus, Georgia.

25. BID INCLUSIONS. When bid inclusions are required, such as warranty information, product literature/specifications, references, etc. The inclusions should reference all aspects of the specific equipment or service proposed by the bidder. Do not include general descriptive catalogs. References to literature or other required inclusions submitted previously does not satisfy this provision. Bids found to be in non-compliance with these requirements will be subject to rejection.

26. NON-COLLUSION. By signing and submitting this bid, bidder declares that its agents, officers or employees have not directly or indirectly entered into any agreements, participated in any collusion or otherwise taken any action in restraint of free competitive bidding in connection with this bid. In the event, said bidder is found guilty of collusion, the company and agents will be removed from the City's bid list for one full year and any current orders will be canceled.

27. INDEMNITY. The Contractor covenants to save, defend, hold harmless, and indemnify the City, and all of its officers, departments, agencies, agents, and employees (collectively the "City") from and against any and all claims, losses, damages, injuries, fines, penalties, costs (including court costs and attorney's fees), charges, liability, or exposure, however caused, resulting from, arising out of, or in any way connected with the Contractor's intentional, negligent, or grossly negligent acts or omissions in performance or nonperformance of its work called for by the Contract Documents.

28. DISADVANTAGED BUSINESS ENTERPRISE. Disadvantaged Business Enterprises (minority or women owned businesses) will be afforded full opportunity to submit proposals in response to this invitation and will not be discriminated against on the grounds of race, color, creed, sex, sexual orientation, gender identity or national origin in consideration for an award. It is the policy of the City that disadvantaged business enterprises and minority business enterprises have an opportunity to participate at all levels of contracting in the performance of City contracts to the extent practical and consistent with the efficient performance of the contract.

29. AFFIRMATIVE ACTION PROGRAM - NON-DISCRIMINATION CLAUSE. The Consolidated Government of Columbus, Georgia ("the City") is committed to using Disadvantaged Business Enterprises (DBEs) (small, women-owned and minority business enterprises) to the greatest extent practical in all solicitations and day-to-day procurement needs of the City and to taking specific affirmative actions to meet these commitments.

The City has an Affirmative Action Program in connection with Equal Employment Opportunities. The successful bidder will comply with all Federal and State requirements concerning fair employment and employment of the handicapped, and concerning the treatment of all employees, and will not discriminate between or among them by reason of race, color, age, religion, sex, sexual orientation, gender identity, national origin or physical handicap.

30. AWARDS TO LOCAL BUSINESSES. Except for construction contracts, Federally funded projects, Request for Proposals and Request for Qualifications, awards will be made to responsive and responsible local businesses proposing a cost not more than two percent (2%) above the low bid or quote for contracts involving an expenditure less than or equal to $25,000.00; and made to responsive and responsible local businesses proposing a cost not more than one percent (1%) above the low bid or quote for contracts involving an expenditure greater than $25,000.00.

31. RIGHT TO PROTEST.

(1) Right of Protest. Any actual or prospective bidder offeror, or contractor who is aggrieved in connection with a solicitation or award of a contract may protest to the Purchasing Manager initially. All protests shall be filed in the manner prescribed herein. Protests that do not comply with the following rules shall be deemed invalid and of no effect.

(2) The protest must be in writing, executed by a company officer that is authorized to execute agreements on behalf of the bidder or offeror or provided by an authorized legal representative of the protestor.

(3) A protest with respect to an invitation for Bids or Request for Proposals shall be submitted in writing no less than five (5) business days prior to the opening of bids or the closing date of proposals or qualification statements.

(4) Stay of Procurement During Protests. If there is a timely protest submitted as described above, the Purchasing Manager shall not proceed further with the solicitation or award of the contract until all administrative remedies have been exhausted or until the City Council, Mayor, or City Manager makes a determination on the record that the award of the contract without delay is necessary to protect substantial interests of the City.

32. FAILURE TO BID. Vendors choosing not to submit a bid are requested to return a **Statement of** "**No Bid".**

33. PRODUCT/EQUIPMENT DEMONSTRATION - SITE VISIT. During the evaluation of bids, the City reserves the right to request a demonstration or site visit of the product, equipment or service offered by a bidder. The demonstration or site visit shall be at the expense of the bidder. Bidders who fail to provide demonstration or site visit, as requested, will be considered non-responsive.

34. CANCELLATION PROVISIONS. An Invitation for Bid, Request for Proposal, or other solicitation may be canceled, or any or all bids, proposals or responses rejected in whole or in part, at the discretion of the City for any reason whatsoever. The reasons for the cancellation shall be sent to all businesses solicited or that responded. The notice shall identify the solicitation, give the reasons for the cancellation, and when appropriate state that an opportunity will be given to compete on any re-solicitation or similar procurement in the future. Reasons for rejection will be provided to unsuccessful bidders or offerors.

When such action is in the best financial interest of the City, contracts for supplies to be purchased or services to be rendered under an annual (term) contract basis may be canceled and re-advertised at the discretion of the Purchasing Officer and in accordance with contract terms.

After the receipt of a product or piece of equipment, it is found that said item does not perform as specified and required, payment for said product or equipment will be withheld. The successful vendor will be notified of the non-performance in writing. After notification, the successful vendor will have ten (10) calendar days, from the date of notification, to deliver product or equipment which performs satisfactorily. If a satisfactory product is not delivered within 10 calendar days, from the notification date, the City will cancel the contract (purchase order) and award to the next low, responsive, responsible bidder. The vendor will be responsible for the pick-up or shipment of the unsatisfactory equipment or product.

35. QUESTIONS: Questions concerning specifications must be submitted, in writing, at least 5 (five) working days (Monday-Friday) prior to receipt date. Questions received less than five working days prior to receipt date will not be considered.

36. SAMPLES: When samples are required to be included with the proposal response, the bidder will be responsible for the following:

1) **Unless otherwise specified**, bidders are required to submit exact samples of item(s) bid. Do not submit sample of "like" item(s).
2) Affix an identification label to each individual sample to include bidder's name, bid name and number.
3) Make arrangements for the return of sample after the bid award. All shipping costs will be the responsibility of the bidder. If bidder does not make arrangements for return of sample, within 60 days after award, the sample will be discarded.

37. GOVERNING LAW: The parties agree that this Agreement shall be governed by the laws of Georgia, both as to interpretations and performance.

38. PAYMENT DEDUCTIONS: The City reserves the right to deduct, from payments to awarded vendor(s), any amount owed to the City for various fees, to include, but not limited to: False Alarm fees, Ambulance fees, Occupation License Fees, Landfill fees, etc.

39. PAYMENT TERMS: The City's standard payment term is usually net 30 days, after successful receipt of goods or services. Payment may take longer if invoice is not properly documented or not easily identifiable, goods/services are not acceptable, or invoice is in dispute.

40. FINAL CONTRACT DOCUMENTS: If a formal contract is required as a result of the Request for Bid; the final contract shall include the following: 1) The RFB; 2) Addenda; 3) Awarded Vendors(s) Bid response; 4) Awarded Vendor(s) Clarifications; and 5) Awarded Vendor(s) Business Requirements.

NOTICE TO VENDORS

Sec. 2-3.05. - Submitting bids to Consolidated Government, etc.—By mayor or councilmembers.
Neither the mayor nor any member of the Columbus Council shall submit any bid to the consolidated government, nor shall the mayor or any member of the Columbus Council own or have a substantial pecuniary interest in any business that submits a bid to the consolidated government. (Ord. No. 92-60, 6-23-92)

Sec. 2-3.06. - Same—By members of boards, authorities, commissions.
No member of any board or authority or commission or other independent or subordinate entity of the consolidated government shall submit any bid to the consolidated government or have a substantial pecuniary interest in any business that submits a bid to the consolidated government if such bid pertains to the board or authority or commission on which such person holds such membership. (Ord. No. 92-61, 6-23-92)

DO YOU HAVE QUESTIONS, CONCERNS OR NEED CLARIFICATION ABOUT THIS SOLICITATION?

COMMUNICATION CONCERNING ANY SOLICITATION CURRENTLY ADVERTISED MUST TAKE PLACE IN WRITTEN FORM AND ADDRESSED TO THE PURCHASING DIVISION.

ALL QUESTIONS OR CLARIFICATIONS CONCERNING THIS SOLICITATION SHALL BE SUBMITTED IN WRITING. THE CITY WILL NOT ORALLY OR TELEPHONICALLY ADDRESS ANY QUESTION OR CLARIFICATION REGARDING BID/PROPOSAL SPECIFICATIONS. IF A VENDOR VISITS OR CALLS THE PURCHASING DIVISION WITH SUCH QUESTIONS, HE OR SHE WILL BE INSTRUCTED TO SUBMIT THE QUESTIONS IN WRITING.

ALL CONTACT CONCERNING THIS SOLICITATION SHALL BE MADE THROUGH THE PURCHASING DIVISION. BIDDERS SHALL NOT CONTACT CITY EMPLOYEES, DEPARTMENT HEADS, USING AGENCIES, EVALUATION COMMITTEE MEMBERS OR ELECTED OFFICIALS WITH QUESTIONS OR ANY OTHER CONCERNS ABOUT THE SOLICITATION. QUESTIONS, CLARIFICATIONS, OR CONCERNS SHALL BE SUBMITTED TO THE PURCHASING DIVISION IN WRITING. IF IT IS NECESSARY THAT A TECHNICAL QUESTION NEEDS ADDRESSING, THE PURCHASING DIVISION WILL FORWARD SUCH TO THE USING AGENCY, WHO WILL SUBMIT A WRITTEN RESPONSE.

THE PURCHASING DIVISION WILL FORWARD WRITTEN RESPONSES TO THE RESPECTIVE BIDDER OR IF IT BECOMES NECESSARY TO REVISE ANY PART OF THIS SOLICITATION, A WRITTEN ADDENDUM WILL BE ISSUED TO ALL BIDDERS.

THE CITY IS NOT BOUND BY ANY ORAL REPRESENTATIONS, CLARIFICATIONS, OR CHANGES MADE TO THE WRITTEN SPECIFICATIONS BY CITY EMPLOYEES, UNLESS SUCH CLARIFICATION OR CHANGE IS PROVIDED TO THE BIDDERS IN A WRITTEN ADDENDUM FROM THE PURCHASING MANAGER.

BIDDERS ARE INSTRUCTED TO USE THE ENCLOSED "QUESTION/CLARIFICATION FORM" TO FAX OR EMAIL QUESTION.

ANY REQUEST, AFTER A SOLICITATION HAS CLOSED AND PENDING AWARD MUST ALSO BE SUBMITTED IN WRITING TO THE PURCHASING DIVISION.

QUESTION/CLARIFICATION FORM

DATE:_____

TO: Sandra Chandler, Buyer I
Email: **bidopportunities@columbusga.org**
Fax: (706) 225-3033

RE: 30′ LOW FLOOR TROLLEY BUS; RFB No. 22-0010

(Questions/clarification requests must be submitted at least five (5) business days before the due date.)

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_____

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_____

From:_____ _____

Company Name Website

_____

Representative Email Address

_____

Complete Address City State Zip

_____

Telephone Number Fax Number

GENERAL SPECIFICATIONS

30′ LOW FLOOR TROLLEY BUS
(ANNUAL CONTRACT)
RFB NO. 22-0010

I. SCOPE

The Columbus Consolidated Government of Columbus, Georgia (the City) is seeking vendors to provide 30′ low floor trolley buses to METRA on an "as needed" basis. The City anticipates purchasing approximately 0-3 during Fiscal Year 2022 through Fiscal Year 2025. This is strictly an estimate; the City cannot guarantee the purchase of specified quantity.

II. FEDERAL/STATE/LOCAL GOVERNMENT PROVISIONS

By submitting a Bid, the Bidder implicitly agrees that federal, state, and local rules, regulations, and statutes will be part of the Bid Award and any contract executed as a result of this solicitation. These include, but are not limited to, the General Statutes of the State of Georgia, the federal requirements contained in the Federal Transit Administration (hereinafter called the "FTA") Master Agreement dated October 1, 2014, as amended, including any certifications and contractual provisions required by any federal statutes or regulations referenced therein. Other federal procurement requirements in FTA Circular 4220.1F as amended are also included.

Similarly, the City's Purchasing Ordinance, insofar as they apply to purchasing and competitive bidding, are made a part hereof.

III. TERM OF CONTRACT

A. The term of this contract shall be for three (3) years. The City will allow for negotiating the bid price if such things as EPA, FTA or regulatory legislative guidelines are changed and bus manufacturers are required to adhere to the new regulations.

It should be noted that multi-year contracts will continue each fiscal year only after funding appropriations and program approval has been granted by the Council of the Consolidated Government of Columbus, Georgia, and Federal and State DOT contracts are awarded. In the event that the necessary funding is not approved, then the affected multi-year contract becomes null and void, effective July 1st of the fiscal year for which such approval has been denied.

B. Termination for Convenience

For the protection of both parties, either party giving 30 days prior notice in writing to the other party may cancel this contract.

IV. APPROVED EQUALS

All requests for **"APPROVED EQUALS"** shall be submitted to the Purchasing Division no later than **5:00 p.m., September 29, 2021. Any requests for approved equals received after the referenced date will not be given consideration.**

V. QUESTIONS/ADDENDA

Questions and requests for clarification must be submitted **within five (5) business days of the due date** (see pages 9 & 10)**.** Changes to the specifications (if any) will be provided in the form of an addendum, which will be posted on the web page of the Finance Department/Purchasing Division of Columbus

Consolidated Government at https://www.columbusga.org/finance/purchasing/docs/opportunities/Bid_Opportunities.htm. **It is the vendors' responsibility to periodically visit the web page for addenda before the due date and prior to submitting a bid.**

VI. INDEMNITY CLAUSE

The Contractor covenants to save, defend, hold harmless, and indemnify the City, and all of its officers, departments, agencies, agents, and employees (collectively the "City") from and against any and all claims, losses, damages, injuries, fines, penalties, costs (including court costs and attorney's fees), charges, liability, or exposure, however caused, resulting from, arising out of, or in any way connected with the Contractor's intentional, negligent, or grossly negligent acts or omissions in performance or nonperformance of its work called for by the Contract Documents.

VII. INSURANCE

The vendors shall be required, at their own expense, to furnish to the City of Columbus Purchasing Division**,** evidence showing the insurance coverage to be in force throughout the term of the contract. Insurance requirements are listed on the attached **Insurance Checklist *(Form 5)*. The limits shown are minimum limits. Vendor shall indicate the actual limit they will provide for each insurance requirement. The bidder shall complete the Insurance Checklist and include with bid response**. **Certificate of Insurance is acceptable.** The Insurance Checklist will indicate to the City, the bidder's ability and agreement to provide the required insurance, in the event of contract award.

The successful candidate shall provide the required Certificates of Insurance within **10 business days** after award notification. The Certificates of Insurance will name Columbus Consolidated Government as an additional insured, **as well as list the applicable project or annual contract name, and/or Solicitation name and number.** The Certificate of Insurance will be included with the contract documents prior to signing.

VIII. E-VERIFY

Pursuant to O.C.G.A. § 13-10-91, a public employer shall not enter into a contract for the performance of services unless the contractor registers and participates in the federal work authorization program. If a supplier is providing services under a contract with a total compensation amount of $2,500 or greater, (even if such services will be performed outside of the State of Georgia), Columbus Consolidated Government requires a notarized affidavit from the supplier attesting to the following:

(A) The affiant has registered with, is authorized to use, and uses the federal work authorization program;

(B) The user identification number and date of authorization for the affiant;

(C) The affiant will continue to use the federal work authorization program throughout the contract period; and

(D) The affiant will contract for the physical performance of services in satisfaction of such contract only with subcontractors who present an affidavit to the contractor with the same information required by subparagraphs (A), (B), and (C) of this paragraph.

Additional information regarding the State's E-Verify requirements can be found at: http://www.audits.ga.gov/NALGAD/IllegalImmigrationReformandEnforcementAct.html. **A completed, notarized E-Verify Affidavit *(Form 2)* must be included with sealed proposal; failure to do so will render the firm's or individual's proposal non-responsive and ineligible for award consideration.**

IX. AWARD

The Contract will be awarded to one supplier. Also see Item 14 of the General Provisions (**Bid Receipt and Evaluation**).

X. BID SUBMISSION REQUIREMENTS

Bid responses must be submitted via DemandStar. **See *APPENDIX A* for: *Submission Requirements; Submission Requirements Checklist; and DemandStar Registration and Submission Instructions.***

Each bidder shall include the following information with bid submission. Bidder shall submit **ONE (1) ELECTRONIC BID RESPONSE VIA DEMANDSTAR**. The City reserves the right to request any omitted information, **excluding *E-Verify* and *Communication Concerning This Solicitation*, WHICH DOES NOT AFFECT THE SUBMITTED BID PRICE.** Bidders shall be notified, in writing, and shall have two (2) days, after notification to submit the omitted information. If the omitted information is not received within two (2) days, the Bidder shall be deemed non-responsive, and the Bid Submission will be deemed "**Incomplete":**

A. **Bid Form Pricing Page *(Form 1)***

B. **E-Verify/GSICA Form:** Refer to page 12, Section IX, regarding ***Form 2* – *Bid submission missing this form will automatically be rejected.***

C. **Communication Concerning This Solicitation: *(Form 3)* – *Bid submissions missing this form will automatically be rejected.***

D. **Federally Required Contract Clauses *(Attachment 1)*:** Complete pages 86-106.

E. **Proof of Insurance: *(Form 5)***

F. **Product Literature:** Provide product literature for proposed product.

G. **Warranty Information:** Provide a copy of manufacturer's warranties, printed on manufacturer's letterhead.

H. **Contract Signature Page *(Form 6)***

I. **Business License:** Vendors shall submit a copy of the Business License (Occupation License) that is required to conduct business at their location or provide a copy of their active Articles of Incorporation from the state in which the business is located.

If awarded the contract, the successful vendor must obtain a business license from the City of Columbus, GA. However, if the business is located in Georgia and has proof of being properly licensed by a municipality in Georgia, and paid applicable occupation taxes in that City, the vendor will not be required to pay occupation taxes in Columbus, Georgia.

If you have questions regarding this requirement, please contact Yvonne Ivey, Revenue Manager, at 706-225-3091.

J. **Form W-9, Request for Taxpayer Identification Number and Certification:** Complete and return **Page 1** of the Form W-9, which is available at **https://www.irs.gov/pub/irs-pdf/fw9.pdf**

K. **Addenda:** Use ***Form 4*** to acknowledge receipt for all addenda (if any). Addenda will be posted at **https://www.columbusga.gov/finance/purchasing/docs/opportunities/Bid_Opportunities.htm**

Vendors are responsible for periodically visiting the web page, to check for addenda, prior to the bid due date and before submitting a bid.

XI. AWARD/ORDERS/DELIVERY/INVOICING

A. **Award:** This bid will be awarded to the lowest, responsive, responsible vendor per item or in total. The City will be the sole judge of the factors and will make the award accordingly. Should the successful vendor not be able to supply the required product(s), the City reserves the right to procure from other sources.

B. Orders: After contract award, orders will be placed on an "as needed basis" by purchase order. It is the vendor's responsibility to notify the **City** at the time an order is placed if delivery will be delayed.

C. Delivery: All freight, shipping and/or delivery charges must be included in the quoted price. The City will not authorize additional freight, shipping, delivery charges, or any other fees. The successful vendor shall deliver and install the items to:

Metra Transfer Center
814 Linwood Boulevard
Columbus, Georgia 31901

D. Invoicing: Invoice(s) must reference the purchase order number and be forwarded to:

Columbus Consolidated Government
Accounting Division
P. O. Box 1340
Columbus, Georgia 31902-1340

*The invoice(s) shall reference the bid number **(RFB No. 22-0010)** and/or purchase order number.*

XII. FEDERALLY REQUIRED CONTRACT CLAUSES *(ATTACHMENT 1)*

The purchase of this equipment is partially funded by the Federal Transit Administration (FTA). In accordance with requirements of the agencies, vendors must read and initial pages 86 through 106 and include the initialed pages with sealed bid. Failure to include the initialed pages may render your bid "Incomplete".

XIII. TERMINATION OF CONTRACT

A. Default: If the contractor refuses or fails to perform any of the provision of this contract with such diligence as will ensure its completion within the time specified in this contract, or any extension thereof, otherwise fails to timely satisfy the contract provisions, or commits any other substantial breach of this contract, the Purchasing Division Director may notify the contractor in writing of the delay or non-performance and if not cured within **ten (10) days** or any longer time specified in writing by the Purchasing Division Director, such director may terminate the contractor's right to proceed with the contract or such part of the contract as to which there has been delay or a failure to properly perform.

In the event of termination in whole or in part the Purchasing Division Director may procure similar supplies or services, from other sources, in a manner and upon terms deeded appropriate by the Purchasing Division Director. The contractor shall continue performance of the contract to the extent it is not terminated and shall be liable for excess costs incurred in procuring similar goods or services.

B. Compensation: Payment for completed supplies delivered and accepted by the City shall be at the contract price. The City may withhold from amounts due the contractor such sums as the Purchasing Division Director deem necessary to protect the City against loss because of outstanding liens or claims of former lien holders and to reimburse the City for the excess costs incurred in procuring similar goods and services.

C. Excuses for Nonperformance or Delayed Performances: Except with respect to defaults of subcontractors, the contractor shall not be in default by reason of any failure in performance of this contract in accordance with its terms, if the contractor has notified the Purchasing Division Director within 15 days after the cause of the delay and the failure arises out of causes such as: acts of God; acts of public enemy; acts of the City and any other governmental entity in its sovereign or contractual capacity; fires;

floods; epidemics; quarantine restrictions; strikes or other labor disputes; freight embargoes; or unusually severe weather.

If the failure to perform is caused by the failure of a subcontractor to perform or to make progress, and if such failure arises out of causes similar to those set forth above, the contractor shall not be deeded in default, unless the supplies or services to be furnished by the subcontractor were reasonably obtainable from other sources in sufficient time to permit the contractor to meet the contract requirements.

Upon request of the contractor, the Purchasing Division Director shall ascertain the facts and extent of such failure, and, if such director determines that any failure to perform was occasioned by any one or more of the excusable causes, and that, but for the excusable cause, the contractor's progress and performance would have met the terms of the contact, the delivery schedule shall be revised accordingly.

TECHNICAL SPECIFICATIONS

30′ LOW FLOOR TROLLEY BUS
(ANNUAL CONTRACT)
RFB NO. 22-0010

5.1 GENERAL

5.1.1 SCOPE

These Technical Specifications define requirements for a thirty foot (30′) low floor trolley bus which, by the selection of specifically identified alternative configurations, may be used for both suburban express service and general service on urban arterial streets. It shall have two (2) doors and have a minimum expected life of 10 years or 350,000 miles, whichever comes first. This bus is intended for the widest possible spectrum of passengers, including children, adults, the elderly, and persons with disabilities.

The exterior and interior of each bus shall have a vintage look and shall resemble an early 1900's cable car in appearance. "Replica" trollies are acceptable.

5.1.2 DEFINITIONS

The following are definitions of special terms used in Part 5.

(1) DBA. Decibels with reference to 0.0002 microbar as measured on the "A" scale.

(2) Audible Discrete Frequency. An audible discrete frequency is determined to exist if the sound power level in any 1/3-octave band exceeds the average of the sound power levels of the two adjacent 1/3-octave bands by 4 decibels (dB) or more.

(3) Standee Line. A line marked across the bus aisle to designate the forward area that passengers may not occupy when the bus is moving.

(4) Free Floor Space. Floor area available to standees, excluding the area under seats, area occupied by feet of seated passengers, the vestibule area forward of the standee line, and any floor space indicated by manufacturer as non-standee areas such as, the floor space "swept" by passenger doors during operation. Floor area of 1.5 square feet shall be allocated for the feet of each seated passenger that protrudes into the standee area.

(5) Curb Weight. Weight of vehicle, including maximum fuel, oil and coolant; and all equipment required for operation and required by this Specification, but without passengers or operator.

(6) Seated Load. One hundred fifty pounds for every designed passenger seating position and for the operator.

(7) Gross Load. One hundred fifty pounds for every designed passenger seating position, for the operator, and for each 1.5 square feet of free floor space.

(8) SLW (Seated Load Weight). Curb weight plus seated load.

(9) GVW (Gross Vehicle Weight). Curb weight plus gross load.

(10) GVWR (Gross Vehicle Weight Rated). The maximum total weight as determined by the vehicle manufacturer, at which the vehicle can be safely and reliably operated for its intended purpose.

(11) GAWR (Gross Axle Weight Rated). The maximum total weight as determined by the axle manufacturer, at which the axle can be safely and reliably operated for its intended purpose.

(12) Heavy Heavy-Duty Diesel Engine (HHDD). Heavy heavy-duty diesel engines have sleeved

cylinder liners, are designed for multiple rebuilds, and a rated horsepower that generally exceeds 250.

(13) Operator's Eye Range. The 95th-percentile ellipse defined in SAE Recommended Practice J941, except that the height of the ellipse shall be determined from the seat at its reference height.

(14) Fireproof. Materials that will not burn or melt at temperatures less than 2,000° F.

(15) Fire Resistant. Materials that have a flame spread index less than 150 as measured in a radiant panel flame test per ASTM-E 162-90.

(16) Class of Failures. Classes of failures are described below.

a. Class 1: Physical Safety. A failure that could lead directly to passenger or operator injury or represents a severe crash situation.

b. Class 2: Road Call. A failure resulting in an en route interruption of revenue service. Service is discontinued until the bus is replaced or repaired at the point of failure.

c. Class 3: Bus Change. A failure that requires removal of the bus from service during its assignments. The bus is operable to a rendezvous point with a replacement bus.

d. Class 4: Bad Order. A failure that does not require removal of the bus from service during its assignments but does degrade bus operation. The failure shall be reported by operating personnel.

(17) Maintenance Personnel Skill Levels. Defined below are maintenance personnel skill levels used in Part 5: Technical Specifications.

a. 5M: Specialist Mechanic or Class A Mechanic Leader
b. 4M: Journeyman or Class A Mechanic
c. 3M: Service Mechanic or Class B Servicer
d. 2M: Mechanic Helper or Bus Servicer
e. 1M: Cleaner, Fueler, Oiler, Hostler, or Shifter

In attachments to Part 5: Technical Specifications, the Procuring Agency may relate the skill levels and ratings of mechanics in its operation to the above definitions.

Note: Whenever a specific time is indicated to access components or complete a task, it is assumed the vehicle is in the location where the work is to be performed. All necessary equipment is in its correct position (tools, jacks, vehicle lifts, lighting, fluid recovery systems, etc.) and ready for use.

(18) Standards. Standards referenced in Part 5: Technical Specifications are the latest revisions unless otherwise stated.

(19) Wheelchair. A mobility aid belonging to any class of three or four-wheeled devices, usable indoors, designed for and used by individuals with mobility impairments, whether operated manually or powered. A "common wheelchair" is such a device that does not exceed 30 inches in width and 48 inches in length measured two inches above the ground and does not weigh more than 600 pounds when occupied.

(20) Structure. The structure shall be defined as the basic body, including floor deck material and installation, load bearing external panels, structural components, axle mounting provisions and suspension beams and attachment points.

(21) Low Floor Bus. A bus which, between at least the front (entrance) and rear (exit) doors, has a floor sufficiently low and level so as to remove the need for steps in the aisle between the doors and in the vicinity of these doors.

(22) Discrete Signals. A signal which can take only pre-defined values, usually of a binary 0 or 1 nature where 0 is battery ground potential and 1 is a defined battery positive potential.

(23) Analog Signals. A continuously variable signal that is solely dependent upon magnitude to express information content. Note: Analog signals are used to represent the state of variable devices such as rheostats, potentiometers, temperature probes, etc.

(24) Serial Data Signals. Serial data signals are a current loop-based representation of ASCII or Alphanumeric data used for transferring information between devices by transmitting a sequence of individual bits in a pre-arranged order of significance. Note: An example is the communication that takes place between two or more electronic components with the ability to process and store information.

(25) Physical Layer. The first layer of the seven-layer International Standards Organization (ISO) Open Systems Interconnect (OSI) reference model. This provides the mechanical, electrical, functional and procedural characteristics required to gain access to the transmission medium (e.g., cable) and is responsible for transporting binary information between computerized systems.

5.1.3 ABBREVIATIONS

The following is a list of abbreviations used in Part 5: Technical Specifications.

(1)	ADA	Americans with Disabilities Act
(2)	ANSI	American National Standards Institute
(3)	ASHRAE	American Society of Heating, Refrigerating and Air Conditioning Engineers
(4)	ASTM	American Society for Testing and Materials
(5)	EMI	Electromagnetic Interference
(6)	EPA	Environmental Protection Agency
(7)	FMCSR	Federal Motor Carrier Safety Regulations
(8)	FMVSS	Federal Motor Vehicle Safety Standards
(9)	FTA	Federal Transit Administration
(10)	I/O	Input/Output
(11)	ISO	International Organization for Standardization
(12)	JIC	Joint Industrial Council
(13)	LED	Light Emitting Diode
(14)	NHTSA	National Highway Traffic Safety Administration
(15)	OSHA	Occupational Safety and Health Administration
(16)	RFI	Radio Frequency Interference
(17)	SAE	SAE International
(18)	SPI	Society of the Plastics Industry
(19)	UL	Underwriters Laboratories
(20)	USDOT	United States Department of Transportation

5.1.3.1 REFERENCED PUBLICATIONS

The documents or portions thereof referenced within this specification shall be considered part of the requirements of the specification. The edition indicated for each referenced document is the current edition, as of the date of the APTA issuance of this specification.

5.1.4 LEGAL REQUIREMENTS

The contractor shall comply with all applicable federal, state and local regulations. These shall include, but not be limited to, Federal ADA as well as state and local accessibility, safety and security requirements. Local regulations are defined as those below the state level.

The bus shall meet all applicable FMVSS and shall accommodate all applicable FMCSR regulations in effect at the date of manufacture.

In the event of any conflict between the requirements of this Specification and any applicable legal requirement, the

legal requirement shall prevail. Technical requirements that exceed the legal requirements are not considered to conflict.

5.1.5 OVERALL REQUIREMENTS

The contractor shall ensure that the application and installation of major bus sub-components and systems are compliant with all such sub-component vendors' requirements and recommendations. Components used in the vehicle shall be of heavy-duty design and proven in transit service.

5.1.5.1 DIMENSIONS

5.1.5.1.1 Physical Size

With the exceptions of exterior mirrors, marker and signal lights, bumpers, fender skirts, washers, wipers, ad frames and rub rail, the bus shall have the following overall dimensions as shown in the figure "Transit Bus Exterior Dimensions" at static conditions and design height.

(1)	Baseline: Use for 102-inch width bus.
(2)	Body Width: 102 inches (+0, -1 inch)
(3)	Maximum Overall Height: 128 inches.

5.1.5.1.2 Underbody Clearance

The bus shall maintain the minimum clearance dimensions and defined in SAE Standard J689, regardless of load up to the gross vehicle weight rating.

Ramp Clearances. Approach angle shall be no less than 8.5 degrees. Break over angle shall be no less than 8 degrees. Departure angle shall be no less than 8.9 degrees.

The approach angle is the angle measured between a line tangent to the front tire static loaded radius arc and the initial point of structural interference forward of the front tire to the ground.

The departure angle is the angle measured between a line tangent to the rear tire static loaded radius arc and the initial point of structural interference rearward of the rear tire to the ground.

The break over angle is the angle measured between two lines tangent to the front and rear tire static loaded radius and intersecting at a point on the underside of the vehicle that defines the largest ramp over which the vehicle can roll.

Ground Clearance. Ground clearance shall be no less than 10 inches, except within the axle zone and wheel area.

Axle Clearance. Axle zone clearance, which is the projected area between tires and wheels on the same axial centerline, shall be no less than 5½ inches.

Wheel Area Clearance. Wheel area clearance shall be no less than 8 inches for parts fixed to the bus body and 6 inches for parts that move vertically with the axles.

5.1.5.1.3 Floor Height

Height of the floor above the street shall be no more than 17 inches measured at the centerline of the front and rear doorway. The floor may be inclined along the longitudinal axis of the bus, and the incline shall be less than 3 1/2° off the horizontal except locally at the doors where 2° slope toward the door is allowed. All floor measurements shall be with the bus at the design running height and on a level surface and with the standard 305 tires.

5.1.5.1.4 Interior Headroom

Headroom above the aisle and at the centerline of the aisle seats shall be no less than 78 inches in the forward half of the bus tapering to no less than 74 inches forward of the rear settee. At the centerline of the window seats, headroom shall be no lower than 65 inches. Headroom at the back of the rear bench seat may be reduced to a minimum of 56

inches, but it shall increase to the ceiling height at the front of the seat. In any area of the bus directly over the head of a seated passenger and positioned where a passenger entering or leaving the seat is prone to strike his/her head, padding shall be provided on the overhead paneling.

5.1.5.2 WEIGHT

Curb weight of the bus, as defined in Section 5.1.2 of these Specifications, shall be minimized to the extent practical without compromising its integrity and durability and shall not exceed 29,000 pounds.

5.1.5.3 CAPACITY

The vehicle shall be designed to carry the Gross Vehicle Weight as defined in Section 5.1.2, which shall not exceed the bus GVWR.

5.1.5.4 SERVICE LIFE AND MAINTENANCE

5.1.5.4.1 Service Life

The bus shall be designed to operate in transit service for at least 10 years or 350,000 miles. It shall be capable of operating at least 40,000 miles per year including the tenth year.

5.1.5.4.2 Maintenance and Inspection

Scheduled maintenance or inspection tasks as specified by the Contractor shall require a skill level of 3M or less. Scheduled maintenance tasks shall be related and shall be grouped in maximum mileage intervals. Based upon the Design Operating Profile defined in Section 5.1.2, routine scheduled maintenance actions, such as filter replacement and adjustments, shall not be required at intervals of less than 6,000 miles, except for engine oil/filter change intervals for severe duty shown below, or as indicated from a regular oil analysis program and routine daily service performed during the fueling operations. Higher levels of scheduled maintenance tasks shall occur at even multiples of mileage for lower-level tasks.

SEVERE DUTY OIL/FILTER CHANGE INTERVAL

Average Vehicle Speed MPH	Oil/Filter Change Interval Miles
10 and higher	6000
8 – 10	5000
6 – 8	4000
4 – 6	3000
2 – 4	1500

Any special tools required to maintain the bus shall be provided in quantities as specified in attachments to Part 5: Technical Specifications. Additional requirements for Maintenance and Inspection Equipment are also provided in these attachments.

Test ports shall be provided for commonly checked functions on the bus such as air intake, exhaust, hydraulic, pneumatic, charge-air and engine cooling systems.

The Contractor shall provide a manual listing the times required for typical repair and service items on the bus.

5.1.5.4.3 Accessibility

All systems or components subject to periodic maintenance or that are subject to periodic failures shall be readily accessible for service and inspection. To the extent practicable, removal or physical movement of components unrelated to the specific maintenance and/or repair tasks involved shall be unnecessary.

As a goal, relative accessibility of components, measured in time required to gain access, shall be inversely proportional to frequency of maintenance and repair of the components. Specific maintainability requirements are defined in other sections of Part 5: Technical Specifications.

5.1.5.4.4 Interchangeability

Components with identical functions shall be interchangeable to the extent practicable. These components shall include, but not limited to, passenger window hardware, interior trim, lamps, lamp lenses, and seat assemblies. Components with non-identical functions shall not be, or appear to be, interchangeable. A component shall not be used in an application for which it was neither designed nor intended.

Any one component or unit used in the construction of these buses shall be an exact duplicate in design, manufacture, and assembly for each bus in each order group in this Contract. The components shall, to the extent possible, also be interchangeable from one length of bus to another. This interchangeability shall include the cradle mounted power-plant and shall include cradle mounted power-plant

5.1.5.5 OPERATING ENVIRONMENT

The bus shall achieve normal operation in ambient temperature ranges of 10º F to 115º F, at relative humidity between 5 percent and 100 percent, and at altitudes up to 3,000 feet above sea level. Degradation of performance due to atmospheric conditions shall be minimized at temperatures below 10° F, above 115° F, or at altitudes above 3,000 feet.

Special equipment or procedures may be employed to start the bus after being exposed for more than 4 hours to temperatures less than 30° F without the engine in operation. Speed, grad ability, and acceleration performance requirements shall be met at, or corrected to, 77º F, 29.31 inches Hg, dry air per SAE J1995. The interior climate control system shall perform in accordance with Section 5.4.8 of Part 5: Technical Specifications.

5.1.5.6 NOISE

5.1.5.6.1 Interior Noise

The combination of inner and outer panels and any material used between them shall provide sufficient sound insulation so that a sound source with a level of 80 dBA measured at the outside skin of the bus shall have a sound level of 75 dBA or less at any point inside the bus. These conditions shall prevail with all openings, including doors and windows, closed and with the engine and accessories switched off.

The bus-generated noise level experienced by a passenger at any seat location in the bus shall not exceed 83 dBA and the operator shall not experience a noise level of more than 75 dBA under the following test conditions. The bus shall be empty except for test personnel, not to exceed 4 persons, and the test equipment. All openings shall be closed and all accessories shall be operating during the test. The bus shall accelerate at full throttle from a standstill to 35 mph on level commercial asphalt or concrete pavement in an area free of large reflecting surfaces within 50 feet of the bus path. During the test, the ambient noise level in the test area shall be at least 10 dBA lower than the bus under test. Instrumentation and other general requirements shall conform to SAE Standard J366. If the noise contains an audible discrete frequency as defined in Section 5.1.2, a penalty of 5 dBA shall be added to the sound level measured.

5.1.5.6.2 Exterior Noise

Airborne noise generated by the bus and measured from either side shall not exceed 83 dBA under full power acceleration when operated at or below 35 mph at curb weight and just prior to transmission upshift. The maximum noise level generated by the bus pulling away from a stop at full power shall not exceed 83 dBA. The bus-generated noise at curb idle shall not exceed 65 dBA. If the noise contains an audible discrete frequency as defined in Section 5.1.2, a penalty of 5 dBA shall be added to the sound level measured. All noise readings shall be taken 50 feet from and perpendicular to, the centerline of the bus with all accessories operating. Instrumentation, test sites, and other general requirements shall be in accordance with SAE Standard J366. The pull away test shall begin with the front bumper even with the microphone. The curb idle test shall be conducted with the rear bumper even with the microphone.

In addition, the Contractor shall comply with the exterior noise requirements defined in local laws and ordinances identified by the Procuring Agency.

5.1.5.7 FIRE SAFETY

The bus shall be designed and manufactured in accordance with all applicable fire safety and smoke emission regulations. These provisions shall include the use of fire-retardant/low-smoke materials, fire detection systems, firewalls, and facilitation of passenger evacuation.

All materials used in the construction of the Passenger Compartment of the bus shall be in accordance with the Recommended Fire Safety Practices defined in FTA Docket 90, dated October 20, 1993. Materials entirely enclosed from the passenger compartment, such as insulation within the sidewalls, need not comply. In addition, smaller components and items, such as seat grabrails, switch knobs and small light lenses, shall be exempt from this requirement.

Fire detection systems as required in Section 5.5.9 shall be provided.

Requirements for firewalls are contained in Section 5.4.1.6.

The requirements for passenger evacuation provisions related to doors, windows, and escape hatches are defined in Section 5.4 of Part 5: Technical Specifications.

5.1.5.8 ELDERLY AND DISABLED PASSENGERS

The contractor shall comply with all applicable Federal requirements defined in the Americans with Disabilities Act, 49 CFR Part 38, and all state and local regulations regarding mobility-impaired persons. Local regulations are defined as those below the state level.

5.1.5.8.1 Respect For The Environment

In the design and manufacture of the bus the Contractor shall make every effort to reduce the amount of potentially hazardous waste generated by the Procuring Agency when maintaining the bus in accordance with the procedures contained in the manufacturer's maintenance manuals. The manufacturer shall use, whenever possible, low mercury fluorescent lighting tubes, PCB free ballast units, cleanable filters (unless required otherwise by the Procuring Agency), and non-asbestos brake blocks and gaskets. In accordance with Section 6002 of the Resource Conservation and Recovery Act the Contractor shall use, whenever possible and allowed by the specifications, recycled materials in the manufacture of the bus.

5.2 PROPULSION SYSTEM

5.2.1 VEHICLE PERFORMANCE

5.2.1.1 POWER REQUIREMENTS

Propulsion system and drive train shall provide power to enable the bus to meet the defined acceleration, top speed, and gradeability requirements, and operate all propulsion-driven accessories. Power requirements are based on heavy, heavy-duty diesel (HHDD) engines and shall meet EPA 2013 requirements.

5.2.1.2 TOP SPEED

The bus shall be capable of achieving a speed of 65 m.p.h. but shall be governed at a top speed of 65 m.p.h.

5.2.1.3 GRADEABILITY

Gradeability requirements shall be met on grades with a dry commercial asphalt or concrete pavement at GVWR with all accessories operating. The propulsion system and drive train shall enable the bus to achieve and maintain a speed of 40 mph on a 2-1/2 percent ascending grade and 7 m.p.h. on a 16 percent ascending grade.

5.2.1.4 ACCELERATION

The acceleration shall meet the requirements below and shall be sufficiently gradual and smooth to prevent throwing standing passengers off-balance. Acceleration measurement shall commence when the accelerator is depressed – (Idle Start.)

MAXIMUM IDLE START ACCELERATION TIMES ON A LEVEL SURFACE
(Vehicle weight = GVWR, 50-State Power Plant)

SPEED (MPH)	TIME (SEC)
10	5.0
20	10.8
30	20.0
40	31.0

5.2.1.5 OPERATING RANGE

The operating range of the coach when run on the transit coach duty cycle shall be at least 400 miles.

5.2.1.6 FUEL ECONOMY

The engine shall be tuned when delivered to provide optimized performance as specified above, including fuel economy. All related components and configuration that affect fuel economy, such as, fan control/operation, transmission, axle ratio, etc., shall be selected accordingly. The bus shall achieve an average fuel economy of 400 miles per gallon when run on the Transit Coach Duty Cycle loaded to SLW. Reference SAE J1376, Fuel Economy Measurement Test (Engineering Type) for Trucks and Buses.

5.2.2 DRIVETRAIN

5.2.2.1 POWER PLANT

5.2.2.1.1 Engine

The engine shall be Cummins ISL or approved equal.

The HHDD engine shall be designed to operate for not less than 300,000 miles without major failure or significant deterioration. Components of the fuel injector and/or control system shall be designed to operate for not less than 150,000 miles without replacement or major service. Mileage intervals are based on the design operating profile defined in Section 5.1.2.

The engine shall meet all requirements of Part 5: Technical Specifications when operating on ultra-low sulfur diesel fuel, as certified by the engine manufacturer and specified by the Procuring Agency. Durability of the engine and its components shall not be seriously reduced, and the requirement of Section 5.2.2.5.1 shall be met by operation on either of the commercially available diesel fuels.

The engine shall be equipped with an electronically controlled management system, compatible with either 12 or 24-volt power distribution. The engine control system shall be capable of transmitting and receiving electronic inputs and data from other Drive train components and broadcasting that data to other vehicle systems. Communication between electronic drive train components and other vehicle systems shall be made using the communications networks specified in Section 5.5.5.2.1. The engine's electronic management system shall monitor operating conditions and provide instantaneous adjustments to optimize both engine and bus performance. The system shall be programmable to allow optimization of engine performance.

In order to avoid potential warranty disputes during the engine warranty period, initial performance settings shall only be changed with the authorization from the bus and engine manufacturers.

The engine control system shall have onboard diagnostic capabilities able to monitor vital engine functions, store and time stamp out of parameter conditions in memory and communicate faults and vital conditions to service personnel. Diagnostic reader device connector ports, suitably protected against dirt and moisture, shall be

provided in operator's area and near or inside engine compartment. Optional requirements for additional ports are identified in Section 5.5.6. The onboard diagnostic system shall inform the operator via visual and/or audible alarms when out-of-parameter conditions exist for vital engine functions. Conditions that require an operator alarm are identified in Section 5.4.6.1.6. Data communication requirements for the on-board Drive train diagnostic system are identified in Section 5.5.5.2.2.

The engine starter shall be protected by an interlock that prevents its engagement when the engine is running. Special equipment or procedures may be employed to start the engine when exposed to temperatures less than 30° F for a minimum of four hours without the engine in operation. All cold weather starting aids, engine heating devices and procedures shall be of the type recommended by the engine manufacturer and approved by the Procuring Agency. The requirements for specific cold weather starting aids are included in attachments to Part 5: Technical Specifications. The engine shall be equipped with an automatic fast idle device. The fast idle device shall be activated and controlled automatically by the engine control system. And shall operate when the transmission selector is in the neutral position and the parking brake is applied. This device may be used to help meet the requirements of bus cool down in Section 5.4.8.

The engine control system shall protect the engine against progressive damage. The system shall monitor conditions critical for safe operation and automatically derate power and/or speed and initiate engine shutdown as needed. The on-board diagnostic system, as described in Section 5.4.6.1.6, shall trigger a visual and audible alarm to the operator when the engine control unit detects a malfunction, and the engine protection system is activated.

Automatic shutdown shall only occur when parameters established for the functions below are exceeded:

Coolant Level
Coolant Temperature
Oil Pressure
Oil Temperature

A control shall be available to the operator, to allow temporary override (30-45 seconds) of the engine protection/shutdown system if engine power is required to move the bus in emergency conditions.

5.2.2.1.2 Cooling Systems

The cooling systems shall be of sufficient size to maintain all engine and transmission fluids and engine intake air at safe, continuous operating temperatures during the most severe operations possible and in accordance with engine and transmission manufacturers' cooling system requirements. The cooling system fan/fans control should sense the temperatures of the operating fluids and the intake air and if either is above safe operating conditions the cooling fan should be engaged. The cooling system in new condition shall have an ambient capacity of at least 110° F with water as coolant and sea level operation.

5.2.2.1.2.1 Engine Cooling

The engine shall be cooled by a water-based, pressure type, cooling system that does not permit boiling or coolant loss during the operations described above. Engine thermostats shall be easily accessible for replacement. Shutoff valves shall allow filter replacement without coolant loss. Valves shall permit complete shutoff of lines for the heating and defroster units, and water booster pumps. The water boost pump shall be a magnetically coupled, brushless design. Air vent valves shall be fitted at high points in the cooling system unless it can be demonstrated that the system is self-purging.

A sight glass to determine satisfactory engine coolant level shall be provided and shall be accessible by opening one of the engine compartment's access doors. A spring-loaded, push button type valve to safely release pressure or vacuum in the cooling system shall be provided with both it and the water filler no more than 62 inches above the ground and both shall be accessible through the same access door.

The radiator, and charge air cooler if integrated, shall be of durable corrosion-resistant construction with bolted-on

removable tanks. The radiator shall be designed so a 2M mechanic can gain access to a substantial portion of the side facing the engine for the purpose of cleaning the radiator in five minutes or less.

Radiators with a fin density greater than 12 fins per inch, and louvered/slit designs, are more susceptible to clogging and deteriorating cooling performance over time and shall not be used.

Radiator piping shall meet the requirements of Section 5.2.2.2.4. No heat producing components or climate control system components shall be mounted between the engine cooling air intake aperture and the radiator.

The radiator and charge air cooler shall be designed to withstand thermal fatigue and vibration associated with the installed configuration.

5.2.2.1.2.2 Charge Air Cooling

The charge air cooling system, also referred to as after-coolers or inter-coolers, shall provide maximum air intake temperature reduction with minimal pressure loss. The charge air radiator shall be sized and positioned to meet engine manufacturer's requirements. The charge air radiator shall not be stacked ahead or behind the engine radiator and shall be positioned as close to the engine as possible unless integrated with the radiator. Air ducting and fittings shall be protected against heat sources and shall be configured to minimize restrictions and maintain sealing integrity.

5.2.2.1.2.3 Transmission Cooling

The transmission shall be cooled by a separate heat exchanger sized to maintain operating fluid within the transmission manufacturer's recommended parameters of flow, pressure and temperature. The transmission cooling system shall be matched to retarder and engine cooling systems to ensure that all operating fluids remain within recommended temperature limits established by each component manufacturer.

5.2.2.1.3 Transmission

The transmission shall be multiple speed, automatic shift with torque converter, retarder and electronic controls. The transmission shall be B400R. Gross input power, gross input torque and rated input speed shall be compatible with the engine. A 3M mechanic, with optional assistance, shall be able to remove and replace the transmission assembly for service in less than 16 total combined man-hours. The transmission shall be designed to operate for not less than 300,000 miles on the design operating profile without replacement or major service.

The electronic controls shall be capable of transmitting and receiving electronic inputs and data from other Drive train components and broadcasting that data to other vehicle systems. Communication between electronic Drive train components and other vehicle systems shall be made using the communications networks specified in Section 5.5.5.2.1. Electronic controls shall be compatible with either 12 or 24 volt power distribution, provide consistent shift quality, and compensate for changing conditions such as variations in vehicle weight and engine power. A brake pedal application of 15 to 20 psi shall be required by the operator to engage forward or reverse range from the neutral position to prevent sudden acceleration of the bus from a parked position.

The electronically controlled transmission shall have on-board diagnostic capabilities, be able to monitor functions, store and time stamp out-of-parameter conditions in memory and communicate faults and vital conditions to service personnel. The transmission shall contain built-in protection software to guard against severe damage. A diagnostic reader device connector port, suitably protected against dirt and moisture, shall be provided in the operator's area. Optional requirements for additional ports are identified in Section 5.5.6. The on-board diagnostic system shall trigger a visual alarm to the operator when the electronic control unit detects a malfunction as described in Section 5.4.6.1.6.

5.2.2.1.4 Retarder

The transmission shall be equipped with an integral hydraulic retarder designed to extend brake lining service life. The application of the retarder shall cause a smooth blending of both retarder and service brake functions without exceeding jerk requirements as defined in Section 5.2.2.1.5. Brake lights shall illuminate when the retarder is activated.

The retarder shall be activated when the brake pedal is depressed.

The thermostatically controlled cooling fan shall be activated when the retarder is engaged, and the coolant temperature exceeds the maximum limit established by the engine and transmission manufacturers.

5.2.2.1.5 Jerk

Jerk, the rate of change of acceleration measured at the centerline, floor level of the bus shall be minimized throughout the shifting of each transmission range and retarder application and shall be no greater than 0.3 g/sec. for a duration of a quarter-second or more.

5.2.2.2 MOUNTING

The power plant shall be cradle mounted in a compartment in the rear of the bus. The cradle shall include, at minimum, the engine, transmission, and cooling system. All power plant mounting shall be mechanically isolated to minimize transfer of vibration to the body structure as defined in Section 5.4.1.5. Mounts shall control movement of the power plant so as not to affect performance of belt driven accessories or cause strain in piping and wiring connections to the power plant.

5.2.2.2.1 Service

The power plant shall be arranged so that accessibility for all routine maintenance is assured. No special tools, other than dollies and hoists, shall be required to remove the power plant. Two 3M mechanics shall be able to remove and replace the cradle assembly in less than 10 total combined man-hours. The muffler, exhaust system, air cleaner, air compressor, starter, alternator, radiator, all accessories, and any other component requiring service or replacement shall be easily removable and independent of the cradle removal. An engine oil pressure gauge and coolant temperature gauge shall be provided in the engine compartment. These gauges shall be easily read during service and mounted in an area where they shall not be damaged during minor or major repairs.

Engine oil and the radiator filler caps shall be hinged to the filler neck and closed with spring pressure or positive locks. All fluid fill locations shall be properly labeled to help ensure correct fluid is added and all fillers shall be easily accessible with standard funnels, pour spouts, and automatic dispensing equipment. All lubricant pumps shall be fitted with magnetic-type, external, hex head, drain plugs.

The engine and transmission shall be equipped with sufficient heavy-duty fuel and oil filters for efficient operation and to protect the engine and transmission between scheduled filter changes. To the extent practicable, the filters shall be of the spin-on, disposable type or integral with the engine and transmission. All filters shall be easily accessible, and the filter bases shall be plumbed to assure correct reinstallation. Fuel and oil lines shall meet the requirements of Section 5.2.2.2.4. The engine shall be equipped with a fuel-priming pump, or a check valve fitted in the fuel suction line to aid restarting after fuel filter changes.

An air cleaner with a dry filter element and a graduated air filter restriction indicator shall be provided. The filter shall be removable by a 3M mechanic in 10 minutes or less. The location of the air intake system shall be designed to minimize the entry of dust and debris and maximize the life of the air filter. The engine air duct shall be designed to minimize the entry of water into the air intake system. Drainage provisions shall be included to allow any water/moisture to drain prior to entry into air filter.

5.2.2.2.2 Accessories

Engine-driven accessories shall be mounted for quick removal and repair. Accessory drive systems shall operate without unscheduled adjustment for not less than 50,000 miles on the design operating profile. These accessories shall be driven at speeds sufficient to assure adequate system performance during extended periods of idle operation and low route speed portion of the design operating profile. Belt guards shall be provided as required for safety and shall be sturdy in design and installation and readily removable.

5.2.2.2.3 Hydraulic Systems

The hydraulic system shall demonstrate a mean time between repairs in excess of 50,000 miles. Hydraulic system service tasks shall be minimized and scheduled no more frequently than those of other major coach systems. All

elements of the hydraulic system shall be easily accessible for service or unit replacement. Critical points in the hydraulic system shall be fitted with service ports so that portable diagnostic equipment may be connected or sensors for an off-board diagnostic system permanently attached to monitor system operation. All hydraulic lines shall meet the requirements of Section 5.2.2.2.4, and all elements of the hydraulic system shall meet the noise limits defined in Section 5.1.5.6. A tamper-proof priority system shall prevent the loss of power steering during operation of the bus if other devices are also powered by the hydraulic system. All elements of the hydraulic system shall meet the accessibility loading requirements of Section 5.4.5.4.2.

5.2.2.2.4 Fluid Lines, Fittings and Clamps, and Charge Air Piping

All fluid lines and air piping shall be rigidly supported to prevent chafing damage, fatigue failures, and tension strain. Lines passing through a panel, frame, or bulkhead shall be protected by grommets (or similar device) that fit snugly to both the line and the perimeter of the hole that the line passes through to prevent chafing and/or wear.

Flexible fuel and oil lines shall be kept at a minimum and shall be as short as practicable. Flexible lines shall be routed or shielded so that failure of a line shall not allow fuel or oil to spray or drain onto any component operable above the auto-ignition temperature of the fluid. Flexible lines shall be Teflon hoses with braided stainless-steel jackets except in applications where premium hoses are required and shall have standard SAE or JIC brass or steel, swivel, end fittings. Flexible hoses over 1 inch in diameter need not be Teflon with braided stainless-steel jacket but shall be in conformance with SAE Standard J100R5. Flexible hoses and fluid lines shall not touch one another, or any part of the bus.

Lines shall have a maximum length of six (6) feet unless demonstrated inappropriate for a given application. Hoses/lines shall be secured with heavy-duty stainless steel, full silicone rubber clamps.

Compression fittings shall be standardized as much as practicable to prevent the intermixing of components. Compression fitting components from more than one manufacturer shall not be mixed even if the components are known to be interchangeable.

5.2.2.2.4.1 Radiator

Radiator piping shall be stainless steel or brass tubing and, if practicable, hoses shall be eliminated. Necessary hoses shall be premium, silicone rubber type that is impervious to all bus fluids. All hoses shall be as short as practicable. All hoses shall be secured with premium, stainless-steel clamps that provide a complete 360□ seal. The clamps shall maintain a constant tension at all times, expanding and contracting with the hose in response to temperature changes and aging of the hose material.

5.2.2.2.4.2 Oil & Hydraulic Lines

Oil and hydraulic lines shall be compatible with the fluid they carry. The lines shall be designed and intended for use in the environment which they are installed, i.e., high temperatures in engine compartment, road salts, oils, etc. Lines shall be capable of withstanding maximum system pressures. Lines within the engine compartment shall be composed of steel tubing where practicable except in locations where flexible lines are specifically required by the Procuring Agency in attachments to Part 5: Technical Specifications.

Hydraulic lines of the same size and with the same fittings as those on other piping systems of the bus, but not interchangeable, shall be tagged or marked for use on the hydraulic system only.

5.2.2.2.4.3 Fuel Lines

Fuel lines shall be rated and sized to prevent freezing and plugging due to condensation and/or fuel gelling in extreme winter.

The fuel lines forward of the engine bulkhead shall be in conformance to SAE Standard J1149 Type 1 for copper tubing, corrosion-resistant stainless-steel tubing or SAE Standard J844 for nylon tubing color coded orange.

5.2.2.2.4.4 Charge Air Piping

Charge air piping and fittings shall be designed to minimize air restrictions and leaks. Piping shall be as short as possible, and the number of bends shall be minimized. Bend radii shall be maximized to meet the pressure drop and temperature rise requirements of the engine manufacturers. The cross section of all charge air piping shall not be less than the cross section of the intake manifold inlet. Any change in pipe diameter shall be gradual to ensure a smooth passage of air and to minimize restrictions. Piping shall be routed away from exhaust manifolds and other heat sources and shielded as required to meet the temperature rise requirements of the engine manufacturer.

Charge air piping shall be constructed of stainless steel, aluminized steel or anodized aluminum, except between the air filter and turbocharger inlet where piping may be constructed of fiberglass. Connections between all charge air piping sections shall be sealed with a short section of reinforced hose and secured with stainless steel, constant tension clamps that provide a complete 360° seal.

5.2.2.3 FUEL SYSTEM

5.2.2.3.1 Fuel Containers - Tank(s)

5.2.2.3.1.2 Fuel Capacity

The fuel tank(s) shall have a total minimum capacity of 100 gallons.

5.2.2.3.1.3 Design and Construction

The fuel tank(s) shall be equipped with an external, hex head, brass drain plug. It shall be at least a 3/8-inch size and shall be located at the lowest point of the tank(s). The fuel tank(s) shall have an inspection plate or easily removable filler neck to permit cleaning and inspection of the tank(s) without removal from the bus. The tank(s) shall be baffled internally to prevent fuel-sloshing noise regardless of fill level. The baffles or fuel pickup location shall assure continuous full power operation on a 6 percent upgrade for 15 minutes starting with no more than 25 gallons of fuel over the unusable amount in the tank(s). The bus shall operate at idle on a 6 percent downgrade for 30 minutes starting with no more than 10 gallons of fuel over the unusable amount in the tank(s). The fuel tank(s) shall be made of corrosion resistant stainless steel.

5.2.2.3.1.4 Installation

The fuel tank(s) shall be securely transversely mounted to the bus to prevent movement during bus maneuvers but shall be capable of being removed and reinstalled by a 2M mechanic for cleaning or replacement in 1.5 hours or less.

5.2.2.3.1.5 Labeling

The capacity, date of manufacture, manufacturer name, location of manufacture, and certification of compliance to Federal Motor Carrier Safety Regulation shall be permanently marked on the fuel tank(s). The markings shall be readily visible and shall not be covered with an undercoating material.

5.2.2.3.2 Fuel Filler

The fuel filler shall be located 7 to 25 feet behind the centerline of the front door on the curbside of the bus. The filler cap shall be retained to prevent loss and shall be recessed into the body so that spilled fuel will not run onto the outside surface of the bus.

The fuel lines forward of the engine bulkhead shall be in conformance to the SAE Standards identified in Section 5.2.2.2.4.

The fuel filler shall accommodate a nozzle that forms a locked and sealed connection during the refueling process to eliminate spills. Fuel shall not be allowed to flow into the tank unless the nozzle has been properly coupled, locked and sealed to the filler. With the nozzle open, fuel shall enter the tank at a fill rate of not less than 40 gallons per minute of foam-free fuel without causing the nozzle to shut off before the tank is full. The nozzle shall automatically shut off when the tank is essentially full. Once disconnected, fuel shall not be allowed to flow through the nozzle at

any time. Any pressure over 3 psi shall be relieved from the fuel tank automatically. An audible signal shall indicate when the tank is essentially full. The dry break system shall be Emco Posilock 105 System or approved equal.

5.2.2.4 FINAL DRIVE

The bus shall be driven by a single heavy-duty axle at the rear with a load rating sufficient for the bus loaded to GVWR. Transfer of gear noise to the bus interior shall be minimized. The drive axle shall be designed to operate for not less than 300,000 miles on the design operating profile without replacement or major repairs. The lubricant drain plug shall be magnetic type, external hex head. If a planetary gear design is employed, the oil level in the planetary gears shall be easily checked through the plug or sight gauge. The drive shaft shall be guarded to prevent it striking the floor of the coach or the ground in the event of a tube or universal joint failure.

5.2.2.5 EMISSIONS/EXHAUST

5.2.2.5.1 Exhaust Emissions

The engine shall meet EPA 07 standards as a minimum.

5.2.2.5.2 Exhaust System

Exhaust gases and waste heat shall be discharged from the roadside rear corner of the roof. A chrome exhaust extension shall be used to ensure exhaust is discharged at a sufficient height to prevent exhaust gases and waste heat from discoloring or causing heat deformation to the bus roof. The entire exhaust system shall be adequately shielded to prevent heat damage to any bus component. The exhaust outlet shall be designed to minimize rain, snow or water generated from high-pressure washing systems from entering into the exhaust pipe and causing damage to the catalyst.

5.3 CHASSIS

5.3.1 SUSPENSION

5.3.1.1 GENERAL REQUIREMENTS

Both the front and rear suspensions shall be pneumatic type. The basic suspension system shall last the service life of the bus without major overhaul or replacement. The system shall have a minimum of 4 air springs at the rear suspension and a minimum of 2 air springs at the front suspension. Normal replacement items, such as one suspension bushing, shock absorbers, or air spring shall be replaceable by a 3M mechanic in 30 minutes or less. Adjustment points shall be minimized and shall not be subject to a loss of adjustment in service. Necessary adjustments shall be easily accomplished without removing or disconnecting the components.

5.3.1.2 SPRINGS AND SHOCK ABSORBERS

5.3.1.2.1 Travel

The suspension system shall permit a minimum wheel travel of 3 inches jounce-upward travel of a wheel when the bus hits a bump (higher than street surface), and 3 inches rebound-downward travel when the bus comes off a bump and the wheels fall relative to the body. Elastomeric bumpers shall be provided at the limit of jounce travel. Rebound travel may be limited by elastomeric bumpers or hydraulically within the shock absorbers. Suspensions shall incorporate appropriate devices for automatic height control so that regardless of load the bus height relative to the centerline of the wheels does not change more than ± 1/2 inch at any point from the height required in Section 5.1.5.1.3.

5.3.1.2.2 Damping

Vertical damping of the suspension system shall be accomplished by hydraulic shock absorbers mounted to the suspension arms or axles and attached to an appropriate location on the chassis. Damping shall be sufficient to control coach motion to 3 cycles or less after hitting road perturbations. Shock absorbers shall maintain their effectiveness for at least 50,000 miles of the service life of the bus. Each unit shall be replaceable by a 2M mechanic in less than 15 minutes.

5.3.1.2.3 Lubrication

All elements of steering, suspension, and drive systems requiring scheduled lubrication shall be provided with grease fittings conforming to SAE Standard J534. These fittings shall be located for ease of inspection and shall be accessible with a standard grease gun without flexible hose end from a pit or with the bus on a hoist. Each element requiring lubrication shall have its own grease fitting with a relief path. Lubricant specified shall be standard for all elements on the bus serviced by standard fittings. Additional requirements for lubrication if any are contained in Attachments to Part 5: Technical Specifications.

5.3.1.2.4 Kneeling

A kneeling system shall lower the entrance(s) of the bus a minimum of 2.5 inches during loading or unloading operations regardless of load up to GVWR, measured at the longitudinal centerline of the entrance door(s), by the driver using a three position, spring loaded to center switch. Downward direction will lower the bus. Release of switch at any time will completely stop lowering motion and hold height of the bus at that position. Upward direction of the switch will allow the system to go to floor height without the driver having to hold the switch up.

Brake and Throttle interlock shall prevent movement when the bus is kneeled. The kneeling control shall be disabled when the bus is in motion. The bus shall kneel at a maximum rate of 2 inches per second at essentially a constant rate. After kneeling, the bus shall rise within 2 seconds to a height permitting the bus to resume service and shall rise to the correct operating height within 7 seconds regardless of load up to GVWR. During the lowering and raising operation, the maximum acceleration shall not exceed 0.2g and the jerk shall not exceed 0.3g/sec.

An indicator visible to the driver shall be illuminated until the bus is raised to a height adequate for safe street travel. An audible warning alarm will sound simultaneously with the operation of the kneeler to alert passengers and bystanders. A warning light mounted near the curbside of the front door, minimum 3″ diameter, amber lens shall be provided that will blink when the kneel feature is activated. Kneeling shall not be operational while the wheelchair ramp is deployed or in operation.

5.3.1.3 WHEELS AND TIRES

5.3.1.3.1 Wheels

Wheels and rims shall be hub-piloted with aluminum rims and shall resist rim flange wear. All wheels shall be interchangeable and shall be removable without a puller. Wheels shall be compatible with tires
in size and load-carrying capacity. Front wheels and tires shall be balanced as an assembly per SAE J1986. Wheels will be polish aluminum.

Tires shall be suitable for the conditions of transit service and sustained operation at the maximum speed capability of the bus. Load on any tire at GVWR shall not exceed the tire supplier's rating. The tires shall be provided under a lease agreement between the Procuring Agency and tire supplier.

The buses shall be equipped with low profile (305/70R 22.5) tires, Load Range H, or approved equal, as appropriate for the bus design. Wheels will be polish aluminum.

5.3.2 STEERING

5.3.2.1 FRONT AXLE

The front axle shall be solid beam, non-driving with a load rating sufficient for the bus loaded to GVWR and shall be equipped with grease type front wheel bearings and seals.

All friction points on the front axle shall be equipped with replaceable bushings or inserts and lubrication fittings easily accessible from a pit or hoist.

5.3.2.2 STRENGTH

Fatigue life of all steering components shall exceed 1,000,000 miles. No element of the steering system shall sustain a Class I failure when one of the tires hits a curb or strikes a severe road hazard. Inadvertent alternations of steering

as a result of striking road hazards are steering failures.

5.3.2.3 TURNING RADIUS

30-foot-long bus shall have a turning radius not to exceed 36 feet 10 inches.

5.3.2.4 STEERING TURNING EFFORT

The steering wheel shall be removable with a standard or universal puller. The steering column shall have full tilt and telescoping capability allowing the operator to easily adjust the location of the steering wheel.

Hydraulically assisted power steering shall be provided. The steering gear shall be an integral type with flexible lines eliminated or the number and length minimized. With the bus on dry, level, commercial asphalt pavement, and tires inflated to recommended pressure and the front wheels positioned straight ahead, the torque required to turn the steering wheel 10 degrees shall be no less than 5 foot pounds and no more than 10 foot pounds. Steering torque may increase to 70 foot pounds when the wheels are approaching the steering stops**,** as the relief valve activates. Steering effort shall be measured with the bus at GVWR, stopped with the brakes released and the engine at normal idling speed on clean, dry, level, commercial asphalt pavement and the tires inflated to recommended pressure. Power steering failure shall not result in loss of steering control. With the bus in operation the steering effort shall not exceed 55 pounds at the steering wheel rim and perceived free play in the steering system shall not materially increase as a result of power assist failure. Gearing shall require no more than seven turns of the steering wheel lock-to-lock.

Caster angle shall be selected to provide a tendency for the return of the front wheels to the straight position with minimal assistance from the driver.

5.3.2.5 STEERING WHEEL - GENERAL

The steering wheel diameter shall be no less than 18″ and no more than 20″; the rim diameter shall be 7/8″ to 1 1/4″ and shaped for firm grip with comfort for long periods of time.

The steering wheel shall be removable with a standard or universal puller. Steering wheel spokes and wheel thickness should be such as to ensure that visibility is within the range of a 95-percentile range as described in SAE 1050a, section 4.2.2 and 4.2.3. Placement of steering column must be as far forward as possible, but either in-line or behind the instrument cluster.

5.3.2.6 STEERING WHEEL TILT

The steering wheel shall have a rearward tilt adjustment range of no less than 40 degrees as measured from the horizontal and upright position or approved equal.

5.3.2.7 STEERING WHEEL TELESCOPIC ADJUSTMENT

Measurement - From the top of the rim of the steering wheel in the horizontal position to the cab floor at the heel point**.**

The steering wheel shall adjust to maximum height of 5″ and a minimum low-end adjustment of 29″**.**

The following chart is acknowledged as the standard for measurements of thigh clearance, resting elbow height, the slope of the steering wheel, and the height of the wheel, and the relationship of one to another, to assist in determining the appropriate telescopic range**.**

5.3.3 BRAKES

5.3.3.1.1 SERVICE BRAKE

5.3.3.1.2 Actuation

Service brakes shall be controlled and actuated by a compressed air system. Force to activate the brake pedal control shall be an essentially linear function of the bus deceleration rate and shall not exceed 50 pounds at a point 7 inches above the heel point of the pedal to achieve maximum braking. The heel point is the location of the driver's heel when foot is rested flat on the pedal and the heel is touching the floor or heel pad of the pedal. A

microprocessor controlled Automatic Braking System (ABS) shall be provided. The microprocessor for the ABS system shall be protected yet in an accessible location to allow for ease of service. The total braking effort shall be distributed between all wheels in such a ratio as to ensure equal friction material wear rate at all wheel locations.

Actuation of ABS shall override the operation of the brake retarder.

5.3.3.1.3 Friction Material

The entire service brake system, including friction material, shall have a minimum overhaul or replacement life of 30,000 miles with a brake retarder on the design operating profile. Brakes shall be self-adjusting throughout this period. Visible stroke indicators shall be provided to allow service personnel to easily identify when the brakes are not in correct adjustment. The brake linings shall be made of non-asbestos material. In order to aid maintenance personnel in determining extent of wear, a provision such as a scribe line or chamfer indicating the thickness at which replacement becomes necessary, shall be provided on each brake lining.

5.3.3.1.4 Hubs and Drums

Replaceable wheel bearing seals shall run on replaceable wear surfaces or be of an integral wear surface sealed design. Wheel bearing and hub seals shall not leak or weep lubricant for 100,000 miles when running on the design operating profile.

The bus shall be equipped with brake drums. Brake drums shall allow machining to ¼ inch oversize, or approved equal, as appropriate for the bus design.

The brake system material and design shall be selected to absorb and dissipate heat quickly, so the heat generated during braking operation does not glaze brake linings. The heat generated shall not increase the temperature of tire beads and wheel contact area to more than that allowed by the tire manufacturer.

5.3.3.2 PARKING/EMERGENCY BRAKE

The parking brake shall be a spring-operated system, actuated by a valve that exhausts compressed air to apply the brakes. The parking brake may be manually enabled when the air pressure is at the operating level per FMVSS 121. An emergency brake release shall be provided to release the brakes in the event of automatic emergency brake application. The parking brake valve button will pop out when air pressure drops below requirements of FMVSS 121. The driver shall be able to manually depress and hold down the emergency brake release valve to release the brakes and maneuver the bus to safety. Once the operator releases the emergency brake release valve, the brakes shall engage to hold the bus in place.

5.3.4 PNEUMATIC SYSTEM

5.3.4.1 GENERAL

The bus air system shall operate the air-powered accessories and the braking system with reserve capacity. New buses shall not leak down more than 5psi as indicted on the instrument panel mounted air gauges, within 15 minutes from the point of governor cut-off.

Provision shall be made to apply shop air to the bus air systems using a quick disconnect fitting specified in attachments to Part 5: Technical Specifications, shall be easily accessible and located in the engine compartment and near the front bumper area for towing. Retained caps shall be installed to protect fitting against dirt and moisture when not in use. Air for the compressor shall be filtered through the main engine air cleaner system. The air system shall be protected by a pressure relief valve set at 150psi and shall be equipped with check valve and pressure protection valves to assure partial operation in case of line failures.

5.3.4.2 AIR COMPRESSOR

The engine-driven air compressor shall be sized to charge the air system from 40psi to the governor cutoff pressure in less than 3 minutes while not exceeding the fast idle speed setting of the engine. The compressor shall produce a minimum of 18.7 CFM.

5.3.4.3 AIR LINES AND FITTINGS

Air lines, except necessary flexible lines, shall conform to the installation and material requirements of SAE Standard J1149 for copper tubing with standard, brass, flared or ball sleeve fittings, or SAE Standard J844 for nylon tubing if not subject to temperatures over 200 degrees F. Nylon tubing shall be installed in accordance with the following color-coding standards:

Green.	Indicates primary brakes and supply
Red.	Indicates secondary brakes
Brown.	Indicates parking brake
Yellow.	Indicates compressor governor signal
Black.	Indicates accessories

Line supports shall prevent movement, flexing, tension strain, and vibration. Copper lines shall be supported to prevent the lines from touching one another or any component of the bus. To the extent practicable and before installation, the lines shall be pre-bent on a fixture that prevents tube flattening or excessive local strain. Copper lines shall be bent only once at any point, including pre-bending and installation. Rigid lines shall be supported at no more than 5-foot intervals. Nylon lines may be grouped and shall be supported at 2-foot intervals or less.

The compressor discharge line between power plant and body-mounted equipment shall be flexible convoluted copper or stainless-steel line or may be flexible Teflon hose with a braided stainless-steel jacket. Other lines necessary to maintain system reliability shall be flexible Teflon hose with a braided stainless-steel jacket. End fittings shall be standard SAE or JIC brass or steel, flanged, swivel type fittings. Flexible hoses shall be as short as practicable and individually supported. They shall not touch one another or any part of the bus except for the supporting grommets. Flexible lines shall be supported at 2-foot intervals or less.

Air lines shall be clean before installation and shall be installed to minimize air leaks. All air lines shall be sloped toward a reservoir and routed to prevent water traps. Grommets or insulated clamps shall protect the air lines at all points where they pass through understructure components.

5.3.4.4 AIR RESERVOIRS

All air reservoirs shall meet the requirements of FMVSS Standard 121 and SAE Standard J10. Major structural members shall protect these valves and any automatic moisture ejector valves from road hazards. Reservoirs shall be sloped toward the drain valve. All air reservoirs shall have brass drain valves which discharge below floor level with lines routed to eliminate the possibility of water traps and/or freezing in the drain line.

5.3.4.5 AIR SYSTEM DRYER

An air dryer shall prevent accumulation of moisture and oil in the air system. The air dryer system shall include a replaceable desiccant bed, electrically heated drain, and activation device. A 2M/3M mechanic shall replace the desiccant in less than 15 minutes.

5.4 BODY

5.4.1 GENERAL

5.4.1.1 Design

The bus shall have a clean, smooth, simple design, primarily derived from bus performance requirements and passenger service criteria established by Part 5: Technical Specifications. The exterior and body features, including grilles and louvers, shall be shaped to facilitate cleaning by automatic bus washers without snagging washer brushes. Water and dirt shall not be retained in or on any body feature to freeze or bleed out onto the bus after leaving the washer. The body and windows shall be sealed to prevent leaking of air, dust, or water under normal operating conditions and during cleaning in automatic bus washers for the service life of the bus. Exterior panels shall be sufficiently stiff to minimize vibration, drumming or flexing while the bus is in service. The exterior of the vehicle shall have no visible hinges, window frames. Exterior bolts and fasteners shall be kept to a minimum and shall only be used where necessary to attach components which necessitate their use.

The exterior and interior aesthetics shall be that of a vintage trolley bus that resembles an early 1900's cable car.

5.4.1.2 Crashworthiness

The bus body and roof structure shall withstand a static load equal to 150 percent of the curb weight evenly distributed on the roof with no more than a 6-inch reduction in any interior dimension. Windows shall remain in place and shall not open under such a load. These requirements must be met without components such as roof mounted air conditioning installed.

The bus shall withstand a 25-mph impact by a 4,000-pound automobile at any point, excluding doorways, along either side of the bus with no more than 3 inches of permanent structural deformation at seated passenger hip height. This impact shall not result in sharp edges or protrusions in the bus interior.

Exterior panels below 35 inches from ground level shall withstand a static load of 2,000 pounds applied perpendicular to the bus by a pad no larger than 5 inches square. This load shall not result in deformation that prevents installation of new exterior panels to restore the original appearance of the bus.

5.4.1.3 Materials

Body materials shall be selected, and the body fabricated to reduce maintenance, extend durability, and provide consistency of appearance throughout the service life of the bus. Detailing shall be kept simple; add-on devices and trim, where necessary, shall be minimized and integrated into the basic design.

5.4.1.4 Corrosion

The bus flooring, sides, roof, understructure, axle suspension components shall resist corrosion or deterioration from atmospheric conditions and road salts for a period of 10 years or 350,000 miles whichever comes first. It shall maintain structural integrity and nearly maintain original appearance throughout its service life, provided that it is maintained by the Procuring Agency in accordance with the procedures specified in the Contractor's service manual. With the exception of periodically inspecting the visible coatings applied to prevent corrosion and reapplying these coatings in limited spots, the Contractor shall not require the complete reapplication of corrosion compounds over the life of the bus.

The structural frame of the vehicle shall be manufactured of 304 stainless steel or approved equal. All exterior body surfaces must be of inherently corrosion resistant materials. All joints and connections of dissimilar metals shall be corrosion-resistant and shall be protected from galvanic corrosion. Representative samples of all materials and connections shall withstand a 2-week (336-hour) salt spray test in accordance with ASTM Procedure B-117 with no structural detrimental effects to normally visible surfaces, and no weight loss of over 1 percent.

Additional requirements for corrosion protection are contained in attachments to Part 5: Technical Specifications.

5.4.1.5 RESONANCE AND VIBRATION

All structure, body, and panel-bending mode frequencies, including vertical, lateral, and torsional modes, shall be sufficiently removed from all primary excitation frequencies to minimize audible, visible, or sensible resonant vibrations during normal service.

5.4.1.6 FIRE PROTECTION

The passenger and engine compartments shall be separated by a bulkhead(s) that shall, by incorporation of fireproof materials in its construction, be a firewall. The engine compartment shall include areas where the engine and exhaust systems are housed including the muffler, if mounted above the horizontal shelf. This firewall shall preclude or retard propagation of an engine compartment fire into the passenger compartment and shall be in accordance with the Recommended Fire Safety Practices defined in FTA Docket 90, dated October 20, 1993. Only necessary openings shall be allowed in the firewall, and these shall be fireproofed. Any passageways for the climate control system air shall be separated from the engine compartment by fireproof material. Piping through the bulkhead shall have copper, brass, or fireproof fittings sealed at the firewall with copper or steel piping on the forward side. Wiring may pass through the bulkhead only if connectors or other means are provided to prevent or retard fire propagation through the firewall. Engine access panels in the firewall shall be fabricated of fireproof material and secured with

fireproof fasteners. These panels, their fasteners, and the firewall shall be constructed and reinforced to minimize warping of the panels during a fire that will compromise the integrity of the firewall. A fire suppression system shall be installed, Kiddle or approve equal. The system shall have a minimum of 4 thermal fire sensors. These sensors shall be in locations that could be origination points for fire. The system shall have both automatic and manual activation capability.

5.4.1.7 DISTORTION

The bus, loaded to GVWR and under static conditions, shall not exhibit deflection or deformation that impairs the operation of the steering mechanism, doors, windows, passenger escape mechanisms and service doors. Static conditions shall include the vehicle at rest with any one wheel or dual set of wheels on a 6-inch curb or in a 6-inch-deep hole.

5.4.2 STRUCTURE

5.4.2.1 GENERAL

5.4.2.1.1 Design

The structure of the bus as defined in Section 5.1.2 (25), shall be designed to withstand the transit service conditions typical of an urban duty cycle throughout its service life. The Design Operating Profile defined in Section 5.1.2 shall be considered for this purpose.

The vehicle structural frame shall be designed to operate with no maintenance throughout a minimum 12-years under the Design Operating Profile. The vehicle shall be constructed using only inherently corrosion-resistant materials and fasteners to minimize deterioration. The structure shall not require corrosion-preventive coatings or after-treatments either during construction or through the service life of the vehicle

5.4.2.1.2 Altoona Testing

Prior to acceptance of first bus, the structure of the bus shall have undergone appropriate structural testing and/or analysis, including FTA required Altoona testing, to ensure adequacy of design for the urban transit service. Any items that required repeated repairs or replacement must undergo the corrective action with supporting test and analysis. A report clearly describing and explaining the failures and corrective actions taken to ensure any and all such failures will not occur shall be submitted to the Procuring Agency. *[Reference Section 2.10.2, Bus Testing]*

5.4.2.2 Towing

Towing devices shall be provided on each end of the bus. Towing devices should accommodate flat-bedding or flat-towing. Each towing device shall withstand, without permanent deformation, tension loads up to 1.2 times the curb weight of the bus within 20 degrees of the longitudinal axis of the bus. The rear towing device(s) shall not provide a toehold for unauthorized riders.

The front towing devices shall allow attachment of adapters for a rigid tow bar and shall permit lifting of bus until the front wheels are clear off the ground in order to position the bus on the towing equipment by the front wheels.

The front towing devices shall allow attachment of adapters for a rigid tow bar and shall permit lifting and towing of the bus, at curb weight, until the front wheels are clear off the ground.

The rear towing devices shall permit lifting and towing of the bus for a short distance, such as in cases of an emergency, to allow access to provisions for front towing of bus. The method of attaching the tow bar or adapter shall require the specific approval of the Procuring Agency. Each towing device shall accommodate a crane hook with a 1-inch throat.

5.4.2.3 JACKING

It shall be possible to safely jack up the bus, at curb weight, with a common 10-ton floor jack with or without special adapter, when a tire or dual set is completely flat and the bus is on a level, hard surface, without crawling under any portion of the bus. Jacking from a single point shall permit raising the bus sufficiently high to remove and reinstall

a wheel and tire assembly. Jacking pads located on the axle or suspension near the wheels shall permit easy and safe jacking with the flat tire or dual set on a 6-inch-high run-up block not wider than a single tire. Jacking and changing any one tire shall be completed by a 2M mechanic helper in less than 30 minutes from the time the bus is approached. The bus shall withstand such jacking at any one or any combination of wheel locations without permanent deformation or damage.

Jacking pads shall be painted safety yellow or orange for ease of identification.

5.4.2.4 HOISTING

The bus axles or jacking plates shall accommodate the lifting pads of a 2-post hoist system. Jacking plates, if used as hoisting pads, shall be designed to prevent the bus from falling off the hoist. Other pads or the bus structure shall support the bus on jack stands independent of the hoist.

5.4.2.5 FLOOR

5.4.2.5.1 Design

The floor shall be essentially a continuous flat plane, except at the wheel housings and platforms. The floor height shall be as specified in Section 5.1.5.1.3, to eliminate steps and facilitate boarding and de-boarding of passengers.

Where the floor meets the walls of the bus, as well as other vertical surfaces, such as, platform risers, the surface edges shall be blended with a circular section of radius not less than 1 inch. Similarly, a molding or cove shall prevent debris accumulation between the floor and wheel housings. The vehicle floor in the area of the entrance and exit doors shall have a lateral slope not exceeding 2º to allow for drainage. In order to facilitate removing accumulations of water from the interior, two drain holes shall be provided on each side of the lower level of the bus.

5.4.2.5.2 Strength

The floor deck may be integral with the basic structure or mounted on the structure securely to prevent chafing or horizontal movement and designed to last the life of the bus. Sheet metal screws shall not be used to retain the floor and all floor fasteners shall be serviceable from one side only. The use of adhesives to secure the floor to the structure shall be allowed only in combination with the use of bolt or screw fasteners and its effectiveness shall last throughout life of the coach. Tapping plates, if used for the floor fasteners, shall be no less than the same thickness as a standard nut and all floor fasteners shall be secured and protected from corrosion for the service life of the bus. The floor deck shall be reinforced as needed to support passenger loads. At GVWR, the floor shall have an elastic deflection of no more than 0.60 inches from the normal plane. The floor shall withstand the application of 2.5 times gross load weight without permanent detrimental deformation. Floor, with coverings applied, shall withstand a static load of at least 150 pounds applied through the flat end of a ½ inch-diameter rod, with 1/32-inch radius, without permanent visible deformation.

5.4.2.5.3 Construction

The floor shall consist of the subfloor and the floor covering (See 5.4.4.5 Floor Covering). The floor, as assembled, including the sealer, attachments and covering shall be waterproof, nonhygroscopic, and resistant to mold growth. The subfloor shall be resistant to the effects of moisture, including decay (dry rot) or approve equal.

If plywood is used, it shall be certified at the time of manufacturing by an industry approved third-party inspection agency such as APA- The Engineered Wood Association (formerly the American Plywood Association). Plywood shall be of a thickness adequate to support the design loads, manufactured with exterior glue, satisfy the requirements of a Group I Western panel as defined in PS 1-95 (Voluntary Product Standard PS 1-95, Construction and Industrial Plywood) and be of a grade that is manufactured with a solid face and back. Plywood shall be installed with the highest-grade veneer up. Plywood shall be pressure-treated with a preservative chemical that prevents decay and damage by insects. Preservative treatments shall utilize no EPA listed hazardous chemicals. The concentration of preservative chemical shall be equal to or greater than required for an above ground level application. Treated plywood will be certified for preservative penetration and retention by a third-

party inspection agency. Pressure-preservative treated plywood shall have a moisture content at or below fifteen percent. A barrier shall be installed to prevent contact by road salt with the plywood panels.

5.4.2.6 PLATFORMS

5.4.2.6.1 General

Platform height shall not exceed 12 inches. An integral nosing, yellow in color shall be provided on the leading edge of all platforms and steps. Except where otherwise indicated, covering of platform surfaces and risers shall be same material as specified for floor covering.

Other raised areas such as for providing space for under-floor installation of components shall be limited. Such raised areas shall be constructed in accordance to these specifications.

5.4.2.6.2 Operator's Platform

The operator's platform shall be of a height that, in a seated position**,** the operator can see an object located at an elevation of 42″ above the road surface, 24″ from the leading edge of the bumper. Notwithstanding this requirement, the platform height shall not position the operator such that the operator's vertical upward view is less than 15 degrees (see Standard Bus Procurement Guidelines/Low Floor Specification section 5.4.7.2 **- WINDSHIELD).** A warning decal or sign shall be provided to alert operator to the change in floor level.

5.4.2.6.3 Farebox

If the driver's platform is higher than 12 inches, then the farebox is to be mounted on platform of suitable height to provide accessibility for operator without compromising passenger's access. Space should be provided to mount GFI Odyssey farebox.

5.4.2.6.4 Intermediate Platform

If the vehicle is of a bi-level floor design, an intermediate platform shall be provided along the center aisle of the bus to facilitate passenger traffic between the upper and lower floor levels. This intermediate platform shall be cut into the rear platform and shall be approximately the aisle width, 24 inches deep and approximately one half the height of the upper level relative to the lower level. The horizontal surface of this platform shall be covered with yellow Hypalon ribbed rubber or skid-resistant material and shall be sloped slightly for drainage. A warning decal or sign shall be provided at the immediate platform area to alert passengers to the change in floor level.

5.4.2.7 WHEEL HOUSING

5.4.2.7.1 Design

Sufficient clearance and air circulation shall be provided around the tires, wheels, and brakes to preclude overheating when the bus is operating on the design operating profile. See Section 5.1.2(20).

Interference between the tires and any portion of the bus shall not be possible in maneuvers up to the limit of tire adhesion with weights from curb weight to GVWR. Wheel housings shall be adequately reinforced where seat pedestals are installed. Wheel housings shall have sufficient sound insulation to minimize tire and road noise and meet all requirements of Section 5.1.5.6, Noise.

Design and construction of front wheel housings shall allow for the installation of radio/electronic equipment storage compartment on interior top surface or its use as a luggage rack.

The exterior finish of the front wheel housings shall be scratch-resistant, meeting requirements of Section 5.4.4.1, Interior Panels and Finishes, and complement interior finishes of the bus to minimize the visual impact of the wheel housing. The lower portion extending to approximately 12 inches above floor shall be equipped with scratch resistant coating or stainless-steel trim.

5.4.2.7.2 Construction

Wheel housings shall be constructed of stainless steel. Wheel housings, as installed and trimmed, shall withstand impacts of a 2-inch steel ball with at least 200 foot-pounds of energy without penetration.

5.4.3 EXTERIOR PANELS AND FINISHES

5.4.3.1 PEDESTRIAN SAFETY

Exterior protrusions greater than 1/2 inch and within 80 inches of the ground shall have a radius no less than the amount of the protrusion. The exterior rearview mirrors and required lights and reflectors are exempt from the protrusion requirement. Advertising frames shall protrude no more than 7/8 inch from the body surface and shall have the exposed edges and corners rounded to the extent practicable. Grilles, doors, bumpers and other features on the sides and rear of the bus shall be designed to minimize the ability of unauthorized riders to secure toeholds or handholds.

5.4.3.2 REPAIR AND REPLACEMENT

Exterior panels below the lower daylight opening and within 35 inches above ground level shall be divided into sections that are repairable or replaceable by a 3M mechanic in less than 30 minutes for a section up to 5 feet long (excludes painting).

5.4.3.3 RAIN GUTTERS

Rain gutters shall be provided to prevent water flowing from the roof onto the passenger doors, operator's side window, and exterior mirrors. When the bus is decelerated, the gutters shall not drain onto the windshield, or operator's side window, or into the door boarding area. Cross sections of the gutters shall be adequate for proper operation.

5.4.3.4 LICENSE PLATE PROVISIONS

Provisions shall be made to mount standard size U.S. license plates per SAE J686 on the rear of the bus. These provisions shall direct mount or recess the license plates so that they can be cleaned by automatic bus washing equipment without being caught by the brushes.

5.4.3.5 FENDER SKIRTS

Features to minimize water spray from the bus in wet conditions shall be included in wheel housing design. Any fender skirts shall be easily replaceable. They shall be manufactured of a brush-like material with 3-inch minimum length bristles. The brushes shall be contoured to the wheel-well. Wheels and tires shall be removable with the fender skirts in place.

5.4.3.6 SPLASH APRONS

Splash aprons, composed of 1/4-inch-minimum composition or rubberized fabric, shall be installed behind and/or in front of wheels as needed to reduce road splash and protect underfloor components. The splash aprons shall extend downward to within 4 inches of the road surface at static conditions. Apron widths shall be no less than tire widths, except for the front apron that shall extend across the width of the bus. Splash aprons shall be bolted to the bus understructure. Splash aprons and their attachments shall be inherently weaker than the structure to which they are attached. The flexible portions of the splash aprons shall not be included in the road clearance measurements. Other splash aprons shall be installed where necessary to protect bus equipment.

5.4.3.7 SERVICE COMPARTMENTS AND ACCESS DOORS - EXTERIOR

5.4.3.7.1 Access Doors

Conventional or pantograph hinged doors shall be used for the engine compartment and for all auxiliary equipment compartments including doors for checking the quantity and adding to the engine coolant, engine lubricant and transmission fluid. Access openings shall be sized for easy performance of tasks within the compartment including tool operating space. Access doors shall be of rugged construction and shall maintain mechanical integrity and function under normal operations throughout the service life of the bus. They shall close flush with the body surface and hinges and fasteners shall not be visible when the doors are closed. All doors shall be hinged at the top or on the forward edge and shall be prevented from coming loose or opening during transit service or in bus washing operations. Doors with top hinges shall have safety props stored behind the door or on the doorframe. All access doors shall be retained in the open position by props or counterbalancing with over-center or gas-filled springs and

shall be easily operable by one person. Springs and hinges shall be corrosion resistant. Latch handles shall be flush with, or recessed behind, the body contour and shall be sized to provide an adequate grip for opening. Access doors, when opened, shall not restrict access for servicing other components or systems.
Access doors larger in area than 100 square inches shall be equipped with corrosion resistant flush-mounted locks. All such access door locks that require a tool to open shall be standardized throughout the vehicle and will require a nominal 5/16-inch square male tool to open or lock.

Access doors larger in area than 100 square inches shall be equipped with locks. The locks shall be standardized as defined by the Procuring Agency in the attachments to Part 5: Technical Specifications so that only one tool is required to open all major access doors on the bus.

Access doors larger in area than 100 square inches shall be equipped with latches. The latches shall be standardized and shall be openable without the use of a key or tool.

5.4.3.7.2 Battery Compartment

The batteries shall be securely mounted on a stainless steel or equivalent tray that can accommodate the size and weight of the batteries. The battery tray shall pull out easily and properly support the batteries while they are being serviced. The tray shall allow each battery cell to be easily serviced and filled. A locking device shall retain the battery tray in the stowed position.

The battery compartment or enclosure shall be vented and self-draining. It shall be accessible only from outside the bus. All components within the battery compartment, and the compartment itself, shall be protected from damage or corrosion from the electrolyte and gases emitted by the battery, and from snow, slush, salt spray, mud, etc. generated from environmental conditions outside the vehicle. The inside surface of the battery compartment's access door shall be electrically insulated, as required, to prevent the battery terminals from shorting on the door if the door is damaged in an accident or if a battery comes loose. The Master Battery Switch accessibility requirements are defined in Section 5.5.3.1.3.

5.4.3.7.3 Service Area Lighting

Lights shall be provided in the engine and all other compartments, where service may be required, to generally illuminate the area for night emergency repairs or adjustments. Sealed lamp assemblies shall be provided in the engine compartment and shall be controlled by a switch located near the rear start controls in the engine compartment. Necessary lights, located in other service compartments, shall be provided with switches on the light fixture or convenient to the light.

5.4.3.8 BUMPERS

5.4.3.8.1 Location

Bumpers shall provide impact protection for the front and rear of the bus with the top of the bumper being 28 ∀ 2 inches above the ground. Bumper height shall be such that when one bus is parked behind another, a portion of the bumper faces will contact each other.

5.4.3.8.2 Front Bumper

The bumper shall be of a two-piece design shaped to compliment the exterior shape of the vehicle. Right and left side bumper sections shall be interchangeable.

No part of the bus, including the bumper, shall be damaged as a result of a 5-mph impact of the bus at curb weight with a fixed, flat barrier perpendicular to the bus' longitudinal centerline. The bumper shall return to its pre-impact shape within 10 minutes of the impact. The bumper shall protect the bus from damage as a result of 6.5 mph impacts at any point by the Common Carriage with Contoured Impact Surface defined in Figure 2 of FMVSS 301 loaded to 4,000 pounds parallel to the longitudinal centerline of the bus and 5.5-mph impacts into the corners at a 30° angle to the longitudinal centerline of the bus. The energy absorption system of the bumper shall be independent of every power system of the bus and shall not require service or maintenance in normal operation during the service life of the bus. The bumper may increase the overall bus length specified in Section 5.1.5.1.1 by no more than 7 inches.

5.4.3.8.3 Rear Bumper

The rear bumper shall be of a two-piece design. No part of the bus, including the bumper, shall be damaged as a result of a 2-mph impact with a fixed, flat barrier perpendicular to the longitudinal centerline of the bus. The bumper shall return to its pre-impact shape within 10 minutes of the impact. When using a yard tug with a smooth, flat plate bumper 2 feet wide contacting the horizontal centerline of the rear bumper, the bumper shall provide protection at speeds up to 5 mph, over pavement discontinuities up to 1 inch high, and at accelerations up to 2 mph/sec. The rear bumper shall protect the bus, when impacted anywhere along its width by the Common Carriage with Contoured Impact Surface defined in Figure 2 of FMVSS 301 loaded to 4,000 pounds, at 4 mph parallel to, or up to a 30º angle to, the longitudinal centerline of the bus. The rear bumper shall be shaped to preclude unauthorized riders standing on the bumper. The bumper shall be independent of all power systems of the bus and shall not require service or maintenance in normal operation during the service life of the bus. The bumper may increase the overall bus length specified in Section 5.1.5.1.1 by no more than 7 inches.

5.4.3.8.4 Bumper Material

Bumper material shall be corrosion-resistant and withstand repeated impacts of the specified loads without sustaining damage. Visible surfaces shall be black or color -coordinated with the bus exterior. These bumper qualities shall be sustained throughout the service life of the bus.

5.4.3.9 FINISH AND COLOR

All exterior surfaces shall be smooth and free of wrinkles and dents. Exterior surfaces to be painted shall be properly prepared as required by the paint system supplier, prior to application of paint to assure a proper bond between the basic surface and successive coats of original paint for the service life of the bus. Drilled holes and cutouts in exterior surfaces shall be made prior to cleaning, priming and painting to prevent corrosion. The bus shall be completely painted prior to installation of exterior lights, windows, mirrors and other items that are applied to the exterior of the bus. Body filler materials may be used for surface dressing, but not for repair of damaged or improperly fitted panels.

Paint shall be applied smoothly and evenly with the finished surface free of dirt and the following other imperfections:

A. Blisters or bubbles appearing in the topcoat film.
B. Chips, scratches, or gouges of the surface finish.
C. Cracks in the paint film.
D. Craters where paint failed to cover due to surface contamination.
E. Overspray.
F. Peeling
G. Runs or sags from excessive flow and failure to adhere uniformly to the surface.
H. Chemical stains and water spots.

To the degree consistent with industry standards for commercial vehicle finishes, painted surfaces shall have gloss and orange peel shall be minimized. All exterior finished surfaces shall be impervious to diesel fuel, gasoline and commercial cleaning agents. Finished surfaces shall resist damage by controlled applications of commonly used graffiti-removing chemicals. Colors and paint schemes shall be in accordance with the attachments to Part 5: Technical Specifications.

Except for periodic cleaning, exterior surfaces of the bus shall be maintenance-free, permanently colored and not require refinish/repaint for the life of the vehicle. In general, the exterior surfaces shall be white except as specified in attachments to Part 5: Technical Specifications. Durable, peel-resistant pressure sensitive appliqués shall be used for any striping and coloring required.

5.4.3.10 NUMBERING AND SIGNING

Monograms, numbers and other special signing specified by the Procuring Agency shall be applied to the inside and outside of the bus as required. Signs shall be durable and fade-, chip-, and peel-resistant; they may be painted signs,

decals, or pressure-sensitive appliqués. All decals shall be sealed with clear, waterproof sealant around all exposed edges if required by the decal supplier. Signs shall be provided in compliance with the ADA requirements defined in 49 CFR Part, Subpart B, 38.27. The exact wording, size, color, and locations for these signs will be discussed at the pre-production meeting.

5.4.3.11 EXTERIOR LIGHTING

All exterior lights shall be designed to prevent entry and accumulation of moisture or dust, and each lamp shall be replaceable in less than 5 minutes by a 2M mechanic helper. Commercially available LED (Light Emitting Diode)-type lamps shall be used wherever possible, excluding applications where white lights are used, such as for headlights. Lights mounted on the engine compartment doors shall be protected from the impact shock of door opening and closing. Lights on the rear of the bus shall be flush-mount type to ease cleaning. Lamps, lenses and fixtures shall be interchangeable to the extent practicable. If any lights on the rear of the bus are obstructed when the engine door is open, hazard lamps must be provided. These lamps may be placed inside the engine compartment. Light lenses shall be designed and located to prevent damage when running the vehicle through an automatic bus washer. Lights located on the roof and sides of the bus shall have protective shields or be of the flush mount type to protect the lens against minor impacts. Headlamps shall be of the replaceable bulb type and shall be replaceable in less than 5 minutes by a 2M mechanic helper.

Visible and audible warning shall inform following vehicles or pedestrians of reverse operation. Visible reverse operation warning shall conform to SAE Standard J593. Audible reverse operation warning shall conform to SAE Recommended Practice J994 Type C or D.

Lamps at the front and rear passenger doorways shall comply with ADA requirements and shall activate only when the doors open. These lamps shall illuminate the street surface to a level of no less than 1 foot-candle for a distance of 3 feet outward from the outboard edge of the door threshold. The lights may be positioned above or below the lower daylight opening of the windows and shall be shielded to protect passengers' eyes from glare.

Turn-signal lights shall be provided on both sides of the bus. Specific number and mounting requirements will be discussed at the pre-production meeting.

5.4.4 INTERIOR PANELS AND FINISHES

5.4.4.1 GENERAL

Materials shall be selected on the basis of maintenance, durability, appearance, safety, flammability, and tactile qualities. Trim and attachment details shall be kept simple and unobtrusive. Materials shall be strong enough to resist everyday abuse and vandalism; they shall be resistant to scratches and markings. Interior trim shall be secured to avoid resonant vibrations under normal operational conditions.

Interior surfaces more than 10 inches below the lower edge of the side windows or windshield shall be shaped so that objects placed on them fall to the floor when the coach is parked on a level surface. The entire interior shall be cleanable with a hose, using a liquid soap attachment. Water and soap should not normally be sprayed directly on the instrument and switch panels.

5.4.4.2 FRONT END

The entire front end of the bus shall be sealed to prevent debris accumulation behind the dash and to prevent the operator's feet from kicking or fouling wiring and other equipment. The front end shall be free of protrusions that are hazardous to passengers standing or walking in the front of the bus during rapid decelerations. Paneling across the front of the bus and any trim around the operator's compartment shall be formed metal or plastic material. Formed metal dash panels shall be painted and finished to the quality described in Section 5.4.3.10 or may be carpeted or vinyl covered. Plastic dash panels shall be reinforced, as necessary, vandal-resistant, and replaceable. All colored, painted, and plated parts forward of the operator's barrier shall be finished with a dull matte surface to reduce glare. (See Section 5.4.6.1.1)

5.4.4.3 REAR END

The rear bulkhead and rear interior surfaces shall be material suitable for exterior skin, painted and finished to exterior quality, or paneled with melamine-type material, plastic, or carpeting and trimmed with stainless steel, aluminum, or plastic. Colors, patterns, and materials are defined in attachments to Part 5: Technical Specifications.

5.4.4.4 INTERIOR PANELS

5.4.4.4.1 General

Interior side trim panels and operator's barrier shall be textured stainless steel, anodized aluminum, plastic, melamine-type material, or carpeting. Panels shall be easily replaceable and tamper resistant. They shall be reinforced, as necessary, to resist vandalism and other rigors of transit bus service. Individual trim panels and parts shall be interchangeable to the extent practicable. Untrimmed areas shall be painted and finished to the quality described in Section 5.4.3.10. All materials shall comply with the Recommended Fire Safety Practices defined in FTA Docket 90, dated October 20,1993. Colors, patterns, and materials for the interior trim are defined in attachments to Part 5: Technical Specifications.

5.4.4.4.1.1 Operator's Coat Hanger

A suitable hanger shall be installed in a convenient approved location for the operator's overcoat.

5.4.4.4.2 Operator Barrier

A barrier or bulkhead between the operator and the street-side front passenger seat shall be provided. The barrier shall minimize glare and reflections in the windshield directly in front of the barrier from interior lighting during night operation.

Operator's Barrier shall extend continually from floor to ceiling and from the bus wall to first stanchion immediately behind the Operator to provide security to the Operator and limit passenger conversation.

- Location and shape must permit full seat travel possibilities and accommodate the shoulders of a 95th percentile male
- Partition shall have a side return and stanchion to prevent passenger from standing behind the Operator's seat; lower area between seat and panel must be accessible to the Operator.
- Partition must be strong enough in conjunction with entire partition assembly for mounting of such equipment as flare kits, fire extinguishers (1.2kg), microcomputer, public address amplifier, etc.
- Partition shall start 25mm (1″) above floor
- Dark or black panels preferred
- Panel should be attached with rubber grommets

5.4.4.4.2.1 Operator Storage Box

An enclosed Operator storage area shall be provided with a positive latching door and lock; minimum approximate size: 355 mm x 355 mm x 355 mm (14″ x 14″ x 14″).

5.4.4.4.3 Modesty Panels

Sturdy divider panels constructed of durable, unpainted, corrosion-resistant material complementing the interior trim shall be provided to act as both a physical and visual barrier for seated passengers. Modesty panels shall be located at doorways to protect passengers on adjacent seats, and along front edge of rear upper level. Design and installation of modesty panels located in front of forward-facing seats shall include a handhold/grabhandle along its top edge. These dividers shall be mounted on the sidewall and shall project toward the aisle no farther than passenger knee projection in longitudinal seats or the aisle side of the transverse seats. Modesty panels shall extend no higher than the lower daylight opening of the side windows and those forward of transverse seats shall extend downward to a level between 1-1/2 and 1 inches above the floor. Panels forward of longitudinal seats shall extend to below the level of the seat. Dividers positioned at the doorways shall provide no less than a 2-1/2-inch clearance between the modesty panel and the opened door to protect passengers from being pinched. Modesty panels installed at doorways shall be equipped with grab rails (see Section 5.4.5.2). The modesty panel

and its mounting shall withstand a static force of 250 pounds applied to a four-inch by four-inch area in the center of the panel without permanent visible deformation.

5.4.4.4.4 Rear Bulkhead

The rear bulkhead paneling shall be contoured to fit the ceiling, side walls, and seat backs so that any litter, such as a cigarette package or newspaper, will tend to fall to the floor or seating surface when the bus is on a level surface. Any air vents in this area shall be louvered to reduce airflow noise and to reduce the probability of trash or liter being thrown or drawn through the grille. If it is necessary to remove the panel to service components located on the rear bulkhead, the panel shall be hinged or shall be able to be removed and replaced by a 3M mechanic in 5 minutes. Grilles where access to or adjustment of equipment is required shall be heavy duty and designed to minimize damage.

5.4.4.4.5 Headlining

Ceiling panels shall be melamine-type material or aluminum composite material. Headlining shall be supported to prevent buckling, drumming, or flexing and shall be secured without loose edges. Headlining materials shall be treated or insulated to prevent marks due to condensation where panels are in contact with metal members. Moldings and trim strips, as required to make the edges tamperproof, shall be stainless steel, aluminum, or plastic, colored to complement the ceiling material. Headlining panels covering operational equipment that is mounted above the ceiling shall be on hinges for ease of service but retained to prevent inadvertent opening. Color of the headlining material shall be chosen from the manufacturer's standard and optional colors.

5.4.4.4.6 Fastening

Interior panels shall be attached so that there are no exposed unfinished or rough edges or rough surfaces. Panels and fasteners shall not be easily removable by passengers. Interior trim fasteners, where required, shall be rivets or cross-recessed head screws.

5.4.4.4.7 Insulation

Any insulation material used between the inner and outer panels shall be sealed or self-sealing to minimize entry and/or retention of moisture. Insulation properties shall be unimpaired during the service life of the bus. Any insulation material used inside the engine compartment shall not absorb or retain oils or water and shall be designed to prevent casual damage that may occur during maintenance operations. All insulation materials shall comply with the Recommended Fire Safety Practices defined in FTA Docket 90, dated October 20,1993.

The combination of inner and outer panels on the sides, roof, wheel-wells and ends of the bus, and any material used between these panels shall provide a thermal insulation sufficient to meet the interior temperature requirements of Part 5: Technical Specifications. The bus body shall be thoroughly sealed so that the operator or passengers cannot feel drafts during normal operations with the passenger doors closed.

5.4.4.5 FLOOR COVERING

The floor covering shall have a non-skid walking surface that remains effective in all weather conditions and complies with all ADA requirements. The floor covering, as well as transitions of flooring material to the main floor and to the entrance and exit area, shall be smooth and present no tripping hazards. The standee line shall be at least 2 inches wide and shall extend across the bus aisle. This line shall be the same yellow color as the outboard edge of the entrance/exit areas. Color/pattern shall be consistent throughout the floor covering, with the exception of the are forward of the standee line, which may be coated with a durable rubber material in lieu of floor-covering. Color and material of the floor covering will be defined at the pre-production meeting.

Any areas on floor, which are not intended for standees, such as areas "swept" during passenger door operation, shall be clearly and permanently marked.

The floor in the operator's compartment shall be easily cleaned and shall be arranged to minimize debris accumulation.

Through the bus where floor-covering us used; the material shall be a minimum of 1/10 inch PVC texture for traction.

5.4.4.6 PASSENGER INTERIOR LIGHTING

The interior lighting system shall provide a minimum 15 foot-candle illumination on a 1 square foot plane at an angle of 45 degrees from horizontal, centered 33 inches above the floor and 24 inches in front of the seat back at each seat position. Allowable average light level for the rear bench seats shall be 7 foot-candles. Floor surface in the aisles shall be a minimum of 10 foot-candles, vestibule area a minimum of 4 foot-candles with the front doors open and a minimum of 2 foot-candles with the front doors closed. The front entrance area and curb lights shall illuminate when the front door is open and master run switch is in the "Lights" positions. Rear exit area and curb lights shall illuminate when rear door is unlocked.

Step lighting for the intermediate platform between lower and upper floor levels shall be provided and shall illuminate in all engine run positions. The step lighting shall be low-profile to minimize tripping and snagging hazard for passengers and shall be shielded as necessary to protect passengers' eyes from glare.

The light source shall be located to minimize windshield glare with distribution of the light focused primarily on the passengers' reading plane while casting sufficient light onto the advertising display. Fluorescent tubes shall be a maximum 6-foot length, single-pin, T-12 type (with exception granted for extinguishing or dimming fixtures as noted below).

Lens material shall be clear polycarbonate. Lens shall be designed to effectively "mask" the fluorescent tube. Lens shall be sealed to inhibit incursion of dust and insects yet are easily removable for service. If threaded fasteners are used, they must be held captive in the lens. Access panels shall be provided to allow servicing of components located behind light panels. If necessary, the entire light fixture shall be hinged.

Individual ballast units shall be provided for each light fixture. Ballast shall have a fireproof housing, minimum operating frequency of above audible range, reverse polarity protection, integrated circuit breaker/automatic thermal protection, and rebuildable.

When the master switch is in the RUN or NITE/RUN mode, the first light module on each side of the coach shall automatically extinguish or dim when the front door is in the closed position and illuminate when the door is opened. This shall be accomplished through use of a ballast specifically designed for this type application without diminishing the life of the fluorescent tubes.

The light system may be designed to form part or the entire air distribution duct.

A light fixture shall be mounted in the ceiling above the farebox location. The fixture shall be capable of projecting a concentrated beam of light on the farebox. This light will automatically come on whenever the front doors are opened, and the run switch is in the "night run" or "night park" position.

5.4.4.7 FARE COLLECTION

Space, as far forward as practicable, and structural provisions shall be made for installation of currently available fare collection device(s). Location of the fare collection device shall not restrict traffic in the vestibule, including wheelchairs if a front door loading device is used, and shall allow the operator to easily reach the farebox controls and to view the fare register. The fare box shall not restrict access to the operator area, shall not restrict operation of operator controls and shall not, either by itself or in combination with stanchions, transfer mounting, cutting, and punching equipment and route destination signs, restrict operator's field of view per SAE Recommended Practice J1050 (See Section 5.4.7.2.) Location and mounting of the fare collection device shall allow use, without restriction, by passengers. Fare box location shall permit accessibility to the vault for easy manual removal or attachment of suction devices. Meters and counters on the fare box shall be readable on a daily basis. The floor under the fare box shall be reinforced, as necessary, to provide a sturdy mounting platform and to prevent shaking of the fare box. The electric and electronic requirements of the fare box are described in Section 5.5.5.4.3.12. Spare shall be provided to mount GFI Odessy farebox.

Transfer mounting, cutting, and punching equipment shall be located in a position convenient to the operator.

The City will supply the farebox; bidders shall supply pre-wiring and farebox pedestal only.

5.4.4.8 ACCESS PANELS AND DOORS - INTERIOR

Access for maintenance and replacement of equipment shall be provided by panels and doors that appear to be an integral part of the interior. Access doors shall be hinged with gas props or over-center springs, where practical, to hold the doors out of the mechanic's way. Panel fasteners shall be standardized so that only one tool is required to service all special fasteners within the bus.

Access doors for the door actuator compartments shall be secured with hand screws or latches and shall prevent entry of mechanism lubricant into the bus interior. All fasteners that retain access panels shall be captive in the cover.

Access openings in the floor shall be sealed to prevent entry of fumes and water into the bus interior. Flooring material shall be flush with the floor and shall be edge-bound with stainless steel, or other material that is acceptable to the Procuring Agency, to prevent the edges from coming loose. Access openings shall be asymmetrical so that reinstalled flooring shall be properly aligned. Fasteners shall tighten flush with the floor.

5.4.5 PASSENGER ACCOMMODATIONS

5.4.5.1 PASSENGER SEATING

5.4.5.1.1 Arrangements and Seat Style

The passenger seating arrangement in the bus shall be such that seating capacity is maximized and in compliance to the following requirements. The Procuring Agency recognizes that ramp location, foot room, hip-to-knee room, doorway type and width, seat construction, floor level type, seat spacing requirements, etc. ultimately affect seating capacity and layout. Seating arrangements as well as seating material will be further discussed during the pre-production meeting. Passenger Seating will be American Insight or approved equal.

Hip-to-knee room measured from the front of one seat back horizontally across the highest part of the seat to the seat or panel immediately in front, shall be no less than 26 inches. At all seating positions in paired transverse seats immediately behind other seating positions hip-to-knee room shall be no less than 26.5 inches.

Foot room, measured at the floor forward from a point vertically below the front of the seat, shall be no less than 14 inches. Seats immediately behind the wheel housings and modesty panels may have foot room reduced, provided the wheelhouse is shaped so that it may be used as a footrest, or the design of modesty panel effectively allows for foot room.

- *Alternative: Reduced foot room*.

Thickness of the transverse seat backs shall be minimized at the bottom to increase passenger knee room and passenger capacity. The area between the longitudinal seat backs and the attachment to the bus sidewalls shall be designed to prevent debris accumulation.

The aisle between the seats shall be no less than 20 inches wide at seated passenger hip height. Seat backs shall be shaped to increase this dimension to no less than 24 inches at standing passenger hip height.

Raised platforms for passenger seats shall not be allowed without Procuring Agency's approval. If vehicle is of a sloped floor design, then raised platforms for passenger seats may be provided in the rear sloped section.

All bidder(s) shall submit in accordance to requirements of Section 1.1.2.2, Offeror Communications and Requests, a copy of his proposed seat layout consistent with these specifications showing hip-to-knee and foot room dimensions, stanchion layout and wheelchair maneuverability layout prior to bid for Procuring Agency review and approval. The bidders shall also indicate on this layout the Free Floor Space available to standees as defined in Section 5.1.2 and include the calculation of the Free Floor Space area.

5.4.5.1.2 Dimensions

Seat dimensions for the various seating arrangements shall have the dimensions as follows:

The width, W, of the seat shall be 35 inches.

The length, L, shall be 17 ±1 inches.

The seat back height, B, shall be a minimum of 15 inches.

The seat height, H, shall be 17 ± 1 inches. For the rear lounge (or settee) and longitudinal seats, and seats located above raised areas for storage of under floor components. This shall also be allowed for limited transverse seats, but only with expressed approval of the Procuring Agency.

The foot room, F, shall be specified in 5.4.5.1.1

The pitch, P, is shown as reference only.

5.4.5.1.3 Structure and Design

The passenger seat frame and its supporting structure shall be constructed and mounted so that space under the seat is maximized to increase wheelchair maneuvering room and is completely free of obstructions to facilitate cleaning.

The transverse seat structure shall be fully cantilevered from the sidewall with sufficient strength for the intended service. The lowest part of the seat assembly that is within 12 inches of the aisle shall be at least 10 inches above the floor. Folding seats used in wheelchair securement areas, as well as, transverse seats mounted in locations at which cantilevered installation is precluded by design and/or structure, need not be cantilevered.

In order to reduce cost and/or maximize seating capacity, the Procuring Agency will allow pedestal mounted transverse seats. For these type seats, the structure shall be attached to the sidewall and supported by a pedestal attached to the floor. The lowest part of the seat assembly that is within 12 inches of the aisle, excluding the pedestal, shall be at least 10 inches above the floor.

The underside of the seat and the sidewall shall be configured to prevent debris accumulation and the transition from the seat underside to the bus sidewall to the floor cove radius shall be smooth. All transverse objects, including seat backs, modesty panels, and longitudinal seats, in front of forward-facing seats shall not impart a compressive load in excess of 1,000 pounds onto the femur of passengers ranging in size from a 5th-percentile female to a 95th-percentile male during a 10g deceleration of the bus. This deceleration shall peak at .05 ± .015 seconds from initiation. Permanent deformation of the seat resulting from two 95th-percentile males striking the seat back during this 10g deceleration shall not exceed 2 inches, measured at the aisle side of the seat frame at height H. Seat back should not deflect more than 14 inches, measured at the top of the seat back, in a controlled manner to minimize passenger injury. Structural failure of any part of the seat or sidewall shall not introduce a laceration hazard.

The seat assembly shall withstand static vertical forces of 500 pounds applied to the top of the seat in each seating position with less than 1/4-inch permanent deformation in the seat or its mountings. The seat assembly shall withstand static horizontal forces of 500 pounds evenly distributed along the top of the seat back with less than 1/4-inch permanent deformation in the seat or its mountings. The seat backs at the aisle position and at the window position shall withstand repeated impacts of two 40-pound sandbags without visible deterioration. One sandbag shall strike the front 40,000 times and the other sandbag shall strike the rear 40,000 times. Each sandbag shall be suspended on a 36-inch pendulum and shall strike the seat back 10,000 times each from distances of 6, 8, 10, and 12 inches. Seats at both seating positions shall withstand 4,000 vertical drops of a 40-pound sandbag without visible deterioration. The sandbag shall be dropped 1,000 times each from heights of 6, 8, 10, and 12 inches. Seats shall withstand 100,000 randomly positioned 3-1/2-inch drops of a squirming, 150-pound, smooth-surfaced, buttocks-shape striker with only minimal wear on the seat covering and no failures to seat structure.

The back of each transverse seat shall incorporate a handhold no less than 7/8 inch in diameter for standees and seat access/egress. The handhold shall not be a safety hazard during severe decelerations. The handhold shall extend

above the seat back near the aisle so that standees shall have a convenient vertical assist, no less than 4 inches long that may be grasped with the full hand. This handhold shall not cause a standee using this assist to interfere with a seated 50th-percentile male passenger. The handhold shall also be usable by a 5th-percentile female, as well as by larger passengers, to assist with seat access/egress for either transverse seating position. During a 10g deceleration of the bus, the HIC number (as defined by SAE Standard J211a) shall not exceed 400 for passengers ranging in size from a 5th percentile female through a 95th percentile male. The seat back handhold may be deleted from seats that do not have another transverse seat directly behind and where vertical assist is provided in accordance with Section 5.4.5.2. Armrests shall not be included in the design of transverse seats.

Longitudinal seats shall be the same general design as transverse seats but without seat back handholds. Longitudinal seats may be mounted on the wheelhouses. Armrests shall be included on the ends of each set of longitudinal seats except on the forward end of a seat set that is immediately to the rear of a transverse seat, the operator's barrier, or a modesty panel and these fixtures perform the function of restraining passengers from sliding forward off the seat. Armrests are not required on longitudinal seats located in the wheelchair parking area that fold up when the armrest on the adjacent fixed longitudinal seat is within 1-1/2 to 3-1/2 inches of the end of the seat. Armrests shall be located from 7 to 9 inches above the seat surface. The area between the armrest and the seat shall be closed by a barrier or panel. The top and sides of the armrests shall have a minimum width of 1 inch and shall be free from sharp protrusions that form a safety hazard.

Seat back handhold and armrests shall withstand static horizontal and vertical forces of 250 pounds applied anywhere along their length with less than 1/4-inch permanent deformation. Seat back handhold and armrests shall withstand 25,000 impacts in each direction of a horizontal force of 125 pounds with less than 1/4-inch permanent deformation and without visible deterioration.

At the Procuring Agency's request, a test report shall be provided by the Contractor, fully documenting compliance with all the requirements defined above upon request. The test report shall contain a record of all testing activities, test diagrams, testing equipment, as well as test data related to loads, deflections and permanent deformation of the seat assembly. The report shall include a statement of compliance with the requirements of this section of Part 5: Technical Specifications.

5.4.5.1.4 Construction and Materials

Seat shall be constructed with materials that comply with the physical test. Selected materials shall minimize damage from vandalism and shall reduce cleaning time. The seats shall be attached to the frame with tamperproof fasteners. Coloring shall be consistent throughout the seat material, with no visually exposed portion painted. All visually exposed metal of the standard seat structure including mounting brackets and other components shall be aluminum or stainless steel. The seat shall be contoured for individuality, lateral support, and maximum comfort and shall fit the framework to reduce exposed edges.

The seat back thickness shall not exceed 1/2 inch in the knee room area.

Seating and interior trim shall have features to improve passenger comfort.

Seats shall be securely attached and shall be detachable by means of a simple release mechanism employing a special tool so that they are easily removable by the maintenance staff but not by the passengers. To the extent practicable, seats shall be interchangeable throughout the bus.

The minimum radius of any part of the seat back, handhold, or modesty panel in the head or chest impact zone shall be a nominal 1/4-inch. Seat covering materials shall be selected on the basis of durability, ease of maintenance, and pleasing texture and appearance. The seat back and seat back handhold immediately forward of transverse seats shall be constructed of energy absorbing materials to provide passenger protection and, in a severe crash, allow the passenger to deform the seating materials in the impact areas in accordance with the Knee Impact and Head Impact Criteria requirements of Section 5.4.5.1.3. Complete seat assemblies shall be interchangeable to the extent practicable. Additional construction details, color of the seat material and optional

safety padding are defined in attachments to Part 5: Technical Specifications.

5.4.5.2 PASSENGER ASSISTS

5.4.5.2.1 General

Passenger assists in the form of full grip, vertical stanchions or handholds shall be provided for the safety of standees and for ingress/egress. Passenger assists shall be convenient in location, shape, and size for both the 95th-percentile male and the 5th-percentile female standee. Starting from the entrance door and moving anywhere in the bus and out the exit door, a vertical assist shall be provided either as the vertical portion of seat back assist (see Section 5.4.5.1.3) or as a separate item so that a 5th-percentile female passenger may easily move from one assist to another using one hand and the other without losing support. All handholds and stanchions at front doorway, around farebox, and at interior steps for bi-level designs shall be powder-coated in high contrast yellow color. The forward-most vertical stanchions on either side of the aisle immediately behind the operator's area, shall be stainless steel finish to match the rest of vehicle.

Excluding those mounted on the seats and doors, the assists shall have a cross-sectional diameter between 1-1/4 and 1-1/2 inches or shall provide an equivalent gripping surface with no corner radii less than 1/4 inch. All passenger assists shall permit a full hand grip with no less than 1-1/2 inches of knuckle clearance around the assist. Passenger assists shall be designed to minimize catching or snagging of clothes or personal items and shall be capable of passing the NHTSA Drawstring Test.

Any joints in the assist structure shall be underneath supporting brackets and securely clamped to prevent passengers from moving or twisting the assists. Passenger assists shall be designed to minimize glare in the Operator's area to the extent possible (see Section 5.4.6.1.1). With the exception of seat and door handholds, all areas of the passenger assist that are handled by passengers including functional components used as passenger assists shall be of anodized aluminum or stainless steel. Seat handholds may be of the same construction and finish as the seat frame. Door mounted passenger assists shall be of anodized aluminum, stainless steel, or powder coated metal. Connecting tees and angles may be powder coated metal castings. Assists shall withstand a force of 300 pounds applied over a 12-inch lineal dimension in any direction normal to the assist without permanent visible deformation. All passenger assist components, including brackets, clamps, screw heads, and other fasteners used on the passenger assists shall be designed to eliminate pinching, snagging and cutting hazards and shall be free from burrs or rough edges.

5.4.5.2.2 Front Doorway

Front doors, or the entry area, shall be fitted with ADA compliant assists. Assists shall be as far outward as practicable but shall be located no farther inboard than 6 inches from the outside edge of the entrance step and shall be easily grasped by a 5th-percentile female boarding from street level. Door assists shall be functionally continuous with the horizontal front passenger assist and the vertical assist and the assists on the wheel housing or on the front modesty panel.

5.4.5.2.3 Vestibule

The aisle side of the operator's barrier, the wheel housings, and when applicable the modesty panels shall be fitted with vertical passenger assists that are functionally continuous with the overhead assist and that extend to within 36 inches of the floor. These assists shall have sufficient clearance from the barrier to prevent inadvertent wedging of a passenger's arm.

A horizontal passenger assist shall be located across the front of the bus and shall prevent passengers from sustaining injuries on the fare collection device or windshield in the event of a sudden deceleration. Without restricting the vestibule space, the assist shall provide support for a boarding passenger from the front door through the fare collection procedure. Passengers shall be able to lean against the assist for security while paying fares. The assist shall be no less than 36 inches above the floor. The assists at the front of the bus shall be arranged to permit a 5th-percentile female passenger to easily reach from the door assist to the front assist, to vertical assists on the operator's barrier, wheel housings, or front modesty panel.

5.4.5.2.4 Rear Doorway

Vertical assists that are functionally continuous with the overhead assist shall be provided at the aisle side of the transverse seat immediately forward of the rear door and on the aisle side of the rear door modesty panel(s). Passenger assists shall be provided on modesty panels that are functionally continuous with the rear door assists. Rear doors, or the exit area, shall be fitted with assists no less than 3/4 inch in width and shall provide at least 1-1/2 inches of knuckle clearance between the assists and their mounting. The assists shall be designed to permit a 5th-percentile female to easily move from one assist to another during the entire exiting process. The assists shall be located no farther inboard than 6 inches from the outside edge of the rear doorway.

5.4.5.2.5 Overhead

Except forward of the standee line and at the rear door, a continuous, full grip, overhead assist shall be provided. This assist shall be convenient to standees anywhere in the bus and shall be located over the center of the aisle seating position of the transverse seats. The assist shall be no less than 70 inches above the floor.

Overhead assists shall simultaneously support 150 pounds on any 12-inch length. No more than 5 percent of the full grip feature shall be lost due to assist supports.

5.4.5.2.6 Longitudinal Seats

Longitudinal seats shall have vertical assists located between every other designated seating position, except for seats that fold/flip up to accommodate wheelchair securement. Assists shall extend from near the leading edge of the seat and shall be functionally continuous with the overhead assist. Assists shall be staggered across the aisle from each other where practicable and shall be no more than 52 inches apart or functionally continuous for a 5th percentile female passenger.

5.4.5.2.7 Wheel Housing Barriers/Assists

Unless passenger seating is provided on top of wheel housing, passenger assists shall be mounted around the exposed sides of the wheel housings (and propulsion compartments if applicable) which shall also be designed to prevent passengers from sitting on wheel housings. Such passenger assists shall also effectively retain items, such as bags and luggage, placed on top of wheel housing.

5.4.5.3 PASSENGER DOORS

5.4.5.3.1 General

Two doorways shall be provided in the curbside of the bus for passenger ingress and egress. The front doorway shall be forward of the front wheels and located so that the operator will be able to collect or monitor the collection of fares. Passenger doors and doorways shall comply with ADA requirements.

The rear doorway centerline shall be rearward of the point midway between the front door centerline and the rearmost seat back.

5.4.5.3.2 Materials and Construction

Structure of the doors, their attachments, inside and outside trim panels, and any mechanism exposed to the elements shall be corrosion resistant. Door panel construction shall be of corrosion-resistant metal or reinforced non-metallic composite materials. The doors, when fully opened, shall provide a firm support and shall not be damaged if used as an assist by passengers during ingress or egress. The front leaves of the passenger doors shall overlap the rear leaves.

5.4.5.3.3 Dimensions

Front door clear width shall be no less than 36 inches with the doors fully opened.

Rear clear width shall be no less than 28 inches with the doors fully opened.

When open, the doors shall leave an opening no less than 75 inches in height.

5.4.5.3.4 Door Glazing

The upper section of both front and rear doors shall be glazed for no less than 45 percent of the respective door opening area of each section. The lower section of the front door shall be glazed for no less than 25 percent of the door opening area of the section.

The front door panel glazing material shall have a nominal ¼ inch or 6 mm thick laminated safety glass conforming with the requirements of ANSI Z26.1 Test Grouping 2 and the Recommended Practices defined in SAE J673.

Glazing material in the rear doorway door panels shall be the same material, thickness and color as the side windows defined in Section 5.4.7.4.2.

5.4.5.3.5 Door Projection

The exterior projection of the front doors beyond the side of the bus shall be minimized and shall not block the line of sight of the rear exit door via the curb side mirror when the doors are fully open. The exterior projection of both doors shall be minimized and shall not exceed 6 inches during the opening or closing cycles or when doors are fully opened. Projection inside the bus shall not exceed 21 inches. The closing edge of each door panel shall have no less than 2 inches of soft weather stripping. The doors, when closed, shall be effectively sealed and the hard surfaces of the doors shall be at least 4 inches apart. The combined weather seal and window glazing elements of the front door shall not exceed 10 degrees of binocular obstruction of the operator's view through the closed door**.** Requirements for sensitive door edges are defined in Section 5.4.5.3.7.

5.4.5.3.6 Door Height Above Pavement

It shall be possible to open and close either passenger door when the bus loaded to GVWR is not knelt and parked with the tires touching an 8-inch-high curb on a street sloping toward the curb so that the street side wheels are 5 inches higher than the right-side wheels.

5.4.5.3.7 Closing Force

Closing door edge speed shall not exceed 19 inches per second. Power close rear doors shall be equipped with a sensitive edge or other obstruction sensing system such that if an obstruction is struck by a closing door edge, the doors will stop and/or reverse direction prior to imparting a 10-pound force on 1 square inch of that obstruction. Doors closed by return spring or counterweight-type device need not be equipped with an obstruction sensing device but shall be capable of being pushed to the point where the door starts to open with a force not to exceed 20 pounds applied to the center edge of the forward door panel. Whether or not the obstruction sensing system is present or functional it shall be possible to withdraw a 1-1/2 inch diameter cylinder from between the center edges of a closed and locked door with an outward force not greater than 35 pounds.

5.4.5.3.8 Actuators

Door actuators shall be adjustable so that the door opening and closing speeds can be independently adjustable to on opening and closing speed of 1.5 to 3.0 seconds. Actuators and the complex door mechanism shall be concealed from passengers but shall be easily accessible for servicing. The door actuators shall be rebuildable. Exhaust from the door system shall be routed below the floor of the bus to prevent accumulation of any oil that may be present in air system and to muffle sound.

5.4.5.3.9 Emergency Operation

In the event of an emergency, it shall be possible to open the doors manually from inside the bus using a force of no more than 25 pounds after actuating an unlocking device at each door. The unlocking devices shall be clearly marked as an emergency-only device and shall require two distinct actions to actuate. The respective door emergency unlocking device shall be accessible from the entrance and exit areas. When the emergency device is actuated, the door interlock throttle system shall return the engine to idle, and the door interlock brake system shall apply to stop the bus. When the front door emergency device is actuated, only the door interlock throttle system shall be actuated. Locked doors shall require a force of more than 100 pounds to open manually. When the locked doors are manually forced to open, damage shall be limited to the bending of minor door linkage with no resulting damage to the doors, engines, and complex mechanism.

5.4.5.4 ACCESSIBILITY PROVISIONS

5.4.5.4.1 General

The design and construction of the bus shall be in accordance with all requirements defined in 49 CFR, Part 38, Subpart B: ADA Accessibility Specifications for Transportation Vehicles - Buses, Vans and Systems. Space and body structural provisions shall be provided at the front door of the bus to accommodate the wheelchair loading system.

5.4.5.4.2 Loading System

An automatically controlled, power-operated ramp system compliant to requirements defined in 49 CFR Part 38, Subpart B, §38.23c shall provide ingress and egress quickly, safely, and comfortably, both in forward and rearward directions, for a passenger in a wheelchair from a level street or curb.

The ramp shall be of a simple hinged, flip-out type design and shall be located at the front door.

When the system is not in use, the passageway shall appear normal. In the stored position of the ramp, no tripping hazards shall be presented, and any resulting gaps shall be minimized. The controls shall be simple to operate with no complex phasing operations required, and the loading system operation shall be under the surveillance and complete control of the operator. If the loading system and controls are at the rear doors, a switch shall be provided in the operator's area to disable the loading system. The bus shall be prevented from moving during the loading or unloading cycle by a throttle and brake interlock system. The wheelchair loading system shall not present a hazard, nor inconvenience any passenger. The loading system shall be inhibited from retracting or folding when a passenger is on the ramp/platform. A passenger departing or boarding via the ramp shall be able to easily obtain support by grasping the passenger assist located on the doors or other assists provided for this purpose. The platform shall be designed to protect the ramp from damage and persons on the sidewalk from injury during the extension/retraction or lowering/raising phases of operation. The loading platform shall be covered with a replaceable or renewable, nonskid material and shall be fitted with devices to prevent the wheelchair from rolling off the sides during loading or unloading. Deployment or storage of the ramp shall require no more than 15 seconds. The device shall function without failure or adjustment for 500 cycles or 5,000 miles in all weather conditions on the design operating profile when activated once during the idle phase. A manual override system shall permit unloading a wheelchair and storing the device in the event of a primary power failure. The manual operation of the ramp shall not require more than 20 lbs. of force. Hydraulic systems incorporated in the loading system mechanism shall comply with the requirements defined in Section 5.2.2.2.3 of Part 5: Technical Specifications. The ramp assembly components shall be replaceable within 30 minutes by 3M mechanic.

5.4.5.4.3 Wheelchair Accommodations

Two forward-facing locations, as close to the wheelchair loading system as practical, shall provide parking space and securement system compliant with ADA requirements for a passenger in a wheelchair.

Additional equipment, including passenger restraint seat belts, shoulder harnesses and wheelchair securement devices shall be provided for each wheelchair passenger. All belt assemblies must stow up and out of the way when not in use. Retractable tie-down shall be provided.

5.4.5.4.4 Interior Circulation

Maneuvering room inside the bus shall accommodate easy travel for a passenger in a wheelchair from the loading device through the bus to the designated parking area, and back out. No portion of the wheelchair or its occupant shall protrude into the normal aisle of the bus when parked in the designated parking space(s). As a guide, no width dimension should be less than 34 inches. Areas requiring 90-degree turns of wheelchairs should have a clearance arc dimension no less than 40 inches and in the parking area where 180-degree turns are expected, space should be clear in a full 60-inch-diameter circle. A vertical clearance of 12 inches above the floor surface should be provided on the outside of turning areas for wheelchair footrest.

5.4.5.4.5 Passenger Information

ADA priority seating signs as required and defined by 49 CFR, Part 38.27 shall be provided to identify the seats designated for passengers with disabilities.

Requirements for a public information system in accordance with 49 CFR, Part 38.35 shall be provided as required in Section 5.4.9.5 of Part 5: Technical Specifications.

Requirements for a stop-request passenger signal in accordance with 49 CFR, Part 38.37 shall be provided as required in Section 5.4.9.3 of Part 5: Technical Specifications.

Requirements for exterior destination signs in accordance with 49 CFR, Part 38.39 shall be provided as required in Section 5.4.9.1 of Part 5: Technical Specifications.

5.4.6 OPERATOR PROVISIONS

5.4.6.1 OPERATOR'S AREA

5.4.6.1.1 General

The operator's work area shall be designed to minimize glare to the extent possible. Objects within and adjacent to this area shall be matte black or dark gray in color wherever possible to reduce the reflection of light onto the windshield. The use of polished metal and light-colored surfaces within and adjacent to the operator's area shall be avoided. Such objects include dash panels, switches and controls, cowlings, windshield wipers and arms, barriers and modesty panels, fare stanchions, access panels and doors, fasteners, flooring, ventilation and heating ducting, window and door frames, and visors. Interior lighting located ahead of the standee line shall be controlled by the operator. Additional provisions for operator's area are included in attachments to Part 5: Technical Specifications.

5.4.6.1.2 Visors

Adjustable sun visor(s) shall be provided for the windshield and the operator's side window. Visors shall be shaped to minimize light leakage between the visor and windshield pillars. Visors shall store out of the way and shall not obstruct airflow from the climate control system or interfere with other equipment such as the radio handset or the destination control. Deployment of the visors shall not restrict vision of the rearview mirrors. Visor adjustments shall be made easily by hand with positive locking and releasing devices and shall not be subject to damage by over-tightening. Sun visor construction and materials shall be strong enough to resist breakage during adjustments. Visors may be transparent but shall not allow a visible light transmittance in excess of 10 percent. Visors, when deployed, shall be effective in the operator's field of view at angles more than 5 degrees above the horizontal.

An adjustable roller type sunscreen shall be provided over the θ operator's windshield and/or the θ operator's side window *[Procuring Agency to choose one or both]*. The sunscreen shall be capable of being lowered to the midpoint of the operator's window. When deployed, the screen shall be secure, stable and shall not rattle, sway or intrude into the operator's field of view due to the motion of the coach or as a result of air movement. Once lowered, the screen shall remain in the lowered position until returned to the stowed position by the operator.

5.4.6.1.3 Operator Hand Controls

All switches and controls necessary for the safe operation of the bus shall be conveniently located in the operator's area and shall provide for ease of operation. Switches and controls shall be divided into basic groups and assigned to specific areas, in conformance with SAE Recommended Practice J680, Revised 1988, Location and Operation of Instruments and Controls in Motor Truck Cabs and be essentially within the hand reach envelope described in SAE Recommended Practice, J287, Driver Hand Control Reach. Operational controls, instrumentation, switches, and other system controls shall not be mixed with ventilation diffusers and non-operational controls or readouts. Controls shall be located so that boarding passengers may not easily tamper with control settings.

The door control, kneel control, windshield wiper/washer controls, and run switch shall be in the most convenient operator locations. They shall be identifiable by shape, touch, and permanent markings. Doors shall be operated by

a single control, conveniently located and operable in a horizontal plane by the operator's left hand. The setting of this control shall be easily determined by position and touch.

All panel-mounted switches and controls shall be marked with easily read identifiers. Text designating position (on/off) shall be a minimum of 9 points, identifying legends shall be a minimum of 11 points. Extremely condensed or italic type fonts shall not be used. Graphical symbols shall conform to SAE Recommended Practice J2402, Road Vehicles - symbols For Controls, Indicators, and Tell Tales, where available and applicable. Color of switches and controls shall be dark with contrasting typography or symbols. Red type on a black or gray field (or vice versa) shall not be used. Mechanical switches and controls shall be replaceable, and the wiring at these controls shall be serviceable from the vestibule or the operator's seat. Switches, controls, and instruments shall be dust and water resistant consistent with the bus washing practice described in Section 5.4.4.1.

5.4.6.1.3.1 Normal Bus Operation

Operator Controls - The following list for Normal Bus Operation identifies bus controls used to operate the bus safely and efficiently. These controls are frequently used, or they are critical to the operation of the bus. They should be located within easy reach of the operator. The operator should not be required to stand or turn his/her body to view or to actuate these controls that include:

Engine Start Switch or Button	Four Position Master Run Switch
Transmission Shift Select	Parking Brake
Door	High Beam
Turn Signals	Hazard Lights
Defroster	Kneel Ramp Control
Windshield Wiper	Instrument Panel Lighting Intensity

Accelerator and brake pedals shall be designed for ankle motion. Foot surfaces of the pedals shall be faced with wear-resistant, nonskid, replaceable material.

5.4.6.1.3.1.1 Master Run Switch

The run switch shall be a four-position rotary switch with the following functions:

OFF - All electrical systems off, except power available for the passenger interior lighting, stoplights, turn lights, hazard lights, radio, silent alarm, interior lighting, stoplights, turn lights, hazard lights, radio, silent alarm, horn, fare box, fire detection equipment, engine compartment lights, auxiliary heater, if provided and electronic equipment that require continuous energizing. If the bus is not operated for a period of 3 days, the total electric load due to devices that require continuous energizing shall not cause the battery to be discharged below the level necessary to start the engine. Electrical loads resulting from the Procuring Agency's devices, such as, farebox, GPS, radio, etc., shall not exceed 1.5 amps with the master run switch in the OFF position

CL/ID - All electrical systems off, except those listed in OFF and power to destination signs, interior lights, and marker lights.

RUN - All electrical systems and engine on, except the headlights, parking lights and marker lights. Daytime running lights (DRL), if provided, shall be on.

NITE/RUN - All electrical systems and engine on.

5.4.6.1.3.1.2 Door Control

Doors shall open or close completely in not more than 3.5 seconds from the time of control actuation and shall be subject to the closing force requirements of Section 5.4.5.3.7 and the adjustment requirements of Section 5.4.5.3.8. The door control shall be located on the street side of the operator's area within the hand reach envelope described in SAE Recommended Practice, J287, Driver Hand Control Reach. The front door shall remain in commanded state position even if power is removed or lost.

Operation of, and power to, the passenger doors shall be completely controlled by the operator. Power to rear doors shall be controlled by the operator. The door shall be of the Push Open/spring close type.

A control or valve in the operator's compartment shall shut off the power to, and/or dump the power from, the front door mechanism to permit manual operation of the front door with the bus shut down. A master door switch which is not within reach of the seated operator when set in the "Off" position shall close the doors, deactivate the door control system, release the interlocks, and permit only manual operation of the doors.

5.4.6.1.3.1.3 Operator Interior Lights

The operator's area shall have a light to provide general illumination and it shall illuminate the half of the steering wheel nearest the operator to a level of 10 to 15 foot-candles. This light shall be operator controlled by a toggle switch located on the operator's control panel or other approved location.

(1) A three-position toggle switch, labeled "Interior Lights; On (at top), Off, Normal" shall control the lights.

- "On" turns on all lights in any Master Switch position
- "Off" turns off lights except as noted in (2) and (3)
- "Normal" turns on all lights in "Night Run" and "Night Park" except as noted in (2).

(2) The first light on each side (behind the Operator and the front door) is normally turned on only when the front door is opened, in "Night Run" and "Night Park." As soon as the door closes, these lights shall go out. These lights shall be turned on at any time if the toggle switch is in the "On" position. (If non-extinguishing light modules are in effect as per Section 5.4.4.6, this requirement shall not apply.)

(3) To help eliminate windshield reflection on suburban roads where street lighting is at a low level, the second light on each side, when "Night Run" or "Night Park" is selected, shall be controlled by the toggle switch; off in "Off" and on in "Normal." (These lights shall be turned on at any time if the toggle switch is in the "On" position.)

(4) All interior lighting shall be turned off whenever the transmission selector is in the reverse and engine run switch is in the "On" position. The interior lighting design shall require the approval of the Procuring Agency**.**

5.4.6.1.3.2 Special Controls

Operator Controls - The following list of Special bus controls identifies the controls to initiate system diagnostics, aid the physically handicapped passenger, and control mirrors and speakers, etc. They are less often used than those in Normal Bus Operation. These controls should be within easy reach for viewing and actuation by the operator:

ABS Diagnostics Test	Engine Diagnostic Test
Stop Engine Override	Chime
Drivers Fan	Kneel/Ramp Control
Mirror Heater (Opt.)	Public Address System
Drivers HVAC	Diagnostic Light Panel Test
Fire Suppression (Opt.)	Destination Sign On/Off (Opt.)
Remote Mirror Control (Opt.)	Retarder

5.4.6.1.3.3 Passenger Comfort Controls

Operator Controls - The following list of Passenger Comfort Controls identifies the bus controls for the interior bus temperature, lighting, air circulation, etc. The settings of these controls are changed infrequently. The operator should be able to see and actuate these controls with minimal effort.

Climate Control	Temperature Select
Interior HVAC	Blower
Interior Lights	Dome Lights
Aisle Lights	

5.4.6.1.4 Operator Foot Controls

5.4.6.1.4.1 Accelerator

5.4.6.1.4.1.1 Accelerator Pedal Angle
The angle of the accelerator pedal shall be determined from a horizontal plane regardless of the slope of the cab floor.

The accelerator pedal shall be positioned at an angle of 40 degrees at the point of initiation of contact and extend downward to an angle of 10-18 degrees at full throttle.

5.4.6.1.4.1.2 Accelerator Pedal Dimensions
The floor mounted accelerator pedal shall be 10″ - 12″ long and 3″ - 4″ wide.

5.4.6.1.4.1.3 Accelerator Pedal Force
The force to depress the accelerator pedal shall be measured at the midpoint of the accelerator. The accelerator force shall be no less than 7 foot pounds and no more than 9 foot pounds**.**

5.4.6.1.4.1.4 Accelerator Interlock
To preclude movement of the bus, an accelerator interlock shall lock the accelerator in the closed position and a brake interlock shall engage the service brake system when the rear door control is activated. The braking effort shall be adjustable with hand tools. Rear doors shall not open until bus speed is below 2 m.p.h.

An accelerator interlock shall lock the accelerator in the closed position whenever front doors are open or when the bus is in the kneeled position.

5.4.6.1.4.2.1 Brake Pedal Angle
The angle of the brake pedal shall be determined from a horizontal plane regardless of the slope of the cab floor. The brake pedal shall be positioned at an angle of 40 degrees at the point of initiation of contact and extend downward to an angle of 20-28 degrees at full depression.

5.4.6.1.4.2.2 Brake Pedal Dimensions
The floor mounted brake pedal shall be 10″ - 12″ long and 3″ - 4″ wide.

5.4.6.1.4.2.3 Brake Force
The force to depress the brake pedal shall be measured at the midpoint of the brake pedal. The brake pedal force shall be no less than 10 foot pounds and no more than 50 foot pounds.

5.4.6.1.4.2.4 Relative Position Between Accelerator Pedal and Brake Pedal
The accelerator and brake pedals shall be positioned such that the spacing between them, measured at the heel of the pedals, is between 1″ and 2″.

5.4.6.1.4.2.5 Accelerator and Brake Pedal Location and Lateral Angle
The location of the brake and accelerator pedals shall be determined by the manufacturer, based on space needs, visibility, lower edge of windshield, and vertical H-point. The brake pedal shall have a 0-degree lateral angle, and the accelerator shall have a 12-degree lateral angle to coincide with the position of the operator's leg as it moves outward to operate the accelerator pedal.

5.4.6.1.4.3 Operator Foot Switches

5.4.6.1.4.3.1 Turn Signal Platform
The angle of the turn signal platform shall be determined from a horizontal plane, regardless of the slope of the cab floor. The turn signal platform shall be angled at a minimum of 10 degrees and a maximum of 28 degrees. It shall be located no closer to the seat-front than the heel point of the accelerator pedal.

5.4.6.1.4.3.2 Turn Signal Controls
Turn signal controls shall be floor-mounted, foot-controlled, waterproof, heavy-duty, momentary contact switches.

5.4.6.1.4.3.3 High Beam, Hazard, and PA Controls
May be floor mounted (Optional) with the same requirements as the Turn Signal controls.

5.4.6.1.5 Instrumentation
The speedometer, air pressure gauge(s), and certain indicator lights shall be approved at the pre-production meeting. The steering wheel spokes or rim shall not obstruct the operator's vision of the instruments when the steering wheel is in the straight-ahead position. Illumination of the instruments shall be simultaneous with the marker lamps. Glare or reflection from the windshield, side window, or front door windows from the instruments, indicators, or other controls shall be minimized. Instruments shall be easily readable in direct sunlight or shielded in such a manner that sunlight does not adversely affect legibility. Instrument covers shall be non-reflective, without electrostatic qualities that attract and hold dust, and shall be resistant to scratching or hazing as a result of cleaning. Text shall be a minimum of 11 points. Extremely condensed or italic type fonts shall not be used. The color of the display field shall be dark with contrasting typography**.** Indicator lights or illuminated symbols or typograph***y*** immediately in front of the operator shall be restricted to those concerned with the operation of the vehicle, as identified in the following table.

Visual Indicator	**Audible Alarm**	**Condition**
Back-Up	Backup Alarm	Reverse gear is selected
Hazard	Click	Four-way flashers activated
DRL	None	Daytime Running Lights
High Beam	None	Headlamp high beams activated
Kneel	Kneel Horn	Suspension kneeling system activated
Left Turn Signal	Click	Left turn signal activated
Parking Brake	None	Parking brake is activated
Rear Door	None	Rear passenger door is not closed and locked
Right Turn Signal	Click	Right turn signal activated
Stop Request	Chime	Passenger stop request has been activated
Wheelchair Request	Double Chime	Passenger wheelchair stop request has been activated

The instrument panel shall include an electronic speedometer indicating no more than 80 mph and calibrated in maximum increments of 5 mph. The speedometer shall be a rotating pointer type, with a dial deflection of 220 to 270 degrees and 40 mph near the top of the dial. The speedometer shall be sized and accurate in accordance with SAE Recommended Practice J678.

The speedometer shall be equipped with an odometer with a capacity reading no less than 999,999 miles.

The bus shall be equipped with a hub odometer mounted at the curbside of the rear axle. The hub odometer shall have a capacity reading no less than 999,999 miles.

The instrument panel shall also include air brake reservoir pressure gauge(s) with indicators for primary and secondary air tanks and voltmeter(s) to indicate the operating voltage across the bus batteries. The instrument panel and wiring shall be easily accessible for service from the operator's seat or top of the panel. The diagnostic panel shall be separately removable and replaceable without damaging the instrument panel or gauges. Wiring shall have sufficient length and be routed to permit service without stretching or chafing the wires.

5.4.6.1.6 Visual and Audible Alarms
The bus shall be equipped with visual and audible alarms linked to an on-board diagnostic system that will indicate conditions that require immediate action by the operator to avoid an unsafe condition or prevent further damage to the bus. The indicator panel shall be located in Area 1 of the Instrument Panel. The intensity of visual indicators shall permit easy determination of on/off status in bright sunlight or shielded in such a manner that sunlight does not adversely affect legibility. Indicator illumination shall not cause a visibility problem at night. All indicators shall have a method of momentarily testing their operation. The audible alarm shall be tamper-resistant and shall

have an outlet level between 80 and 83 dBA when measured at the location of the operator's ear. Wherever possible, sensors shall be of the closed-circuit type, so that failure of the circuit and/or sensor shall activate the malfunction indicator.

To avoid unnecessary confusion and anxiety on the part of the operator, on-board displays visible to the operator should be limited to indicating the status of those functions described herein that are necessary for the safe operation of the bus and protection of assets. All other indicators needed for diagnostics and their related interface hardware shall be concealed and protected from unauthorized access. Data communications requirements for Drivetrain diagnostics are identified in Section 5.5.5.2.2.

Malfunction and other indicators listed in the following table shall be supplied on all buses.

Visual Indicator	Audible Alarm	Condition or Malfunction
ABS	None	ABS System Malfunction
A/C Stop	None	Compressor stopped due to high/low pressure or loss of refrigerant
Check Engine	None	Engine Electronic Control Unit detects a malfunction
Check Transmission	None	Transmission Electronic Control Unit detects a malfunction
Fire	Bell	Over-temperature condition in engine compartment
Alternator Fail	None	Loss of alternator output
Hot Engine	Buzzer	Excessive engine coolant temperature
Low Air	Buzzer	Insufficient air pressure in either primary or secondary reservoirs
Low Oil	Buzzer	Insufficient engine oil pressure
Low Coolant	Buzzer	Insufficient engine coolant level
Wheelchair Ramp	Beeper	Wheelchair ramp is not stowed and disabled

5.4.6.2 WINDSHIELD WIPERS

The bus shall be equipped with a variable speed windshield wiper for each half of the windshield. A single control shall be provided for adjustment of wiper speed**,** ranging approximately 5 to 25 cycles per minute. If powered by compressed air, exhaust from the wiper motors shall be muffled or piped under the floor of the bus. At 60 mph, no more than 10 percent of the wiped area shall be lost due to windshield wiper lift. Both wipers shall park along the edges of the windshield glass. Windshield wiper motors and mechanisms shall be easily accessible for repairs or service and shall be removable as complete units. The fastener that secures the wiper arm to the drive mechanism shall be corrosion resistant.

5.4.6.3 WINDSHIELD WASHERS

The windshield washer system shall deposit washing fluid on the windshield and, when used with the wipers, shall evenly and completely wet the entire wiped area. If powered by compressed air, all fluid shall be purged from the lines after each use of the washers.

The windshield washer system shall have a minimum 3-gallon reservoir, located for easy refilling from the front exterior curbside of the bus and shall be protected from freezing. Reservoir pumps, lines, and fittings shall be corrosion-resistant, and the reservoir itself shall be translucent for easy determination of fluid level.

5.4.6.4 OPERATOR'S SEAT

5.4.6.4.1 Dimensions

The operator's seat shall be comfortable and adjustable so that persons ranging in size from the 95th-percentile male to the 5th-percentile female may operate the bus. While seated, the operator shall be able to make seat adjustments by hand without complexity, excessive effort, or being pinched. Adjustment mechanisms shall hold

the adjustments and shall not be subject to inadvertent changes. Graphical symbols shall conform to SAE Recommended Practice (Proposed) J1458, Universal Symbols for Seat and Suspension Adjustments.

5.4.6.4.1.1 Seat Pan Length
Measurement shall be from the front edge of the seat pan to the rear at its intersection with the seat back. The adjustment of the seat pan length shall be no more than 16.5″ at its minimum length and no less than 20.5″ at its maximum length.

5.4.6.4.1.2 Seat Pan Height
Measurement shall be from the cab floor to the top of the level seat at its center midpoint. The seat shall adjust in height from a minimum of 14″ to a maximum of 20″, with a minimum of a 6″ range of adjustment.

5.4.6.4.1.3 Seat Pan Slope
Measurement is the slope of the plane created by connecting the two high points of the seat, one at the rear of the seat at its intersection with the seat back and the other at the front of the seat just before it waterfalls downward at the edge. The slope can be measured using an inclinometer and shall be stated in degrees of incline relative to the horizontal plane (0 degrees). The seat pan shall adjust in its slope from no less than plus 12 degrees (rearward "bucket seat" incline), to no less than minus 5 degrees (forward slope).

5.4.6.4.1.4 Seat Base Fore/Aft Adjustment
Measurement is the horizontal distance from the heel-point to the front edge of the seat. The minimum and maximum distances shall be measured from the front edge of the seat when it is adjusted to its minimum seat pan depth (approximately 15″). On all low-floor buses, the seat-base shall travel horizontally a minimum of 9″. It shall adjust no closer to the heel-point than 6″. On all high-floor buses, the seat-base shall travel a minimum of 9″ and adjust no closer to the heel-point than 6″.

5.4.6.4.1.5 Seat Pan Width
Measurement is the horizontal distance across the seat. The seat pan shall be 17″ - 21″ across at the front edge of the seat and 20″ - 23″ across at the side bolsters.

5.4.6.4.1.6 Seat Suspension
The operator's seat shall be appropriately dampened to support a minimum weight of 380 pounds. The suspension shall be capable of dampening adjustment.

5.4.6.4.1.7 Operator Area Depth
The measurement is the horizontal distance from the heel-point to the barrier at the height at which the top of the seat back reclines. For all low-floor buses, the operator area depth shall be a minimum of 45″ and be able to accommodate the full range of seat adjustment and travel (for a seat with the specifications as described in these guidelines). For all high-floor buses, the operator area depth shall be a minimum of 43″.

5.4.6.4.1.8 Seat Back Width
Measurement is the distance between the outer-most points of the front of the seat back, at or near its midpoint in height. The seat back width shall be no less than 19″.

5.4.6.4.19 Seat Back Lumbar Support
Measurement is from the bottom of the seat back at its intersection with the seat pan, to the top of the lumbar. The seat back shall provide adjustable depth lumbar back support in at least two locations, within a minimum range of 7″ - 11″.

5.4.6.4.1.10 Seat Back Angle Adjustment
The seat back angle shall be measured relative to a level seat pan, whereas 90 degrees is the upright position and 90 degrees-plus represents the amount of recline. The angle can be measured using a protractor (or its equivalent) with the X-axis being the horizontal plane of a level seat pan, and the Y-axis the upright plane of the seat back. The angle is created by the intersection of the two planes, with the upright plane parallel to the frame of the seat

back.

The seat back shall adjust in angle from a minimum of no more than 90 degrees (upright) to at least 105 degrees (reclined), with infinite adjustment in between.

5.4.6.4.1.11 Seat Belt Adjustment

Required Type I seat belts shall be fastened to the seat so that the operator may adjust the seat without resetting the seat belt. Seat belts shall be stored in automatic retractors.

5.4.6.4.2 Seat Structure and Materials

The operator's seat shall be contoured to provide maximum comfort for extended period of time.

All visually exposed metal on the operator's seat, including the pedestal, shall be unpainted aluminum or stainless steel.

The seat and seatbelt assemblies as installed in the bus shall withstand static horizontal forces as required in FMVSS 207 and 210. The seat shall withstand 10,000 impacts of a 40-pound sandbag dropped from a height of 12 inches without visible deterioration. The seat shall be tested in the lowest vertical position and repeated with the seat in the top vertical position.

The 40-pound sandbag shall be suspended on a 36-inch pendulum and shall strike the seat back 10,000 times from distances of 6, 8, 10, and 12 inches. Seat shall withstand 100,000 randomly positioned 3-1/2-inch drops of a squirming, 150-pound, smooth-surfaced, buttocks-shape striker with only minimal wear on the seat covering.

Color of the operator's seat is defined in the attachments to Part 5: Technical Specifications.

5.4.6.5 MIRRORS

5.4.6.5.1 Exterior Mirrors

The bus shall be equipped with a corrosion-resistant, outside rearview mirror on each side of the bus. The mirrors shall be of a modern design and shall be contoured to enhance the overall appearance of the vehicle exterior. Mirrors shall permit the operator to view the roadway along both sides of the bus, including the rear wheels. The curbside rearview mirror shall be mounted so that its lower edge is no less than 80 inches above the street surface. Electric mirrors will be provided.

The bus shall be equipped with outside mirrors of unit magnification (flat), each with not less than 50 sq. in. of reflective surface. The mirrors shall be corrosion-resistant and be installed with stable supports on each side of the bus. The mirrors shall be located so as to provide the operator a view to the rear along both sides of the bus and shall be adjustable both in the horizontal and vertical directions to view the rearward scene. The curbside rearview mirror shall be mounted so that its lower edge is no less than 80 inches above the street surface. The roadside rearview mirror shall be mounted lower on the bus body so that the operator's line of sight is not obstructed.

The operator shall be able to adjust the curbside mirror remotely while seated in the driving position. The control for remote positioning of the mirror shall be a single switch or device.

Mirrors shall be firmly attached to the bus to minimize vibration and prevent loss of adjustment, but not so firmly attached that the bus or its structure is damaged when the mirror is struck in an accident. Mirrors shall retract or fold sufficiently to allow bus washing operations.

5.4.6.5.2 Interior Mirrors

Mirrors shall be provided for the operator to observe passengers throughout the bus without leaving his seat and without shoulder movement. The operator shall be able to observe passengers in the front/entrance and rear/exit areas, anywhere in the aisle, and in the rear seats.

5.4.7 WINDOWS

5.4.7.1 GENERAL

A minimum of 8,000 square inches of window area, including operator and door windows, shall be required on each side of the standard configuration bus.

5.4.7.1 WINDSHIELD

The windshield shall permit an operator's field of view as referenced in SAE Recommended Practice J1050. The vertically upward view shall be a minimum of 15 degrees, measured above the horizontal and excluding any shaded band. The vertically downward view shall permit detection of an object 3-1/2 feet high no more than 2 feet in front of the bus. The horizontal view shall be a minimum of 90 degrees above the line of sight. Any binocular obscuration due to a center divider may be ignored when determining the 90-degree requirement, provided that the divider does not exceed a 3-degree angle in the operator's field of view. Windshield pillars shall not exceed 10 degrees of binocular obscuration. The windshield shall be designed and installed to minimize external glare as well as reflections from inside the bus. A shaded band shall be provided at the top of the windshield. The band shall be a minimum of 6 inches in width.

The windshield shall be easily replaceable by removing zip-locks from the windshield retaining moldings. Bonded-in-place windshield shall not be used. The windshield glazing material shall have a 1/4-inch or 6-mm nominal thickness laminated safety glass conforming to the requirements of ANSI Z26.1 Test Grouping 1A and the Recommended Practices defined in SAE J673. The glazing material shall have single density tint. The upper portion of the windshield above the operator's field of view shall have a dark, shaded band with a minimum luminous transmittance of 6 percent when tested in accordance to ASTM D-1003.

5.4.7.3 OPERATOR'S SIDE WINDOW

The operator's side window shall be the sliding type, requiring only the rear half of sash to latch upon closing and shall open sufficiently to permit the seated operator to easily adjust the street side outside rearview mirror. When in an open position, the window shall not rattle or close during braking. The entire assembly shall be hinged and have a single release for Emergency Egress. This window section shall slide in tracks or channels designed to last the service life of the bus. The operator's side window shall not be bonded in place and shall be easily replaceable. The glazing material shall have a single density tint.

The operator's view, perpendicular through operator's side window glazing, should extend a minimum of 840 mm (33 inches) to the rear of the Heel Point on the accelerator, and in any case must accommodate a 95th percentile male operator. The view through the glazing at the front of the assembly should begin not more than 560 mm (26 inches) above the operator's floor to ensure visibility of an under-mounted convex mirror. Operator's window construction shall maximize ability for full opening of the window.

The operator's side window glazing material shall have a 1/4 inch nominal thickness laminated safety glass conforming with the requirements of ANSI Z26.1 Test Grouping 2 and the Recommended Practices defined in SAE J673.

5.4.7.4 SIDE WINDOWS

5.4.7.4.1 Configuration

All side windows, except windows in passenger doors and those smaller than 500 square inches or those in a location where window is obstructed by vehicle equipment, shall have window panels that are openable by passengers. Openable window panels shall be equipped with latches or gas springs that secure the window in the fully open and fully closed positions. The requirements for stops limiting the window opening travel and the window opening area are defined in Attachment to Part 5: Technical Specifications.

Each openable side window shall incorporate an upper transom portion. The transom shall be between 20 and 35 percent of the total window area. The lower portion of the window shall be fixed. The transom portion shall be hinged along the lower edge and open inward.

All side windows shall be easily replaceable without disturbing adjacent windows and shall be mounted so that flexing or vibration from engine operation or normal road excitation is not apparent. The windows shall be mounted to the internal frame of the bus with no visible frame exposed. Window panels shall be "butt-jointed" with spacing of less than 0.5 inches. The installed windows shall have a smooth and continuous frameless appearance.

The windows shall be designed and constructed to enable a 3M mechanic to remove and replace two windows in less than 10 minutes.

An opening in the rear of the bus shall be provided to accommodate a cyclone cleaner. An openable rear window may be used if the window cannot be accidentally closed during the cleaning operation. Minimum size of this opening is defined in attachment to Part 5: Technical Specifications.

5.4.7.4.2 Materials

Side windows glazing material shall have a 1/4-inch nominal thickness tempered safety glass. The material shall conform to the requirements of ANSI Z26.1 Test Grouping 2 and the Recommended Practices defined in SAE J673.

All glazing material that is aft of the standee line shall be equipped with a protective coating which shields the window surface from graffiti.

Windows on the bus sides and in the rear door shall be tinted a neutral color, complementary to the bus exterior. The maximum solar energy transmittance shall not exceed 37 percent, as measured by ASTM E-424, and the luminous transmittance shall be no less than 16 percent as measured by ASTM D-1003. Windows over the destination signs shall not be tinted.

5.4.8 HEATING VENTILATING AND AIR CONDITIONING

5.4.8.1 CAPACITY AND PERFORMANCE

The Heating, Ventilation and Air Conditioning (HVAC) climate control system shall be capable of maintaining the interior of the bus at the temperature and humidity levels defined in the following paragraphs. Air conditioning shall be provided by Thermo King with brushless condenser motor or approved equal. Driver must have the ability to control A/C and heater temperature.

The HVAC unit shall be rear-mounted.

Accessibility and serviceability of components shall be provided without requiring maintenance personnel to climb-up on the roof of the bus.

With the bus running at the design operating profile with corresponding door opening cycle, and carrying a number of passengers equal to 150 percent of the seated load, the HVAC system shall maintain an average passenger compartment temperature within a range between 65^{o} and 80^{o}F, while controlling the relative humidity to a value of 50 percent or less. The system shall maintain these conditions while subjected to any outside ambient temperatures within a range of 10^{o} to 95^{o} F and at any ambient relative humidity levels between 5 and 50 percent.

When the bus is operated in outside ambient temperatures of 95^{o} to 115^{o}F, the interior temperature of the bus shall be permitted to rise one degree for each degree of exterior temperature in excess of 95^{o}F.

When bus is operated in outside ambient temperatures in the range of -10^{o} to +10^{o}F, the interior temperature of the bus shall not fall below 55^{o}F while bus is running on the Design Operating Profile.

System capacity testing, including pulldown/warm-up, stabilization and profile, shall be conducted in accordance to the APTA Recommended Instrumentation and Performance Testing for Transit Bus Air Conditioning System. Temperature measurements shall be made in accordance to this document with the following modifications:

The three primary locations used for temperature probes are (1) 6 inches aft of front wheelhousing, (2) centered between the two axles and (3) 6 inches aft of rear wheelhousing. At each primary location, the nine (9) temperature sensing devices shall be (A) 72 inches above floor level, (B) 6 inches above top surface of seat and (C) 6 inches above floor.

The recommended locations of temperature probes are only guidelines and may require slight modifications to address actual bus design. Care must be taken to avoid placement of sensing devices in immediate path of air duct outlet. In general, the locations are intended to accurately represent the interior passenger area.

Additional testing shall be performed as necessary to ensure compliance to performance requirements stated herein.

The air conditioning portion of the HVAC system shall be capable of reducing the passenger compartment temperature from 110^{O} to 90^{O}F in less than 20 minutes after engine start-up. Engine temperature shall be within the normal operating range at the time of start-up of the cool-down test and the engine speed shall be limited to fast idle. During the cool-down period the refrigerant pressure shall not exceed safe high-side pressures and the condenser discharge air temperature, measured 6 inches from the surface of the coil, shall be less than 45^{O}F above the condenser inlet air temperature. The appropriate solar load as recommended in the APTA "Recommended Instrumentation and Performance Testing for Transit Bus Air Conditioning System," representing 4 P.M. on August 21, shall be used. There shall be no passengers on board, and the doors and windows shall be closed.

The climate control blower motors and fan shall be designed such that their operation complies with the interior noise level requirements as specified in Section 5.1.5.6.1.

5.4.8.2 CONTROLS AND TEMPERATURE UNIFORMITY

The HVAC system excluding the operator's heater/defroster shall be centrally controlled with an advanced electronic/diagnostic control system with provisions for extracting/reading data.

After manual selection and/or activation of climate control system operation mode, all interior climate control system requirements for the selected mode shall be attained automatically to within ±2^{O}F of specified temperature control set-point.

The temperature control set-point for the system shall be 70^{O}F.

The operator shall have full control over the defroster and operator's heater. The operator shall be able to adjust the temperature in the operator's area through air distribution and fans. The interior climate control system shall switch automatically to the ventilating mode if the refrigerant compressor or condenser fan fails.

Interior temperature distribution shall be uniform to the extent practicable to prevent hot and/or cold spots. After stabilization with doors closed, the temperatures between any two points in the passenger compartment in the same vertical plane, and 6 inches to 72 inches above the floor, shall not vary by more than 5^{O}F with doors closed. The interior temperatures, measured at the same height above the floor, shall not vary more than ± 5^{O}F, from the front to the rear, from the average temperature determined in accordance with APTA Recommended Instrumentation and Performance Testing for Transit Bus Air Conditioning System. Variations of greater than ± 5^{O}F will be allowed for limited, localized areas provided the majority of the measured temperatures fall within the specified requirement.

5.4.8.3 AIR FLOW

5.4.8.3.1 Passenger Area

The cooling mode of the interior climate control system shall introduce air into the bus at or near the ceiling height at a minimum rate of 25 cubic feet per minute (cfm) per passenger based on the standard configuration bus carrying a number of passengers equal to 150 percent of the seated load. Airflow shall be evenly distributed

throughout the bus with air velocity not exceeding 100 feet per minute on any passenger. The ventilating mode shall provide air at a minimum flow rate of 20 cfm per passenger.

Airflow may be reduced to 15 cfm per passenger (150 percent of seated load) when operating in the heating mode. The fans shall not activate until the heating element has warmed sufficiently to assure at least 70^{O}F air outlet temperature. The heating air outlet temperature shall not exceed 120^{O}F under any normal operating conditions.

5.4.8.3.2 Operator's Area

The bus interior climate control system shall deliver at least 100 cfm of air to the operator's area when operating in the ventilating and cooling modes. Adjustable nozzles shall permit variable distribution or shutdown of the airflow. Airflow in the heating mode shall be reduced proportionally to the reduction of airflow into the passenger area. The windshield defroster unit shall meet the requirements of SAE Recommended Practice J382, Windshield Defrosting Systems Performance Requirements, and shall have the capability of diverting heated air to the operator's feet and legs. The defroster or interior climate control system shall maintain visibility through the operator's side window.

5.4.8.3.2.1 Controls for the Climate Control System (CCS)

The controls for the operator's compartment for heating, ventilation, and cooling systems shall be integrated and shall meet the following requirements**.**

(1) The heat/defrost system fan shall be controlled by a separate switch that has an "Off" position and at least two positions for speed control. All switches and controls shall preclude the possibility of clothing becoming entangled and shields shall be provided, if required. If the fans are approved by the Procuring Agency, an "On-Off" switch shall be located to the right of or near the main Defroster switch.

(2) A manually operated control valve shall control the coolant flow through the heater core.

If a cable operated manual control valve is used, the cable length shall be kept to a minimum to reduce cable seizing. Heater water control valves shall be "positive" type, closed or open. The method of operating remote valves shall require the concurrence of the Project Manager Procuring Agency.

5.4.8.3.2.2 Operator's Compartment Requirements

A separate heating, ventilation, and defroster system for the operator's area shall be provided and shall be controlled by the operator. The system shall meet the following requirements:

(1) The heater and defroster system shall provide heating for the operator and heated air to completely defrost and defog the windshield, operator's side window, and the front door glasses in all operating conditions. Fan(s) shall be able to draw air from the bus body interior and/or the exterior through a control device and pass it through the heater core to the defroster system and over the operator's feet. A minimum capacity of 100cfm shall be provided. The operator shall have complete control of the heat and fresh airflow for their area**.**

(2) The defroster supply outlets shall be located at the lower edge of the windshield. These outlets shall be unbreakable and shall be free of sharp edges that can catch clothes during normal daily cleaning. The system shall be such that foreign objects such as coins or tickets cannot fall into the defroster air outlets. Adjustable ball vents shall be provided at the left of the operator's position to allow direction of air onto the side windows. Two additional ball vents shall be located on the vertical front dash panel adjacent to the front door to allow direction of air onto the door windows and/or entrance area

A ventilation system shall be provided to ensure operator comfort and shall be capable of providing fresh air in both the foot and head areas. Vents shall be controllable by the operator from the normal driving position. Decals shall be provided indicating "operating instructions" and "pen" and "closed" positions as well. When closed, vents shall be sealed to prevent the migration of water or air into the bus.

5.4.8.3.2.3 Operator's Cooling

5.4.8.4 AIR FILTRATION

Air shall be filtered before discharge into the passenger compartment. The filter shall meet the ANSI/ASHRAE 52.1 requirement for 5 percent or better atmospheric dust spot efficiency, 50 percent weight arrestance, and a minimum dust holding capacity of 120 gram per 1,000 cfm cell. More efficient air filtration may be provided to maintain efficient heater and/or evaporator operation. Air filters shall be easily removable for service.

5.4.8.5 ROOF VENTILATORS

One ventilator shall be provided in the roof of the bus approximately over the rear axle.

The ventilator shall be easily opened and closed manually by a 50th percentile female. If roof ventilator cannot be reached by a 50th percentile female, then a tool shall be provided to allow this. When open with the bus in motion, this ventilator shall provide fresh air inside the bus. Ventilator shall cover an opening area no less than 425 square inches and shall be capable of being positioned as a scoop with either the leading or trailing edge open no less than 4 inches, or with all four edges raised simultaneously to a height of no less than 3-1/2 inches. An escape hatch shall be incorporated into the roof ventilator. Roof ventilator shall be sealed to prevent entry of water when closed.

5.4.8.6 MAINTAINABILITY

Manually controlled shutoff valves in the refrigerant lines shall allow isolation of the compressor and dehydrator filter for service. To the extent practicable, self-sealing couplings utilizing O-ring seals shall be used to break and seal the refrigerant lines during removal of major components, such as the refrigerant compressor. Shut-off valves may be provided in lieu of self-sealing couplings. The condenser shall be located to efficiently transfer heat to the atmosphere and shall not ingest air warmed above the ambient temperature by the bus mechanical equipment, or to discharge air into any other system of the bus. The location of the condenser shall preclude its obstruction by wheel splash, road dirt or debris. HVAC components located within 6 inches of floor level shall be constructed to resist damage and corrosion.

5.4.8.7 ENTRANCE/EXIT AREA HEATING

Heat shall be supplied to the entrance and exit areas to prevent accumulation of snow, ice, or slush with bus operating under design operating profile and corresponding door opening cycle

5.4.8.8 FLOOR LEVEL HEATING

Floor level heating is not required if adequate heat from other sources are available to meet the requirements of 5.4.8.1.

5.4.9 SIGNAGE AND COMMUNICATION

5.4.9.1 DESTINATION SIGNS

If selected in section 5.5.5.4.3, a destination sign system shall be furnished on the front, on the right side near the front door, and on the rear of the vehicle. The destination signs shall be Luminator Horizon with white lettering.

The sign located near the front door shall not block the operator's critical horizontal line of sight. Display areas of destination signs shall be clearly visible in direct sunlight and/or at night. Signs shall be installed to allow replacement by a 3M mechanic within 30 minutes. Parts shall be commercially available.

All signs shall be controlled via a single Human Machine Interface (HMI). In the absence of a single Mobile Data Terminal (MDT), the HMI shall be conveniently located for the bus operator in Area 5 of the Operator's Workstation Control and Instrument Array, mounted in such a manner that will not pose any safety hazard.

The destination sign compartments shall be designed to meet the following minimum requirements:

1. Prevent condensation and entry of moisture and dirt.
2. Prevent fogging of both compartment window and glazing on unit itself.

3. Access shall be provided to allow cleaning of inside compartment window and unit glazing.
4. Front window shall have an exterior display area of no less than 8.5″h by 56″w.

5.4.9.2 PASSENGER INFORMATION AND ADVERTISING

5.4.9.2.1 Interior Displays

Provisions shall be made on the rear of the operator's barrier for a frame to retain information that is sized *(Procuring Agency to specify width)* inches wide and *(Procuring Agency to specify height)* inches high posted by the Procuring Agency, such as routes and schedules. Advertising media 11 inches high and 0.09 inches thick shall be retained near the juncture of the bus ceiling and sidewall. The retainers may be concave and shall support the media without adhesives. The media shall be illuminated by the interior fluorescent light system.

5.4.9.2.2 Exterior Displays

Provisions shall be made to integrate advertising, which may be specified by the Procuring Agency, into the exterior design of the bus. Advertising media, frames, or supporting structures shall not detract from the readability of destination signs and signal lights, and shall not compromise passenger visibility. Advertising provisions shall not cause pedestrian hazards or foul automatic bus washing equipment, and shall not cover or interfere with doors, air passages, vehicle fittings, or in any other manner restrict the operation or serviceability of the bus.

5.4.9.3 PASSENGER STOP REQUEST/EXIT SIGNAL

A passenger "Stop Requested" signal system that complies with applicable ADA requirements defined in 49 CFR, Part 38.37 shall be provided. The system shall consist of a touch tape, chime, and interior sign message. The touch tape shall be located the full length of the bus on the sidewalls, towards the ceiling. It shall be easily accessible to all passengers, seated or standing. Vertical touch tape shall be provided at each window mullion and adjacent to each wheelchair parking position and priority seating positions

An auxiliary passenger "Stop Requested" signal shall be installed at the rear door to provide passengers standing in the rear door/exit area convenient means of activating the signal system. The signal shall be a heavy-duty push button type located above rear door on the rear door actuator compartment access panel. Button shall be clearly identified as "Passenger Signal."

A heavy-duty "Stop Request" signal button shall be installed on modesty panel stanchion immediately forward of rear door and clearly identified as "Passenger Signal."

Exit signals located in the wheelchair parking area shall be no higher than 4 feet above the floor. Instructions shall be provided to clearly indicate function and operation of these signals.

A single "Stop Requested" chime shall sound when the system is first activated. A double chime shall sound when the system is first activated from wheelchair passenger areas.

5.5 ELECTRICAL, ELECTRONIC AND DATA COMMUNICATION SYSTEMS

5.5.1 ENVIRONMENTAL AND MOUNTING REQUIREMENTS

The electrical system and its electronic components shall be capable of operating in the area of the vehicle in which they will be installed as recommended in SAE J1455.

Electrical and electronic equipment shall not be located in an environment that will reduce the performance or shorten the life of the component or electrical system. No vehicle component shall generate, or be affected by, electromagnetic interference or radio frequency interference (EMI/RFI) that can disturb the performance of electrical/electronic equipment as defined in SAE J1113.

The Procuring Agency shall follow recommendations from bus manufacturers and subsystem suppliers regarding methods to prevent damage from voltage spikes generated from welding, jump starts, shorts, etc.

5.5.1.1 MOUNTING

All electrical/electronic hardware shall be accessible and replaced by a 3M mechanic in 30 minutes. It shall be mounted on an insulating panel to facilitate replacement. The mounting of the hardware shall not be used to provide the sole source ground, and all hardware shall be isolated from potential EMI/RFI.

All electrical/electronic hardware mounted in the interior of the vehicle shall be inaccessible to passengers and hidden from view unless intended to be viewed. The hardware shall be mounted in such a manner as to protect it from splash or spray.

All electrical/electronic hardware mounted on the exterior of the vehicle, that is not designed to be installed in an exposed environment, shall be mounted in a sealed enclosure.

All electrical/electronic hardware and its mounting shall comply with the shock and vibration requirements of SAE J1455.

5.5.2 GENERAL ELECTRICAL REQUIREMENTS

5.5.2.1 BATTERIES

5.5.2.1.1 Main Power Supply

The system shall supply a nominal 12V and/or 24V of direct current (DC). Batteries, except those used for auxiliary power, shall be easily accessible for inspection and service from the outside of the vehicle only.

Two 8D battery units conforming to SAE Standard J537 shall be provided. Each battery shall have a minimum of 1150 cold cranking amps. Each battery shall have a purchase date no more than 120 days from date of release and shall be fully maintained prior to shipment to the Procuring Agency.

Positive and negative terminal ends on the Baseline 8D batteries shall have different size studs to prevent incorrect installation. The battery terminal ends, and cables shall be color-coded with red for the primary positive, black for negative, and another color for any intermediate voltage cables. Battery cables shall be flexible and sufficiently long to reach the batteries with tray in the extended position without stretching or pulling on any connection and shall not lie directly on top of the batteries. Except as interrupted by the master battery switch, battery and starter wiring shall be continuous cables with connections secured by bolted terminals; and shall conform to specification requirements of SAE Standard J1127 –Type SGT or SGX and SAE Recommended Practice J541**.**

5.5.2.1.2 Dedicated Electronic Power Supply

If required, gel-pack, or any form of encased batteries used for auxiliary power, are allowed to be mounted on the interior of the vehicle if they are contained in an enclosed, non-airtight compartment and accessible only to maintenance personnel. This compartment shall contain a warning label prohibiting the use of lead-acid batteries.

5.5.2.1.3 Master Battery Switch

A single master switch shall be provided near the battery compartment for the disconnecting of all battery positives (12V & 24V) except for safety devices such as fire suppression system and other systems as specified. The location of the master battery switch shall be clearly identified on the exterior access panel, be accessible in less than 10 seconds for de-activation and prevent corrosion from fumes and battery acid when the batteries are washed off or are in normal service.

Turning the master switch “OFF”, with the power plant operating, shall not damage any component of the electrical system. The master switch shall be capable of carrying and interrupting the total circuit load. Any equipment that requires power with the master battery switch “OFF” shall be listed in attachments to Part 5: Technical Specifications.

The batteries shall be equipped with a single switch for disconnecting both 12V & 24V power.

5.5.2.2 POWER GENERATION AND DISTRIBUTION

The power generating system shall maintain the charge on fully charged batteries, except when the vehicle is at standard idle with a total alternator load exceeding 70 percent of the alternator nameplate rating. Use of fast idle shall maintain a charge on fully charged batteries so long as the total alternator load does not exceed 90 percent of the alternator nameplate rating.

The vehicle manufacturer shall provide to the procuring agency both at time of bid and actual production an analysis of the estimated electrical load for each system.

Alternator over-voltage output protection shall be provided.

Power distribution to all equipment requiring dedicated power and ground wiring to the batteries shall be accomplished by using power bus bars consisting of either a solid copper bar or heavy-duty terminal strip. One bus bar for each voltage potential, including ground, shall be located as close to the source of the potential as possible. Cabling from the bus bars to the equipment must be sized to supply the total current requirements with no greater than a five percent volt drop across the length of the cable.

5.5.2.3 CIRCUIT PROTECTION

All branch circuits, except battery-to-starting motor and battery-to-generator/alternator circuits, shall be protected by circuit breakers or fuses sized to the requirements of the load. Electronic circuit protection for the cranking motor shall be provided to prevent engaging of the motor for no more than 30 seconds at a time to prevent overheating. The circuit breakers or fuses shall be easily accessible for authorized personnel. Fuses shall be used only where it can be demonstrated that circuit breakers are not practicable. Any manually re-settable circuit breakers shall provide visible indication of open circuits.

Circuit breakers or fuses shall be sized to a minimum of 15 percent larger than the total circuit load current. The current rating for the wire used for each circuit must exceed the size of the circuit protection being used.

The battery shall be grounded to the vehicle chassis/frame at one location only, as close to the batteries as possible. When using a chassis ground system, the chassis shall be grounded to the frame in multiple locations, evenly distributed throughout the vehicle to eliminate ground loops. No more than four ground connections shall be made per ground stud. Electronic equipment requiring an isolated ground to the battery (i.e., electronic ground) shall not be grounded to the chassis.

5.5.2.4 WIRING AND TERMINALS

All power and ground wiring shall have double electrical insulation, shall be waterproof, and shall conform to specification requirements of SAE Recommended Practice J1127, J1128 and J1292. Double insulation shall be maintained as close to the junction box, electrical compartment, or terminals as possible.

Wiring shall be grouped, numbered, and color-coded. Wiring harnesses shall not contain wires of different voltage classes unless all wires within the harness are insulated for the highest voltage present in the harness. Kinking, grounding at multiple points, stretching, and exceeding minimum bend radius shall be prevented.

Strain-relief fittings shall be provided at points where wiring enters all electrical compartments. Grommets or other protective material shall be installed at points where wiring penetrates metal structures outside of electrical enclosures. Wiring supports shall be protective and non-conductive at areas of wire contact and shall not be damaged by heat, water, solvents, or chafing.

To the extent practicable, wiring shall not be located in environmentally exposed locations under the vehicle. Wiring and electrical equipment necessarily located under the vehicle shall be insulated from water, heat, corrosion, and mechanical damage. Where feasible, front to rear electrical harnesses should be installed above the window line of the vehicle.

All wiring harnesses over five feet long and containing at least five wires shall include 10 percent (minimum one [1]) excess wires for spares. This requirement for spare wires does not apply to data links and/or communication cables. Wiring length shall allow end terminals to be replaced twice without pulling, stretching, or replacing the wire. Except for large wires such as battery cables, terminals shall be crimped according to connector manufacturers recommendations for techniques and tools to the wiring and may be soldered only if the wire is not stiffened above the terminal and no flux residue remains on the terminal. Battery cable connectors shall be crimped and soldered.

Terminals shall be crimped, corrosion-resistant and full ring type or interlocking lugs with insulating ferrules. When using pressure type screw terminal strips, stranded wire only shall be used. Insulation clearance shall ensure wires have a minimum of "visible clearance" and a maximum of two (2) times the conductor diameter or 1/16″, whichever is less. When using shielded or coaxial cable, upon stripping of the insulation, the metallic braid shall be free from frayed strands that can penetrate the insulation of the inner wires.

For shielding and coaxial requirements refer to Section 5.5.4.1.2.

Ultra-sonic and T-splices may be used with 7 AWG or smaller wire. When a T-splice is used it shall meet these additional requirements: include a mechanical clamp in addition to solder on the splice; the wire supports no mechanical load in the area of the splice; and the wire is supported to prevent flexing. All splicing shall be staggered in the harness so that no two splices are positioned in the same location within the harness.

For wiring harness connectors, pins shall be removable, crimp contact type of the correct size, and rated for the wire being terminated. All supply-side terminations shall end in a socket, not a pin. Unused pin positions shall be sealed with sealing plugs. Adjacent connectors shall either use opposing pin genders, different insert orientations, or different connectors to prevent incorrect connections. All cable connectors shall be placed to provide adequate space for ease of removal and disconnection. All electrical connectors subjected to environmental exposure outside the passenger compartment shall be corrosion resistant and splash proof.

5.5.2.5 ELECTRICAL COMPONENTS

All electrical components, including switches, relays, flashers, and circuit breakers, shall be heavy-duty designs with either a successful history of application to heavy-duty vehicles, or design specifications for an equivalent environment. These components shall be replaceable in less than 5 minutes by a 3M mechanic.

All electric motors shall be either heavy-duty brushless type where practical or have a constant duty rating of no less than 40,000 hours (except cranking motors). All electric motors shall be easily accessible for servicing. All motors to be brushless are listed in attachments to Section 5: Technical Specifications.

5.5.2.6 ELECTRICAL COMPARTMENTS

All relays, controllers, flashers, circuit breakers, and other electrical components shall be mounted in easily accessible electrical compartments. All compartments exposed to the outside environment shall be corrosion resistant and sealed. The components and circuits in each electrical compartment shall be identified and their location permanently recorded on a drawing attached to the inside of the access panel or door. The drawing shall be protected from oil, grease, fuel, and abrasion. The front compartment shall be completely serviceable from the operator's seat, vestibule, or from outside. A rear start and run control box shall be mounted in an accessible location in the engine compartment.

5.5.3 GENERAL ELECTRONIC REQUIREMENTS

If an electronic component has an internal clock, it shall provide its own battery backup to monitor time when battery power is disconnected.

All electronic component suppliers shall ensure that their equipment is self-protecting in the event of shorts in the cabling, and also in over-voltage and reverse polarity conditions. If an electronic component is required to interface with other components, it shall not require external pull-up and/or pull-down resistors.

5.5.3.1 Wiring and Terminals

Kinking, grounding at multiple points, stretching, and exceeding minimum bend radius shall be prevented.

5.5.3.1.1 Discrete I/O (Inputs/Outputs)

All wiring to I/O devices, either at the harness level or individual wires, shall be labeled, stamped or color-coded in a fashion that allows unique identification. Labels shall be resistant to rubbing (hot stamped tubing and protected printing are service-proven examples of acceptable labels). Wiring for each I/O device shall be bundled together. If the I/O terminals are the same voltages, then jumpers may be used to connect the common of each I/O terminal.

5.5.3.1.2 Shielding

All wiring that requires shielding shall meet the following minimum requirements. A shield shall be generated by connecting to a ground, which is sourced from a power distribution bus bar or chassis. A shield shall be connected at one location only, typically at one end of the cable. However certain standards or special requirements, such as SAE J1939 or RF applications, have separate shielding techniques that shall also be used as applicable. *Note: A shield grounded at both end forms a ground loop, which can cause intermittent control or faults.* When using shielded or coaxial cable, upon stripping of the insulation, the metallic braid shall be free from frayed strands, which can penetrate the insulation of the inner wires. To prevent the introduction of noise, the shield shall not be connected to the common side of a logic circuit.

5.5.3.1.3 Communications

The data network cabling shall be selected and installed according to the selected protocol requirements. The physical layer of all network communication systems shall not be used for any other purpose other than communication between the system components, unless provided for in the network specifications.

Communications networks that use power line carriers (e.g., data modulated on a 24V-power line) shall meet the most stringent applicable wiring and terminal specifications.

5.5.3.1.4 Radio Frequency (RF)

RF components, such as radios, video devices, cameras, global positioning systems (GPS), etc, shall use coaxial cable to carry the signal. All RF systems require special design consideration for losses along the cable. Connectors shall be minimized, since each connector and crimp has a loss, which will attribute to attenuation of the signal. Cabling should allow for the removal of antennas or attached electronics without removing the installed cable between them. The corresponding component vendors shall be consulted for proper application of equipment including installation of cables.

5.5.3.1.5 Audio

Cabling used for microphone level and line level signals shall be 22 AWG minimum with shielded twisted pair. Cabling used for amplifier level signals shall be 18 AWG minimum.

5.5.3.2 MULTIPLEXING

5.5.3.2.1 General

All vehicles shall be equipped with a multiplexing system. The primary purpose of the multiplexing system is control of components necessary to operate the vehicle. This is accomplished by processing information from input devices and controlling output devices through the use of an internal logic program. This system shall meet the network communications requirements of Section 5.5.5.3.

Versatility and future expansion shall be provided for by an expandable system architecture. The multiplex system shall be capable of accepting new inputs and outputs through the addition of new modules and/or the utilization of existing spare inputs and outputs. All like components in the multiplex system shall be modular and interchangeable with self-diagnostic capabilities. The modules shall be easily accessible for troubleshooting electrical failures and performing system maintenance. Multiplex input/output modules shall use solid-state devices to provide extended service life and individual circuit protection.

Ten percent (10%) of the total number of inputs and outputs (or at least one each) at each zone location shall be designated as spares. Zone locations are: (1) behind the rear bulkhead; (2) forward of the bulkhead above the window line; and (3) forward of the bulkhead below the window line.

5.5.3.2.2 System Configuration

Multiplexing may either be distributed or centralized. A distributed system shall process information on multiple control modules within the network. A centralized system shall process the information on a single control module. Both systems shall consist of several modules connected to form a control network.

5.5.3.2.3 I/O (Input/Output) Signals

The input/output for the multiplex system may contain three types of electrical signals: discrete, analog, or serial data.

Discrete signals shall reflect the on/off status of switches, levers, limit switches, lights, etc. Analog signals shall reflect numerical data as represented by a voltage signal (0-12V, 10-24V, etc) or current signal (4-20ma). Both types of analog signals shall represent the status of variable devices such as rheostats, potentiometers, temperature probes, etc. Serial data signals shall reflect ASCII or alphanumeric data used in the communication between other on-board components.

5.5.4 DATA COMMUNICATIONS SYSTEMS

5.5.4.1 GENERAL

All data communication networks shall be either in accordance with a nationally recognized interface standard such as those published by SAE, IEEE, or ISO, or shall be published to the Procuring Agency with the following minimum information:

1. Protocol requirements for all timing issues (bit, byte, packet, inter-packet timing, idle line timing, etc.) packet sizes, error checking, and transport (bulk transfer of data to/from the device)
2. Data definition requirements that ensure access to diagnostic information and performance characteristics
3. The capability and procedures for uploading new application or configuration data
4. Access to revision levels of data, application software and firmware
5. The capability and procedures for uploading new firmware or application software

Any electronic vehicle components used on a network shall be conformance tested to the corresponding network standard.

All components on the Drivetrain network shall communicate data over the network as specified in Section 5.5.5.2. The Multiplex Level shall use a communications network that meets the requirements of Section 5.5.5.3. Components integrated on the Information Level shall communicate data over the network selected in Section 5.5.5.4.

5.5.4.2 DRIVETRAIN LEVEL

5.5.4.2.1 General

Drive train components, consisting of the engine, transmission, retarder, anti-lock braking system, and all other related components shall communicate data using a combination of the SAE Recommended Communications Protocols J1939 and/or J1708/J1587, or other open protocols as referenced in Section 5.5.5.1.

5.5.4.2.2 Diagnostics & Fault Detection

Drive train performance, maintenance and diagnostic data, and other electronic messages shall be formatted and transmitted on the communications networks.

The Drive train Level shall have the ability to record abnormal events in memory and provide diagnostic codes and other information to service personnel. At a minimum, this network level shall provide live/fail status, current hardware serial number, software/data revisions, and uninterrupted timing functions.

5.5.4.2.3 Data Access

Access to Drivetrain data shall be provided through diagnostic device connector ports. Location of these diagnostic ports shall comply with Sections 5.2.2.1.1 for the engine; 5.2.2.1.3 for the transmission; and 5.3.3.1.1 for brake actuation. Data transfer from the Drivetrain Level to the Multiplex Level, Information Level, and Central Data Access System shall comply with Sections 5.5.5.3, 5.5.5.4, and 5.5.6 respectively.

5.5.4.2.4 Programmability (Software)

The Drive train Level components shall be programmable by the Procuring Agency with limitations as specified by the sub-system supplier.

5.5.4.3 MULTIPLEX LEVEL

5.5.4.3.1 Data Access

At a minimum, information shall be made available via a communication port on the multiplex system. The location of the communication port shall be easily accessible. A hardware gateway and/or wireless communications system are options if requested by the Procuring Agency in Worksheet 5.5.5.4.4.1. The communication port(s) shall be located as specified by the Procuring Agency in attachment to Part 5: Technical Specifications.

5.5.4.3.2 Diagnostics And Fault Detection

The multiplex system shall have a proven method of determining its status (system health and input/output status) and detecting either active (Online) or inactive (Offline) faults through the use of on-board visual/audible indicators.

In addition to the indicators, the system shall employ an advanced diagnostic and fault detection system, which shall be accessible via either a personal computer (PC) or a handheld unit. Either unit shall have the ability to check logic function. The diagnostic data can be incorporated into the Information Level Network (5.5.5.4.3.1.2) or the Central Data Access System (5.5.6).

5.5.4.3.3 Programmability (Software)

The multiplex system shall have security provisions to protect its software from unwanted changes. This shall be achieved through any or all of the following procedures: password protection, limited distribution of the configuration software, limited access to the programming tools required to change the software, and hardware protection that prevents undesired changes to the software.

Provisions for programming the multiplex system shall be possible through a PC/laptop. The multiplex system shall have proper revision control to ensure that the hardware and software is identical on each vehicle equipped with the system. Revision control shall be provided by all of the following: hardware component identification where labels are included on all multiplex hardware to identify components; hardware series identification where all multiplex hardware displays the current hardware serial number and firmware revision employed by the module; and software revision identification where all copies of the software in service displays the most recent revision number, and a method of determining which version of the software is currently in use in the multiplex system.

5.5.4.3.4 General Component Specifications

All Information Level components selected by the Procuring Agency shall be networked on the Information Level, unless otherwise specified on the corresponding Worksheet, and have the capabilities as outlined in the following sub-sections.

5.5.4.3.4.1 Upgrade Ability

All programmable components shall be capable of upgrade without replacing the component. This is commonly done through EEPROM (flash), or replacement of EPROM(s). The flash upgrade shall be performed by either connecting a hand-held device, by contact-less device, PC Card, or via the network.

Instead of using separate Human/Machine Interface (HMI) devices, the components shall share the MDT. This typically consists of both a display screen and a method of accepting operator input, usually via keypad and/or touchscreen.

5.5.4.3.4.2 Diagnostic Data
Component diagnostic data shall be available upon request of the network. If an error condition is self-detected on a component, then that condition, and any relevant diagnostic data, shall immediately be broadcast on the network.

5.5.4.3.4.3 Automatic/Manual Override
Any component that is controlled from the network shall have a means of providing an override. This override will then allow the operator to manually set/configure the device. This type of override is typically for disabling automatic update of route-displays and/or voice annunciation. If a Mobile Data Terminal (MDT) is specified, it shall provide this override functionality.

5.5.4.3.4.4 Power Requirements
To prevent battery drain, power shall not be supplied from the unswitched side of the Master Battery Switch. Unless otherwise specified, all components shall receive their power source from either a circuit enabled with the master-run switch or have an internal timer that is configurable to place the component into a deep-sleep mode.

Unless otherwise specified, every component shall be designed to operate at 12V and 24V with required power filtering provided by the individual component.

When multiple microprocessor-based components require a minimum sustained voltage of 9V, and also a clean (filtered) power source, it may be more cost effective to specify a shared DC/DC converter and/or dedicated electronic power supply as specified in 5.5.3.1.2. Requirements for a shared DC/DC converter are contained in attachments to Part 5: Technical Specifications.

5.5.4.3.4.5 Real Time Clock
Any networked component that maintains its own time shall allow that time to be updated via the network.

5.5.4.3.4.6 External Route Display (ERD)
Baseline signs will be of electronic design, with the following requirements.

1. The bus “Master Run” switch shall control power to the ERD and shall be operable in all switch positions except “Off”. After the “Master Run” switch is placed in the “Off” position, all signs shall blank within 30 seconds, before powering down.
2. An emergency message may be specified by the Procuring Agency, which will only be displayed on exterior signs and not the HMI, initiated by method(s) specified by the procuring Agency, and reset by method(s) as specified by the Procuring Agency in Worksheet 5.5.5.4.4.8.
3. Via the sign programming software, each sign shall be separately configurable, with an option for all signs to be consistently configured from a single alphanumeric message. Signs shall have alternating message capability with selectable transition effects.
4. The front sign shall have pixel elements of at least 16 rows by 105 columns. The side sign shall have pixel elements of at least 7 rows by 80 columns. The rear sign shall have pixel elements of at least 7 rows by 23 columns.
5. LEDs and LCDs shall not fade or discolor for the life of the coach and shall have a rated life of at least 100,000 hours.

5.5.4.3.4.7 Passenger Stop Request Sign
Specific requirements for touch tape, pull cord and push button activated Passenger Stop Request Signs are defined in Section 5.4.9.3.

A “Stop Requested” message in red letters shall be illuminated when the passenger “Stop Requested” signal system is activated. The message shall remain visible until one or both passenger doors are opened. The message shall be visible to the seated operator and seated passengers. As an option, this sign could be integrated with other passenger displays.

The operator shall be able to deactivate the signal system from the operator’s area. A green light shall be mounted above the rear door, approximately on center of the rear door actuator compartment access panel, to indicate when the rear doors have been unlocked.

5.5.4.3.4.8 Covert Emergency Alarm

The Covert Emergency Alarm is for the operators use in dangerous situations. The alarm can be integrated with many of the Information Level components: the radio can transmit audio from a listen-in microphone as well as location data from the AVL; the External Route Display can signal an emergency; and the CCTV can tag and save recordings.

5.5.4.3.4.9 Public Address System (PA)

A public address system shall be provided that complies with the ADA requirements of 49 CFR, Part 38.35 and enables the operator to address passengers either inside or outside the bus. Inside speakers shall broadcast, in a clear tone, announcements that are clearly perceived from all seat positions at approximately the same volume level. A speaker shall be provided so announcements can be clearly heard by passengers standing outside the bus near the front door. An operator-controlled switch shall select inside or outside announcements. A separate volume control shall be provided for the outside system if volume adjustment would otherwise be necessary when switching from inside to outside. The system shall be muted when not in use. A provision shall be provided to secure the microphone in a stored position when not in use. An input jack and mounting clip shall be provided in the operator’s area for a handheld microphone. Gooseneck microphone will also be provided.

Additional requirements for the PA system are defined in attachments to Part5: Technical Specifications.

The microphone shall be vandal resistant, mounted on a heavy-duty, flexible gooseneck, which is secured with tamper-proof fasteners and will allow the operator to comfortably speak into it without using his/her hands.

5.6 TROLLEY INTERIOR AND EXTERIOR BUS AESTHETICS AND DESIGN

5.6.1 Exterior Appearance

The exterior of each bus shall have a decorative and vintage look and shall resemble an early 1900’s cable car in appearance. Replica trolley buses are acceptable. In this case, the term “replica” is used to describe a regular transit bus with a trolley package.

5.6.2 Interior Appearance

The interior of each bus shall have a decorative and vintage look and shall resemble an early 1900’s cable car in appearance. Railing should be brass or brass in appearance. Seats should be red in color and made of either a hard plastic or some other similar material. Seating should not be wood, and seats should not have cushions. Flooring and interior paneling should appear wooden.

5.6.3 Maintaining Safety and Performance

The interior and exterior aesthetics and design of the bus should not compromise passenger and operator safety. In addition, exterior aesthetics should not compromise the performance of the bus in its expected daily duties of transporting passengers nor compromise the overall longevity of the vehicle’s operational life.

5.6.4 Forward Door Location

The forward door on the bus must be located next to the driver’s seat, to the driver’s right. For safety purposes, the forward passenger door must not be located behind where the driver sits.

5.7 COMPONENTS SUBJECT TO CHANGE

5.7.1 Aesthetic Components

The agency purchasing the trolley buses, with consultation from the vendor, reserves the right to make changes or alterations to the aesthetic components of the bus prior to final build, to ensure that the most cost effective and efficient layout is achieved.

5.7.2 Functional Components

The agency purchasing the trolley buses, with consultation from the vendor, reserves the right to make some changes or alterations to the functional components of the bus prior to final build, to ensure that the most cost effective and efficient layout is achieved.

FORM 1

BID FORM PRICING PAGE
RFB NO. 22-0010
30′ LOW FLOOR TROLLEY BUS
(ANNUAL CONTRACT)

Upon receipt of contract acceptance, the undersigned (as bidder) hereby agrees to furnish to the Columbus Consolidated Government METRA Transit System goods and/or services in accordance with the specifications and instructions herein attached which are known to and understood by the bidder.

Bidder has submitted this bid with the understanding that the Columbus Consolidated Government METRA Transit System acceptance in writing of this offer to furnish the goods and/or services described herein shall constitute a contract between the bidder and the City which shall bind the bidder on its part to furnish and deliver (at the prices bid and in accordance with the terms and conditions set forth in these specifications) the following:

*CONTRACT YEAR	DESCRIPTION	MODEL/MANUFACTURER	UNIT COST PER BUS
First Year	30′ Low Floor Transit Bus		$
Second Year	30′ Low Floor Transit Bus		$
Third Year	30′ Low Floor Transit Bus		$

* The contract year will start according to the resolution when it is approved by City Council.

All shipping, delivery, and/or freight charges must be included in unit price. Columbus Consolidated Government will pay no additional shipping, delivery, freight charges, nor any other fees or charges.

The undersigned agrees to deliver the 30′ Low Floor Transit Bus to METRA Transit System within _____ days after receipt of the purchase order.

IMPORTANT INFORMATION:

PLEASE SUBMIT ONE ELECTRONIC SUBMISSION

By signing this Bid Form, the authorized representative understands the City reserves the right to request any omitted information, to exclude the E-Verify form and the form titled "*Communication Concerning This Solicitation*", WHICH DOES NOT AFFECT THE SUBMITTED PRICE. Bidders shall be notified, in writing, and shall have two (2) days, after notification to submit the omitted information (to exclude the E-Verify form and the form titled *"Communication Concerning This Solicitation"*). If the omitted information is not received within two (2) days, the Bidder shall be deemed non-responsive, and the Bid Submission will be deemed "Incomplete". Use the following checklist to verify the items are included in sealed bid:

☐ **Bid Form/Pricing Page (Form 1)** ☐ **Federally Required Contract Clauses (Attachment 1)**

☐ **E-Verify (Form 2)** ☐ **Communication Concerning This Solicitation (Form 3)**

☐ **Addenda Acknowledgement (Form 4)** ☐ **Proof of Insurance (Form 5)**

☐ **Product Literature** ☐ **Warranty Information**

☐ **Contract Signature Page (Form 6)** ☐ **Business License** ☐ **Form W-9**

If there is a discrepancy between words and figures, the words will prevail. The above prices are total prices delivered to the City as described herein. Except as stated in the instructions, the City will pay no charges, which are not included in the above bid. Any and all deviations from the specifications must be approved by METRA in advance of changes/revisions to items to be furnished and delivered. Additional cost resulting from contractor requested and approved revisions are the responsibility of the contractor.

COMPANY NAME:

COMPLETE AND RETURN THIS PAGE WITH SEALED RESPONSE

FORM 2

"GEORGIA SECURITY AND IMMIGRATION COMPLIANCE"
Contractor Affidavit under O.C.G.A. § 13-10-91(b)(1)

By executing this affidavit, the undersigned contractor verifies its compliance with O.C.G.A. § 13-10-91, stating affirmatively that the individual, firm or corporation which is engaged in the physical performance of services on behalf of ***Columbus Consolidated Government*** has registered with, is authorized to use and uses the federal work authorization program commonly known as E-Verify, or any subsequent replacement program, in accordance with the applicable provisions and deadlines established in O.C.G.A. § 13-10-91. Furthermore, the undersigned contractor will continue to use the federal work authorization program throughout the contract period and the undersigned contractor will contract for the physical performance of services in satisfaction of such contract only with subcontractors who present an affidavit to the contractor with the information required by O.C.G.A. § 13-10-91(b). Contractor hereby attests that its federal work authorization user identification number and date of authorization are as follows:

_____ _____

Company ID Number ***(numerical, 4-7 digits)*** Date of Authorization

****See https://e-verify.uscis.gov/emp/vislogin.aspx?JS=YES to access your E-Verify Company Identification Number.**

_____

Date of Authorization

_____

Name of Contractor

30' Low Floor Trolley Bus (Annual Contract); RFB No. 22-0010

Name of Project

Columbus Consolidated Government

Name of Public Employer

I hereby declare under penalty of perjury that the foregoing is true and correct.

Executed on _____, ____, 20___ in _____(city), _____(state).

_____

Signature of Authorized Officer or Agent

_____

Printed Name and Title of Authorized Officer or Agent

SUBSCRIBED AND SWORN BEFORE ME

ON THIS THE _____ DAY OF _____, 20___.

_____

NOTARY PUBLIC

My Commission Expires: _____

A properly completed, notarized E-Verify Affidavit must be included with sealed proposal; failure to do so will render the firm's proposal non-responsive and ineligible for further consideration.

COMPLETE AND RETURN THIS PAGE WITH SEALED RESPONSE

FORM 3

COMMUNICATION CONCERNING THIS SOLICITATION

THIS PAGE MUST BE SIGNED AND RETURNED WITH THE VENDOR'S BID/PROPOSAL. FAILURE TO INCLUDE THIS FORM WILL AUTOMATICALLY RENDER VENDOR'S RESPONSE NON-RESPONSIVE.

****

ALL QUESTIONS OR CLARIFICATIONS CONCERNING THIS SOLICITATION SHALL BE SUBMITTED IN WRITING. THE CITY WILL NOT ORALLY OR TELEPHONICALLY ADDRESS ANY QUESTION OR CLARIFICATION REGARDING BID/PROPOSAL SPECIFICATIONS. IF A VENDOR VISITS OR CALLS THE PURCHASING DIVISION WITH SUCH QUESTIONS, HE OR SHE WILL BE INSTRUCTED TO SUBMIT THE QUESTIONS IN WRITING.

ALL CONTACT CONCERNING THIS SOLICITATION SHALL BE MADE THROUGH THE PURCHASING DIVISION. BIDDERS SHALL NOT CONTACT CITY EMPLOYEES, DEPARTMENT HEADS, USING AGENCIES, EVALUATION COMMITTEE MEMBERS, INCLUDING NON-CCG EMPLOYEES, CONTRACTED PERSONNEL ASSOCIATED WITH THIS PARTICULAR PROJECT (I.E. ARCHITECTS, ENGINEERS, CONSULTANTS), OR ELECTED OFFICIALS WITH QUESTIONS OR ANY OTHER CONCERNS ABOUT THE SOLICITATION. QUESTIONS, CLARIFICATIONS, OR CONCERNS SHALL BE SUBMITTED TO THE PURCHASING DIVISION IN WRITING. IF IT IS NECESSARY THAT A TECHNICAL QUESTION NEEDS ADDRESSING, THE PURCHASING DIVISION WILL FORWARD SUCH TO THE USING AGENCY, WHO WILL SUBMIT A WRITTEN RESPONSE.

THE PURCHASING DIVISION WILL FORWARD WRITTEN RESPONSES TO THE RESPECTIVE BIDDER. IF IT BECOMES NECESSARY TO REVISE ANY PART OF THIS SOLICITATION, A WRITTEN ADDENDUM WILL BE ISSUED TO ALL BIDDERS.

THE CITY IS NOT BOUND BY ANY ORAL REPRESENTATIONS, CLARIFICATIONS, OR CHANGES MADE TO THE WRITTEN SPECIFICATIONS BY CITY EMPLOYEES, UNLESS SUCH CLARIFICATION OR CHANGE IS PROVIDED TO THE BIDDERS IN A WRITTEN ADDENDUM FROM THE PURCHASING MANAGER.

BIDDERS ARE INSTRUCTED TO USE THE ENCLOSED "QUESTION/CLARIFICATION FORM" TO FAX OR EMAIL QUESTION. **QUESTIONS AND REQUESTS FOR CLARIFICATION MUST BE SUBMITTED AT LEAST FIVE (5) *BUSINESS* DAYS BEFORE THE DUE DATE.**

ANY REQUEST/CONCERN/PROTEST, AFTER A SOLICITATION HAS CLOSED AND PENDING AWARD, MUST ALSO BE SUBMITTED IN WRITING TO THE PURCHASING DIVISION.

****

I agree to forward all communication about this solicitation, in writing, to the Purchasing Division. I understand that communication with other persons, other than the Purchasing Division, will render my Bid/Proposal response non-responsive and I will no longer be considered in the solicitation process.

Vendor Name: _____

Print Name of Authorized Agent: _____

Signature of Authorized Agent: _____

COMPLETE AND RETURN THIS PAGE WITH SEALED RESPONSE

FORM 4

ADDENDA ACKNOWLEDGEMENT

30′ Low Floor Trolley Bus
RFB No. 22-0010

The Purchasing Division will post addenda (if any) on the Bid Opportunities page: https://www.columbusga.gov/finance/purchasing/docs/opportunities/Bid_Opportunities.htm. It is the vendors' responsibility to periodically visit the page to check for addenda, ***both before the due date and prior to submitting a response in DemandStar.***

IF ADDENDA WERE ISSUED:
By signing below, I acknowledge 1) I have received the addenda (if any) as indicated below, 2) my submittal reflects the changes to the specifications, and 3) my submittal includes the most recently revised forms:

Addendum No. _____ dated _____ Addendum No. _____ dated _____

Addendum No. _____ dated _____ Addendum No. _____ dated _____

Addendum No. _____ dated _____ Addendum No. _____ dated _____

Addendum No. _____ dated _____ Addendum No. _____ dated _____

Addendum No. _____ dated _____ Addendum No. _____ dated _____

IF NO ADDENDA WERE ISSUED:
By signing below, I acknowledge that I reviewed the Bid Opportunities page referenced above on _____ and did not see any addenda listed for this solicitation.

(date)

Business Name **Date**

Authorized Signature **Print Name**

FORM 5

SOLICITATION ID: RFB NO. 22-0010

30′ LOW FLOOR TROLLEY BUS (ANNUAL CONTRACT)

INSURANCE CHECKLIST

CERTIFICATE OF INSURANCE MUST SHOW ALL COVERAGE AND ENDORSEMENTS INDICATED BY "X"

CSL = Combined Single Limit; BI = Bodily Injury; PD=Property Damage

Required Coverage(s)		Limits (Figures denote minimums)	Bidders Limits/Response
X	**1. Worker's Compensation and Employer's Liability**	**STATUTORY REQUIREMENTS**	
	Comprehensive General Liability:		
X	2. General Liability Premises/Operations	$1 Million CSL BI/PD each occurrence, $1 Million annual aggregate	
X	3. Independent Contractors and Sub - Contractors	$1 Million CSL BI/PD each occurrence, $1 Million annual aggregate	
X	4. Products Liability	$1 Million CSL BI/PD each occurrence, $1 Million annual aggregate	
	5. Completed Operations	$1 Million CSL BI/PD each occurrence, $1 Million annual aggregate	
X	6. Contractual Liability (Must be shown on Certificate)	$ 1 Million CSL BI/PD each occurrence, $1 Million annual aggregate	
	Automobile Liability:		
X	7. Owned/Hired/Non-Owned Vehicles/ Employer non-ownership	$1 Million BI/PD each Accident, Uninsured Motorist	
	Other:		
X	8. Miscellaneous Errors and Omissions	$1 Million per occurrence/claim	
X	9. Umbrella/Excess Liability	$1 Million Bodily Injury, Property Damage and Personal Injury	
	10. Personal and Advertising Injury Liability	$1 Million each offense, $1 Million annual aggregate	
	11. Professional Liability	$1 Million per occurrence/claim	
	12. Architects and Engineers	$1 Million per occurrence/claim	
	13. Asbestos Removal Liability	$2 Million per occurrence/claim	
	14. Medical Malpractice	$1 Million per occurrence/claim	

Required Coverage(s)		Limits (Figures denote minimums)	Bidders Limits/Response
	15. Medical Professional Liability	$1 Million per occurrence/claim	
	16. Dishonesty Bond		
	17. Builder's Risk	Provide Coverage in the full amount of contract	
	18. XCU (Explosive, Collapse, Underground) Coverage		
	19. USL&H (Long Shore Harbor Worker's Compensation Act)		
	20. Contractor Pollution Liability	$2 Million per occurrence/claim	
	21. Environmental Impairment Liability	$2 Million per occurrence/claim	
X	22. Carrier Rating shall be Best's Rating of A-VII or its equivalents		
X	23. Notice of Cancellation, non-renewal or material change in coverage shall be provided to City at least 30 days prior to action.		
X	24. The City shall be named Additional Insured on all policies		
X	25. Certificate of Insurance shall show Bid Number and Bid Title		
	26. Pollution:	$2 Million per occurrence/claim	

*****If offeror's employees will be using their privately-owned vehicles while working on this contract and are privately insured, please state that fact in the **Bidders Limits/Response** column of the insurance checklist.

BIDDER'S STATEMENT:

If awarded the contract, I will comply with contract insurance requirements and provide the required Certificate(s).

BIDDER NAME:_____

AUTH. SIGNATURE:_____

COMPLETE AND RETURN THIS PAGE WITH SEALED RESPONSE

FORM 6

CONTRACT SIGNATURE PAGE

30′ LOW FLOOR TROLLEY BUS
(Annual Contract)
RFP No. 22-0010

THE UNDERSIGNED HEREBY DECLARES THAT HE HAS/THEY HAVE CAREFULLY EXAMINED THE SPECIFICATIONS HEREIN REFERRED TO AND WILL PROVIDE ALL EQUIPMENT, TERMS AND SERVICES TO THE CONSOLIDATED GOVERNMENT OF COLUMBUS, GEORGIA.

_____ By:_____

Witness as to the signing of the contract — Signature of Authorized Representative — Date

_____ _____

Witness as to the signing of the contract — Print Name and Title of Signatory

(Corporate seal, if applicable)

Company:_____

Company Ordering Address	***Company Payment Address***
_____	_____
_____	_____
Contact:_____	Contact:_____
Contact Email_____	Contact Email_____
Telephone_____ Fax_____	Telephone:_____ Fax_____

CONSOLIDATED GOVERNMENT OF COLUMBUS, GEORGIA

Accepted this___ day of _____20__

_____

Isaiah Hugley, City Manager

APPROVED AS TO LEGAL FORM:

_____

Clifton C. Fay, City Attorney

ATTEST:

_____

Sandra T. Davis, Clerk of Council

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FTA REQUIREMENTS

FTA CLAUSES
(Attachment 1)

Clear Form

FEDERALLY REQUIRED CONTRACT CLAUSES
GOVERNING DOCUMENTS
REVENUE ROLLING STOCK
CONTRACTS GREATER THAN
$250,000

Contents

INSTRUCTIONS

About: This document contains the federally required contract clauses for a rolling stock procurement greater than $250,000 for grants executed after 12/26/14.

Applicability: Some of the attached clauses may or may not apply to your procurement. If you are procuring architectural engineering (A&E) services, materials, etc., other clauses will apply so check the FTA website for more information and applicability. **Federal Circular 4220.1F *Third Party Contracting Requirements* Appendix D** has a handy chart listing the federal model contract clauses, certifications, reports, forms, and their applicability:
www.transit.dot.gov/funding/procurement/third-party-procurement/third-party-contracting-requirements-fta-c-42201f

Complete list of Federal required and other model contract clauses:
www.transit.dot.gov/funding/procurement/bppm-federally-required-and-other-model- clauses

Transit Agency Instructions: Read all the contract clauses and verify if they apply to your procurement. Insert your transit agency's **legal name** where applicable (parts 15, 19, and 21). Insert the applicable clauses in your request for proposal (RFP) or invitation for bid (IFB) or purchase order (if purchasing an applicable State Vehicle Purchasing Program vehicle). The bidder/vendor shall sign all applicable clauses and return to the procuring agency. If this is local purchase, attach the clauses, including the winning bidder/vendor signed sections, in your third party contract to be submitted to MDOT. Copies should be filed with the procuring agency. If this is a State Vehicle Purchasing Program vehicle purchase, keep on file, at the procuring agency, all clauses and vendor signed sections with the purchase order.

NOTE: If a bidder/vendor does not agree to all applicable Federal clauses/terms then the transit agency shall not procure the product or service from the bidder/vendor.

Bidder/Vendor Instructions: If applicable, complete all sections and return to the procuring transit agency.

1. **ENERGY CONSERVATION REQUIREMENTS** 42 U.S.C. 6321 et seq./49 CFR Part 18

   The contractor agrees to comply with mandatory standards and policies relating to energy efficiency which are contained in the state energy conservation plan issued in compliance with the Energy Policy and Conservation Act.

2. **BUS TESTING** 49 U.S.C. § 5318(e) / 49 C.F.R. part 665

   The Contractor [Manufacturer] agrees to comply with the Bus Testing requirements under 49 U.S.C. 5318(e) and FTA's implementing regulation at 49 C.F.R. part 665 to ensure that the requisite testing is performed for all new bus models or any bus model with a major change in configuration or A-15 components, and that the bus model has achieved a passing score. Upon completion of the testing, the contractor shall obtain a copy of the bus testing reports from the operator of the testing facility and make that report(s) publicly available prior to final acceptance of the first vehicle by the WRTA.

3. **CLEAN WATER REQUIREMENTS** 33 U.S.C. 1251

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

   (2) The Contractor also agrees to include these requirements in each subcontract exceeding $150,000 for grants executed after 12/26/14 financed in whole or in part with Federal assistance provided by FTA.

4. **LOBBYING** 31 U.S.C. 1352/49 CFR Part 19/49 CFR Part 20

   Byrd Anti-Lobbying Amendment, 31 U.S.C. 1352, as amended by the Lobbying Disclosure Act of 1995, P.L. 104-65 [to be codified at 2 U.S.C. § 1601, et seq.] - Contractors who apply or bid for an award of $150,000 or more for grants executed after 12/26/14 shall file the certification required by 49 CFR part 20, "New Restrictions on Lobbying." Each tier certifies to the tier above that it will not and has not used Federal appropriated funds to pay any person or organization for influencing or attempting to influence an officer or employee of any agency, a member of Congress, officer or employee of Congress, or an employee of a member of Congress in connection with obtaining any Federal contract, grant or any other award covered by 31 U.S.C. 1352. Each tier shall also disclose the name of any registrant under the Lobbying Disclosure Act of 1995 who has made lobbying contacts on its behalf with non-Federal funds with respect to that Federal contract, grant or award covered by 31 U.S.C. 1352. Such disclosures are forwarded from tier to tier up to the recipient.

   APPENDIX A, 49 CFR PART 20--CERTIFICATION REGARDING LOBBYING
   Certification for Contracts, Grants, Loans, and Cooperative Agreements
   (To be submitted with each bid or offer exceeding $150,000 for grants executed after 12/26/14)
   The undersigned [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

Read and initial this page _____

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 [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 require that the language of this certification be included in the award documents for all subawards at all tiers (including subcontracts, subgrants, and contracts under grants, loans, and cooperative agreements) and that all subrecipients 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.

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

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

_____Signature of Contractor's Authorized Official

_____ Name and Title of Contractor's Authorized Official

_____ Date

Read and initial this page _____

5. ACCESS TO RECORDS AND REPORTS 49 U.S.C. 5325/18 CFR 18.36 (i)/49 CFR 633.17

The following access to records requirements apply to this Contract:

(1) Where the Purchaser is not a State but a local government and is the FTA Recipient or a subgrantee of the FTA Recipient in accordance with 49 C.F.R. 18.36(i), the Contractor agrees to provide the Purchaser, the FTA Administrator, the Comptroller General of the United States or any of their authorized representatives access to any books, documents, papers and records of the Contractor which are directly pertinent to this contract for the purposes of making audits, examinations, excerpts and transcriptions. Contractor also agrees, pursuant to 49 C.F.R. 633.17 to provide the FTA Administrator or his authorized representatives including any PMO Contractor access to Contractor's records and construction sites pertaining to a major capital project, defined at 49 U.S.C. 5302(a)1, which is receiving federal financial assistance through the programs described at 49 U.S.C. 5307, 5309 or 5311.

(2) Where the Purchaser is a State and is the FTA Recipient or a subgrantee of the FTA Recipient in accordance with 49 C.F.R. 633.17, Contractor agrees to provide the Purchaser, the FTA Administrator or his authorized representatives, including any PMO Contractor, access to the Contractor's records and construction sites pertaining to a major capital project, defined at 49 U.S.C. 5302(a)1, which is receiving federal financial assistance through the programs described at 49 U.S.C. 5307, 5309 or 5311. By definition, a major capital project excludes contracts of less than the simplified acquisition threshold currently set at $150,000 for grants executed after 12/26/14.

(3) Where the Purchaser enters into a negotiated contract for other than a small purchase or under the simplified acquisition threshold and is an institution of higher education, a hospital or other non-profit organization and is the FTA Recipient or a subgrantee of the FTA Recipient in accordance with 49 C.F.R. 19.48, Contractor agrees to provide the Purchaser, FTA Administrator, the Comptroller General of the United States or any of their duly authorized representatives with access to any books, documents, papers and record of the Contractor which are directly pertinent to this contract for the purposes of making audits, examinations, excerpts and transcriptions.

(4) Where any Purchaser which is the FTA Recipient or a subgrantee of the FTA Recipient in accordance with 49 U.S.C. 5325(a) enters into a contract for a capital project or improvement (defined at 49 U.S.C. 5302(a)1) through other than competitive bidding, the Contractor shall make available records related to the contract to the Purchaser, the Secretary of Transportation and the Comptroller General or any authorized officer or employee of any of them for the purposes of conducting an audit and inspection.

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

(6) The Contractor agrees to 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 which case Contractor agrees to maintain same until the Purchaser, the FTA Administrator, the Comptroller General, or any of their duly authorized representatives, have disposed of all such litigation, appeals, claims or exceptions related thereto. Reference 49 CFR 18.39(i)(11).

Read and initial this page _____

(7) FTA does not require the inclusion of these requirements in subcontracts.

REQUIREMENTS FOR ACCESS TO RECORDS AND REPORTS BY TYPES OF CONTRACT

Contract Characteristics	Operational Service Contract	Turnkey	Construction	Architectural Engineering	Acquisition of Rolling Stock	Professional Services
I. State Grantees						
a. Contracts below SAT $150,000 for grants executed after 12/26/14	None	Those imposed on state pass thru to Contractor	None	None	None	None
b. Contracts above $150,000 for grants executed after 12/26/14/Capital Projects	None unless[1] non-competitive award		Yes, if non-competitive award or if funded thru[2] 5307/5309/ 5311	None unless non-competitive award	None unless non-competitive award	None unless non-competitive award
II. Non-State Grantees						
a. Contracts below SAT $150,000 for grants executed after 12/26/14	Yes[3]	Those imposed on non-state Grantee pass thru to Contractor	Yes	Yes	Yes	Yes
b. Contracts above $150,000 for grants executed after 12/26/14/ Capital Projects	Yes[3]		Yes	Yes	Yes	Yes

Sources of Authority:

[1] 49 USC 5325 (a)
[2] 49 CFR 633.17
[3] 18 CFR 18.36 (i)

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6. FEDERAL CHANGES 49 CFR Part 18

Contractor shall at all times comply with all applicable FTA regulations, policies, procedures and directives, including without limitation those listed directly or by reference in the Master Agreement between Purchaser and FTA, 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.

7. CLEAN AIR 42 U.S.C. 7401 et seq/40 CFR 15.61/49 CFR Part 18

(1) The Contractor agrees to comply with all applicable standards, orders or regulations issued pursuant to the Clean Air Act, as amended, 42 U.S.C. §§ 7401 et seq. The Contractor agrees to report each violation to the Purchaser and understands and agrees that the Purchaser will, in turn, report each violation as required to assure notification to FTA and the appropriate EPA Regional Office.

(2) The Contractor also agrees to include these requirements in each subcontract exceeding $150,000 for grants executed after 12/26/14 financed in whole or in part with Federal assistance provided by FTA.

8. RECYCLED PRODUCTS 42 U.S.C. 6962/40 CFR Part 247/Executive Order 12873

The contractor agrees to comply with all the requirements of Section 6002 of the Resource Conservation and Recovery Act (RCRA), as amended (42 U.S.C. 6962), including but not limited to the regulatory provisions of 40 CFR Part 247, and Executive Order 12873, as they apply to the procurement of the items designated in Subpart B of 40 CFR Part 247.

9. NO GOVERNMENT OBLIGATION TO THIRD PARTIES

No Obligation by the Federal Government.

(1) The Purchaser and Contractor acknowledge and agree that, notwithstanding any concurrence by the Federal Government in or approval of the solicitation or award of the underlying contract, absent the express written consent by the Federal Government, the Federal Government is not a party to this contract and shall not be subject to any obligations or liabilities to the Purchaser, Contractor, or any other party (whether or not a party to that contract) pertaining to any matter resulting from the underlying contract.

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

10. PROGRAM FRAUD AND FALSE OR FRAUDULENT STATEMENTS AND RELATED ACTS 31 U.S.C. 3801 et seq. /49 CFR Part 31 18 U.S.C. 1001/49 U.S.C. 5307

(1) The Contractor acknowledges that the provisions of the Program Fraud Civil Remedies Act of 1986, as amended, 31 U.S.C. § 3801 et seq. and U.S. DOT regulations, "Program Fraud Civil Remedies," 49 C.F.R. Part 31, apply to its actions pertaining to this Project. Upon execution of the underlying contract, the Contractor certifies or affirms the truthfulness and accuracy of any statement it has made, it makes, it may make, or causes to be made, pertaining to the underlying contract or the FTA assisted project for which this contract work is being performed. In addition to other penalties that may be applicable, the Contractor further acknowledges that if it makes, or causes to be made, a false, fictitious, or fraudulent

claim, statement, submission, or certification, the Federal Government reserves the right to impose the penalties of the Program Fraud Civil Remedies Act of 1986 on the Contractor to the extent the Federal Government deems appropriate.

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

(3) The Contractor agrees to include the above two clauses in each subcontract financed in whole or in part with Federal assistance provided by FTA. It is further agreed that the clauses shall not be modified, except to identify the subcontractor who will be subject to the provisions.

11. <u>TERMINATION</u> 49 U.S.C. Part 18/FTA Circular 4220.1F

a) Termination for Convenience (General Provision) The Columbus Consolidated Government/METRA Transit System may terminate this contract, in whole or in part, at any time by written notice to the Contractor when it is in the Government's best interest. The Contractor shall be paid its costs, including contract close-out costs, and profit on work performed up to the time of termination. The Contractor shall promptly submit its termination claim to Columbus Consolidated Government/METRA Transit System to be paid the Contractor. If the Contractor has any property in its possession belonging to the Columbus Consolidated Government/METRA Transit System, the Contractor will account for the same, and dispose of it in the manner the Columbus Consolidated Government/METRA Transit System directs.

b) Termination for Default [Breach or Cause] (General Provision) If the Contractor does not deliver supplies in accordance with the contract delivery schedule, or, if the contract is for services, the Contractor fails to perform in the manner called for in the contract, or if the Contractor fails to comply with any other provisions of the contract, the Columbus Consolidated Government/METRA Transit System may terminate this contract for default. Termination shall be effected by serving a notice of termination on the contractor setting forth the manner in which the Contractor is in default. The contractor will only be paid the contract price for supplies delivered and accepted, or services performed in accordance with the manner of performance set forth in the contract.

If it is later determined by the Columbus Consolidated Government/METRA Transit System that the Contractor had an excusable reason for not performing, such as a strike, fire, or flood, events which are not the fault of or are beyond the control of the Contractor, the Columbus Consolidated Government/METRA Transit System, after setting up a new delivery of performance schedule, may allow the Contractor to continue work, or treat the termination as a termination for convenience.

c) Opportunity to Cure (General Provision) The Columbus Consolidated Government/METRA Transit System in its sole discretion may, in the case of a termination for breach or default, allow the Contractor [an appropriately short period of time] in which to cure the defect. In such case, the notice of termination will state the time period in which cure is permitted and other appropriate conditions.

If Contractor fails to remedy to Columbus Consolidated Government/METRA Transit System's satisfaction the breach or default of any of the terms, covenants, or conditions

of this Contract within [ten (10) days] after receipt by Contractor of written notice from Columbus Consolidated Government/METRA Transit System setting forth the nature of said breach or default, Columbus Consolidated Government/METRA Transit System shall have the right to terminate the Contract without any further obligation to Contractor. Any such termination for default shall not in any way operate to preclude Columbus Consolidated Government/METRA Transit System from also pursuing all available remedies against Contractor and its sureties for said breach or default.

d) Waiver of Remedies for any Breach In the event that Columbus Consolidated Government/METRA Transit System elects to waive its remedies for any breach by Contractor of any covenant, term or condition of this Contract, such waiver by Columbus Consolidated Government/METRA Transit System shall not limit Columbus Consolidated Government/METRA Transit System's remedies for any succeeding breach of that or of any other term, covenant, or condition of this Contract.

e) Termination for Convenience (Professional or Transit Service Contracts) The Columbus Consolidated Government/METRA Transit System, by written notice, may terminate this contract, in whole or in part, when it is in the Government's interest. If this contract is terminated, the Recipient shall be liable only for payment under the payment provisions of this contract for services rendered before the effective date of termination.

f) Termination for Default (Supplies and Service) If the Contractor fails to deliver supplies or to perform the services within the time specified in this contract or any extension or if the Contractor fails to comply with any other provisions of this contract, the Columbus Consolidated Government/METRA Transit System may terminate this contract for default. The Columbus Consolidated Government/METRA Transit System shall terminate by delivering to the Contractor a Notice of Termination specifying the nature of the default. The Contractor will only be paid the contract price for supplies delivered and accepted, or services performed in accordance with the manner or performance set forth in this contract.

If, after termination for failure to fulfill contract obligations, it is determined that the Contractor was not in default, the rights and obligations of the parties shall be the same as if the termination had been issued for the convenience of the Recipient.

g) Termination for Default (Transportation Services) If the Contractor fails to pick up the commodities or to perform the services, including delivery services, within the time specified in this contract or any extension or if the Contractor fails to comply with any other provisions of this contract, the Columbus Consolidated Government/METRA Transit System may terminate this contract for default. The Columbus Consolidated Government/METRA Transit System shall terminate by delivering to the Contractor a Notice of Termination specifying the nature of default. The Contractor will only be paid the contract price for services performed in accordance with the manner of performance set forth in this contract.

If this contract is terminated while the Contractor has possession of Recipient goods, the Contractor shall, upon direction of the Columbus Consolidated Government/METRA Transit System, protect and preserve the goods until surrendered to the Recipient or its agent. The Contractor and Columbus Consolidated Government/METRA Transit System shall agree on payment for the preservation and protection of goods. Failure to agree on an amount will be resolved under the Dispute clause.

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If, after termination for failure to fulfill contract obligations, it is determined that the Contractor was not in default, the rights and obligations of the parties shall be the same as if the termination had been issued for the convenience of the Columbus Consolidated Government/METRA Transit System.

h) Termination for Default (Construction) If the Contractor refuses or fails to prosecute the work or any separable part, with the diligence that will insure its completion within the time specified in this contract or any extension or fails to complete the work within this time, or if the Contractor fails to comply with any other provisions of this contract, the Columbus Consolidated Government/METRA Transit System may terminate this contract for default. The Columbus Consolidated Government/METRA Transit System shall terminate by delivering to the Contractor a Notice of Termination specifying the nature of the default. In this event, the Recipient may take over the work and compete it by contract or otherwise, and may take possession of and use any materials, appliances, and plant on the work site necessary for completing the work. The Contractor and its sureties shall be liable for any damage to the Recipient resulting from the Contractor's refusal or failure to complete the work within specified time, whether or not the Contractor's right to proceed with the work is terminated. This liability includes any increased costs incurred by the Recipient in completing the work.

The Contractor's right to proceed shall not be terminated nor the Contractor charged with damages under this clause if-

1) the delay in completing the work arises from unforeseeable causes beyond the control and without the fault or negligence of the Contractor. Examples of such causes include: acts of God, acts of the Recipient, acts of another Contractor in the performance of a contract with the Recipient, epidemics, quarantine restrictions, strikes, freight embargoes; and

2) the contractor, within [10] days from the beginning of any delay, notifies the Columbus Consolidated Government/METRA Transit System in writing of the causes of delay. If in the judgment of the Columbus Consolidated Government/METRA Transit System, the delay is excusable, the time for completing the work shall be extended. The judgment of the Columbus Consolidated Government/METRA Transit System shall be final and conclusive on the parties, but subject to appeal under the Disputes clauses.

    a) If, after termination of the Contractor's right to proceed, it is determined that the Contractor was not in default, or that the delay was excusable, the rights and obligations of the parties will be the same as if the termination had been issued for the convenience of the Recipient.

i) Termination for Convenience or Default (Architect and Engineering) The Columbus Consolidated Government/METRA Transit System may terminate this contract in whole or in part, for the Recipient's convenience or because of the failure of the Contractor to fulfill the contract obligations. The Columbus Consolidated Government/METRA Transit System shall terminate by delivering to the Contractor a Notice of Termination specifying the nature, extent, and effective date of the termination. Upon receipt of the notice, the Contractor shall (1) immediately discontinue all services affected (unless the notice directs otherwise), and (2) deliver to the Contracting Officer all data, drawings, specifications,

reports, estimates, summaries, and other information and materials accumulated in performing this contract, whether completed or in process.

Contractor shall (1) immediately discontinue all services affected (unless the notice directs otherwise), and (2) deliver to the Contracting Officer all data, drawings, specifications, reports, estimates, summaries, and other information and materials accumulated in performing this contract, whether completed or in process.

If the termination is for the convenience of the Recipient, the Contracting Officer shall make an equitable adjustment in the contract price but shall allow no anticipated profit on unperformed services.

If the termination is for failure of the Contractor to fulfill the contract obligations, the Recipient may complete the work by contact or otherwise and the Contractor shall be liable for any additional cost incurred by the Recipient.

If, after termination for failure to fulfill contract obligations, it is determined that the Contractor was not in default, the rights and obligations of the parties shall be the same as if the termination had been issued for the convenience of the Recipient.

j) **Termination for Convenience of Default (Cost-Type Contracts)** The Columbus Consolidated Government/METRA Transit System may terminate this contract, or any portion of it, by serving a notice or termination on the Contractor. The notice shall state whether the termination is for convenience of the Columbus Consolidated Government/METRA Transit System or for the default of the Contractor. If the termination is for default, the notice shall state the manner in which the contractor has failed to perform the requirements of the contract. The Contractor shall account for any property in its possession paid for from funds received from the Columbus Consolidated Government/METRA Transit System, or property supplied to the Contractor by the Columbus Consolidated Government/METRA Transit System. If the termination is for default, the Columbus Consolidated Government/METRA Transit System may fix the fee, if the contract provides for a fee, to be paid the contractor in proportion to the value, if any, of work performed up to the time of termination. The Contractor shall promptly submit its termination claim to the Columbus Consolidated Government/METRA Transit System and the parties shall negotiate the termination settlement to be paid the Contractor.

If the termination is for the convenience of the Columbus Consolidated Government/METRA Transit System, the Contractor shall be paid its contract close-out costs, and a fee, if the contract provided for payment of a fee, in proportion to the work performed up to the time of termination.

If, after serving a notice of termination for default, the Columbus Consolidated Government/METRA Transit System determines that the Contractor has an excusable reason for not performing, such as strike, fire, flood, events which are not the fault of and are beyond the control of the contractor, the Columbus Consolidated Government/METRA Transit System, after setting up a new work schedule, may allow the Contractor to continue work, or treat the termination as a termination for convenience.

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12. GOVERNMENT-WIDE DEBARMENT AND SUSPENSION (NONPROCUREMENT)

49 CFR Part 29/Executive Order 12549/Executive Order 12689/31 U.S.C. 6101 note (Section 2455, Public Law 103-355, 108 Stat. 3327)

Suspension and Debarment

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

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

By signing and submitting its bid or proposal, the bidder or proposer certifies as follows:

The certification in this clause is a material representation of fact relied upon by the METRA Transit System. If it is later determined that the bidder or

(Insert transit agency name)

proposer knowingly rendered an erroneous certification, in addition to remedies available to METRA Transit System, the Federal Government may

(Insert transit agency name)

pursue available remedies, including but not limited to suspension and/or debarment. The bidder or proposer agrees to comply with the requirements of 49 CFR 29, Subpart C while this offer is valid and throughout the period of any contract that may arise from this offer. The bidder or proposer further agrees to include a provision requiring such compliance in its lower tier covered transactions.

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13. CIVIL RIGHTS REQUIREMENTS 29 U.S.C. § 623, 42 U.S.C. § 2000/42 U.S.C. § 6102, 42 U.S.C. § 12112/42 U.S.C. § 12132, 49 U.S.C. § 5332/29 CFR Part 1630/41 CFR Parts 60 et seq.

The following requirements apply to the underlying contract:

(1) Nondiscrimination - In accordance with Title VI of the Civil Rights Act, as amended, 42 U.S.C. § 2000d, section 303 of the Age Discrimination Act of 1975, as amended, 42 U.S.C. § 6102, section 202 of the Americans with Disabilities Act of 1990, 42 U.S.C. § 12132, and Federal transit law at 49 U.S.C. § 5332, the Contractor agrees that it will not discriminate against any employee or applicant for employment because of race, color, creed, national origin, sex, age, or disability. In addition, the Contractor agrees to comply with applicable Federal implementing regulations and other implementing requirements FTA may issue.

(2) Equal Employment Opportunity - The following equal employment opportunity requirements apply to the underlying contract:

a. Race, Color, Creed, National Origin, Sex - In accordance with Title VII of the Civil Rights Act, as amended, 42 U.S.C. § 2000e, and Federal transit laws at 49 U.S.C. § 5332, the Contractor agrees to comply with all applicable equal employment opportunity requirements of U.S. Department of Labor (U.S. DOL) regulations, "Office of Federal Contract Compliance Programs, Equal Employment Opportunity, Department of Labor," 41 C.F.R. Parts 60 et seq., (which implement Executive Order No. 11246, "Equal Employment Opportunity," as amended by Executive Order No. 11375, "Amending Executive Order 11246 Relating to Equal Employment Opportunity," 42 U.S.C. § 2000e note), and with any applicable Federal statutes, executive orders, regulations, and Federal policies that may in the future affect construction activities undertaken in the course of the Project. The Contractor 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. In addition, the Contractor agrees to comply with any implementing requirements FTA may issue.

b. Age - In accordance with section 4 of the Age Discrimination in Employment Act of 1967, as amended, 29 U.S.C. § § 623 and Federal transit law at 49 U.S.C. § 5332, the Contractor agrees to refrain from discrimination against present and prospective employees for reason of age. In addition, the Contractor agrees to comply with any implementing requirements FTA may issue.

c. Disabilities - In accordance with section 102 of the Americans with Disabilities Act, as amended, 42 U.S.C. § 12112, the Contractor agrees that it will comply with the requirements of U.S. Equal Employment Opportunity Commission, "Regulations to Implement the Equal Employment Provisions of the Americans with Disabilities Act," 29 C.F.R. Part 1630, pertaining to employment of persons with disabilities. In addition, the Contractor agrees to comply with any implementing requirements FTA may issue.

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The Contractor also agrees to include these requirements in each subcontract financed in whole or in part with Federal assistance provided by FTA, modified only if necessary to identify the affected parties.

14. AMERICANS WITH DISABILITIES ACT (ADA)

ADA Access - This requirement applies to contracts for Architectural and Engineering Services. The contractor agrees to comply with the requirements of 49 U.S.C. § 5301 (d), which states the Federal policy that the elderly and persons with disabilities have the same right as other persons to use mass transportation service and facilities, and that special efforts shall be made in planning and designing those services and facilities to implement that policy. The contractor also agrees to comply with all applicable requirements of section 504 of the Rehabilitation Act of 1973, as amended, 29 U.S.C. § 794, which prohibits discrimination on the basis of handicaps, with 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 persons with disabilities, including any subsequent amendments to that Act, and with 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 persons with disabilities, including any subsequent amendments to that Act. In addition, the contractor agrees to comply with any and all applicable requirements issued by the FTA, DOT, DOJ, U.S. GSA, U.S. EEOC, U.S. FCC, any subsequent amendments thereto and any other nondiscrimination statute(s) that may apply to the Project.

15. §60-1.4 EQUAL OPPORTUNITY CLAUSE

(a) Government contracts. Except as otherwise provided, each contracting agency shall include the following equal opportunity clause contained in section 202 of the order in each of its Government contracts (and modifications thereof if not included in the original contract):

During the performance of this contract, the contractor agrees as follows:

(1) The contractor will not discriminate against any employee or applicant for employment because of race, color, religion, sex, sexual orientation, gender identity, or national origin. The contractor will take affirmative action to ensure that applicants are employed, and that employees are treated during employment, without regard to their race, color, religion, sex, sexual orientation, gender identity, or national origin. 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. The contractor agrees to post in conspicuous places, available to employees and applicants for employment, notices to be provided by the contracting officer setting forth the provisions of this nondiscrimination clause.

(2) The contractor will, in all solicitations or advertisements for employees placed by or on behalf of the contractor, state that all qualified applicants will receive consideration for employment without regard to race, color, religion, sex, sexual orientation, gender identity, or national origin.

(3) The contractor will send to each labor union or representative of workers with which he has a collective bargaining agreement or other contract or understanding, a notice to be provided by the agency contracting officer, advising the labor union or workers' representative of the contractor's commitments under section 202 of Executive Order 11246 of September 24, 1965, and shall post copies of the notice in conspicuous places available to employees and applicants for employment.

(4) The contractor will comply with all provisions of Executive Order 11246 of September 24, 1965, and of the rules, regulations, and relevant orders of the Secretary of Labor.

(5) The contractor will furnish all information and reports required by Executive Order 11246 of September 24, 1965, and by the rules, regulations, and orders of the Secretary of Labor, or pursuant thereto, and will permit access to his books, records, and accounts by the contracting agency and the Secretary of Labor for purposes of investigation to ascertain compliance with such rules, regulations, and orders.

(6) In the event of the contractor's non-compliance with the nondiscrimination clauses of this contract or with any of such rules, regulations, or orders, this contract may be canceled, terminated or suspended in whole or in part and the contractor may be declared ineligible for further Government contracts in accordance with procedures authorized in Executive Order 11246 of September 24, 1965, and such other sanctions may be imposed and remedies invoked as provided in Executive Order 11246 of September 24, 1965, or by rule, regulation, or order of the Secretary of Labor, or as otherwise provided by law.

(7) the contractor will include the provisions of paragraphs (1) through (7) in every subcontract or purchase order unless exempted by rules, regulations, or orders of the Secretary of Labor issued pursuant to section 204 of Executive Order 11246 of September 24, 1965, so that such provisions will be binding upon each subcontractor or vendor. The contractor will take such action with respect to any subcontract or purchase order as may be directed by the Secretary of Labor as a means of enforcing such provisions including sanctions for noncompliance: Provided, however, that in the event the contractor becomes involved in, or is threatened with, litigation with a subcontractor or vendor as a result Special DOL EEO Clause - Construction >$10K of such direction, the contractor may request the United States to enter into such litigation to protect the interests of the United States.

(b) Federally assisted construction contracts. Except as otherwise provided, each administering agency shall require the inclusion of the following language as a condition of any grant, contract, loan, insurance, or guarantee involving federally assisted construction which is not exempt from the requirements of the equal opportunity clause:

The applicant hereby agrees that it will incorporate or cause to be incorporated into any contract for construction work, or modification thereof, as defined in the regulations of the Secretary of Labor at 41 CFR chapter 60, which is paid for in whole or in part with funds obtained from the Federal Government or borrowed on the credit of the Federal Government pursuant to a grant, contract, loan insurance, or guarantee, or undertaken pursuant to any Federal program involving such grant, contract, loan, insurance, or guarantee, the following equal opportunity clause:

During the performance of this contract, the contractor agrees as follows:

(1) The contractor will not discriminate against any employee or applicant for employment because of race, color, religion, sex, sexual orientation, gender identity, or national origin. The contractor will take affirmative action to ensure that applicants are employed, and that employees are treated during employment without regard to their race, color, religion, sex, sexual orientation, gender identity, or national origin. 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. The contractor agrees to post in conspicuous places,

available to employees and applicants for employment, notices to be provided setting forth the provisions of this nondiscrimination clause.

(2) The contractor will, in all solicitations or advertisements for employees placed by or on behalf of the contractor, state that all qualified applicants will receive considerations for employment without regard to race, color, religion, sex, sexual orientation, gender identity, or national origin.

(3) The contractor will send to each labor union or representative of workers with which he has a collective bargaining agreement or other contract or understanding, a notice to be provided advising the said labor union or workers' representatives of the contractor's commitments under this section and shall post copies of the notice in conspicuous places available to employees and applicants for employment.

(4) The contractor will comply with all provisions of Executive Order 11246 of September 24, 1965, and of the rules, regulations, and relevant orders of the Secretary of Labor.

(5) The contractor will furnish all information and reports required by Executive Order 11246 of September 24, 1965, and by rules, regulations, and orders of the Secretary of Labor, or pursuant thereto, and will permit access to his books, records, and accounts by the administering agency and the Secretary of Labor for purposes of investigation to ascertain compliance with such rules, regulations, and orders.

(6) In the event of the contractor's noncompliance with the nondiscrimination clauses of this contract or with any of the said rules, regulations, or orders, this contract may be canceled, terminated, or suspended in whole or in part and the contractor may be declared ineligible for further Government contracts or federally assisted construction contracts in accordance with procedures authorized in Executive Order 11246 of September 24, 1965, and such other sanctions may be imposed and remedies invoked as provided in Executive Order 11246 of September 24, 1965, or by rule, regulation, or order of the Secretary of Labor, or as otherwise provided by law.

The contractor will include the portion of the sentence immediately preceding paragraph (1) and the provisions of paragraphs (1) through (7) in every subcontract or purchase order unless exempted by rules, regulations, or orders of the Secretary of Labor issued pursuant to section 204 of Executive Order 11246 of September 24, 1965, so that such provisions will be binding upon each subcontractor or vendor. The contractor will take such action with respect to any subcontract or purchase order as the administering agency may direct as a means of enforcing such provisions, including sanctions for noncompliance: Provided, however, That in the event a contractor becomes involved in, or is threatened with, litigation with a subcontractor or vendor as a result of such direction by the administering agency the contractor may request the United States to enter into such litigation to protect the interests of the United States.

The applicant further agrees that it will be bound by the above equal opportunity clause with respect to its own employment practices when it participates in federally assisted construction work: Provided, that if the applicant so participating is a State or local government, the above equal opportunity clause is not applicable to any agency, instrumentality or subdivision of such government which does not participate in work on or under the contract.

The applicant agrees that it will assist and cooperate actively with the administering agency and the Secretary of Labor in obtaining the compliance of contractors and subcontractors with the equal opportunity clause and the rules, regulations, and relevant orders of the Secretary of Labor, that it will furnish the administering agency and the Secretary of Labor such information

as they may require for the supervision of such compliance, and that it will otherwise assist the administering agency in the discharge of the agency's primary responsibility for securing compliance.

The applicant further agrees that it will refrain from entering into any contract or contract modification subject to Executive Order 11246 of September 24, 1965, with a contractor debarred from, or who has not demonstrated eligibility for, Government contracts and federally assisted construction contracts pursuant to the Executive order and will carry out such sanctions and penalties for violation of the equal opportunity clause as may be imposed upon contractors and subcontractors by the administering agency or the Secretary of Labor pursuant to Part II, Subpart D of the Executive order. In addition, the applicant agrees that if it fails or refuses to comply with these undertakings, the administering agency may take any or all of the following actions: Cancel, terminate, or suspend in whole or in part this grant (contract, loan, insurance, guarantee); refrain from extending any further assistance to the applicant under the program with respect to which the failure or refund occurred until satisfactory assurance of future compliance has been received from such applicant; and refer the case to the Department of Justice for appropriate legal proceedings

(c) *Subcontracts*. Each nonexempt prime contractor or subcontractor shall include the equal opportunity clause in each of its nonexempt subcontracts.

(d) *Incorporation by reference*. The equal opportunity clause may be incorporated by reference in all Government contracts and subcontracts, including Government bills of lading, transportation requests, contracts for deposit of Government funds, and contracts for issuing and paying U.S. savings bonds and notes, and such other contracts and subcontracts as the Deputy Assistant Secretary may designate.

(e) *Incorporation by operation of the order*. By operation of the order, the equal opportunity clause shall be considered to be a part of every contract and subcontract required by the order and the regulations in this part to include such a clause whether or not it is physically incorporated in such contracts and whether or not the contract between the agency and the contractor is written.

(f) *Adaptation of language*. Such necessary changes in language may be made in the equal opportunity clause as shall be appropriate to identify properly the parties and their undertakings.

[43 FR 49240, Oct. 20, 1978, as amended at 62 FR 66971, Dec. 22, 1997; 79 FR 72993, Dec. 9, 2014]

16. <u>BREACHES AND DISPUTE RESOLUTION</u> 49 CFR Part 18/FTA Circular 4220.1F

Disputes - Disputes arising in the performance of this Contract which are not resolved by agreement of the parties shall be decided in writing by the authorized representative of Columbus Consolidated Government/METRA Transit System's [title of employee]. This decision shall be final and conclusive unless within [ten (10)] days from the date of receipt of its copy, the Contractor mails or otherwise furnishes a written appeal to the [title of employee]. In connection with any such appeal, the Contractor shall be afforded an opportunity to be heard and to offer evidence in support of its position. The decision of the [title of employee] shall be binding upon the Contractor and the Contractor shall abide be the decision.

Performance During Dispute - Unless otherwise directed by Columbus Consolidated Government/METRA Transit System, Contractor shall continue performance under this Contract while matters in dispute are being resolved.

Read and initial this page _____

Claims for Damages - Should either party to the Contract suffer injury or damage to person or property because of any act or omission of the party or of any of his employees, agents or others for whose acts he is legally liable, a claim for damages therefor shall be made in writing to such other party within a reasonable time after the first observance of such injury of damage.

Remedies - Unless this contract provides otherwise, all claims, counterclaims, disputes and other matters in question between the Columbus Consolidated Government/METRA Transit System and the Contractor arising out of or relating to this agreement or its breach will be decided by arbitration if the parties mutually agree, or in a court of competent jurisdiction within the State in which the Columbus Consolidated Government/METRA Transit System is located.

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

17. <u>DISADVANTAGED BUSINESS ENTERPRISE (DBE)</u> 49 CFR Part 26

a. The contractor shall not discriminate on the basis of race, color, national origin, or sex in the performance of this contract. The contractor shall carry out applicable requirements of 49 CFR Part 26 in the award and administration of this U.S. DOT-assisted contract. Failure by the 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 the METRA Transit System deems appropriate. Each subcontract the

(Insert transit agency name)

contractor signs with a subcontractor must include the assurance in this paragraph (*see* 49 CFR 26.13(b)).

b. This contract is subject to the requirements of Title 49, Code of Federal Regulations, Part 26, *Participation by Disadvantaged Business Enterprises in Department of Transportation Financial Assistance Programs.* Each subcontract the contractor signs with a subcontractor must include the assurance in this paragraph (*see* 49 CFR 26.13(b)). Accordingly, as a condition of permission to bid, a certification must be completed and submitted with the bid. A bid which does not include certification may not be considered.

c. The contractor is required to pay its subcontractors performing work related to this contract for satisfactory performance of that work no later than 30 days after the contractor's receipt of payment for that work from the METRA Transit System. In addition, [the contractor may not hold retainage from its subcontractors.] [is required to return any retainage payments to those subcontractors within 30 days after the subcontractor's work related to this contract is satisfactorily completed.] [is required to return any retainage payments to those subcontractors within 30 days after incremental acceptance of the subcontractor's work by the METRA Transit System and contractor's receipt of the partial retainage payment related to the subcontractor's work.]

d. The contractor must promptly notify METRA Transit System, whenever a DBE subcontractor performing work related to this contract is terminated or fails to complete its work and must make good faith efforts to engage another DBE subcontractor to perform at least the same amount of work. The contractor may not terminate any DBE subcontractor and perform that work through its own forces or those of an affiliate without prior written consent of METRA Transit System."

18. DBE TRANSIT VEHICLE MANUFACTURER CERTIFICATION

_____ (Name of Manufacturer), a TVM, Hereby certifies that it has complied with the requirement of Section 26.49 of 49 CFR, Part 26 by submitting a current annual DBE goal to FTA. The goals apply to Federal Fiscal Year _____ (October 1, _____ to September 30, _____) and have been approved or not disapproved by FTA. _____ (Name of Contract Vendor), hereby certifies that the manufacturer of the transit vehicle to be supplied _____ (Name of Manufacturer) has complied with the above referenced requirement of Section 26.49 of 49 CFR Part 26.

Signature_____

Date_____

Title_____

Manufacturer_____

19. BUY AMERICA REQUIREMENTS 49 U.S.C. 5323(j) / 49 C.F.R. part 661

Buy America

The contractor agrees to comply with 49 U.S.C. 5323(j) and 49 C.F.R. part 661, which provide that Federal funds may not be obligated unless all steel, iron, and manufactured products used in FTA funded projects are produced in the United States, unless a waiver has been granted by FTA or the product is subject to a general waiver. General waivers are listed in 49 C.F.R. § 661.7. Separate requirements for rolling stock are set out at 49 U.S.C. 5323(j)(2)(C) and 49 C.F.R. § 661.11.

The [bidder or offeror] must submit to [WRTA] the appropriate Buy America certification below with its [bid or offer]. Bids or offers that are not accompanied by a completed Buy America certification will be rejected as nonresponsive.

In accordance with 49 C.F.R. § 661.6, for the procurement of steel, iron or manufactured products, use the certifications below.

Certificate of Compliance with Buy America Requirements

The bidder or offeror hereby certifies that it will comply with the requirements of 49 U.S.C. 5323(j)(1), and the applicable regulations in 49 C.F.R. part 661.

Date: _____

Signature: _____

Company: _____

Name: _____

Title: _____

Read and initial this page _____

Certificate of Non-Compliance with Buy America Requirements

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

Date: _____

Signature: _____

Company: _____

Name: _____

Title: _____

In accordance with 49 C.F.R. § 661.12, for the procurement of rolling stock (including train control, communication, and traction power equipment) use the following certifications:

Certificate of Compliance with Buy America Rolling Stock Requirements

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

Date: _____

Signature: _____

Company: _____

Name: _____

Title: _____

Certificate of Non-Compliance with Buy America Rolling Stock Requirements

The bidder or offeror hereby certifies that it cannot comply with the requirements of 49 U.S.C. 5323(j), but may qualify for an exception to the requirement consistent with 49 U.S.C. 5323(j)(2)(C), and the applicable regulations in 49 C.F.R. § 661.7.

Date: _____

Signature: _____

Company: _____

Name: _____

Title: _____

Read and initial this page _____

20. PRE-AWARD AND POST-DELIVERY AUDITS OF ROLLING STOCK PURCHASES
49 U.S.C. 5323(m) / 49 C.F.R. part 663

Pre-Award and Post-Delivery Audit Requirements

The Contractor agrees to comply with 49 U.S.C. § 5323(m) and FTA's implementing regulation at 49 C.F.R. part 663. The Contractor shall comply with the Buy America certification(s) submitted with its proposal/bid. The Contractor agrees to participate and cooperate in any pre-award and post-delivery audits performed pursuant to 49 C.F.R. part 663 and related FTA guidance.

21. FLY AMERICA 49 U.S.C. § 40118 / 41 C.F.R. part 301-10 / 48 C.F.R. part 47.4

Fly America Requirements

a) Definitions. As used in this clause—

"International air transportation" means transportation by air between a place in the United States and a place outside the United States or between two places both of which are outside the United States.

"United States" means the 50 States, the District of Columbia, and outlying areas.

"U.S.-flag air carrier" means an air carrier holding a certificate under 49 U.S.C. Chapter 411.

b) When Federal funds are used to fund travel, Section 5 of the International Air Transportation Fair Competitive Practices Act of 1974 (49 U.S.C. 40118) (Fly America Act) requires contractors, WRTAs, and others use U.S.-flag air carriers for U.S. Government-financed international air transportation of personnel (and their personal effects) or property, to the extent that service by those carriers is available. It requires the Comptroller General of the United States, in the absence of satisfactory proof of the necessity for foreign-flag air transportation, to disallow expenditures from funds, appropriated or otherwise established for the account of the United States, for international air transportation secured aboard a foreign-flag air carrier if a U.S.-flag air carrier is available to provide such services.

c) If available, the Contractor, in performing work under this contract, shall use U.S.-flag carriers for international air transportation of personnel (and their personal effects) or property.

d) In the event that the Contractor selects a carrier other than a U.S.-flag air carrier for international air transportation, the Contractor shall include a statement on vouchers involving such transportation essentially as follows:

Statement of Unavailability of U.S.-Flag Air Carriers

International air transportation of persons (and their personal effects) or property by U.S.-flag air carrier was not available or it was necessary to use foreign-flag air carrier service for the following reasons. See FAR § 47.403. [State reasons]:

_____

(End of statement)

e) The Contractor shall include the substance of this clause, including this paragraph (e), in each subcontract or purchase under this contract that may involve international air transportation.

Read and initial this page _____

22. CARGO PREFERENCE REQUIREMENTS 46 U.S.C. § 55305 / 46 C.F.R. part 381

Cargo Preference - Use of United States-Flag Vessels

The contractor agrees:

a. to use privately owned United States-Flag commercial vessels to ship at least 50 percent of the gross tonnage (computed separately for dry bulk carriers, dry cargo liners, and tankers) involved, whenever shipping any equipment, material, or commodities pursuant to the underlying contract to the extent such vessels are available at fair and reasonable rates for United States-Flag commercial vessels;

b. to furnish within 20 working days following the date of loading for shipments originating within the United States or within 30 working days following the date of loading for shipments originating outside the United States, a legible copy of a rated, "on-board" commercial ocean bill-of-lading in English for each shipment of cargo described in the preceding paragraph to the Division of National Cargo, Office of Market Development, Maritime Administration, Washington, DC 20590 and to the FTA WRTA (through the contractor in the case of a subcontractor's bill-of-lading.); and

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

23. CONTRACT WORK HOURS AND SAFETY STANDARDS

For all contracts in excess of $100,000 that involve the employment of mechanics or laborers, the Contractor shall comply with the Contract Work Hours and Safety Standards Act (40 U.S.C. §§ 3701-3708), as supplemented by the DOL regulations at 29 C.F.R. part 5. Under 40 U.S.C. § 3702 of the Act, the Contractor shall compute the wages of every mechanic and laborer, including watchmen and guards, on the basis of a standard work week of 40 hours. Work in excess of the standard work week is permissible provided that the worker is compensated at a rate of not less than one and a half times the basic rate of pay for all hours worked in excess of 40 hours in the work week. The requirements of 40 U.S.C. § 3704 are applicable to construction work and provide that no laborer or mechanic be required to work in surroundings or under working conditions which are unsanitary, hazardous or dangerous. These requirements do not apply to the purchase of supplies or materials or articles ordinarily available on the open market, or to contracts for transportation or transmission of intelligence.

In the event of any violation of the clause set forth herein, the Contractor and any subcontractor responsible therefor shall be liable for the unpaid wages. In addition, the Contractor and subcontractor shall be liable to the United States (in the case of work done under contract for the District of Columbia or a territory, to such District or to such territory), 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 this clause in the sum of $10 for each calendar day on which such individual was required or permitted to work in excess of the standard workweek of forty hours without payment of the overtime wages required by this clause.

The FTA shall upon its own action or upon written request of an authorized representative of the Department of Labor withhold or cause to be withheld, from any moneys payable on account of work performed by the Contractor or subcontractor under any such contract or any other Federal contract with the same prime Contractor, or any other federally-assisted contract subject to the Contract Work Hours and Safety Standards Act, which is held by the same prime Contractor, such sums as may be determined to be necessary to satisfy any liabilities of such Contractor or subcontractor for unpaid wages and liquidated damages as provided in this section. The Contractor or subcontractor shall insert in any subcontracts the clauses set forth in this section and also a clause requiring the subcontractors to include these clauses in any lower tier subcontracts. The prime Contractor shall be responsible for compliance by any subcontractor or lower tier subcontractor with the clauses set forth in this agreement.

Read and initial this page _____

Contract Work Hours and Safety Standards for Awards Not Involving Construction

The Contractor shall comply with all federal laws, regulations, and requirements providing wage and hour protections for non-construction employees, in accordance with 40 U.S.C. § 3702, Contract Work Hours and Safety Standards Act, and other relevant parts of that Act, 40 U.S.C. § 3701 et seq., and U.S. DOL regulations, "Labor Standards Provisions Applicable to Contracts Covering Federally Financed and Assisted Construction (also Labor Standards Provisions Applicable to Non-construction Contracts Subject to the Contract Work Hours and Safety Standards Act)," 29 C.F.R. part 5.

The Contractor shall maintain payrolls and basic payroll records during the course of the work and shall preserve them for a period of three (3) years from the completion of the contract for all laborers and mechanics, including guards and watchmen, working on the contract. Such records shall contain the name and address of each such employee, social security number, correct classifications, hourly rates of wages paid, daily and weekly number of hours worked, deductions made, and actual wages paid.

Such records maintained under this paragraph shall be made available by the Contractor for inspection, copying, or transcription by authorized representatives of the FTA and the Department of Labor, and the Contractor will permit such representatives to interview employees during working hours on the job.

The contractor shall require the inclusion of the language of this clause within subcontracts of all tiers.

24. INCORPORATION OF FEDERAL TRANSIT ADMINISTRATION (FTA) TERMS

FTA Circular 4220.1F

The preceding provisions include, in part, certain Standard Terms and Conditions required by U.S. DOT, whether or not expressly set forth in the preceding contract provisions. All contractual provisions required by U.S. DOT, as set forth in FTA Circular 4220.1F, are hereby incorporated by reference. Anything to the contrary herein notwithstanding, all FTA mandated terms shall be deemed to control in the event of a conflict with other provisions contained in this Agreement. The Contractor shall not perform any act, fail to perform any act, or refuse to comply with any METRA Transit System *(Insert transit agency name)* requests which would cause METRA Transit System *(Insert transit agency name)* to be in violation of the FTA terms and conditions.

Read and initial this page _____

Protest Procedures for Request for Bid (RFB) and Request for Proposals (RFP)

FTA must receive notification when all protest(s) have been received by the recipient and are well informed about its status.

If a bid protest is denied by the recipient METRA Transit System is required to inform FTA.

I. Who May File the Protest.

- An offeror, prospective offeror or prospective contractor who is aggrieved in connection with the request for proposals (RFP) or award of the contract may file a protest.
- No protest may be filed if the request for proposals (RFP) is cancelled or if all proposals received in response to the RFP are rejected.

II. Place for Filing.

- A protest must be filed with the Issuing Office at 814 Linwood Blvd, Columbus, GA 31901 identified in the RFP.

III. Time for Filing.

- If a prospective offeror is considering submitting a proposal, they must file the protest within five (5) days after the prospective offeror knew or should have known of the facts giving rise to the protest, but in no event later than the proposal submission deadline specified in the RFP.
- A protest is considered filed when received by the Issuing Office (METRA Transit System). **Protests filed after the five (5) day period shall not be considered and are deemed a failure on the part of the protestor to exhaust administrative remedies.**

IV. Contents of Protest.

- A protest must be in writing.
- A protest shall state all grounds upon which the protesting party asserts the RFP or contractor selection was improper.
- Protestors may file a protest on any phase of solicitation or award including but not limited to specifications preparation, bid solicitation, award, or disclosure of information marked confidential in the bid or offer.
- The protesting party may submit with the protest any documents or information it deems relevant.

V. Notice of Protest.

- The Issuing Office will notify Purchasing and they will inform the successful offeror of the protest if contractor selection has already been made.
- If the Issuing Office receives the protest before the selection, and it determines that substantial issues are raised by the protest, the Issuing Office will notify all offerors who appear to have a substantial and reasonable prospect of selection.

- Any offeror notified of a protest pursuant to this Section V. may file its agreement/disagreement with the Issuing Office within the time period specified in the acknowledgement of protest letter sent by the Issuing Office.

VI. Stay of Procurement.

- The METRA Transit System and Columbus Consolidated Government will promptly decide upon receipt of a timely protest whether or not the award of a contract shall be delayed, or if the protest is timely received after the award, whether the performance of the contract should be suspended.
- The Issuing Office shall not proceed further with the RFP unless METRA Transit System and Columbus Consolidated Government, in consultation with the using agency where applicable, makes a written determination that the protest is clearly without merit or that award of the contract without delay is necessary to protect the substantial interests of the Commonwealth.

VII. Response and Reply.

- Within ten (10) days of receipt of the protest, Columbus Consolidated Government is required to submit to the protesting party a response to the protest.

VIII. Procedures.

- The METRA Transit System and Columbus Consolidated Government shall review the protest and any response or reply.
- The METRA Transit System and Columbus Consolidated Government may decide the merits of the protest on the written, submitted documentation; request and review any additional documents or information deemed necessary to render a determination; or, in his sole discretion, conduct a meeting.

IX. Determination.

- The METRA Transit System and Columbus Consolidated Government shall promptly, but in no event later than 60 days from the filing of the protest unless both parties agree to an extension, issue a written determination. The determination shall:
- State the reason for the decision, and
- Send a copy of the determination to the protesting party and any other person determined by the METRA Transit System and Columbus Consolidated Government to be affected by the determination.
- Be submitted within the time period requested in order to expedite resolution of the protest. If any party fails to comply expeditiously with any request for information by the METRA Transit System and Columbus Consolidated Government, the protest may be resolved without such information.

Appendix A

DemandStar

Requirements and Instructions

DEMANDSTAR
SUBMISSION REQUIREMENTS

There is no cost to submit responses electronically through DemandStar; you will only incur a fee if you opt to receive e-notifications directly from DemandStar. You must select "Columbus Consolidated Government" as your free agency (see registration instructions). Solicitations may be accessed thru the DemandStar link that is posted at https://www.columbusga.gov/finance/purchasing/docs/opportunities/Bid_Opportunities.htm . Per Georgia HB489, the Purchasing Division will continue to post solicitations on the Georgia Procurement Registry. To receive future procurement notifications, you must register with the Team Georgia Marketplace at http://doas.ga.gov/state-purchasing/suppliers/getting-started-as-a-supplier.

Excluding responses to Requests for Proposals (RFP), a tabulation of responses will be available on DemandStar shortly after the solicitation closes. The Purchasing Division will also continue to post tabulations at https://www.columbusga.gov/finance/purchasing/docs/tabulations/bid_tabulations.htm.

Failure to submit electronic responses, via DemandStar, will result in the rejection of your response. Submittals received via U.S. Postal Service, FedEx, UPS, etc., will be returned unopened at the expense of the sender. The Purchasing Division will not accept hand-delivered submittals, and will immediately discard any submittal left in the reception area of the Finance Department.

See following pages for an Electronic Proposal Submission Requirements Checklist and information for DemandStar.

The Purchasing Division sincerely appreciates your cooperation during these unprecedented times.

ELECTRONIC BID - SUBMISSION REQUIREMENTS CHECKLIST

30' LOW FLOOR TROLLEY BUS
RFB No. 22-0010

Please submit your electronic response as indicated below:

IMPORTANT NOTICE:

1. Vendors shall submit **only** the required documents listed using the **"Bidder Response ALL Documents"** function. **Do not enter information using the "Supplemental Documents" function.**

2. **Zip files with multiple folders will not be accepted.** Vendors shall submit one PDF file of their submittal.

3. Due to file size limitations, please **do not resend the City's full specifications** document as this information is already on file.

4. **In the event DemandStar requires a dollar value for your submittal, enter "0".**

☐ 1. BID FORM PRICING PAGE – **FORM 1**

☐ 2. E-VERIFY AFFIDAVIT – **FORM 2**

☐ 3. COMMUNICATION CONCERNING THIS SOLICITATION – **FORM 3**

☐ 4. FEDERALLY REQUIRED CONTRACT CLAUSES – **ATTACHMENT 1**

☐ 5. PROOF OF INSURANCE – **FORM 5**

☐ 6. PRODUCT LITERATURE

☐ 7. WARRANTY

☐ 8. CONTRACT SIGNATURE PAGE – **FORM 6**

☐ 9. BUSINESS LICENSE

☐ 10. **Page 1** of Form W-9 – (https://www.irs.gov/pub/irs-pdf/fw9.pdf)

☐ 11. ADDENDA ACKNOWLEDGEMENT (if any) – **FORM 4**

Registering for DemandStar

DEMANDSTAR
Building Communities.

We are pleased to announce our membership in the DemandStar network. DemandStar is an online marketplace that connects our suppliers directly to the bids, quotes and RFPs that matter to them.

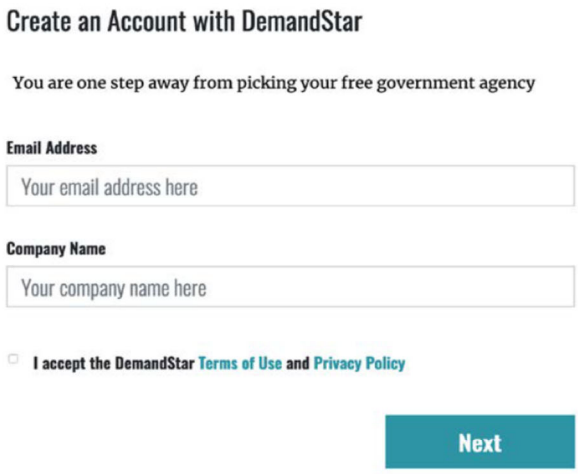
DemandStar is open and accessible to all businesses and provides instant access to our solicitations. By registering for your complimentary DemandStar account, you will receive:

- **Instant** access to bids, quotes and RFPs
- **Automatic** notifications, right to you inbox, of bids that match the commodity codes you select
- The ability to **quickly view** the contractual terms and scope of work
- All the **forms and documents** you need in one place
- Access to **more government bids** in neighboring cities, counties and states

It's EASY! Get started with these 3 easy steps!

1 REGISTER

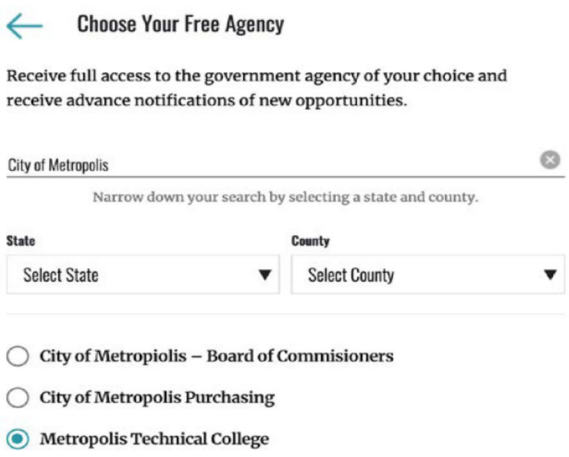
Go to:
https://www.demandstar.com/registration



206.940.0305

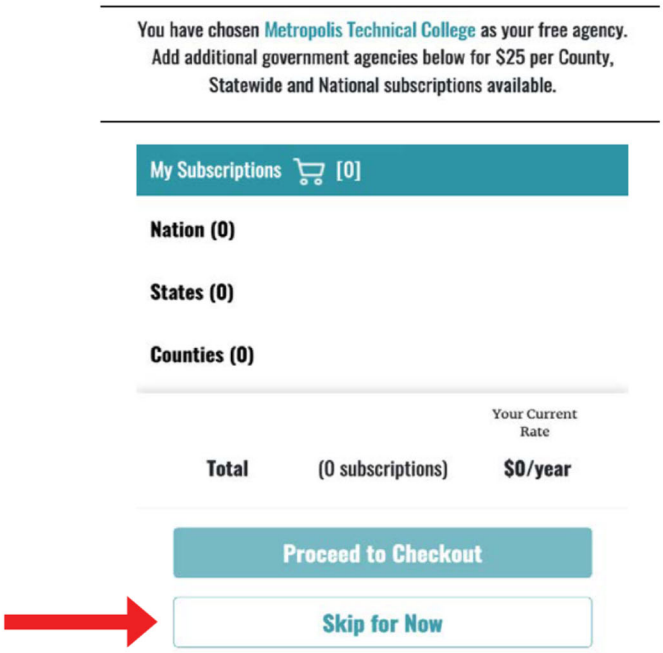
2 CHOOSE YOUR FREE AGENCY

Type in the name of the government agency you'd like to add, for example "City of Metropolis" in the Search Box



3 CHECK OUT

Check out with your **FREE AGENCY** Registration by clicking "Skip for now" on the page where it gives you options to add additional counties and States



SIGN UP

Visit www.demandstar.com

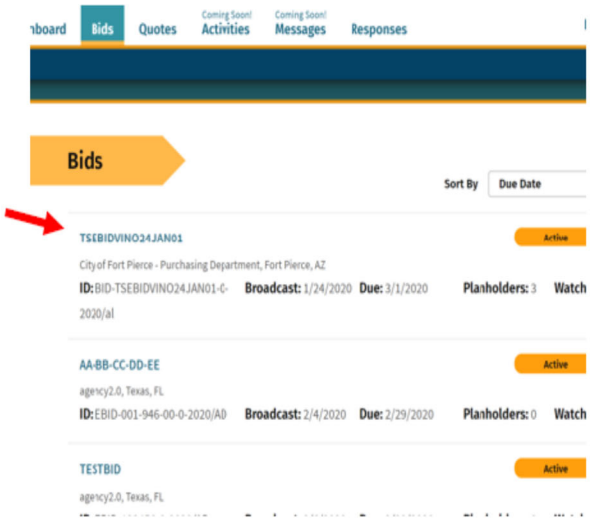
Responding to an Electronic Bid

5 Step Instructions

Step 1

Many governments are moving toward requiring bid responses electronically. Here are the steps to respond to a bid Electronically.

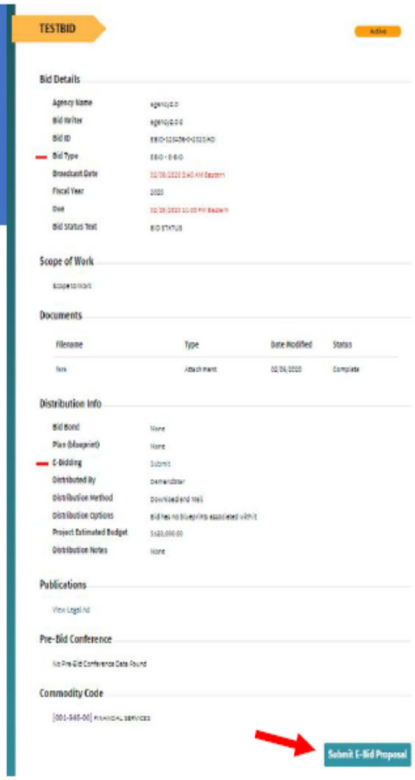
- Click on the solicitation name



Step 2

Once you are in the solicitation, you will see the Bid Details page that is standard for all solicitations

- When you are ready to submit your bid, click on "Submit E-Bid Proposal"

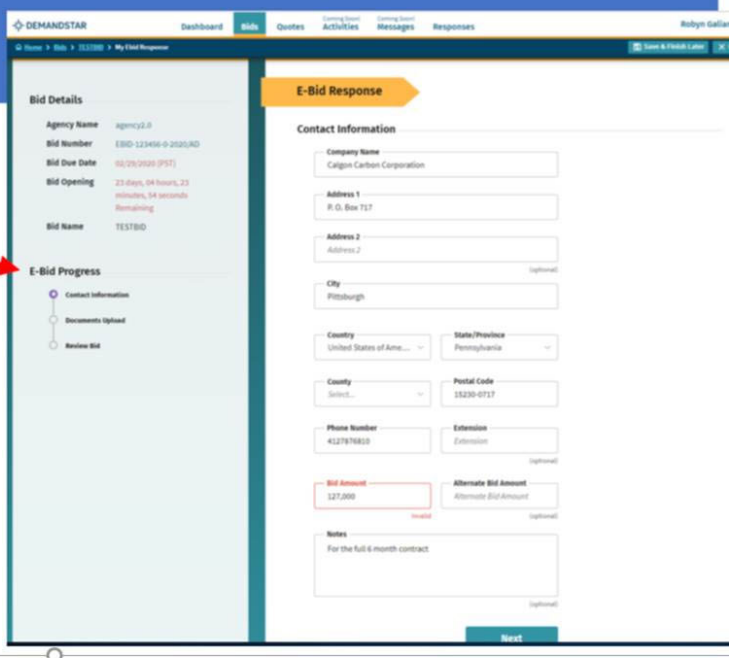


Step 3

Enter information requested page-by-page and you can see what will come next via the menu bar on the left under "E-Bid Progress"

Enter "0" as your bid (proposal) amount.

(As cost proposals remain confidential until after contract award (if any), Columbus Consolidated Government will not consider proposed costs, fees, revenue, etc., that are entered directly into DemandStar.)



Step 4

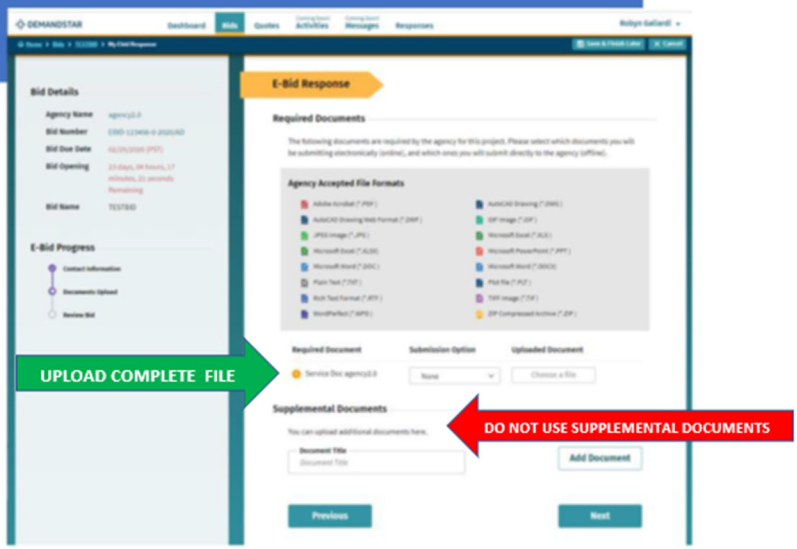
After you click NEXT on the Contract Information page, you will be directed to enter the documents required.

Create one (1) file containing **only** the required documents listed on the "*Electronic Proposal Submission Checklist*" page of the specifications and upload using the "**Bidder Response ALL Documents**" function.

NOTE: Do not enter information using the "Supplemental Documents" function.

Due to file size limitations, please do not include the City's specification document in your uploaded response as this information is already on file. Font and page limitations may also apply.

BEST PRACTICE TIP: In some instances, multiple addenda may be issued for a solicitation. To avoid having to re-upload your firm's response file multiple times, it is **recommended** that vendors upload within five (5) business days of the due date. The City posts all documents, to include addenda, on the Finance Department Bid Opportunities web page: https://www.columbusga.gov/finance/purchasing/docs/opportunities/Bid_Opportunities.htm.



Step 5

Review Your E-Bid Response, and if everything is correct, then press "Submit Response"

You are done! And the government to which you've submitted this will download your responses and documents and see the day and time upon which you submitted your proposal.