305 Fountain Circle
Huntsville, AL 35801

Huntsville, Alabama

Cover Memo

Meeting Type: City Council Regular Meeting **Meeting Date:** 7/25/2024 **File ID:** TMP-4397

Department: Public Transit

Subject:

Type of Action: Approval/Action

Resolution authorizing the Mayor to enter into an agreement with Gillig, LLC for the purchase of diesel/hybrid diesel buses.

Resolution No.

Finance Information:

Account Number: 2000-54-54M11-520100-PT111040

City Cost Amount: $491,471.20

Total Cost: $2,457,356.00

Special Circumstances:

Grant Funded: 1,965,884.80

Grant Title - CFDA or granting Agency: Grant Application No. 1075-2023-3

Resolution #: 23-610

Location: (list below)

Address: 500 Church St.
District: District 1 ☐ District 2 ☐ District 3 ☐ District 4 ☐ District 5 ☐

Additional Comments:

AGREEMENT BETWEEN THE CITY OF HUNTSVILLE AND GILLIG, LLC FOR THE PURCHASE OF PUBLIC TRANSIT BUSES

STATE OF ALABAMA)
)
COUNTY OF MADISON)

This Agreement is made this 25 day of July, 2024 by and between the City of Huntsville, Alabama, a municipal corporation (hereinafter referred to as the "City") and Gillig, LLC a California Limited Liability Company (hereinafter referred to as "Gillig") for the purchase and sale of public transit buses. The City and Gillig hereby agree as follows:

STATEMENT OF BACKGROUND AND INTENT

A. The City issued Request for Proposals Number 22-2024-54 for Buses, dated December 21, 2023. This Request for Proposals, together with all attachments, amendments and addendums, is referred to as the "RFP", and is attached hereto and incorporated by reference as exhibit "A". The RFP sought a one-year contract with two one-year renewable options to purchase both diesel and hybrid/diesel buses.

B. In response to the RFP, Gillig submitted to the City a proposal dated March 26, 2024. This proposal, together with all attachments, is referred to herein as the "Proposal", and is available for inspection at the City's Office of Parking and Public Transportation located at 500B Church Street, Huntsville, AL 35801.

C. The City and Gillig have negotiated and now desire to enter into an agreement for Gillig to manufacture and deliver buses to the City, in accordance with the terms and conditions set forth herein.

WITNESSETH

NOW THEREFORE, in consideration of the mutual promises and covenants, herein contained, the parties hereby agree as follows, to wit:

1.0 Scope of Work.

1.1 Manufacture

Gillig will manufacture and deliver to the City's facility located at 500B Church Street, Huntsville, AL 35801 up to four buses diesel or hybrid/diesel (as ordered by the City) buses per year. The term of this contract is one year, effective July, 2024

The City shall, prior to the end of the term or any renewal term, have the option to renew for two additional one-year terms.

More particularly, the scope of work will be as set forth in City of Huntsville Request for Proposals #22-2024-54, dated December 21, 2023, including all exhibits, attachments and addendums, and in the Proposal submitted by Gillig, dated March 26, 2024. The scope of work set forth in the Request for Proposals is amended for the purposes of this Agreement as follows:

The portion of the second paragraph of APPENDIX A: CITY OF HUNTSVILLE SCOPE OF WORK & RELATED INFORMATION which reads, "The City of Huntsville agrees to confirm the current year appropriation of federal funds associated with a contemplated Purchase Order, prior to issuance of the Purchase Order. Due to anticipated delivery lead times that may exceed 12 months, the City of Huntsville reserves the right to issue Purchase Orders based on historic federal allocations in the next fiscal year; without penalty should that federal allocation not occur, and order canceled" is amended (for purposes of this Agreement only) to read as follows:

"The City of Huntsville agrees to confirm the current year appropriation of federal funds associated with a contemplated Purchase Order, prior to issuance of the Purchase Order. Due to anticipated delivery lead times that may exceed 12 months, the City of Huntsville reserves the right to issue Purchase Orders based on historic federal allocations in the next fiscal year; should that federal allocation not occur, and order canceled, the Contractor shall be paid costs, including contractor close-out costs and profit on work performed up to the time of termination."

City of Huntsville agrees that GILLIG's FY 2024 FTA Notice of Eligibility letter and GILLIG's DBE Certification comply with the requirements of City of Huntsville Exhibit D Disadvantage Business Enterprise and Exhibit D DBE Participation Schedule form. No further reporting will be required.

In the event there is a conflict between the two documents, the terms of the City's Request for Proposals shall control.

1.2 Delivery

Each bus produced pursuant to this Agreement shall be delivered FOB destination on its own power in new condition along with the original invoice and manufacturer's statement of origin. Delivery lead time shall be as proposed by Gillig in the "Pricing Schedule" included within its Proposal. The Pricing Schedule is attached hereto and incorporated herein by reference as Exhibit B. The warranty will go into effect when the bus is placed in service. Each bus must be serviced and ready for use when delivered. Gillig shall provide the City with all service, warranty, and technical bulletins for the model(s) purchased within 60 days of date of delivery. Gillig shall give the City five (5) days' notice of Delivery.

1.3 Acceptance Testing

The City shall conduct acceptance tests on each delivered bus. These tests shall be completed within thirty (30) days after bus delivery and shall be conducted in accordance with the City's written test plans. The purpose of these tests is to identify defects that have become apparent between the time of bus release and delivery to the City. The post-delivery tests shall include visual inspection and bus operations. No post-delivery test shall apply new criteria that are different from criteria applied in a pre-delivery test.

Buses that fail to pass the post-delivery tests are subject to non-acceptance. The City shall record details of all defects on the appropriate test forms and shall notify Gillig of acceptance or non-acceptance of each bus, after completion of the tests. The defects detected during these tests shall be repaired according to procedures defined in the contract.

1.4 Liquidated Damages

In the event that Gillig does not make shipments within eighteen (18) months of order through no fault of the City, Gillig agrees to pay to the City as liquidated damages for each and every day (past eighteen months) that the ordered bus is not shipped as agreed, One Hundred Dollars ($100.00) per day. This figure does not include incidental or consequential damages to which the City retains full rights in the event of breach.

2.0 Contract Amount and Payment Schedule.

The unit price for the buses and options are as set forth in Exhibit B. The City will pay the unit price (including all options selected) upon delivery and acceptance by the City. In the event of any conflict in the terms set forth in the RFP and Gillig's price proposal, the terms of the RFP shall control.

3.0 General Terms and Conditions

3.1 Notices.

All notices (a) shall be in writing, (b) shall be deemed served on the date on which they are actually received, and (c) shall be served by (i) personal delivery, or (ii) United States First Class Certified or Registered Mail, Return Receipt Requested, properly addressed with postage prepaid or (iii) a nationally recognized overnight courier/delivery service (i.e. Federal Express, United Parcel Service, etc.) or (iv) electronic transmission ("E-mail") or telephonic facsimile transmission ("Fax") in conjunction with one of the other methods of delivery set forth in subparagraphs (i), (ii) or (iii), each addressed as follows:

Gillig 451 DISCOVERY DRIVE, LIVERMORE, CA 94551; SALES@GILLIG.COM; 800-735-1500
Attn: WILLIAM F. FAY, JR., VICE PRESIDENT SALES

City Of Huntsville

Attention: John Autry, Project Manager
500B Church Street
Huntsville, Alabama 35801
(256) 427-6826

3.4 Work Outside Scope of Project.

No work outside the scope of work in the Agreement shall be authorized other than by mutually agreeable and properly authorized written change order.

4.0 SUBCONTRACT.

Gillig may not associate/hire/contract with any subcontractor/independent contractor/consultant in order to fulfill the requirements of this Agreement without obtaining the prior written approval of the City's Project Manager. Gillig shall be solely responsible for any and all payments/wages/earnings due any such independent contractor for work performed thereby in furtherance of this Agreement. Gillig shall be legally responsible for any and all actions of any subcontractor/independent contractor/consultant. Consent by the City to any subcontract shall not constitute approval of the acceptability of any subcontract price or of any amount paid under any subcontract, nor relieve Gillig of any responsibility for performing this contract. The City's Project Manager shall have final approval of any proposed subcontractor.

5.0 Confidential Information.

Each party hereto (each, a "Recipient") shall protect and keep confidential all non-public information disclosed to Recipient by the other party (each, a "Discloser") and identified as confidential by Discloser ("Confidential Information) and shall not, except as may be authorized by Discloser in writing, use or disclose any such Confidential Information during and after the term of this Agreement. These obligations of confidentiality shall not apply to information that: (1) was previously known to Recipient; (ii) is or becomes publicly available through no fault of Recipient; (iii) is disclosed to Recipient by a third party having no obligation of confidentiality to Discloser relating to such Confidential Information; (iv) is independently configured by Recipient; or (v) is required to be disclosed as a matter of law (e.g. Open Records Laws).

6.0 Termination

The contract may be terminated in accordance with Section 5 (Termination Provisions) of Appendix E of the RFP.

7.0 Nonexclusiveness of Remedies.

Any right or remedy on behalf of the City or Gillig provided for in any of these specifications, including but not limited to any guaranty or warranty or any remedy for

nonperformance, shall be in addition to and not a limitation of any right or remedy otherwise available by law, equity, or statute.

8.0 Injuries to Gillig.

Gillig is obligated to obtain sufficient liability insurance coverage (as well as worker's compensation coverage, if required by law) for the benefit of Gillig and its agents and/or employees. Gillig waives any and all rights to recovery from the City for any injuries that Gillig (and/or its agents and/or employees) may sustain while performing services under this Agreement.

9.0 Insurance and Indemnity.

Gillig shall meet the insurance, indemnity and bond requirements set forth in Appendix D of the RFP with the following modifications: 1) Section C(1)(a) of Appendix D is hereby renumbered as Section C(1)(b) and Section (C)(1)(b) is renumbered as Section C(1)(c); and 2) the following language is added as Section C(1)(a) of Appendix D:

> The City, its agents, officers, employees, representatives and specified volunteers are to be covered as Additional Insured's, as their interests may appear, as respects: liability arising out of activities performed by or on behalf of the contractor and sub-contractor, if any, for products used by and completed operations of the Contractor, or automobiles owned, leased, hired or borrowed by the Contractor. The coverage shall contain no special limitations on the scope of protection afforded to the City, its agents and their officers, employees, representatives or specified volunteers. Waiver of subrogation shall be included.

10. GENERAL PROVISIONS.

10.1 Governing Law and Venue.

This Agreement shall be governed by and construed in accordance with the laws of the State of Alabama without regard to Alabama conflict of laws provisions. Sole venue for any action to enforce the terms of this Agreement shall be in the state or federal courts of Madison County, Alabama.

10.2 Force Majeure.

Should any delays to delivery emanating from Force Majeure events (non-exhaustive examples of this event: earthquake, flood, any other natural disaster, pandemic, civil disturbance, strikes, labor disputes, fires, explosions, government imposed restrictions, war and other hostilities or embargo), Contractor shall be excused from said delay and liability.

10.3 Headings.

The titles and headings of the various sections and paragraphs in this Agreement are intended solely for convenience of reference and are not intended for any other purpose whatsoever, or to explain, modify or place any construction upon or on any of the provisions of the Agreement.

10.4. Agreement Deemed to Have Been Jointly Drafted.

The parties acknowledge that they have thoroughly reviewed this Agreement and bargained over its terms. Accordingly, neither party shall be considered responsible for the preparation of this Agreement which shall be deemed to have been prepared jointly by both parties. The provisions of the Agreement allocate the risks between the parties. The terms and conditions included herein reflect the allocation of risk, and each provision herein is a part of the bargained for consideration of this Agreement.

10.5 Waiver.

The failure of the City to insist in one or more instances upon the performance of any term of this Agreement is not a waiver of its right to future performance of such terms unless such waiver is in writing and signed by a duly authorized officer of the City.

10.6 All Amendments in Writing.

No provisions in either party's purchase orders, or in any other business forms employed by either party will supersede the terms and conditions of this Agreement, and no supplement, modification, or amendment of this Agreement shall be binding, unless executed in writing by a duly authorized representative of each party to this Agreement.

10.7 Third Parties.

Nothing contained herein shall create a contractual relationship with, or any rights in favor of, any third party.

10.8 Non Discrimination Policy.

In consideration of this agreement, the parties hereto for themselves, their agents, officials, employees, and servants agree not to discriminate in any manner on the basis of race, color, creed, age, sex, disability or national origin with reference to the subject matter of this agreement, no matter how remote.

10.9 No Assignment

Neither party shall assign its rights hereunder, excepting its right to payment, nor shall it delegate any of its duties hereunder without the written consent of the other party.

10.11 Entire Agreement.

The parties have read this Agreement, including all Exhibits, and agree to be bound by its terms, and further agree that it constitutes the complete and entire agreement of the parties and supersedes all previous communications, oral or written, and all other communications between them relating to the subject matter hereof. No representations or statements of any kind made by either party, which are not expressly stated herein, shall be binding on such party. Any pre-printed terms and conditions of Gillig's and City's business forms shall be without legal effect with respect to this Agreement or any subsequent Statements of Work.

10.12 Electronic Signatures

The Parties agree that any form of electronic signature, including but not limited to signatures via facsimile, scanning, or electronic mail, may substitute for the original signature and shall have the same legal effect as the original signature.

10.13 Order of Precedence of Contract Documents

In the event any conflict, discrepancy, or inconsistency among any of the documents which make up this contract, the following shall control, and Gillig is deemed to have based its estimate of performing the work upon the order of precedence as set forth below. Interpretations shall be based upon the following order of precedence: 1) this Agreement; 2) City of Huntsville Request for Proposals #22-2024-54 dated December 21, 2023; and 3) Gillig's Response to Request for Proposals #22-2024-54 dated March 26, 2024 (which include the Pricing Proposal attached hereto as Exhibit B).

IN WITNESS WHEREOF, the parties hereto, by their respective duly authorized officers or representatives, have each executed this Agreement, effective as of the date first above written.

CITY OF HUNTSVILLE, ALABAMA

By: _____ Attest: _____
Tommy Battle Shaundrika Edwards
Its: Mayor Its: Clerk

GILLIG, LLC

By: _____
WILLIAM F. FAY JR.

Its: VICE PRESIDENT, SALES

Exhibit A

HUNTSVILLE

Tommy Battle
Mayor

City of Huntsville, Alabama
Finance Department
Procurement Services Division

Request For Proposals
Buses

Request for Proposal #:	22-2024-54
Issue Date:	December 21, 2023
Bid Bond Requirements:	No, a bid bond is not required
Certificate of Insurance Requirements:	Yes, a certificate of insurance is required
Pre-Proposal Teleconference Date and Time:	January 18, 2024 @ 2:00:00 PM CST
Pre-Proposal Conference Date:	N/A
Deadline for Questions Date:	February 13, 2024 @ 2:00:00 PM CST
RFP Closing Date:	February 20, 2024 @ 2:00:00 PM CST
Post-Closing Proposer Teleconference Date:	N/A
Post-Closing Proposer Presentation/Demonstration Date:	N/A
Procurement Services Contact:	Carrie Power Carrie.power@huntsvilleal.gov (256) 564-8060
City Internet Site:	https://www.bidnetdirect.com/alabama/cityofhuntsville
RFP E-Documents:	Exhibit A, B, C & D
Proposal Copies to be Submitted	1 Original, 5 Copies
City File Reference:	Buses RFP 2024

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SECTION 1. INTRODUCTION

The City hereby gives notice it is requesting sealed proposals for the goods and/or services described in Appendix A of this RFP. The City intends to award a contract to the successful Proposer(s) who the City determines will best meet the City's objectives as described herein.

The major objectives of this RFP are as follows:

- Describe the goods and/or services desired by the City.
- Describe the Proposal and City contract terms and conditions.
- Provide Proposers with instructions for responding to this RFP.

1.1 DEFINITIONS

In addition to other terms that may be defined herein, certain terms and abbreviations are defined as follows:

"City"	City of Huntsville, Alabama
"Contract"	The agreement between the City and the Proposer chosen by the City pursuant to this RFP, which shall include this RFP and the Proposal.
"Contractor"	The party with whom the City will execute the Contract.
"Proposal"	The response to this RFP submitted by a Proposer.
"Proposer"	A person or entity submitting a response to this RFP.
"RFP"	This Request for Proposal, all addenda, and appendices.
"RFP E-Documents"	The documents referenced by this name on the cover of this RFP.

1.2 CONTACT INFORMATION

All questions regarding this RFP must be directed in writing to the contact provided on the cover of this RFP.

1.3 SCHEDULE

The sequence of events related to this RFP are as follows:

A. Pre-Proposal Conference: A Pre-Proposal Teleconference or Conference, as the City deems necessary, will be held at the date and time specified on the cover of this RFP, at which time City representatives will discuss the requirements of the RFP and answer any questions regarding the RFP. The City will issue a notification by addenda of the Teleconference call-in number and password on the day of the conference. Any Conferences will be held in the City Council Chambers located on the 1st floor of the Municipal Administration Building, 308 Fountain Circle, Huntsville, Alabama.

B. Deadline for Questions: All questions must be received in writing not later than the deadline for questions date and time noted on the cover of this RFP.

C. RFP Closing Date: Proposals are due no later than 2:00:00 PM City time on the proposal closing date noted on the cover of this RFP.

D. Proposer Teleconference/Presentation/Demonstration: To possibly be held as described herein on the date and time noted on the cover of this RFP.

E. Proposal Selection: Within ninety (90) days of proposal closing date, unless extended by the City.

F. Proposal Negotiation: To be announced.

G. Contract Award: Successful Proposer(s) will be notified of the date the award will be submitted to the City Council for approval. The City will notify Proposer(s) about the need to execute contract documents and provide other required documents as required.

H. Award Notification: City will provide final notification of award and/or notification to proceed when all City requirements have been met.

SECTION 2. GENERAL TERMS & CONDITIONS

It is the intent of the City, through this RFP to establish to the greatest extent possible complete clarity regarding the obligations of all parties to be incorporated in the Contract. Before submitting a proposal, Proposer should become familiar with all requirements of this RFP and the conditions and requirements under which the Contract obligations must be fulfilled.

2.1 INTERPRETATIONS

The City will not be responsible for the Proposer's misunderstanding of the scope of work or any terms and conditions of the Contract. The City will not be responsible for oral interpretations of this RFP. Proposer's questions and/or comments concerning lack of clarity, defects and questionable or objectionable material in the RFP must be submitted in writing to and received by the contact provided on the cover of this RFP not later than the deadline for questions date noted on the cover of this RFP. Questions shall specify the Section(s), paragraph(s), and page number(s) to which the question refers.

2.2 ADDENDA

The City may issue addenda to this RFP to provide additional information or clarifications. The City of Huntsville will not be responsible for a Proposer's failure to acquire any addenda issued. The City will issue notifications of addenda issued via the City's Internet Site, and Proposer's who have downloaded this RFP will be notified of any addenda by email. It is the Proposer's responsibility, however, to periodically check the City's Internet Site for addenda issued. All Proposers will be responsible for downloading any addenda at https://www.bidnetdirect.com/alabama/cityofhuntsville.

Proposer shall acknowledge receipt of all addenda in the space provided on the Proposal Pricing Form (Appendix G). Failure to acknowledge receipt of addenda shall not relieve Proposer of full responsibility for all requirements contained in addenda.

2.3 PRE-PROPOSAL CONFERENCES & QUESTIONS

A Pre-Proposal Conference may be scheduled to review and answer any pertinent questions concerning the proposal and the specifications. Any questions or requests for clarification must be addressed at a Pre-Proposal Conference, if scheduled, or submitted in writing not later than the deadline for questions noted on the cover of this RFP.

2.4 PRICE REDUCTIONS

If at any time after the date of the contract award, the Proposer makes a general price reduction in the comparable price of any material covered by the contract to customers generally, an equivalent price reduction based on similar quantities and/or considerations shall apply to this contract for the duration of the contract period or until the price is further reduced. Such price reduction shall be effective at the same time and in the same manner as the reduction in the price to customers generally. For purpose of this provision, an occasional sale at a lower price or sale of distressed merchandise would not be considered a general price reduction.

2.5 BID BOND

An original Bid Bond is required as specified in Appendix D unless it is waived on the cover of this RFP. Any proposal submitted without an original Bid Bond, when required, will not be considered. Such Bid Bond shall be an original document in the form of a firm commitment, such as Bid Bond, postal money order, certified check, cashier's check, or irrevocable letter of credit. A company check is not an acceptable Bid Bond. Bid Bonds shall be retained by the City until such time as a contract is executed; a purchase order is issued, or in some cases, materials and/or equipment is received, if a Performance Bond is not required.

2.6 LOCAL PREFERENCE

In accordance with Alabama State Law, the City may choose to utilize a local preference for items of personal property only. In the event a Proposal is received for an item of personal property from a Proposer deemed to be a responsible Proposer, having a place of business within the Huntsville City limits and the Proposer's price is no more than three percent (3%) greater than the price of the lowest responsible Proposer located outside the City limits, the City may award the Contract to the local responsible proposer. The local preference is not applicable if the procurement in question is funded with a federal grant.

2.7 PROPOSAL AWARDS

The City reserves the right to accept or reject any or all items covered in the request, or any portion(s) thereof, waive formalities, re-advertise and/or take such other steps decreed necessary and in the best interest of the City. The City reserves the right to make an award in whole or part to one or more proposers whenever deemed necessary and in the best interest of the City. The award will be made to the responsive and responsible proposer providing the best value to the City, based on the City's sole discretion in making this determination. This determination may involve all or some of the following factors: price,

conformity to specifications, financial ability to meet the contract, previous performance, facilities and equipment, availability of repair parts, experience, delivery promise, terms of payments, compatibility as required, other costs, and other objective and accountable factors which are reasonable. In the event only one proposer responds to a request for proposal, the City may reject the proposal and negotiate the purchase or contract, providing the negotiated price is lower than the proposal price.

Written notification of award will be mailed the successful proposer upon approval of the Huntsville City Council. All other proposers will also be notified by mail and Bid Bonds, if applicable, will be returned at that time. Orders will be placed by issuance of a purchase order against the contract which serves as the contractor's authorization. Delivery instructions will be noted on the purchase order as well as billing instructions.

2.8 INVOICING THE CITY

Invoices submitted pursuant to this RFP must include:

a. Name and remittance address of Proposer.
b. Invoice date.
c. Invoice number.
d. RFP number.
e. City purchase order number.
f. Contact information of the person to be notified in event of a discrepancy in the invoice.

2.9 PAYMENT TERMS

The City will render payment to the successful Proposer(s) by check on a net 30-day basis after receipt of an invoice that has been submitted as required in this RFP, unless the City authorizes alternative terms in the Contract.

2.10 NON-APPROPRIATION

As required by State of Alabama law, the City assumes no legal liability to purchase items or services under any contract until funds are appropriated for that particular fiscal year.

2.11 SPECIFICATIONS

The specifications are provided to potential proposers as guidelines that describe the type and quality of commodity or service the City is seeking to procure. The proposer must indicate compliance or list exceptions to each specification item for consideration. Failure to comply with this provision could be cause for rejection of the proposal.

The name of a certain brand, make, manufacturer, or definite specification is to denote the quality standard of the article desired but does not restrict the proposer to the specified brand, make, manufacturer, or specification names. It is set forth to convey the general style, type, character, and quality of the article desired by the City. Proposer shall incur all cost involved in obtaining an Independent Laboratory Test if the City deems necessary.

It will be assumed that all proposals are based upon the specifications unless the proposer stipulates to the contrary in the Proposal, in which case, the Proposer shall point out in detail any and all deviations from the specifications. Proposers having items that do not meet the specifications may offer the same on an optional basis. Minor exceptions from the specifications may be considered if they do not alter the performance for the intended purpose. The City reserves the right to request a demonstration of any and all items proposed before making the award.

All items proposed will be inspected by a representative of the City upon delivery to ascertain compliance with the specifications. Items not in compliance with the specifications will be rejected until proper remedial measures are taken to assure compliance.

2.12 NEW EQUIPMENT

All manufactured commodities shall be new, latest model unless otherwise stipulated. The proposer shall guarantee that commodities submitted for their proposal shall be new, and of the latest and most improved model of the current production and shall be of first quality as to workmanship and materials used in said units. All modifications shall be made at the factory. Equipment shall not have been operated for any purpose other than routine operational testing. Demonstrators will not be accepted unless specifically requested.

2.13 WARRANTY

The Proposer shall assume full responsibility for warranty of all components of the equipment. A statement shall be attached with the Proposal setting out the conditions of the warranty. The manufacturer's standard warranty shall be furnished.

2.14 CONTRACT TERM

In accordance with the Alabama Competitive Bid Law, as amended, the City may enter into multi-year leases, purchase, and lease-purchase contracts for the acquisition of goods, supplies, materials and all other types of personal property, real property and services for a period not to exceed three years with the following provisions:

a. Contracts shall terminate without further obligation on the part of the City except as set forth in the contract as permitted by this Act at the close of the calendar year in which it was executed and at the close of each succeeding calendar year for which it may be renewed as provided in this section;

b. Contracts may provide for automatic renewal unless positive action is taken by the City to terminate such contract, and the nature of such action shall be determined by the City and specified in the contract.

2.15 CONTRACT ASSIGNMENT AND SUBLETTING

The Contractor shall not assign, transfer, convey, sublet or otherwise dispose of his or her contractual duties to any other person, firm or corporation without the previous written consent of the city. If the contractor desires to assign his or her right to payment of the contract, the contractor shall notify the city immediately, in writing, of such assignment of right to payment. In no case shall such assignment of contract relieve the contractor of his or her obligations or change the terms of the contract.

2.16 INSURANCE REQUIREMENTS

Contractor must maintain insurance as described in Appendix D, which shall be incorporated into the Contract, for which proof of insurance shall be required.

2.17 HOLD HARMLESS

The successful proposer agrees to defend, indemnify, and hold the City harmless from any and all causes of action or claims of damages arising out of or related to proposer's performance.

2.18 ORDER OF PRECEDENCE

Any expressed terms or conditions made in this RFP shall supersede any provisions outlined herein the General Terms &Conditions.

2.19 ALABAMA IMMIGRATION LAW

Proposer must agree to comply with Alabama Immigration Law - see Appendix H, Section 3.3; and complete Appendix J.

2.20 EQUAL OPPORTUNITY

The City has an Equal Opportunity Purchasing Policy and encourages utilization of minority and women-owned business enterprises in its procurement activities. The City provides equal opportunities for all businesses and does not discriminate against any Proposer regardless of race, color, creed, sex, national origin, or disability in consideration for an award.

2.21 ADA

The vendor/Proposer/contractor agrees to comply fully with the Americans with Disabilities Act and will indemnify and hold harmless the City from all costs, including but not limited to damages as well as attorney's fees and staff time, in any action or proceeding brought alleging a violation of the American with Disabilities Act.

2.22 RIGHT TO INSPECT

At reasonable times, the City may inspect those areas of the Proposer's place of business that are related to the performance of a contract. If the City makes such an inspection, the Proposer must provide reasonable assistance. The City reserves the right on demand and without notice to inspect all of the Proposer's files associated with a subsequent contract where payments are based on Proposer's record of time, salaries, materials, or actual expenses. This same clause will apply to any subcontractors assigned to the contract; and, subcontractors, at any tier, may be required to provide access to records as provided in 49 U.S.C. § 5325(g), if required by federal regulations that may pertain the Contract.

2.23 ETHICS, COMPLIANCE AND OTHER MATTERS

For purposes of this Section, Proposer includes Proposer's parent company(ies) , subsidiary(ies), and affiliate(s). In Appendix H, Section 3.4, Proposer must acknowledge;

1) Proposer is fully qualified to provide the requested goods and services to the City.

2) Proposer is properly established, licensed and authorized to do business in the State of Alabama and the City, or will be prior to commencement of performance under the Contract. Proposer shall provide evidence of such licenses to the City upon request.

3) This Proposal is true, accurate and complete.

4) This Proposal is genuine and is not made in the interest of, or in the behalf of, any undisclosed person, firm, or corporation.

5) Proposer has not directly or indirectly induced or solicited any other Proposer to this RFP to submit a false or sham Proposal.

6) Proposer has not sought by collusion to obtain for themselves any advantage over any other Proposer to this RFP or over the City.

7) Except as disclosed in Proposal, Proposer:
   i) Has not, in the past three (3) years made contributions to elected City officials or candidates for City offices;
   ii) Is not subject to pending, contemplated or ongoing administrative or judicial proceedings material to Proposer's business, finances or products including, but not limited to, any litigation, consent orders, debarment or contracts with any local, state or federal regulatory agency issued to Proposer;
   iii) Has not had an agreement canceled or terminated due, in whole or in part, to the fault of Proposer, or a default or breach of contract on the part of the Proposer (the details of which shall be disclosed in Proposal);
   iv) Has not had a bond or surety canceled or forfeited (the details of which shall be disclosed in Proposal); and,
   v) Has not been adjudged bankrupt (Chapter 7) or petitioned the court for relief under the Bankruptcy Code or Act for either business reorganization (Chapter 11) or the Wage Earner's Plan (Chapter 13) (the details of which shall be disclosed in Proposal).

8) Neither the Proposer nor any individuals who will fulfill Contract requirements has a possible conflict of interest with the City, except as disclosed in writing in the Proposal; that the City reserves the right to cancel the award if any interest disclosed from any source could either give the appearance of a conflict or cause speculations to the objectivity of the goods and services to be provided by Proposer; and that the City's determination regarding any questions of conflict of interest shall be final.

9) Proposer is not indebted to the City and will not at any time during the term of the Contract (including any extensions or renewals thereof) be indebted to the City, for or on account of any delinquent taxes, liens, judgments, fees or other debts for which no written agreement or payment plan satisfactory to the City has been established. In addition to any other rights or remedies available to the City at law or in equity, Proposer acknowledges that upon any breach or failure to conform to such certification, the City shall have the right to, and may, at the option of the City, withhold payments otherwise due to Proposer, and, if such breach or failure is not resolved to the City's satisfaction within a reasonable time frame as specified by the City in writing, this will offset any such indebtedness against said payments and/or terminate the Contract for default (in which case Proposer shall be liable for all excess costs and other damages including reasonable attorney's fees resulting from the termination).

10) Code of Ala. 1975 §36-25-11 requires that contracts entered into with a public official, a public employee, a member of the household of the public official or public employee, or a business with which a public official or public employee associates be filed with the Alabama Ethic Commission. If you are awarded the contract, and if you are a City employee, or if a member of your household is a City employee or public official, or if your business associates with a City employee or public official, you must comply with the provisions of Code of Ala. 1975 §36-25-11.

2.24 GOVERNING LAW

All contracts entered into as a result of this solicitation shall be governed by and construed in accordance with the substantive laws of the State of Alabama. Federal grants are subject to Federal laws. Federal laws, regulations, and directives may change, and the most recent changes will apply, unless otherwise determined in writing by the Federal Agency. All contractual provisions required by the Department of Transportation, as set forth in FTA Circular 4220.1F, are incorporated by reference, if applicable.

2.25 TERMINATION

The City reserves the right to terminate, without cause, any award made as a result of RFP by providing a thirty (30) day letter of cancellation notification to the successful Proposer. If the funding source is a Federal grant, the Federal Government reserves the right to terminate, without cause, any award made as result of this Proposal.

SECTION 3. PROPOSAL INSTRUCTIONS

Proposers are required to submit the required information in accordance with the instructions in this section. A response that deviates from these instructions may be considered non-responsive and may be rejected at the discretion of the City.

The City intends that this RFP is accurate and complete but recognizes that there may be some details or work requirements not expressly described herein. Therefore, Proposer is required to (1) include in its Proposal all labor, supervision, materials, equipment, and tools of the trade required to meet the City's objectives, and (2) make inquiries of the City during the RFP process about the specific requirements of the City, for which the City may issue clarifications in the form of addenda to this RFP, as described herein.

3.1 SUBMISSION OF PROPOSALS

Complete, sealed proposals must be clearly marked with the RFP# and received by Procurement Services no later than 2:00:00 PM City time on the proposal closing date specified on the cover of this RFP. For the purposes of receiving Proposals, the clock located in the City Council Chambers at 308 Fountain Circle, Huntsville, Alabama 35801, regulated by the National Institute for Standards and Technology (NIST), and shall be the official record of time. The number of copies specified on the RFP cover must be delivered to:

City of Huntsville
Procurement Services
P. O. Box 308 (35804)
308 Fountain Circle (35801)
Huntsville, Alabama

For Proposer's convenience, a mailing label is provided in Appendix I.

3.2 PROPOSAL PREPARATION EXPENSES

Proposers are responsible for all expenses incurred in the development and submission of their proposals and in participating in any negotiations related to this RFP. The City assumes no obligation for any expenses incurred by the Proposer as a result of the issuance of this RFP, the preparation or submission of a proposal, the evaluation of a proposal, or the selection of the successful Proposer(s).

3.3 LATE PROPOSALS

The City will not be responsible in the event the U.S. Postal Service or any other courier system fails to deliver the proposal response to the City's Procurement Services office by the 2:00:00 PM City time on the proposal closing date specified on the cover of this RFP. Any proposal received after this date and time will not be considered.

3.4 PROPOSAL OPENINGS

All Proposal Openings are open to the public and will be held in the City Council Chambers located on the first floor of the Municipal Administration Building, 308 Fountain Circle, Huntsville, Alabama. The City will notify Proposers of the date and time for such.

3.5 RESPONSIVE PROPOSALS

Each Proposal must be submitted in accordance with the requirements of this RFP. A Proposal that is not completed or submitted as required by the RFP will be rejected as "non-responsive." Proposals may be disqualified and rejected for any of (but not limited to) the following causes:

a. Failure to use the proposal forms furnished by the City.
b. Lack of signature by an authorized representative on the proposal form.
c. Failure to properly complete the proposal form and Proposer compliance.
d. Evidence of collusion among proposers.
e. Unauthorized alteration of the proposal form.
f. Failure to submit a Bid Bond, if required.
g. For public improvement projects only, failure to note the General Contractor's license number or a note that the bid amount is less than $50,000.

3.6 RESPONSIBLE PROPOSERS

The City shall take reasonable measures to determine Proposer capability, business integrity, financial resources, and reliability

in all respects to perform fully the contract requirements and insure good faith performance prior to contract award and during the term of the contract. If, during the RFP process, a Proposer does not demonstrate its ability to comply with the City's requirements, to the City's satisfaction and at the City's sole determination, based on all information available to the City, the City may determine the Proposer to be "non-responsible" and may reject the Proposal.

3.7 RIGHT TO REJECT PROPOSALS

The City reserves the right to reject any part of any Proposal or to solicit new proposals for the same goods and services that may be the subject of this RFP, as the City may deem necessary and in its best interest. Proposers must comply with all the terms of the RFP and all applicable local, state and federal laws, codes and regulations.

Minor informalities, that do not affect responsiveness; that are merely a matter of form or format; that do not change the relative standing or otherwise prejudice other proposals; that do not change the meaning or scope of the RFP; that are trivial, negligible, or immaterial in nature; that do not reflect a material change in the work; or, that do not constitute a substantial reservation against a requirement or provision, may be waived at the discretion of the City.

3.8 PUBLIC RECORDS NOTICE AND CITY RIGHTS TO INFORMAITON

The City is governed by the public records laws of the State of Alabama. All Proposals and information received by or that is available to the City pursuant to this RFP, except copyright material, shall become the property of the City. All such information, as it becomes the property of the City, becomes a public record and is subject to disclosure pursuant to applicable open records laws that provide for reasonable inspection by the public. All proposal information, including detailed pricing information and proprietary technical information, will be held in confidence by the City's Procurement Services Division until a recommendation for contract award has been made to the City Council, after which proposal information will be subject to disclosure as a public record.

At the specific written request of Proposer, the City will make reasonable efforts to protect from public disclosure any information that Proposer (1) segregates from other information and (2) is clearly labeled as "proprietary," "trade secret," "confidential," or "restricted," provided that Proposer also furnishes a brief statement that describes the reasons for the requested nondisclosure.

If proprietary, confidential, trade secret or otherwise restricted information is submitted to the City by Proposer as a result of this RFP or any resulting contract, then Proposer shall hold harmless and indemnify the City, its elected and appointed officials, employees, agents, and representatives against all claims, damages, losses, expenses, and costs, including, but not limited to, any costs related to legal defense, attorney's fees, court costs, damages, or judgments arising from or resulting from any disclosure request or disclosure by the City of such information.

3.9 DELIVERY/COMPLETION SCHEDULE

The delivery or completion schedule must be provided as noted in this RFP. If all items cannot be delivered on the same schedule, please note variances. (See Appendix G: Proposal Pricing Form)

3.10 GENERAL PROPOSAL REQUIREMENTS

Proposals must be prepared in English and be presented on 8 ½ x 11 paper, pages sequentially numbered within each tabbed section described in section 3.2, and single spaced with an easily legible font size. Proposals shall be prepared as simply as possible and provide a straightforward, concise description of the Proposer's capabilities to satisfy the requirements of the RFP. Expensive bindings, color display, promotional material, etc., are not necessary. EMPHASIS SHOULD BE CONCENTRATED ON ACCURACY, COMPLETENESS, AND CLARITY OF CONTENT. All parts, pages, figures, and tables shall be numbered and labeled clearly. Proposal shall be typewritten or in ink; those prepared in pencil will not be accepted. All corrections shall be initialed and dated by the person authorized to sign the Proposal. All signatures on all submitted documents must be signed by officials of the corporation or company duly authorized to bind Proposer.

3.11 PROPOSAL FORMAT

Proposals must be submitted with tabbed indexes separating the sections, organized in the following order:

Tab 1: Transmittal letter.

Tab 2: Proposer Information. Proposer must complete and submit Appendix H and Appendix J.
Tab 3: Qualification and Experience of Proposer. See Appendix K.

Tab 4: Scope of Work. See Appendix K.

If required by Appendix F, Proposer must submit forms documenting its compliance with the City's required/ desired performance specifications.

Tab 5: Proposer shall acknowledge receipt of all addenda in the space provided on the Proposal Pricing Form (Appendix G) and submitting in this section (see Section 2.2).

Tab 6: Additional Documentation. If applicable, Proposer shall include screen shots and sample reports from computer software applications that may be part of the proposed goods. This is intended to illustrate how a particular requirement might be met by Proposer, NOT a complete submission of all screens/reports/features.

3.12 PRICE PROPOSAL

Proposer's price for the goods and services purchased by the City pursuant to this RFP shall be specified in the Proposal Pricing Form, Appendix G. All tools of the trade required to meet the Contract requirements must be included in the Proposal price.

> The Proposal Pricing Form must be submitted with the original Proposal, in a SEPARATE SEALED ENVELOPE clearly marked "PROPOSAL PRICING FORM". The additional copies of the Proposal requested in Section 3.2 must NOT include any copies of the Proposal Pricing Form. The City will evaluate the other components of the Proposal before opening or revealing the Proposal Pricing Form.

Prices quoted shall be in U.S. Dollars, delivered prices, F.O.B. destination, exclusive of all federal or state excise, sales, and manufacturer's taxes.

The City will not accept charges for transportation, handling, packaging, installation or out-of-pocket expense other than as specified in the Proposal.

Prices quoted to the City shall remain firm for a minimum of 90 days from the date of opening of the proposal, unless so stated differently in the proposal. If there are discrepancies between unit prices quoted and extensions, the unit price will prevail. The City will be protected against any increase above the price in the proposal. Any proposal containing an "Escalator Clause" will not be considered unless so stipulated in this RFP. Discounts will be considered in determining the lowest price, however, any payment term based on less than 30 days may not be considered. Discounts will be figured from the date of acceptance by the City regardless of date of delivery or invoice.

3.13 PROPOSAL SUBMISSION CHECKLIST

Proposers are encouraged to review Appendix C, which provides a checklist of things to consider before a Proposal is submitted to the City. The checklist is for general guidance only and not intended to provide an all-inclusive list of response requirements, which Proposers must determine from this RFP.

APPENDIX A
CITY OF HUNTSVILLE, ALABAMA
SCOPE OF WORK & RELATED INFORMATION

CITY OBJECTIVES

The City of Huntsville Parking and Public Transit is requesting proposals for the manufacture and delivery of transit buses ranging from 32 - 40 feet in accordance with the terms and conditions set forth in this RFP and the attached FTA terms and conditions. The contract (s) will be for one year, with two (2) one-year renewable options. The second- and third-year pricing will be based on latest published preliminary index number prior to Notice of Exercise of Option/Index number on effective date of the contract. The estimated number of buses to be ordered per year is a minimum of 2, but up to a maximum of 4. The purpose of this procurement is to support the City of Huntsville Parking and Public Transit's fleet replacement plan.

The City of Huntsville agrees to confirm the current year appropriation of federal funds associated with a contemplated Purchase Order, prior to issuance of the Purchase Order. Due to anticipated delivery lead times that may exceed 12 months, the City of Huntsville reserves the right to issue Purchase Orders based on historic federal allocations in the next fiscal year; without penalty should that federal allocation not occur, and order canceled.
Due to the various award combinations that are possible under this RFP, the different bus requirements are separated into Groups to describe and define the four (4) different bus types.
Group A – 40' Diesel Transit Buses
Group B – 40' Hybrid/Diesel Transit Buses
Group C – 35' Diesel Transit Buses
Group D – 35' Hybrid/Diesel Transit Buses
Group E – 32' Diesel Transit Buses
Group F – 32' Hybrid/Diesel Transit Buses

It is the City of Huntsville's intent to award, at its sole discretion, one or more contracts for any combination of the Groups(s) described above. Proposers must submit one proposal that details your company's information, qualifications and technical experience, and separate fixed price proposal.

GENERAL REQUIREMENTS

Specifically, the City of Huntsville is requesting specifications and prices for 32 - 40 feet heavy-duty diesel or hybrid/diesel transit buses. Buses shall have a minimum expected life of twelve (12) years or 500,000 miles, whichever comes first, and are intended for the widest possible spectrum of passengers, including children, adults, the elderly, and individuals with disabilities.

The proposer is to submit documentation equal to or use the Vehicle Technical Information form in Exhibit A for each transit bus they are proposing,

During the open RFP process the City of Huntsville will not discuss any legal languages within this RFP document. The City of Huntsville will attempt to negotiate the legal contract language with the awarded proposer(s) prior to signing of the final contract; but after proposal submission and evaluation.

Federal Participation in Contract

The Contract to be awarded as a result of this solicitation shall be financed in part by funds from the Federal Government awarded through programs of its operating administrations, including the Federal Transit Administration (FTA). As such, all FTA requirements governing the use of federal funds or that may come into effect are in effect.

Proposer must submit completed FTA certifications with their proposal. Please refer to ***FTA Terms and Conditions*** for a complete list of the required certifications. Failure to provide all required certifications, completed in full, including an authorized signature, will cause the proposal to be deemed non-responsive. There are no exceptions to this requirement.

RFP Schedule (Subject to Change)

RFP Release Date:	12/21/23
RFP Pre-Bid Conference:	1/18/2024 (non-mandatory, via teams or zoom)
RFP Last day for Questions:	2/13/24
RFP Due Date:	2/20/24
RFP Eval Committee Mtg (1st):	2/26/24
RFP Eval Committee Mtg (2nd):	TBD
RFP Eval Committee Mtg (3rd):	TBD
RFP/Contract to Council for Approval:	3/21/24
Contract Begins:	3/25/24

NEW EQUIPMENT

The proposer shall guarantee that commodities submitted for their bid shall be new, and of the latest and most improved model of the current production and shall be of first quality as to workmanship and materials used in said units. All modifications shall be made at the factory. Equipment shall not have been operated for any purpose other than routine operational testing. Demonstrators will not be accepted unless specifically requested.

Each bus proposed must include the following sole source items / systems:

- Route Match AVL System including tablet, modem, VLU, scroll sign, HINT mounting brackets, wiring harnesses, ADA Scrolling sign and initial commissioning.
- 2-Way Motorola Radio
- Q-Straint, Q-POD, Wheelchair Securement systems, one system on each isle (located across from each other side by side) forward facing.
- The wheelchair ramp shall be automated with an electric motor on the front door.
- SEON Video Surveillance System including DVR, 8 Cameras, all wiring, installation, and commissioning.
- Diamond Farebox, Manual.

Proposers should provide a priced list of maintenance and repair tools as option items.

BUY AMERICA CERTIFICATION

This Contract is subject to the "Buy America" requirements of 49 United States Code (USC) §5323(j) and 49 Code of Federal Regulations (CFR) Part 661, as may be amended from time to time, and applicable federal regulations. Prospective Proposers' attention is directed to 49 CFR §661.11, "Rolling Stock Procurements." Prospective Proposers have the responsibility to comply with the cited and any governing statutes and regulations, including official interpretations.

A Proposer shall submit to the Agency the appropriate Buy America certification, included in this document, with all offers on FTA-funded contracts. Proposals that are not accompanied by a properly completed Buy America certification are subject to the provisions of 49 CFR 661.13 and will be rejected as nonresponsive.

The two signature blocks on the Buy America certificate are mutually exclusive. Proposers shall sign only one signature block on the certificate. Signing both signature blocks will make the Proposal nonresponsive. A false certification is a criminal act in violation of 18 USC §1001.

A Proposer who has submitted an incomplete Buy America certificate or an incorrect certificate of noncompliance through inadvertent or clerical error (but not including failure to sign the certificate, submission of certificates of both compliance and noncompliance, or failure to submit any certification), may submit to the FTA Chief Counsel within ten (10) days of Proposal opening a written explanation of the circumstances surrounding the submission of the incomplete or incorrect certification in accordance with 28 USC §1746, sworn under penalty of perjury, stating that the submission resulted from inadvertent or clerical error. The Proposer will also submit evidence of intent, such as information about the origin of the product, invoices, or other working documents. The Proposer will simultaneously send a copy of this information to the Agency.

The FTA Chief Counsel may request additional information from the Proposer, if necessary. The Agency may not make Contract award until the FTA Chief Counsel issues his or her determination, except as provided in 49 CFR Part 661.15(m).

Certification based on ignorance of proper application of the Buy America requirements is not an inadvertent or clerical error.

A waiver from the Buy America provisions will be sought by the Agency from the FTA for the proposed awardee, if the grounds for a waiver exist. All Proposers seeking a waiver must submit to the Agency a timely request in writing, which shall include the facts and justification to support the granting of the waiver. Such waiver from the Buy America provisions may be granted if the FTA determines the following:

1. Their application would be inconsistent with the public interest.
2. Materials are not produced in the United States in sufficient and reasonably available quantities and of a satisfactory quality; or
3. Inclusion of domestic material will increase the cost of the overall Contract by more than 25 percent.

Any party may petition the FTA to investigate a successful Proposer's compliance with the Buy America certification. The procedures are set out in 49 CFR Part 661.15. If the FTA determines that the evidence indicates noncompliance, the FTA will require the Agency to initiate an investigation. The successful Proposer has the burden of proof to establish compliance with its certification. If the successful Proposer fails to so demonstrate compliance, then the successful Proposer will be required to substitute sufficient domestic materials without revision of the original Contract terms. Failure to do so will be a breach of the Contract and may lead to the initiation of debarment proceedings under 49 CFR Part 29.

Scope of Work

The City of Huntsville Parking and Public Transit is requesting proposals for the manufacture and delivery of transit buses ranging from 32 - 40 feet in accordance with the terms and conditions set forth in this RFP. The specifications should be in a similar format to Exhibit A (Vehicle Technical Information form) for each bus proposal. The specifications are as follows:

BUS TECHNICAL SPECIFICATIONS

TS 1. Definitions

Alternative: An alternative specification condition to the default bus configuration. The Agency may define alternatives to the default configuration to satisfy local operating requirements. Alternatives for the default configuration will be clearly identified.

Ambient Temperature: The temperature of the surrounding air. For testing purposes, the ambient temperature must be between 16°C (50°F) and 38°C (100°F).

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.

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.

Battery Compartment: Low-voltage energy storage, i.e., 12/24 VDC batteries.

Battery Management System (BMS): Monitors energy, as well as temperature, cell or module voltages, and total pack voltage. The BMS adjusts the control strategy algorithms to maintain the batteries at uniform state of charge and optimal temperatures.

Braking Resistor: Device that converts electrical energy into heat, typically used as a retarder to supplement or replace the regenerative braking.

Burst Pressure: The highest pressure reached in a container during a burst test.

Capacity (fuel container): The water volume of a container in gallons (liters).

Cells: Individual components (i.e., battery or capacitor cells).

Code: A legal requirement.

Combination Gas Relief Device: A relief device that is activated by a combination of high pressures or high temperatures, acting either independently or together.

Composite Container for CNG: A container fabricated of two or more materials that interact to facilitate the container design criteria.

Compressed Natural Gas (CNG): Mixtures of hydrocarbon gases and vapors consisting principally of methane in gaseous form that has been compressed for use as a vehicular fuel.

Container: A pressure vessel, cylinder or cylinders permanently manifolded together, used to store CNG.

Container Appurtenances: Devices connected to container openings for safety, control or operating purposes.

Container Valve: A valve connected directly to a container outlet.

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 driver.

DBA: Decibels with reference to 0.0002 microbar as measured on the "A" scale.

DC to DC Converter: A module that converts a source of direct current from one voltage level to another.

Default Configuration Bus: The bus described if no alternatives are selected. Signing, colors, the destination sign reading list and other information must be provided by the Agency.

Defueling: The process of removing fuel from a tank.

Defueling Port: Device that allows for vehicle defueling, or the point at which this occurs.

Destroyed: Physically made permanently unusable.

Discrete Signal: A signal that 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.

DPF: Diesel particulate filter.

Driver'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.

Energy Density: The relationship between the weight of an energy storage device and its power output in units of watt-hours per kilogram (Wh/kg).

Energy Storage System (ESS): A component or system of components that stores energy and for which its supply of energy is rechargeable by the on-vehicle system (engine/regenerative braking/ generator)or an off-vehicle energy source.

Fill Pressure for CNG: The pressure attained at the actual time of filling. Fill pressure varies according to the gas temperatures in the container, which are dependent on the charging parameters and the ambient conditions. The maximum dispensed pressure shall not exceed 125 percent of service pressure.

Flow Capacity: For natural gas flow, this is the capacity in volume per unit time (normal cubic meters/minute or standard cubic feet per minute) discharged at the required flow rating pressure.

Fuel Line: The pipe, tubing, or hose on a vehicle, including all related fittings, through which natural gas passes.

Fusible Material: A metal, alloy, or other material capable of being melted by heat.

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

Fireproof: Materials that will not burn or melt at temperatures less than 2000°F.
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 sq. ft. shall be allocated for the feet of each seated passenger protruding into the standee area.

Fuel Management System: Natural gas fuel system components that control or contribute to engine air fuel mixing and metering, and the ignition and combustion of a given air-fuel mixture. The fuel management system would include, but is not limited to, reducer/regulator valves, fuel metering equipment (e.g., carburetor, injectors), sensors (e.g., main throttle, waste gate).

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.

Gross Load: 150lbs for every designed passenger seating position, for the driver, and for each 1.5 sq. ft. of free floor space.

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

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.

High Pressure: Those portions of the CNG fuel system that see full container or cylinder pressure.

High Voltage (HV): Greater than 50 V (AC and DC).

Hose: Flexible line.

Hybrid: A vehicle that uses two or more distinct power sources to propel the vehicle.

Hybrid System Controller (HSC): Regulates energy flow throughout hybrid system components in order to provide motive performance and accessory loads, as applicable, while maintaining critical system parameters (voltages, currents, temperatures, etc.) within specified operating ranges.

Hybrid Drive System (HDS): The mechanical and/or electromechanical components, including the engine, traction motors and energy storage system, which comprise the traction drive portion of the hybrid propulsion system.

Intermediate Pressure: The portion of a CNG system after the first pressure regulator, but before the engine pressure regulator. Intermediate pressure on a CNG vehicle is generally from 3.5 to 0.5 MPa (510 to 70 psi).

Inverter: A module that converts DC to and from AC.

Labeled: Equipment or materials to which has been attached a label, symbol or other identifying mark of an organization, which is acceptable to the authority having jurisdiction and concerned with product evaluation, which maintains periodic inspection of production labeled equipment or materials, and by whose labeling the manufacturer indicates compliance with appropriate standards or performance in a specified manner.

Leakage: Release of contents through a Defect or a crack. See *Rupture*.

Line: All tubes, flexible and hard, carry fluids.

Liner: Inner gas-tight container or gas container to which the overwrap is applied.
Local Regulations: Regulations below the state level.

Low-Floor Bus: A bus that, 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.

Low Voltage (LV): 50 V or less (AC and DC).

Lower Explosive Limit: The lowest concentration of gas where, given an ignition source, combustion is possible.

Maximum Service Temperature: The maximum temperature to which a container/cylinder will be subjected in normal service.

Metallic Hose: A hose whose strength depends primarily on the strength of its metallic parts; it can have metallic liners or covers, or both.

Metering Valve: A valve intended to control the rate of flow of natural gas.

Module: An assembly of individual components

Motor (Electric): A device that converts electrical energy into mechanical energy.

Motor (Traction): An electric motor used to power the driving wheels of the bus.

Operating Pressure: The varying pressure developed in a container during service.

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.

Pipe: Nonflexible line.

Pressure Relief Device (PRD): A pressure and/or temperature activated device used to vent the container/cylinder contents and thereby prevent rupture of an NGV fuel container/cylinder, when subjected to a standard fire test as required by fuel container/cylinder standards.

> **NOTE:** Since this is a pressure-activated device, it may not protect against rupture of the container when the application of heat weakens the container to the point where its rupture pressure is less than the rated burst pressure of the relief device, particularly if the container is partially full.

Power: Work or energy divided by time

Power Density: Power divided by mass, volume, or area.

Propulsion System: System that provides propulsion for the vehicle proportional to operator commands. Includes, as applicable, engine, transmission, traction motors, the hybrid drive system, (HDS), energy storage system (ESS), and system controllers including all wiring and converter/inverter.

Real-Time Clock (RTC): Computer clock that keeps track of the current time.
Regenerative Braking: Deceleration of the bus by switching motors to act as generators, which return vehicle kinetic energy to the energy storage system.

Rejectable Damage: In terms of NGV fuel containers/cylinders, this is damage as outlined in CGA C-6.4, "Methods for External Visual Inspection of Natural Gas Vehicle Fuel Containers and Their Installations," and in agreement with the manufacturer's recommendations.

Retarder: Device used to augment or replace some of the functions of primary friction based braking systems of the bus.

Rupture: Sudden and unstable damage propagation in the structural components of the container resulting in a loss of contents. See *Leakage*.

Seated Load: 150lbs for every designed passenger seating position and for the driver.

SLW (Seated Load Weight): Curb weight plus seated load.
Serial Data Signals: 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 prearranged 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.

Service Pressure: The settled pressure at a uniform gas temperature of 21°C (70°F) and full gas content. It is the pressure for which the equipment has been constructed, under normal conditions. Also referred to as the nominal service pressure or working pressure.

Settled Pressure: The gas pressure when a given settled temperature, usually 21°C (70°F), is reached.

Settled Temperature: The uniform gas temperature after any change in temperature caused by filling has dissipated.

Solid State Alternator: A module that converts high-voltage DC to low-voltage DC (typically 12/24 Vsystems).

Sources of Ignition: Devices or equipment that because of their modes of use or operation, are capable of providing sufficient thermal energy to ignite flammable compressed natural gas-air mixtures when introduced into such a mixture, or when such a mixture comes into contact with them.

Special Tools: Tools not normally stocked by the Agency.

Specification: A particular or detailed statement, account or listing of the various elements, materials, dimensions, etc. involved in the manufacturing and construction of a product.

Standard: A firm guideline from a consensus group. Standards referenced in "Section 6: Technical Specifications" are the latest revisions unless otherwise stated.

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

State of Charge (SOC): Quantity of electric energy remaining in the battery relative to the maximum rated amp-hour (Ah) capacity of the battery expressed in a percentage. This is a dynamic measurement used for the energy storage systems. A full SOC indicates that the energy storage system cannot accept further charging from the engine-driven generator or the regenerative braking system.

Stress Loops: The "pigtails" commonly used to absorb flexing in piping.

Structure: The basic body, including floor deck material and installation, load-bearing external panels, structural components, axle mounting provisions and suspension beams and attachment points.

Thermally Activated Gas Relief Device: A relief device that is activated by high temperatures and generally contains a fusible material.

> **NOTE:** Since this is a thermally activated device, it does not protect against over-pressure from improper charging practices.

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 in. in width and 48 in. in length measured 2 in. above the ground and does not weigh more than 600 lbs. when occupied.

TS 2. Legal Requirements

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

Buses shall meet all applicable FMVSS regulations and shall accommodate all applicable FMCSR regulations in effect at the location of the Agency and the date of manufacture.

In the event of any conflict between the requirements of these specifications and any applicable legal requirement, the legal requirement shall prevail. Technical requirements that exceed the legal requirements are not considered to conflict.

TS 3. Overall Requirements

The Contractor shall ensure that the application and installation of major bus subcomponents and systems are compliant with all such subcomponent vendors' requirements and recommendations.

TS 3.1 Weight

It shall be a design goal to construct each bus as light in weight as possible without degradation of safety, appearance, comfort, traction, or performance.

Buses at a capacity load shall not exceed the tire factor limits, brake test criteria or structural design criteria.

TS 3.2 Capacity

The vehicle shall be designed to carry the gross vehicle weight, which shall not exceed the bus GVWR.

TS 3.3 Service Life

The minimum useful design life of the bus in transit service shall be at least twelve (12) years or 500,000 miles. It shall be capable of travelling at least 40,000 miles per year, including the 12th year.

TS 3.4 Maintenance and Inspection

Scheduled maintenance tasks shall be related and shall be in accordance with the manufacturer's recommended preventative maintenance schedule (along with routine daily service performed during the fueling operations).
Test ports, as required, shall be provided for commonly checked functions on the bus, such as air intake, exhaust, hydraulic, pneumatic, charge-air and engine cooling systems.

The coach manufacturer shall give prime consideration to the routine problems of maintaining the vehicle. All coach components and systems, both mechanical and electrical, which will require periodic physical Work or inspection processes shall be installed so that a minimum of time is consumed in gaining access to the critical repair areas. It shall not be necessary to disassemble portions of the coach structure and/or equipment such as seats and flooring under seats to gain access to these areas. Each coach shall be designed to facilitate the disassembly, reassembly, servicing, or maintenance, using tools and equipment that are normally available as standard commercial items.

Requirements for the use of unique specialized tools will be minimized. The body and structure of the coach shall be designed for ease of maintenance and repair. Individual panels or other equipment that may be damaged in normal service shall be repairable or replaceable. Ease of repair shall be related to the vulnerability of the item to damage in service.

The contractor shall provide a list of all special tools and pricing required for maintaining this equipment. Said list shall be submitted as a supplement to the Pricing Schedule.

> **NOTE:** Tools such as compartment door keys, bellows gauges and other tools that are required for daily maintenance and inspections shall not be included in the special tool list and shall be furnished for each coach.

TS 3.5 Interchangeability

Unless otherwise agreed, all units and components procured under this Contract, whether provided by Suppliers or manufactured by the Contractor, shall be duplicates in design, manufacture, and installation to ensure interchangeability among buses in each order group in this procurement. This interchangeability shall extend to the individual components as well as to their locations on the buses. These components shall include, but are 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.

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. Contractor shall identify and secure approval for any changes in components or unit construction provided within a Contract.

If the Contractor is unable to comply with the interchangeability requirement, the Contractor must notify the Agency and obtain the Agency's prior written approval, including any changes in pricing.

The Agency shall review proposed product changes on a case-by-case basis and shall have the right to request extended warranties to ensure that product changes perform at least as well as the originally supplied products.

TS 3.6 Training

The Contractor shall have at least one qualified instructor who shall be available at the Agency's property for 10 calendar days between the hours of 8:00 a.m. and 5:00 p.m. within 1 month of acceptance of the first bus. Instructor(s) shall conduct schools and advise the personnel of the Agency on the proper operation and maintenance of the equipment. The Contractor also shall provide visual and other teaching aids (such as manuals, slide presentations and literature) for use by the Agency's own training staff, which become the property of the Agency.

TS 3.6.1 Technical/Service Representatives

The Contractor shall, at its own expense, have one or more competent technical service representatives available on request to assist the Agency in the solution of engineering or design problems within the scope of the specifications that may arise during the warranty period. This does not relieve the Contractor of responsibilities under the provisions of "Section 7: Warranty Requirements."

TS 3.7 Operating Environment

The bus shall achieve normal operation in ambient temperature ranges of 10 °F to 115 °F, at relative humidity between 5 percent and 100 percent, and at altitudes up to 3000 ft 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 3000 ft. Altitude requirements above 3000 ft will need separate discussions with the engine manufacturer to ensure that performance requirements are not compromised. Speed, gradability and acceleration performance requirements shall be met at, or corrected to, 77 °F, 29.31 in. Hg, dry air per SAEJ1995.

TS 3.8 Noise

The Contractor is expected to meet interior and exterior noise requirements specified in Section 3.8.1 and Section 3.8.2. Furthermore, it shall be a design goal to minimize noise. Component layout and packaging, material selection, and build quality shall reflect that goal.

TS 3.8.1 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 65 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 80 dBA. The driver area shall not experience a noise level of more than 75 dBA. Measurements of interior noise levels shall be taken in accordance with SAEJ2805. An exception shall be made for the turntable area, which shall be considered a separate environment.

TS 3.8.2 Exterior Noise

Airborne noise generated by the bus and measured from either side shall not exceed 80dBA under full power acceleration when operated at 0 to 35 mph at curb weight. 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 65dBA.If the noise contains an audible discrete frequency, a penalty of 5 dBA shall be added to the sound level measured. The Contractor shall comply with the exterior noise requirements defined in local laws and ordinances identified by the Agency andSAEJ366.

TS 3.9 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, bulkheads and facilitation of passenger evacuation.

TS 3.9.1 Materials

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 FMVSS 302.

TS 3.10 Fire Suppression

The bus shall have a fire suppression system installed per manufacturer's recommendations. Fire extinguisher should also be provided for emergency use by Bus Operator.

TS 3.11 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. 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.

DIMENSIONS

TS 4. Physical Size

With exceptions such as exterior mirrors, marker and signal lights, bumpers, fender skirts, washers, wipers, ad frames, cameras, object detection systems, bicycle racks, feelers and rub rails, the bus shall have the following overall dimensions.

TS 4.1 Bus Length

For ease of use, the following tolerances will be allowable for each given bus length. Bus length is determined as the measurement from bumper to bumper.

- 32 ft bus: 29 ft, 11 in. to 34 ft, 11 in.
- 35 ft bus: 35 ft to 39 ft, 11 in.
- 40 ft bus: 40 ft to 44 ft, 11 in.

TS 4.2 Bus Width

102 in. Width Bus

Body width shall be 102 in. (+0, -1 in.).

TS 4.3 Bus Height

Maximum Overall Height shall be 140 in., including all rigid, roof-mounted items such as A/C, exhaust, fuel system and cover, etc.

TS 4.3.1 Transit Coach Step Height

The step height shall not exceed 16.5 in. at either doorway without kneeling and shall not exceed 15.5 in. at the step. A maximum of two steps are allowed to accommodate a raised aisle floor in the rear of the bus.

TS 4.3.2 Commuter Coach Step Height

The step height shall not exceed 16.5 in. at doorway without kneeling and shall not exceed 15.5 in. at the step.

TS 4.4 Underbody Clearance

The bus shall maintain the minimum clearance dimensions as defined and shown in Figure 2of SAE Standard J689, regardless of load up to the gross vehicle weight rating.

TS 4.5 Ramp Clearances

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. (Refer to Table 2a)

TABLE 2a
Default Breakover Angle

Angle	30 to 45ft Bus	60ft Bus
Approach	8.6 deg (min.)	8.6 deg (min.)
Front breakover	8 deg (min.)	10.2 deg (min.)
Rear breakover (articulated only)	n/a	8.7 deg (min.)

TS 4.6 Ground Clearance

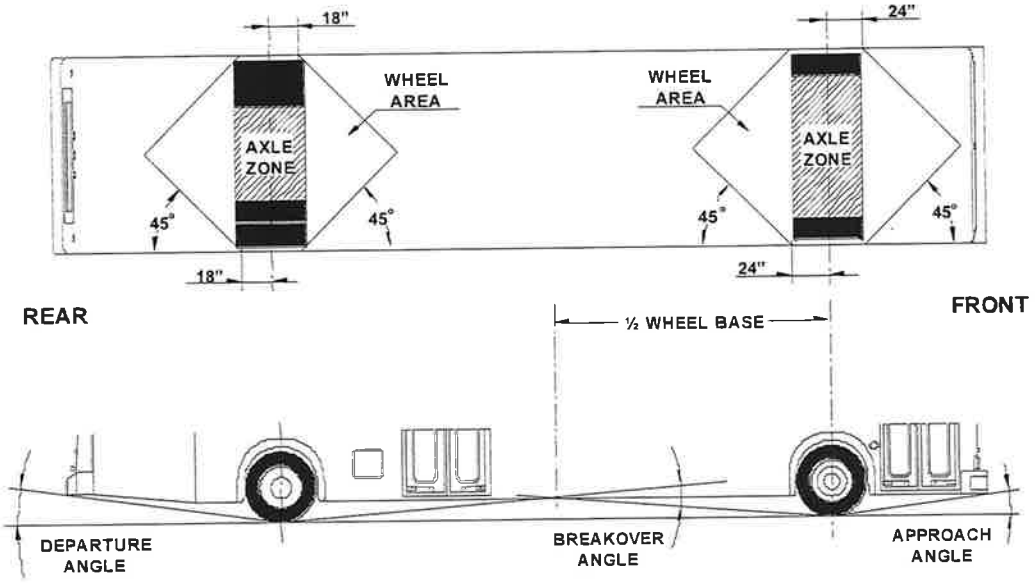
Ground clearance shall be no less than 9 in., (8 in. at jacking pad) except within the axle zone and wheel area.

Axle zone clearance, which is the projected area between tires and wheels on the same axial centerline, shall be no less than 5.4 in.

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

FIGURE 2

Transit Bus Minimum Road Clearance



TS 4.7 Floor Height

TS 4.7.1 Transit Coach

The height of the step above the street shall be no more than 16 in. measured at the centerline of the front and rear doorway. All floor measurements shall be with the bus at the design running height and on a level surface and with the standard installed tires. A maximum of two steps are allowed to accommodate a raised aisle floor in the rear of the bus.

TS 4.8 Interior Headroom

Headroom above the aisle and at the centerline of the aisle seats shall be no less than 78 in. in the forward half of the bus tapering to no less than 74 in. forward of the rear settee. At the centerline of the window seats, headroom shall be no lower than 65 in., except for parcel racks and reading lights, if specified. Headroom at the back of the rear bench seat may be reduced to a minimum of 56 in., but it shall increase to the ceiling height at the front of the seat cushion. 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 or her head, padding shall be provided on the overhead paneling.

VEHICLE PERFORMANCE

TS 5. Power Requirements

The propulsion system shall be sized to provide sufficient power to enable the bus to meet the defined acceleration, top speed and gradability requirements, and operate all propulsion-driven accessories using actual road test results and computerized vehicle performance data.

TS 5.1 Top Speed

The bus shall be capable of achieving a top speed of 55 mph on a straight, level road at GVWR with all accessories operating. The bus shall be capable of safely maintaining the vehicle speed according to the recommendations by the tire manufacturer.

TS 5.2 Gradability

Gradability requirements shall be met on grades with a dry commercial asphalt or concrete pavement at GVWR with all accessories operating.

The propulsion system shall enable the bus to achieve and maintain a speed of 40 mph on a 2½ percent ascending grade and 15 mph on a 10 percent ascending grade continuous.

Approved Equal: 38.5mph at a 2.5% grade and 13.2mph at 10% grade is acceptable.

TS 5.3 Acceleration

TS 5.3.1 Non-Hybrid

The acceleration shall meet the requirements in Table 3below and shall be sufficiently gradual and smooth to prevent throwing standing passengers off-balance. Acceleration measurement shall commence when the accelerator is depressed.

Approved Equal: 40mph in 31.4 Seconds

TABLE 3

Maximum Start Acceleration Times on a Level Surface[1]

Speed (mph)	Maximum time (seconds)
10	5
20	10
30	18
40	30
50	60
Top speed	

1. Vehicle weight = GVWR

TS 5.3.2 Acceleration (Hybrid)

The propulsion and braking systems shall meet the performance requirements of the duty cycle.
Braking application and performance shall remain consistent across the highest possible range of battery system state of charge (SoC) or other variances related to regenerative braking. At very high or very low SoC, or at other conditions such as very cold or very hot battery temperatures, the application and performance of regenerative braking can be reduced but this must be done in a smooth and predicable manner. At no time should the application and performance of the mechanical friction brakes be affected by these conditions.

The system shall be programmable to allow optimization of acceleration and deceleration rate. Performance may be affected when reprogramming. The manufacturer shall supply the new performance data.

TS 5.4 Operating Range

The operating range of the coach shall be designed to meet the operating profile as stated in the "Design Operating Profile" section.

TS 5.4.1 Diesel (Transit Coach)

The operating range of the coach when run on the FTA ABD Cycle shall be at least 350 miles (560 km) or 20 hours with full fuel capacity.

TS 5.4.2 Hybrid
The operating range of the coach when run on the design operating profile "Design Operating Profile" shall be at least 350 miles on a full tank of fuel.

POWERPLANT

TS 6. Engine

L9 280 hp, 8.9 Cummins Diesel or Approved Equal

The engine shall comply with applicable local, state and/or federal emissions and useful life requirements. The engine shall have a design life of not less than 300,000 miles without replacement or major service. The lifetime estimate is based on the design operating profile.

Rear T-mounted Cummins L9, current model year, 8.9-liter turbo-charged and charge air-cooled in-line 6-cylinder electronic control, heavy/heavy-duty diesel engine.

- PERFORMANCE - Peak horsepower is 280 BHP @ 2,200 RPM and peak torque of 900 ft.-lbs. @ 1,600 RPM.
- CERTIFICATION – Current model year Federal EPA emissions standards certifications with Ultra low sulfur diesel fuel, diesel particulate filter (DPF) and selective catalytic reduction (SCR). A ten (10) gallon diesel exhaust fluid (DEF) tank will be integrated into the emission after-treatment system with an addition of Heavy-Duty On-Board Diagnostic (HD OBD) for current year emissions.
- OILING - Engine oiling system includes a full flow spin-on two (2) quart capacity filter. Engine oil cooling is by internal mounted water to oil heat exchanger.

The engine shall be equipped with an electronically controlled management system, compatible with either 12 or 24 Vpower distribution. The engine control system shall be capable of transmitting and receiving electronic inputs and data from other drivetrain components and broadcasting that data to other vehicle systems. Communication between electronic drivetrain components and other vehicle systems shall be made using the communications networks. 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 programmable features.

The engine starting system 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 bus 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 Agency. The integration of all systems on the vehicle relative to engine idle speed shall be the responsibility of the vehicle manufacturer to meet the requirements of the transit property.

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.

A control shall be available to the operator/driver that when constantly depressed and released will delay the engine shutdown or allow the bus to be moved. Override action shall be recorded. This data shall be retrievable by the Agency.

The controller shall monitor and process inputs and execute outputs as appropriate to control the operation of all propulsion system components.

Energy storage system SOC correction methods stated in SAE J2711 shall be utilized.

The engine and related emission systems shall meet all applicable emissions and design/durability guidelines and standards. The Contractor shall provide the Agency with expected durability of the engine and related emission systems.

NOTE: fuel type low sulfur diesel.

The engine shall be equipped with an auto-controlled fast idle device with a 1-minute delay before actuation.

TS 7. 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 controls 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 fan control system shall be designed with a fail-safe mode of "fan on." The cooling system shall meet the requirements stated in the operating environment.

TS 7.1 Engine Cooling

A means of determining satisfactory engine coolant level shall be provided. A spring-loaded, push-button type valve or lever shall be provided to safely release pressure or vacuum in the cooling system with both it and the water filler no more than ±60 in. above the ground. Both shall be accessible through the same access door.

The cooling fan shall be temperature controlled, allowing the engine to reach operating temperature quickly.

The radiator and charge air cooler shall be of durable, corrosion-resistant construction with non-removable tanks.

TS 7.1.1 Radiator Screen

Screen in Front of Radiator – The radiator input shall be protected by an easily cleanable screen designed to collect large debris. Radiators with a fin density greater than 12 fins per inch or louvered slit design shall not be used. 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. The radiator and charge air cooler cores shall be easily cleaned (to include engine side core surface) with standard pressure-washing equipment.

TS 7.1.2 Drive Design

Electric Fans
EMP Engine Cooling System or approved equal.
The bus shall be equipped with an electric fan drive bus cooling system. A screen guard must be installed on electric motor fans per SAE J1308.

TS 7.1.3 Mounting

Standard Mounting Design
Mounting location of radiator and charging air cooler shall be the Contractor's standard design.

TS 7.2 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 the engine manufacturer's requirements. The charge air radiator shall not be stacked ahead of 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.

TS 7.3 Transmission Cooling

The transmission shall be cooled by a dedicated 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 the retarder and engine cooling systems to ensure that all operating fluids remain within recommended temperature limits established by each component manufacturer. The engine cooling system should provide coolant bypass flow to the transmission cooling system with the engine thermostats closed. Unless otherwise noted, the transmission cooler is to be the first component to see cold water from the radiator outlet. In addition, all return water piping, aside from the thermostat bypass line, is to be plumbed in after the transmission cooler.

TS 7.3.1 Hybrid Drive System Cooling
The thermal management system shall maintain hybrid system components within design operating temperature limits.

TS 8. Transmission

Group A – 40' Diesel Transit Buses Allison B400R Transmission
Group B – 40' Hybrid/Diesel Transit Buses Allison E-FLEX 50 Transmission
Group C – 35' Diesel Transit Buses Allison B400R Transmission
Group D – 35' Hybrid/Diesel Transit Buses Allison E-FLEX 40 Transmission
Group E – 32' Diesel Transit Buses Allison B400R Transmission
Group F – 32' Hybrid/Diesel Transit Buses Allison E-FLEX 40 Transmission

The transmission shall be multiple speed, automatic shift with torque converter, retarder, and electronic controls. Gross input power, gross input torque and rated input speed shall be compatible with the engine. 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 transmission should be easily removable without disturbing the engine and accessible for service.

The electronic controls shall be capable of transmitting and receiving electronic inputs and data from other drivetrain components and of broadcasting that data to other vehicle systems. Communication between electronic drivetrain components and other vehicle systems shall be made using the communications networks. Electronic controls shall be compatible with either 12 or 24 Vpower distribution, provide consistent shift quality, and compensate for changing conditions, such as variations in vehicle weight and engine power. At a minimum, drivetrain components consisting of the engine, transmission, retarder, ASR, and anti-lock braking systems shall be powered by a dedicated and isolated ignition supply voltage to ensure data communication among components exists when the vehicle ignition is switched to the "on" position.

A nominal brake pedal application of 6 to 10 psi shall be required by the driver 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 timestamp 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. The on-board diagnostic system shall trigger a visual alarm to the driver when the electronic control unit detects a malfunction.

ALLISON B400R TRANSMISSION

Allison B400R five (5) speed pushbutton automatic transmission with an integral output hydraulic brake retarder. The transmission has a duty cycle rating of 45,000 lbs. GVWR.

- OIL FILTERS - Transmission is equipped with integral cartridge-type oil filters located in the transmission main oil supply and cooler return circuits. Access to each filter is through the bottom of the transmission control module.
- OIL COOLER - Transmission oil, is cooled by an externally mounted heavy-duty water to oil heat exchanger.
- CONTROLS - Transmission is controlled electronically.

An electronic transmission fluid level monitoring and protection system shall be provided.

Approved Equal: Allison B400R 6-speed automatic transmission.

TS 9. Retarder (Transit Coach)

The powertrain shall be equipped with a retarder designed to extend brake lining service life. The application of the retarder shall cause a smooth blending of both retarder and service brake function.

Actuation of ABS and/or automatic traction control (ATC) shall override the operation of the brake retarder.

Brake lights shall illuminate when the retarder is activated.

Throttle Pedal Activation of the Retarder

The retarder shall become partially engaged (approximately one-third of its total application, with a resulting deceleration of no greater than 0.077g) when the throttle pedal is completely released. Maximum retarder shall be achieved when brake pedal is depressed prior to engagement of service brakes, with a maximum resulting deceleration of approximately 0.20g

in an empty bus. The resulting decelerations specified include the effects of engine braking, wind resistance and rolling resistance.

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

Retarder Disable Switch Not Accessible

The retarder disable switch is not required to be accessible to the seated driver.

Approved Equal: The retarder switch can be located within the driver's reach.

TS 10. Mounting

All power plant mounting shall be mechanically isolated to minimize transfer of vibration to the body structure and provide a minimum clearance of 0.75 in. Mounts shall control the 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.

TS 10.1 Service

The propulsion system shall be arranged for ease of access and maintenance. The Contractor shall list all special tools, fixtures or facility requirements recommended for servicing. 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 engine and transmission 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.

An air cleaner with a dry filter element and a graduated air filter restriction indicator shall be provided. The location of the air intake system shall be designed to minimize the entry of dust and debris and to 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 the air filter.

No engine bypass oil filter.

Oil Pressure and Coolant Temperature Display

Engine oil pressure and coolant temperature gauges are required in the engine compartment.

Approved Equal: City of Huntsville will allow a single electronic gauge to check the engine oil pressure and coolant temps.

TS 11. Hydraulic Systems

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 when applicable. 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.

The hydraulic system shall operate within the allowable temperature range as specified by the lubricant manufacturer.

No requirement for hydraulic system sensors.

TS 11.1 Fluid Lines

All lines shall be rigidly supported to prevent chafing damage, Fatigue Failures, degradation, and tension strain. Lines should be sufficiently flexible to minimize mechanical loads on the components. Lines passing through a panel, frame or bulkhead shall be protected by grommets (or similar devices) that fit snugly to both the line and the perimeter of the hole that the line

passes through to prevent chafing and wear. Pipes and fluid hoses shall not be bundled with or used to support electrical wire harnesses.

Lines shall be as short as practicable and shall be routed or shielded so that failure of a line shall not allow the contents to spray or drain onto any component operable above the auto-ignition temperature of the fluid.

All hoses, pipes, lines, and fittings shall be specified and installed per the manufacturer's recommendations.

TS 11.2 Fittings and Clamps

All clamps shall always maintain a constant tension, expanding and contracting with the line in response to temperature changes and aging of the line material. The lines shall be designed for use in the environment where they are installed (for example, high-temperature resistant in the engine compartment, resistant to road salts near the road surface, and so on).

Compression fittings shall be standardized 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.

TS 11.3 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 manufacturer. The cross section of all charge air piping shall not be less than the cross section of the intake manifold inlet. Any changes in pipe diameter shall be gradual to ensure a smooth passage of air and to minimize restrictions. Piping shall be routed away from heat sources as practicable 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, anodized aluminum, or painted steel rated at minimum 1000 hours of salt spray according to ASTM B117, except between the air filter and turbocharger inlet, where piping may be constructed of flexible heat-resistant material. 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 360deg seal.

TS 12. Radiator

Radiator piping shall be stainless steel, brass tubing or painted steel rated at 1000 hours of salt spray according to ASTM B117 and where practicable, hoses shall be eliminated, including biodiesel. Necessary hoses shall be impervious to all bus fluids. All hoses shall be secured with stainless steel clamps that provide a complete 360deg seal. The clamps shall always maintain a constant tension, expanding and contracting with the hose in response to temperature changes and aging of the hose material.

TS 13. Oil and Hydraulic Lines

Oil and hydraulic lines shall be compatible with the substances they carry. The lines shall be designed and intended for use in the environment where they are installed (for example, high-temperature resistance in the engine compartment, resistant to road salts near the road surface and so on). Lines within the engine compartment shall be composed of steel tubing where practicable, except in locations where flexible lines are required.

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.

TS 14. Fuel

TS 14.1 Fuel Lines

Fuel lines shall be securely mounted, braced and supported as designed by the bus manufacturer to minimize vibration and chafing and shall be protected against damage, corrosion or breakage due to strain or wear.

Manifolds connecting fuel containers shall be designed and fabricated to minimize vibration and shall be installed in protected locations to prevent line or manifold damage from unsecured objects or road debris.

Fuel hose and hose connections, where permitted, shall be made from materials resistant to corrosion and fuel and protected from fretting and high heat. Fuel hoses shall be accessible for ease of serviceability.

Diesel is the required fuel type for the City of Huntsville Parking & Public Transit Department

TS 14.1.1 Fuel Lines, Diesel

Fuel lines shall be capable of carrying the type of fuel specified by the Agency (i.e., up to B20 type fuel).

TS 14.2 Design and Construction

TS 14.2.1 Design and Construction, Diesel

Fuel Tank(s)

The fuel tank(s) shall be made of corrosion-resistant stainless steel, or HEAVY GAUGE 300 SERIES OR ASTM A240 STAINLESS STEEL, OR aluminum material, or HIGH-DENSITY CROSS-LINKED POLYETHYLENE PLASTIC MATERIAL WITH OR WITHOUT BAFFLES.

PROTECTIVE SHIELD MOUNTED FULL UNDERNEATH THE TANK(S).

Fuel Tank Installation

The fuel tank(s) shall be securely mounted to the bus to prevent movement during bus maneuvers.

The fuel tank(s) shall be equipped with an external, hex head, drain plug. It shall be at least a ⅜in. 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 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 gal 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 gal of fuel over the unusable amount in the tank(s).

The materials used in mounting shall withstand the adverse effects of road salts, fuel oils and accumulation of ice and snow for the life of the bus.

Fuel Tank Labeling

The capacity, date of manufacture, manufacturer name, location of manufacture, and certification of compliance to federal motor carrier safety regulations shall be permanently marked on the fuel tank(s). The markings shall be readily visible and shall not be covered with undercoating material.

Fuel Filler

The fuel filler shall be located 7 to 32ft 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 SAE Standards.

OEM to designate height of fuel filler.

Dry-Break Fuel Filler

The fuel filler shall accommodate a standard fuel nozzle. The nozzle shall automatically shut off when the tank is essentially full. An audible signal shall indicate when the tank is essentially full. The fuel filler cap shall be a screw-on cap.

TS 15. Emissions and Exhaust

TS 15.1 Exhaust Emissions

The engine and related systems shall meet all applicable emission and engine design guidelines and standards.

TS 15.2 Exhaust System

The exhaust pipe shall be of sufficient height to prevent exhaust gases and waste heat from discoloring or causing heat deformation to the bus. The entire exhaust system shall be adequately shielded to prevent heat damage to any bus component, including the exhaust after treatment compartment area. The exhaust outlet shall be designed to minimize rain, snow or water generated from high-pressure washing systems from entering the exhaust pipe and causing damage to the after treatment.

Exhaust gases and waste heat shall be discharged from the roadside rear corner of the roof.

TS 15.3 Exhaust After treatment

An exhaust after treatment system will be provided to ensure compliance with all applicable EPA regulations in effect.

Diesel Exhaust Fluid Injection

If required by the engine manufacturer to meet NOx level requirements specified by EPA, a DEF injection system will be provided. The DEF system will minimally include a tank, an injector, a pump, an ECM and a selective catalytic converter. The tanks shall be designed to store DEF in the operating environment described in the "Operating Environment" section.

The DEF filler shall accommodate a standard nozzle. The nozzle shall automatically shut off when the tank is essentially full. The DEF filler cap shall be a screw-on cap and located curbside.

TS 15.4 Particulate After treatment

If required by the engine manufacturer to meet particulate level requirements specified by EPA, a particulate trap will be provided. The particulate trap shall regenerate itself automatically if it senses clogging. Regeneration cycles and conditions will be defined by the engine manufacturer.

STRUCTURE

TS 16. General

TS 16.1 Design

The structure of the bus shall be designed to withstand the transit service conditions typical of an urban or intercity duty cycle throughout its service life. The vehicle structural frame shall be designed to operate with minimal maintenance throughout the 12-year design operating profile. The design operating profile specified by the Agency shall be considered for this purpose.

TS 17. Altoona Testing

Prior to acceptance of the first bus, the vehicle must have completed any FTA-required Altoona testing. Any items that require repeated repairs or replacement must undergo corrective action with supporting test and analysis. A report clearly describing and explaining the failures and corrective actions taken to ensure that all such failures will not occur shall be submitted to the Agency.

If available, the Altoona Test Report shall be provided to the Agency with the Proposal submittal. If not available, then the report shall be provided prior to first acceptance of bus.

TS 17.1 Structural Validation

Baseline Structural Analysis

The structure of the bus shall have undergone appropriate structural testing and/or analysis. At minimum, appropriate structural testing and analysis shall include Altoona testing or finite element analysis (FEA).

TS 18. 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 or service doors. Static conditions shall include the vehicle at rest with any one wheel or dual set of wheels on a 6 in. curb or in a 6 in. deep hole.

TS 19. 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.

TS 19.1 Engine Compartment Bulkheads

The passenger and engine compartment shall be separated by fire-resistant bulkheads. The engine compartment shall include areas where the engine and exhaust system are housed. This bulkhead 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 90A, dated October 20, 1993. Only necessary openings shall be allowed in the bulkhead, and these shall be fire-resistant. Any passageways for the climate control system air shall be separated from the engine compartment by fire-resistant material. Piping through the bulkhead shall have fire-resistant fittings sealed at the bulkhead. Wiring may pass through the bulkhead only if connectors or other means are provided to prevent or retard fire propagation through the bulkhead. Engine access panels in the bulkhead shall be fabricated of fire-resistant material and secured with fire-resistant fasteners. These panels, their fasteners and the bulkhead shall be constructed and reinforced to minimize warping of the panels during a fire that will compromise the integrity of the bulkhead.

TS 19.2 Crashworthiness (Transit Coach)

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 in. reduction in any interior dimension. Windows shall remain in place and shall not open under such a load. These requirements must be met without the roof-mounted equipment installed.

The bus shall withstand a 25-mph impact by a 4000lb automobile at any side, excluding doorways, along either side of the bus and the articulated joint, if applicable, with no more than 3 in. 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 in. from ground level shall withstand a static load of 2000 lbs. applied perpendicular to the bus by a pad no larger than 5 sq. in. This load shall not result in deformation that prevents installation of new exterior panels to restore the original appearance of the bus.

TS 20. Corrosion

The bus flooring, sides, roof, understructure, and axle suspension components shall be designed to resist corrosion or deterioration from atmospheric conditions and de-icing materials for a period of 12 years or 500,000 miles, whichever comes first. It shall maintain structural integrity and nearly maintain original appearance throughout its service life, with the Agency's use of proper cleaning and neutralizing agents.

All materials that are not inherently corrosion resistant shall be protected with corrosion-resistant coatings. 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 two-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 Corrosion-Resistance Requirements

The vehicle shall be constructed using only inherently corrosion-resistant materials and fasteners such as stainless steel or composites to minimize deterioration. The structure shall not require corrosion-preventive coatings or after treatments, either during construction or throughout the service life of the vehicle.

TS 21. Towing

Each towing device shall withstand, without permanent deformation, tension loads up to 1.2 times the curb weight of the bus within 20 deg. of the longitudinal axis of the bus. If applicable, the rear towing device(s) shall not provide a toehold for unauthorized riders. The method of attaching the towing device shall not require the removal, or disconnection, of front suspension or steering components.

No Provision of Glad-Hand Type Connectors for Towing

No glad-hand type connector shall be provided.

Lifted (Supported) Front Axle and Flat Towing Capability

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

TS 22. 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 in. high run-up block not wider than a single tire. The bus shall withstand such jacking at any one or any combination of wheel locations without permanent deformation or damage.

Yellow Pads
Jacking pads shall be painted safety yellow.

Decals – Apply decals to identify the location of jacking pads.

TS 23. Floor

TS 23.1 Design (Transit Coach)

The floor shall be essentially a continuous plane, except at the wheel housings and platforms. 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 ¼ in. or installed in a fully sealed butt joint. Similarly, a molding or cover shall prevent debris accumulation between the floor and wheel housings. The vehicle floor around the entrance and exit doors shall have a lateral slope not exceeding 2degto allow for drainage.

Bi-Level Floor Design

The floor design shall consist of two levels (bi-level construction). Aft of the rear door extending to the rear settee riser, the floor height may be raised to a height no more than 21 in. above the lower level, with equally spaced steps. An increase slope shall be allowed on the upper level, not to exceed 3.5 deg. off the horizontal.

TS 23.2 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. Any adhesives, bolts or screws used to secure the floor to the structure shall last and

remain effective throughout the 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 in. from the normal plane. The floor shall withstand the application of 2.5 times gross load weight without permanent detrimental deformation. The floor, with coverings applied, shall withstand a static load of at least 150 lbs. applied through the flat end of a ½ in. diameter rod, with 1/32 in. radius, without permanent visible deformation.

TS 23.3 Construction

The floor shall consist of the subfloor and the floor covering that will last the life of the bus. The floor as assembled, including the sealer, attachments and covering, shall be waterproof, non-hygroscopic and resistant to mold growth.

The subfloor shall be resistant to the effects of moisture, including decay (dry rot). It shall be impervious to wood-destroying insects such as termites.

Pressure-Preserved Plywood Panel

Plywood 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 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 side up. Plywood shall be pressure-treated with a preservative chemical and process such as alkaline copper quaternary (ACQ) that prevents decay and damage by insects. Preservative treatments shall utilize no EPA-listed hazardous chemicals. The concentration of preservative chemicals 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 15 percent.

TS 24. Platforms

TS 24.1 Driver's Area

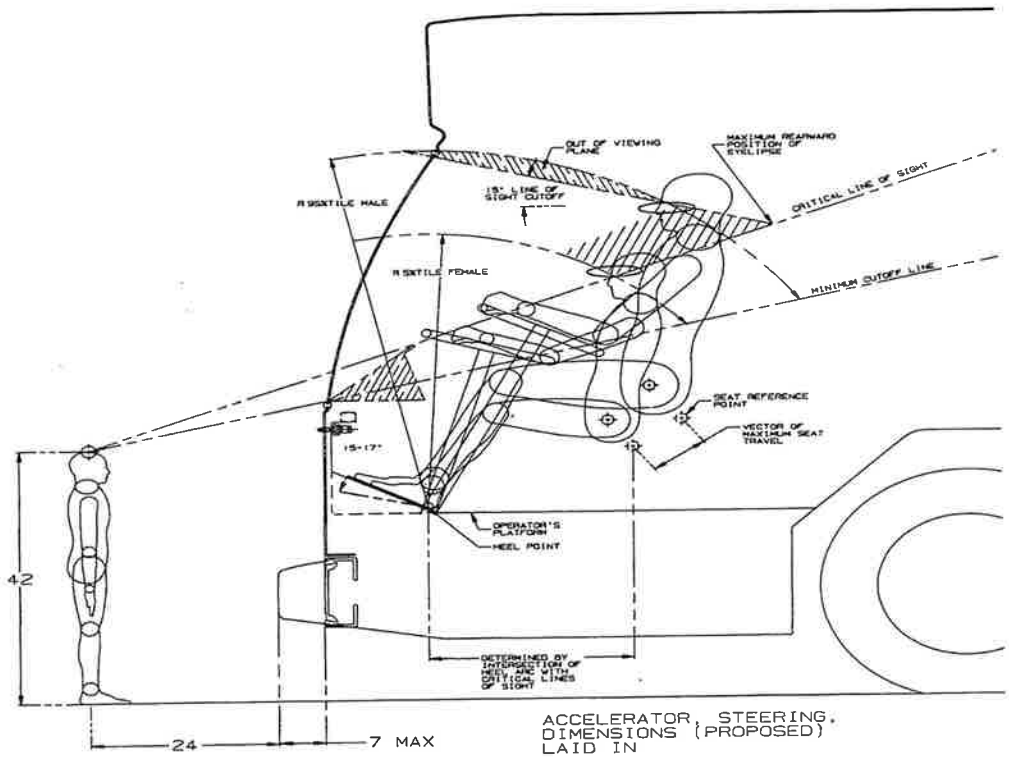
The covering of platform surfaces and risers, except where otherwise indicated, shall be the same material as specified for floor covering. Trim shall be provided along the top edges of platforms unless integral nosing is provided.

Stainless Steel trim material specified.

TS 24.2 Driver's Platform

The driver's platform shall be of a height such that, in a seated position, the driver can see an object located at an elevation of 42 in. above the road surface, 24 in. from the leading edge of the bumper. Notwithstanding this requirement, the platform height shall not position the driver such that the driver's vertical upward view is less than 15 deg. A warning decal or sign shall be provided to alert the driver to the change in floor level. Figure 2 illustrates a means by which the platform height can be determined, using the critical line of sight.

FIGURE 2
Determining Platform Height



TS 24.3 Farebox

Farebox placement should minimize impact to passenger access and minimize interference with the driver's line of sight.

Driver Interface Required; Platform Needed to Bring Height to Driver Access

If the driver's platform is higher than 12 in., then the farebox is to be mounted on a platform of suitable height to provide accessibility for the driver without compromising passengers' access.

TS 24.4 Rear Step Area to Rear Area (Transit Coach)

If the vehicle is of a bi-level floor design, then a rear step area shall be provided along the center aisle of the bus to facilitate passenger traffic between the upper and lower floor levels. This step area shall be cut into the rear platform and shall be approximately the aisle width, a minimum 12 in. deep and approximately half the height of the upper level relative to the lower level. The horizontal surface of this platform shall be covered with skid-resistant material with a visually contrasting nosing 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.

TS 25. Wheel Housing

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. Wheel housings shall be constructed of corrosion-resistant and fire-resistant material.

Wheel housings, as installed and trimmed, shall withstand impacts of a 2 in. steel ball with at least 200 ft-lb of energy without penetration.

TS 26. Jacking

TS 26.1 Design and Construction

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. Wheel housings shall be constructed of corrosion-resistant and fire-resistant material.

Wheel housings, as installed and trimmed, shall withstand impacts of a 2in. steel ball with at least 200 ft-lbs. of energy without penetration.

TS 26.2 Design and Construction (Transit Coach)

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 housing 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 noise requirements of this specification.

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

The finish of the front wheel housings shall be scratch-resistant and complement interior finishes of the bus to minimize the visual impact of the wheel housing. If fiberglass wheel housings are provided, then they shall be color-impregnated to match interior finishes. The lower portion extending to approximately 10 to 12 in. above the floor shall be equipped with scuff-resistant coating or stainless-steel trim.

Wheel housings not equipped with seats or equipment enclosure shall have a horizontal assist mounted on the top portion of the housing no more than 4 in. higher than the wheel well housing.

Acceptable Equal: The City of Huntsville will allow 6.7 inches above the top surface of the wheel housing.

The wheel housing shall be designed to have the ability to chain buses.

TS 26.3 Bellows

Replacement fabric type bellows with draft-free, no-sag bottom closure and water drains shall be provided between the lead and trailing sections to seal the bus interior and keep it free of water, dirt and drafts. Bellows hardware shall be corrosion resistant, and the under-floor area of the bellows shall be easy to clean when necessary. The passageway between the lead unit and trailing unit shall have an inside cross section that is as nearly equal as possible to the inside cross section of the bus bodies, with no tripping or pinching hazards created by the turntable cross section or closeouts. The bellows shall be durable, and its supporting structure and stiffeners shall support the bellows material in a neat, sag-free manner. The Contractor shall supply information on the actual service life achieved by the type of bellows being proposed. A sample of the bellows and attaching hardware may be requested for evaluation at the Agency's option. Bellows shall be approved by the Agency.

Bellows liner shall be provided.

CHASSIS

TS 27. Suspension

TS 27.1 General Requirements

The front, rear and mid (if articulated) suspensions shall be pneumatic type. The basic suspension system shall last the service life of the bus without major overhaul or replacement. Adjustment points shall be minimized and shall not be subject to a loss of adjustment in service. Routine adjustments shall be easily accomplished by limiting the removal or disconnecting the components.

TS 27.2 Alignment

All axles should be properly aligned so the vehicle tracks accurately within the size and geometry of the vehicle.

TS 27.3 Springs and Shock Absorbers

TS 27.3.1 Suspension Travel

The suspension system shall permit a minimum wheel travel of 2.75 in. jounce-upward travel of a wheel when the bus hits a bump (higher than street surface), and 2.75 in. 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 ½ in. at any point from the height required. The safe operation of a bus cannot be impacted by ride height up to 1 in. from design normal ride height.

TS 27.3.2 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 three cycles or less after hitting road perturbations. The shock absorber bushing shall be made of elastomeric material that will last the life of the shock absorber. The damper shall incorporate a secondary hydraulic rebound stop.

TS 27.3.3 Lubrication

Standard Grease Fittings

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 from a pit or with the bus on a hoist. Each element requiring lubrication shall have its own grease fitting with a relief path. The lubricant specified shall be standard for all elements on the bus serviced by standard fittings and shall be required no less than every 6000 miles.

TS 27.3.4 Kneeling

A kneeling system shall lower the entrance(s) of the bus a minimum of 2.5 in. during loading or unloading operations regardless of load up to GVWR, measured at the longitudinal centerline of the entrance door(s) by the driver. The kneeling control shall provide the following functions:

- Down control without having to hold down button
- Upward control actuation must allow the bus to return to normal floor height without the driver having to hold the control.

The 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 1.25 in. per second at essentially a constant rate. After kneeling, the bus shall rise within 4 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 vertical acceleration shall not exceed 0.2g, and the jerk shall not exceed 0.3g/second.

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, a minimum 2.5 in. 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.

TS 28. Wheels and Tires

TS 28.1 Wheels

All wheels shall be interchangeable except for the middle axle of an artic where a super single tire size is used 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.

One-sided polished aluminum.

No tire-pressure monitoring system.

Standard non-locking lug nut.

TS 28.2 Tires

Tires shall be heavy duty Michelin Transit Tires suitable for the conditions of transit service and sustained operation at the maximum speed capability of the bus. The load on any tire at GVWR shall not exceed the tire supplier's rating.

The tires shall be supplied by the Contractor.

TS 29. Steering

Hydraulically assisted steering shall be provided. The steering gear shall be an integral type with the number and length of flexible lines minimized or eliminated. An engine-driven hydraulic pump shall be provided for power steering.

On battery-electric and hybrid coaches capable of supporting it, electrically driven hydraulic power steering may be used.

TS 29.1 Steering Axle (Transit Coach)

Oiled-Type Front Bearings

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

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

The steering geometry of the outside (front lock) wheel shall be within 2 deg. of true Ackerman up to 50 percent lock measured at the inside (back lock) wheel. The steering geometry shall be within 3 deg. of true Ackerman for the remaining 100 percent lock measured at the inside (back lock) wheel.

TS 29.2 Steering Wheel

TS 29.2.1 Turning Effort

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.

Under these conditions, the torque required to turn the steering wheel 10 deg. shall be no less than 5 ft.-lbs. and no more than 10 ft.-lbs. Steering torque may increase to 70 ft.-lbs. when the wheels are approaching the steering stops, as the relief valve activates.

Power steering failure shall not result in loss of steering control. With the bus in operation, the steering effort shall not exceed 55 lbs. 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.

TS 29.2.2 Steering Wheel, General

The steering wheel diameter shall be approximately 18 to 20 in.; the rim diameter shall be ⅞ to 1¼ in. and shaped for firm grip with comfort for long periods of time.

Steering wheel spokes and wheel thickness shall ensure visibility of the dashboard so that vital instrumentation is clearly visible at center neutral position (within the range of a 95th-percentile male, as described in SAE 1050a, Sections 4.2.2 and 4.2.3). Placement of steering column must be as far forward as possible, but either in line with or behind the instrument cluster.

TS 29.2.3 Steering Column Tilt

The steering column shall have full tilt capability with an adjustment range of no less than 40 deg. from the vertical and easily adjustable by the driver and shall be accessible by a 5th percentile female and 95th percentile male.

TS 29.2.4 Steering Wheel Telescopic Adjustment

The steering wheel shall have full telescoping capability and have a minimum telescopic range of 2 in. and a minimum low-end adjustment of 29 in., measured from the top of the steering wheel rim in the horizontal position to the cab floor at the heel point.

TABLE 4

Steering Wheel Height[1] Relative to Angle of Slope

At Minimum Telescopic Height Adjustment (29 in.)		At Maximum Telescopic Height Adjustment (5 in.)	
Angle of Slope	Height	Angle of Slope	Height
0 deg.	29 in.	0 deg.	34 in.
15 deg.	26.2 in.	15 deg.	31.2 in.
25 deg.	24.6 in.	25 deg.	29.6 in.
35 deg.	22.5 in.	35 deg.	27.5 in.

1. Measured from bottom portion closest to driver.

TS 30. Drive Axle

The bus shall be driven by a heavy-duty axle with a load rating sufficient for the bus loaded to GVWR. The drive axle shall have a design life 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. 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 axle and driveshaft components shall be rated for both propulsion and retardation modes with respect to duty cycle.

NOTE: The retardation duty cycle can be more aggressive than propulsion.

The drive shaft shall be guarded to prevent hitting any critical systems, including brake lines, coach floor or the ground, in the event of a tube or universal joint failure.

TS 30.1 Non-Drive Axle

The non-drive axle is the drive axle without the drive gear with a load rating sufficient for the load to GVWR.

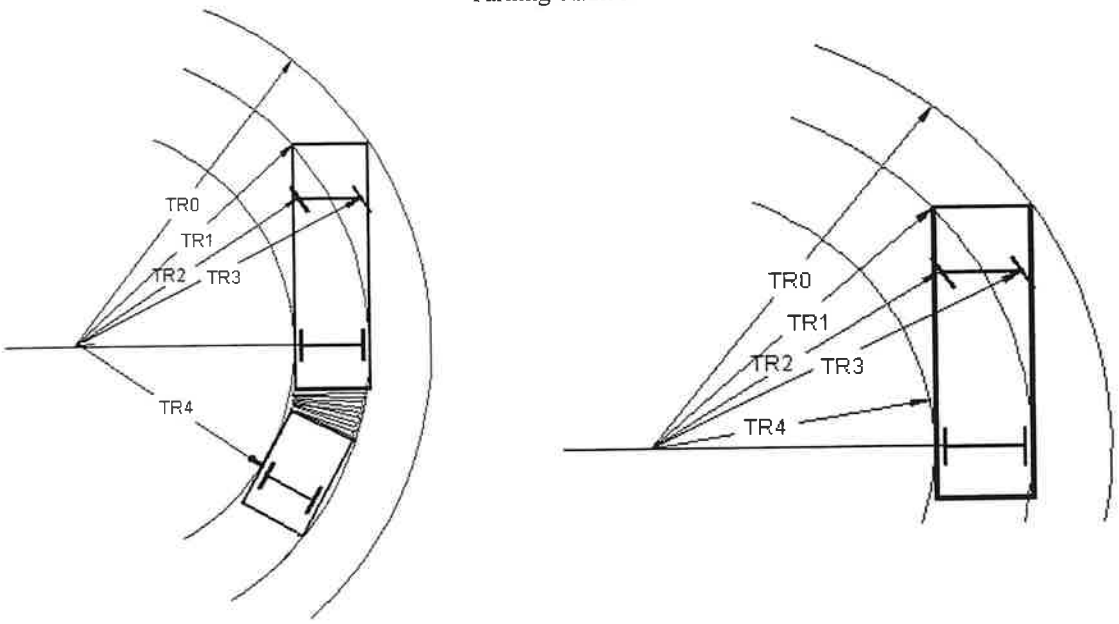
TS 31. Turning Radius

TABLE 5

Maximum Turning Radius

Bus Length (approximate)	Maximum Turning Radius (see **Figure 3**)	Agency Requirement
30 ft.	31 ft. (TR0)	
35 ft.	39 ft. (TR0)	
40 ft.	44 ft. (TR0)	
45 ft.	49 ft. (TR0)	
60 ft.	44.5ft (outside front axle, TR0) 17 ft. (inside rearmost axle, TR4)	

FIGURE 3
Turning Radius



TS 32. Brakes

TS 32.1 Service Brake

Disc Air Brake System is preferred. Brake wear indicators (visible brake sensors) shall be provided.

TS 32.2 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 75 lbs. at a point 7 in. above the heel point of the pedal to achieve maximum braking. The heel point is the location of the driver's heel when his or her foot is rested flat on the pedal and the heel is touching the floor or heel pad of the pedal. The ECU 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 among all wheels in such a ratio as to ensure equal friction material wear rate at all wheel locations. The manufacturer shall demonstrate compliance by providing a copy of a thermodynamic brake balance test upon request.

Microprocessor-controlled automatic traction control (ATC) shall be provided.

TS 32.3 Hubs and Drums/Discs

Replaceable wheel bearing seals shall run on replaceable wear surfaces or be of an integral wear surface sealed design. Wheel bearing and hub seals and unitized hub assemblies shall not leak or weep lubricant when operating on the design operating profile for the duration of the initial manufacturer's warranty.

Disc Brakes on All Axles

The bus shall be equipped with disc brakes on all axles, and the brake discs shall allow machining of each side of the disc to obtain smooth surfaces per manufacturer's specifications.

The brake system material and design shall be selected to absorb and dissipate heat quickly so that the heat generated during braking operation does not glaze the brake linings.

TS 32.4 Parking/Emergency Brake

Air Brakes
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.

Emergency Brake
An emergency brake release shall be provided to release the brakes in the event of automatic emergency brake application. 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 driver releases the emergency brake release valve, the brakes shall engage to hold the bus in place. Air to the emergency brake release system shall be provided by a dedicated emergency air tank.

TS 32.5 Regenerative Braking (Hybrid)

In addition to traditional mechanical friction service braking, the bus shall be equipped with regenerative braking designed to improve energy efficiency and extend brake lining service life. The application of regenerative braking shall cause a smooth blending of both regenerative and service brake function. Actuation of ABS and/or automatic traction control (ATC) shall override the operation of the regenerative brake. To protect the ESS system from over-

charge, regenerative braking should be limited to above a certain SOC which is defined by the manufacturer; a written document and training should be provided to the Agency.

TS 33. Interlocks (Transit Coach)

TS 33.1 Passenger Door Interlocks

To prevent opening mid and rear passenger doors while the bus is in motion, a speed sensor shall be integrated with the door controls to prevent the mid/rear doors from being enabled or opened unless the bus speed is less than 2 mph.
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 to stop movement of the bus when the driver's door control is moved to a mid/rear door enable or open position, or a mid or rear door panel is opened more than 3 in. from the fully closed position (as measured at the leading edge of the door panel).The interlock engagement shall bring the bus to a smooth stop and shall be capable of holding a fully loaded bus on a 6 percent grade, with the engine at idle and the transmission in gear, until the interlocks are released. These interlock functions shall be active whenever the vehicle master run switch is in any run position.

All door systems employing brake and accelerator interlocks shall be supplied with supporting failure mode effects analysis (FEMA) documentation, which demonstrates that failure modes are of a failsafe type, thereby never allowing the possibility of release of interlock while an interlocked door is in an unsecured condition, unless the door master switch has been actuated to intentionally release the interlocks.

Non-adjustable brake interlock regulator.

No Requirements for Accelerator and Brake Interlocks Whenever Front Doors Are Open

TS 34. Pneumatic System

TS 34.1 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 over a 15-minute period of time as indicated on the dash gauge.

Provision shall be made to apply shop air to the bus air systems. A quick disconnect fitting 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 the fitting

against dirt and moisture when not in use. The air for the compressor shall be filtered. The air system shall be protected per FMVSS 121.

TS 34.2 Air Compressor

The engine-driven air compressor shall be sized to charge the air system from 40psi to the governor cut-off pressure in less than 4 minutes while not exceeding the fast idle speed setting of the engine.

TS 34.3 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 °F. The air on the delivery side of the compressor where it enters nylon housing shall not be above the maximum limits as stated in SAE J844. 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 5ft intervals. Nylon lines may be grouped and shall be supported at 30 in. intervals or less.

The compressor discharge line between power plant and body-mounted equipment shall be flexible convoluted copper or stainless-steel line, or maybe 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 2ft intervals or less.

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

TS 34.4 Air Reservoirs

All air reservoirs shall meet the requirements of FMVSS Standard 121 and SAE Standard J10 and shall be equipped with drain plugs and guarded or flush type drain valves. 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 drain valves that discharge below floor level with lines routed to eliminate the possibility of water traps and/or freezing in the drain line.

TS 34.5 Air System Dryer

An air dryer shall prevent accumulation of moisture and oil in the air system. The air dryer system shall include one or more replaceable desiccant cartridges.

ELECTRICAL, ELECTRONIC AND DATA COMMUNICATION SYSTEMS

TS 35. Overview

The electrical system will consist of vehicle battery systems and components that generate, distribute and store power throughout the vehicle. (e.g., generator, voltage regulator, wiring, relays, and connectors).

Electronic devices are individual systems and components that process and store data, integrate electronic information or perform other specific functions.

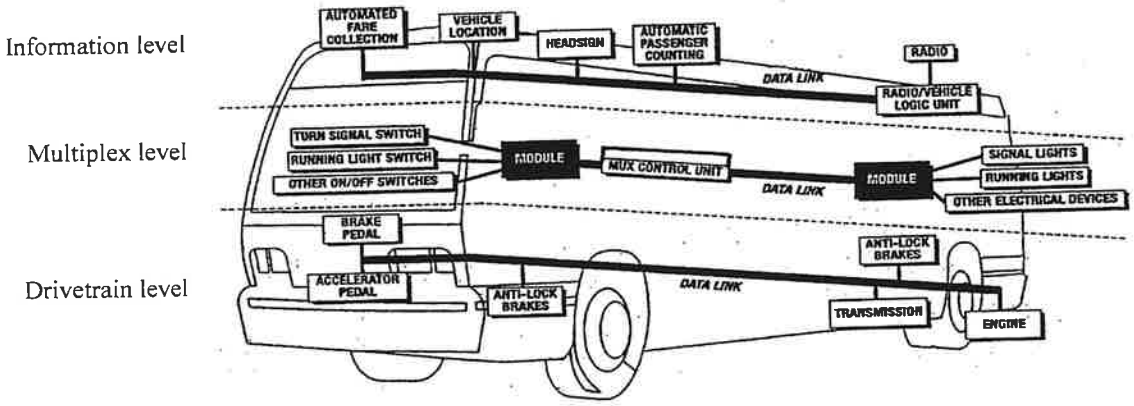
The data communication system consists of bi-directional communications networks that electronic devices use to share data with other electronic devices and systems. Communication networks are essential to integrating electronic functions, both onboard the vehicle and off.

Information level systems that require vehicle information for their operations or provide information shall adhere to J1939 data standard.

Data communications systems are divided into three level store the use of multiple data networks:

- **Powertrain level:** Components related to the powertrain, including the propulsion system components (engine, transmission, and hybrid units) and anti-lock braking system (ABS), which may include traction control. At a minimum, powertrain components consisting of the engine, transmission, retarder, ASR, and anti-lock braking systems shall be powered by a dedicated and isolated ignition supply voltage to ensure data communication between components exists when the vehicle ignition is switched to the "on" position.
- **Information level:** Components whose primary function is the collection, control or display of data that is not necessary to the safe drivability of the vehicle (i.e., the vehicle will continue to operate when those functions are inoperable). These components typically consist of those required for automatic vehicle location (AVL) systems, destination signs, fareboxes, passenger counters, radio systems, automated voice and signage systems, video surveillance and similar components.
- **Multiplex level:** Electrical or electronic devices controlled through input/output signals such as discrete, analog, and serial data information (i.e., on/off switch inputs, relay or relay control outputs). Multiplexing is used to control components not typically found on the drivetrain or information levels, such as lights; wheelchair lifts; doors; heating, ventilation, and air conditioning (HVAC) systems (if applicable); and gateway devices.

FIGURE 4
Data Communications Systems Levels



TS 35.1 Modular Design

The design of the electrical, electronic and data communication systems shall be modular so that each electronic device, apparatus panel, or wiring bundle is easily separable from its interconnect by means of connectors.
Power plant wiring shall be an independent wiring harness. Replacement of the engine compartment wiring harness(es)shall not require pulling wires through any bulkhead or removing any terminals from the wires.

TS 36. 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, asrecommendedinSAEJ1455.

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 when operating within the design operating profile. As a recommendation, 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 SAEJ1113and UNECE Council Directive 95/54(R10).

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

TS 36.1 Hardware Mounting

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, as referenced in SAE J1113.

All electrical/electronic hardware mounted in the interior of the vehicle shall be accessible 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 SAEJ1455.

TS 37. General Electrical Requirements

TS 37.1 Batteries

TS 37.1.1 Low-Voltage Batteries (24V)

FourGroup31 Maintenance-Free Batteries

Four Group 31 Series deep-cycling maintenance-free battery units shall be provided. Each battery shall have a minimum of 700cold-cranking amps. Each battery shall have a purchase date no more than one year from the date of release for shipment to the Agency.

Same Size Terminal Ends

Positive and negative terminal ends shall be the same size.

TS 37.1.2 Battery Cables

The battery terminal ends, and cable ends shall be color-coded with red for the primary positive, black for negative and another color for any intermediate voltage cables. Positive and negative battery cables shall not cross each other, if at all possible, shall be flexible and shall be sufficiently long to reach the batteries with the tray in the extended position without stretching or pulling on any connection and shall not lie directly onto 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 SGR, SGT, SGX or GXL and SAE Recommended Practice J541, with 2100 strand 4/0 cable or greater recommended.

Color codes each voltage.

TS 37.1.3 Battery Compartment

The battery compartment shall prevent accumulation of snow, ice and debris on top of the batteries and shall be vented and self-draining. It shall be accessible only from the outside of the vehicle. All components within the battery compartment, and the compartment itself, shall be protected from damage or corrosion from the electrolyte. The inside surface of the battery compartment's access doors hall 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 battery compartment temperature should not exceed manufacturers specification.

The vehicle shall be equipped with a12VDC and 24VDC quick disconnect switch(es). The battery compartment door shall conveniently accommodate operation of the12VDC and 24VDC quick disconnect switch(es).

The battery quick disconnect access door shall be identified with a decal. The decal size shall not be less than3.5 × 5in. (8.89 × 12.7cm).

The battery hold-down bracket shall be constructed of a nonconductive and corrosion-resistant material (plastic or fiberglass).

This access door shall not require any special locking devices to gain access to the switch, and it shall be accessible without removing or lifting the panel. The door shall be flush-fitting and incorporate a spring tensioner or equal to retain the door in a closed position when not in use.

The batteries shall be securely mounted on a stainless steel, or polyethylene or equivalent tray that can accommodate the size and weight of the batteries. The battery tray, if applicable, 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. A locking device shall retain the battery tray to the stowed position.

If not located in the engine compartment, the same fire-resistant properties must apply to the battery compartment. No sparking devices should be located within the battery box. The quick disconnect switch may also be accessed through the fuse box.

TS 37.1.4 Auxiliary Electronic Power Supply

If required, gel-pack, or any form of sealed (non-venting) 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.

TS 37.1.5 Master Battery Switch

The location of the master battery switch shall be clearly identified on the exterior access panel, be accessible in less than10 seconds for deactivation and prevent corrosion from fumes and battery acid when the batteries are washed of for are in normal service.

Turning the master switch off with the power plant operating, during an emergency, shall shut off the engine and shall not damage any component of the electrical system. The master switch shall be capable of carrying and interrupting the total circuit load.

Single Switch
The batteries shall be equipped with a single switch for disconnecting both12V and 24Vpower.

TS 37.1.6 Low-Voltage Generation and Distribution

The low-voltage generating systems hall maintain the charge on fully charged batteries, except when the vehicle is at standard idle with at to allow-voltage generator load exceeding 70 percent of the low-voltage generator name plate rating.

Voltage monitoring and over-voltage output protection (recommended at 32V) shall be provided.

Dedicated power and ground shall be provided as specified by the component or system manufacturer. Cabling to the equipment must be sized to supply the current requirements with no greater than a 5 percent volt drop across the length of the cable.

TS 37.1.7 Circuit Protection

All branch circuits, except battery-to-starting motor and battery-to-generator/alternator circuits, shall be protected by current-limiting devices such as circuit breakers, fuses or solid-state devices sized to the requirements of the circuit. Electronic circuit protection for the cranking motor shall be provided to prevent engaging of the motor for more than 30 seconds at a time to prevent overheating. The circuit breaker fuses shall be easily accessible for authorized personnel. Fuses shall be used only where it can be demonstrated that circuit breakers are not practicable. This requirement applies to in-line fuses supplied by either the Contractor or a supplier. Fuse holders shall be constructed to be rugged and waterproof. All manual reset circuit breakers critical to the operation of the bus shall be mounted in a location convenient to the Agency mechanic with visible indication of open circuits. The Agency shall consider the application of automatic reset circuit breakers on a case-by-case basis. The Contractor shall show all in-line fuses in the final harness drawings. Any manually resettable circuit breakers shall provide a visible indication of open circuits. Any manually resettable circuit breaker s shall provide a visible indication of open circuits.
Circuit breakers or fuses shall be sized to a minimum of 15 percent larger than the total circuit load. The current rating for the wire used for each circuit must exceed the size of the circuit protection being used.

TS 37.2 Grounds

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 /spade terminal connections shall be made per ground stud with spacing between studs ensuring conductivity and serviceability. Electronic equipment requiring an isolated ground of the battery (i.e., electronic ground) shall not be grounded through the chassis.

TS 37.3 Low Voltage/Low Current Wiring and Terminals

All power and ground wiring shall conform to specification requirements of SAE Recommended Practice J1127, J1128 and J1292.Double insulations hall be maintained as close to the junction box, electrical compartment, or terminals as possible. The requirement for double insulations hall be met by wrapping the harness with plastic electrical tape or by sheathing all wires and harnesses with non-conductive, rigid, or flexible conduit.

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

Strain-relief fittings shall be provided at all points where wiring enters 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 5 ft. long and containing at least five wires shall include 10percent (minimum one wire) excess wires for spares. This requirement for spare wires does not apply to datalinks and communication cables. Wiring harness length shall allow end terminals to be replaced twice without pulling, stretching, or replacing the wire.

Terminals shall be crimped to the wiring according to the connector manufacturer's recommendations for techniques and tools. All cable connectors shall be locking type, keyed and sealed, unless enclosed in watertight cabinets or vehicle interior. Pins shall be removable, crimp contact type, of the correct size and rating for the wire being terminated. Unused pin positions shall be sealed with sealing plugs. Adjacent connectors shall use either different inserts or different insert orientations to prevent incorrect connections.

Terminals shall be crimped, corrosion-resistant and full ring type or interlocking lugs with insulating ferrules. When using pressure type screw terminal strips, only stranded wire shall be used. Insulation clearance shall ensure that wires have a minimum of "visible clearance" and a maximum of two times the conductor diameter or1/16 in., 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.

Ultra-sonic and T-splices may be used with 8AWG or smaller wire. When a T-splice is used, it shall meet these additional requirements:

- It shall include a mechanical clamp in addition to solder on the splice.
- The wire shall support no mechanical load in the area of the splice.
- The wire shall be 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.

Wiring located in the engine compartment shall be routed away from high-heat sources or shielded and/or insulated from temperatures exceeding the wiring and connector operating requirements.

The instrument panel and wiring shall be easily accessible for service from the driver's seat or top of the panel. The instrument panel shall be separately removable and replaceable without damaging the instrument panel or gauges.

Wiring shall be of sufficient length and be routed to permit service without stretching or chafing the wires.

TS 37.4 Electrical Components

All electrical components, including switches, relays, flashers, and circuit breakers, shall be heavy-duty designs with either a successful history of application in heavy-duty vehicles or design specifications for an equivalent environment.

All electric motors shall be heavy-duty brushless type where practical and have a continuous duty rating of no less than40,000hours (except cranking motors, washer pumps, auxiliary heater pumps, defroster, and wiper motors). All electric motors shall be easily accessible for servicing.

TS 37.5 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 their functions 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 service able from the driver's seat, vestibule or from the outside. "Rear start and run" controls shall be mounted in an accessible location in the engine compartment and shall be protected from the environment.

TS 38. General Electronic Requirements

If an electronic component has an internal real-time clock, it shall provide its own battery backup to monitor time when battery power is disconnected, and/or it may be updated by a network component. If an electronic component has an hour meter, it shall record accumulated service time without relying on battery backup.

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 (over 32V DC on a 24V DC nominal voltage rating with a maximum of 50V DC) 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. Where this is not possible, the use of a pull-up or pull-down resistor shall be limited as much as possible and easily accessible and labeled.

TS 38.1 Wiring and Terminals

Kinking, grounding at multiple points, stretching and reducing the bend radius below the manufacturer's recommended minimum shall not be permitted.

TS 38.1.1 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 at a spacing not exceeding 4 in. 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 nodes of each I/O terminal.

TS 38.1.2 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 a tone end of the cable. However, certain standards or special requirements, such as SAE J1939 or RF applications, have separate shielding techniques that also shall be used as applicable.

NOTE: A shield grounded at both ends 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.

TS 38.1.3 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 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.

TS 38.1.4 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 have a loss that will at tribute to attenuation of the signal. Cabling should allow for the removal of antennas or attached electronics without removing the installed cable between them. If this cannot be done, then a conduit of sufficient size shall be provided for ease of attachment of antenna and cable assembly. The corresponding component vendors shall be consulted for proper application of equipment, including installation of cables.

TS 38.1.5 Audio

Cabling used for microphone level and line level signals shall be 22AWG minimum with shielded twisted pair. Cabling used for amplifier level signals shall be18AWG minimum.

TS 39. Multiplexing

TS 39.1 General

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 using an internal logic program.

Versatility and future expansion shall be provided for by expandable system architecture. The multiplex system shall be capable of accepting new inputs and outputs thought head edition of new modules and/or the utilization no existing spare inputs and outputs. All 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 of the total number of inputs and outputs, or at least one each for each voltage type utilized (0V,12V,24V) at each module location shall be designated as spares.

TS 39.2 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. Either system shall consist of several modules connected to form a control network.

TS 39.2.1 I/O Signals

The input/output for the multiplex system may contain four types of electrical signals: discrete, modulating, analogue, 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 (4–20 mA). 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.

TS 40. Data Communications

TS 40.1 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 Agency with the following minimum information:

- 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).
- Data definition requirements that ensure access to diagnostic information and performance characteristics.
- The capability and procedures for uploading new application or configuration data.
- Access to revision level of data, application software and firmware.
- The capability and procedures for uploading new firmware or application software.

- Evidence that applicable data shall be broadcast to the network in an efficient manner such that the overall network integrity is not compromised.

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

TS 40.2 Drivetrain Level

Drivetrain components, consisting of the engine, transmission, retarder, anti-lock braking system and all other related components, shall be integrated and communicate fully with respect to vehicle operation with data using SAE Recommended Communications Protocols such as J1939 and/or J1708/J1587 with forward and backward compatibilities or other open protocols. At a minimum, drivetrain components consisting of the engine, transmission, retarder ASR, and anti-lock braking systems shall be powered by a dedicated and isolated ignition supply voltage to ensure data communication among components exists when the vehicle ignition is switched to the "on" position.

TS 40.2.1 Diagnostics, Fault Detection and Data Access

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

The drivetrain 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.

TS 40.2.2 Programmability (Software)

The drivetrain level components shall be programmable by the Agency with limitations as specified by the subsystem Supplier.

TS 40.3 Multiplex Level

TS 40.3.1 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 Agency. The communication port(s)shall be located as specified by the Agency.

TS 40.3.2 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 using 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 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 or the central data access system.

No requirement for mock-up board.

TS 40.3.3 Programmability (Software)

The multiplex system shall have security provisions to protect its software from unwanted changes. This shall be achieved through any or all the following procedures:

- Password protection
- Limited distribution of the configuration software
- Limited access to the programming tools required to change the software.
- Hardware protection that prevents undesired changes to the software

Provisions for programming the multiplex system shall be possible through a PC or laptop. The multiplex system shall have proper revision control to ensure that the hardware and software are identical on each vehicle equipped with the system. Revision control shall be provided by all 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.

- Software revision identification where all copies of the software in the service display the most recent revision number.
- A method of determining which version of the software is currently in use in the multiplex system.

Revision control labels shall be electronic.

TS 40.4 Electronic Noise Control

Electrical and electronic subsystems and components on all buses shall not emit electromagnetic radiation that will interfere with on-board systems, components or equipment, telephone service, radio or TV reception, or violate regulations of the Federal Communications Commission.

Electrical and electronic subsystems on the coaches shall not be affected by external sources of RFI/EMI. This includes, but is not limited to, radio and TV transmission, portable electronic devices including computers in the vicinity of or onboard buses, AC or DC power lines and RFI/EMI emissions from other vehicles.

DRIVER PROVISIONS, CONTROLS, AND INSTRUMENTATION

TS 41. Driver's Area Controls

TS 41.1 General

In general, when designing the driver's area, it is recommended that SAE J833, "Human Physical Dimensions," be used.

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."

TS 41.2 Glare

The driver'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 driver's area shall be avoided.

TS 41.3 Visors/Sunshades

Driver's Window Sunscreens

An adjustable roller type sunscreen shall be provided over the driver's windshield and/or the driver's side window. The sunscreen shall be capable of being lowered to the midpoint of the driver's window. When deployed, the screen shall be secure, stable, and shall not rattle, sway, or intrude into the driver'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 driver. Sunscreen shall be shaped to minimize light leakage between the visor and windshield pillars to the extent possible.

TS 41.4 Driver's Controls

Frequently used controls must be in easily accessible locations. These include the door control, kneel control, windshield wiper/washer controls, ramp, and lift and run switch. Any switches and controls necessary for the safe operation of the bus shall be conveniently located and shall provide ease of operation. They shall be identifiable by shape, touch, and permanent markings. Controls also shall be located so that passengers may not easily tamper with control settings.

All panel-mounted switches and controls shall be marked with easily read identifiers. Graphic symbols shall conform to SAE Recommended Practice J2402, "Road Vehicles – Symbols for Controls, Indicators, and Tell Tales", where available and applicable. The color of switches and controls shall be dark with contrasting typography or symbols.
Mechanical switches and controls shall be replaceable, and the wiring at these controls shall be serviceable from a convenient location. Switches, controls, and instruments shall be dust- and water-resistant.

The transmission shift selector shall be mounted in an angled panel steep enough to discourage drivers from using it as a personal storage area for electronic devices such as cell phones, music players, navigation systems, etc.

TS 41.5 Normal Bus Operation Instrumentation and Controls

The following list identifies bus controls used to operate the bus. These controls are either frequently used or critical to the operation of the bus. They shall be located within easy reach of the operator. The operator shall not be required to stand or turn to view or actuate these controls unless specified otherwise.

Systems or components monitored by onboard diagnostics system shall be displayed in clear view of the operator and provide visual and/or audible indicators. The intensity of indicators shall permit easy determination of on/off status in bright sunlight but shall not cause a distraction or visibility problem at night. All indicators shall be illuminated using backlighting.
The indicator panel shall be located in Area 1 or Area 5, within easy view of the operator instrument panel. 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.

On-board displays visible to the operator shall be limited to indicating the status of those functions described herein that are necessary for the operation of the bus. All other indicators needed for diagnostics and their related interface hardware shall be concealed and protected from unauthorized access. Table 6represents instruments and alarms. The intent of the overall physical layout of the indicators shall be in a logical grouping of systems and severity nature of the fault.

Consideration shall be provided for future additions of spare indicators as the capability of onboard diagnostic systems improves.

TABLE 6 (Transit Coach)
Transit Bus Instruments and Alarms

Device	Description	Location	Function	Visual/ Audible
Master run switch	Rotary, four-position detent	Side console	Master control for bus, off, day run, night run and clearance ID lights	
Engine start, front	Approved momentary switch	Side console	Activates engine starter motor	
Engine start, rear	Approved momentary switch	Engine compartment	Activates engine starter motor	
Engine run, rear	Three-position toggle switch	Engine compartment	Permits running engine from rear start, normal front run position and off	Amber light
Drive selector	Touch panel switch	Side console	Provides selection of propulsion: forward, reverse and neutral	Gear selection
HVAC	Switch or switches to control HVAC	Side console	Permits selection of passenger ventilation: off, cool, heat, low fan, high fan or full auto with on/off only	
Driver's ventilation	Rotary, three-position detent	Side console or dash left wing	Permits supplemental ventilation: fan off, low or high	
Defroster fan	Rotary, three-position detent	Side console or dash left wing	Permits defroster: fan off, low, medium or high	
Defroster temperature	Variable position	Side console or dash left wing	Adjusts defroster water flow and temperature	
Windshield wiper	One-variable rotary position operating both wipers	Dash left wing	Variable speed control of left and right windshield wipers	
Windshield washer	Push button	Dash left wing	Activates windshield washers	

TABLE 6 (Transit Coach)
Transit Bus Instruments and Alarms

Device	Description	Location	Function	Visual/ Audible
Dash panel lights	Rotary rheostat or stepping switch	Side console or dash left wing	Provides adjustment for light intensity in night run position	
Interior lights	Three-position switch	Side console	Selects mode of passenger compartment lighting: off, on, normal	
Fast idle	Two-position switch	Side console	Selects high idle speed of engine	
WC ramp/ kneel enable	Two-position switch[1]	Side console or dash right wing	Permits operation of ramp and kneel operations at each door remote panel	Amber light
Front door ramp/kneel enable	Two-position keyed switch[1]	Front door remote or dash right wing	Permits ramp and kneel activation from front door area, key required[1]	Amber light
Front door ramp	Three-position momentary switch	Right side of steering wheel	Permits deploy and stow of front ramp	Red light
Front kneel	Three-position momentary switch	Front door remote	Permits kneeling activation and raise and normal at front door remote location	Amber or red dash indicator; exterior alarm and amber light
Rear door ramp/kneel enable	Two-position keyed switch[1]	Rear door remote	Permits ramp and kneel activation from rear door area; key required[1]	Red light
Rear door ramp	Three-position momentary switch	Rear door remote	Permits deploy and stow of rear ramp	
Rear kneel	Three-position momentary switch	Rear door remote	Permits kneeling activation and raise and normal at rear door remote location	
Silent alarm	Recessed push button, NO and NC contacts momentary	Side console	Activates emergency radio alarm at dispatch and permits covert microphone and/or enables destination sign emergency message	
Video system event switch	Momentary on/off momentary switch with plastic guard	Side console	Triggers event equipment, triggers event light on dash	Amber light
Left remote mirror	Four-position toggle type	Side console	Permits two-axis adjustment of left exterior mirror	
Right remote mirror	Four-position toggle type	Side console	Permits two-axis adjustment of right exterior mirror	
Mirror heater	Switch or temperature activated	Side console	Permits heating of outside mirrors when required	
Passenger door control	Five-position handle type detent or two momentary push buttons	Side console, forward	Permits open/close control of front and rear passenger doors	Red light

TABLE 6 (Transit Coach)
Transit Bus Instruments and Alarms

Device	Description	Location	Function	Visual/ Audible
Rear door override	Two-position switch in approved location	Side console, forward	Allows driver to override activation of rear door passenger tape switches	
Engine shutdown override	Momentary switch with operation protection	Side console	Permits driver to override auto engine shutdown	
Hazard flashers	Two-position switch	Side console or dash right wing	Activates emergency flashers	Two green lights
Fire suppression	Red push button with protective cover	Dash left wing or dash center	Permits driver to override and manually discharge fire suppression system	Red light
Mobile data terminal	Mobile data terminal coach operator interface panel	Above right dash wing	Facilitates driver interaction with communication system and master log-on	LCD display with visual status and text messages
Farebox interface	Farebox coach operator interface panel	Near farebox	Facilitates driver interaction with farebox system	LCD display
Destination sign interface	Destination sign interface panel	In approved location	Facilitates driver interaction with destination sign system, manual entry	LCD display
Turn signals	Momentary push button (two required) raised from other switches	Left foot panel	Activates left and right turn signals	Two green lights and optional audible indicator
PA manual	Momentary push button	In approved location	Permits driver to manually activate public address microphone	
Low-profile microphone	Low-profile discrete mounting	Steering column	Permits driver to make announcements with both hands on the wheel and focusing on road conditions	
High beam	Push button	In approved location	Permits driver to toggle between low and high beam	Blue light
Parking brake	Pneumatic PPV	Side console or dash left wing	Permits driver to apply and release parking brake	Red light
Park brake release	Pneumatic PPV	Vertical side of the side consoler dash center	Permits driver to push and hold to release brakes	
Hill holder	Two-position momentary switch	Side console	Applies brakes to prevent bus from rolling	
Remote engine speed	Rotary rheostat	Engine compartment	Permits technician to raise and lower engine RPM from engine compartment	
Master door/ interlock	Multi-pole toggle, detented	Out of operator's reach	Permits driver override to disable door and brake/throttle interlock	Red light

TABLE 6 (Transit Coach)
Transit Bus Instruments and Alarms

Device	Description	Location	Function	Visual/ Audible
Warning interlocks deactivated	Red indicator light	Dash panel center	Illuminates to warn driver that interlocks have been deactivated	Red light
Retarder disable	Multi-pole switch detented	Within reach of operator or approved location	Permits driver override to disable brake retardation/regeneration	Red light
Alarm acknowledge	Push button momentary	Approved location	Permits driver to acknowledge alarm condition	
Rear door passenger sensor disable	Multi-pole toggle, detented	In sign compartment or driver's barrier compartment	Permits driver to override rear door passenger sensing system	
Indicator/ alarm test button	Momentary switch or programming[1]	Dash center panel	Permits driver to activate test of sentry, indicators and audible alarms	All visuals and audibles
Auxiliary power	110 V power receptacle	Approved location	Property to specify what function to supply	
Speedometer	Speedometer, odometer, and diagnostic capability, 5-mile increments	Dash center panel	Visual indication of speed and distance traveled, accumulated vehicle mileage, fault condition display	Visual
Air pressure gauge	Primary and secondary, 5 psi increments	Dash center panel	Visual indication of primary and secondary air systems	Red light and buzzer
Fire detection	Coach operator display	Property specific or dash center	Indication of fire detection activation by zone/location	Buzzer and red light
Door obstruction	Sensing of door obstruction	Dash center	Indication of rear door sensitive edge activation	Red light and buzzer
Door ajar	Door not properly closed	Property specific or dash center	Indication of rear door not properly closed	Buzzer or alarm and red light
Low system air pressure	Sensing low primary and secondary air tank pressure	Dash center	Indication of low air system pressure	Buzzer and red light
Methane detection function	Detection of system integrity	Property specific or dash center	Detects system failure	No start condition, amber light
Methane detection	Indication of 20% LED emergency light (LEL)	Property specific or dash center	Detects levels of methane	Flashing red at 20% LEL
Methane detection	Indication of 50% LEL	Property specific or dash center	Detects levels of methane	Solid red at 50% LEL

TABLE 6 (Transit Coach)
Transit Bus Instruments and Alarms

Device	Description	Location	Function	Visual/ Audible
Engine coolant indicator	Low coolant indicator may be supplied as audible alert and visual and/or text message	Within driver's sight	Detects low coolant condition	Amber light
Hot engine indicator	Coolant temperature indicator may be supplied as audible alert and visual and/or text message	Within driver's sight	Detects hot engine condition and initiates time delay shutdown	Red light
Low engine oil pressure indicator	Engine oil pressure indicator may be supplied as audible alert and visual and/or text message	Within driver's sight	Detects low engine oil pressure condition and initiates time-delayed shutdown	Red light
ABS indicator	Detects system status	Dash center	Displays system failure	Amber light
HVAC indicator	Detects system status	Dash center	Displays system failure	Amber or red light
Charging system indicator (12/24 V)	Detect charging system status	Dash center	Detects no charge condition and optionally detects battery high, low, imbalance, no charge condition, and initiates time-delayed shutdown	Red light flashing or solid based on condition
Bike rack deployed indicator	Detects bike rack position	Dash center	Indication of bike rack not being in fully stowed position	Amber or red light
Fuel tank level	Analog gauge, graduated based on fuel type	Dash center	Indication of fuel tank level/pressure	
DEF gauge	Level Indicator	Center dash	Displays level of DEF tank and indicates with warning light when low	Red light
Active regeneration	Detects status	Dash center	Indication of electric regeneration	Amber or red light
Turntable	Detects status	Dash center	Warning indication for hinge locking	Audible and amber warning and red light if locked
Turntable	Interlock momentary switch	Side console	Momentarily release interlock brakes due to over angled condition	

1. Indicate area by drawing. Break up switch control from indicator lights.

TS 41.6 Driver Foot Controls

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

TS 41.6.1 Pedal Angle

The vertical angle of the accelerator and brake pedals shall be determined from a horizontal plane regardless of the slope of the cab floor. The accelerator and brake pedals shall be positioned at an angle of 37 to 50deg at the point of initiation of contact and extend downward to an angle of 10 to 18deg at full throttle.

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.

TS 41.6.2 Pedal Dimensions and Position

The floor-mounted accelerator pedal shall be 10 to 12 in. long and 3 to 4 in. wide. Clearance around the pedal must allow for no interference precluding operation.

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 in. Both pedals should be located approximately on the same plane coincident to the surface of the pedals.

TS 41.7 Driver Foot Switches

Floor-Mounted Foot Control 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 deg and a maximum of 37 deg. It shall be located no closer to the seat front than the heel point of the accelerator pedal.

Foot Switch Control

The control switches for the turn signals shall be mounted on an inclined, floor-mounted stainless-steel enclosure or metal plate mounted to an incline integrated into the driver's platform, located to the left of the steering column. The location and design of this enclosure shall be such that foot room for the operator is not impeded. The inclined mounting surface shall be skid resistant. All other signals, including high beam and public address system, shall be in approved locations.

The foot switches shall be UL-listed, heavy-duty type, of a rugged, corrosion-resistant metal construction. The foot switches for the directionals shall be momentary type, while those for the PA system and the high beam shall be latching type. The spacing of the switches shall be such that inadvertent simultaneous deflection of switches is prevented.

TS 42. Driver's Amenities

TS 42.1 Coat Hanger

Coat Hanger

A suitable hanger shall be installed in a convenient, approved location for the driver's coat.

TS 42.2 Drink Holder

Drink Holder

A device shall be provided to securely hold the driver's drink container, which may vary widely in diameter. It must be mounted within easy reach of the driver and must have sufficient vertical clearance for easy removal of the container. When the container is in the device, the driver's view of the road must not be obstructed, and leakage from the container must not fall on any switches, gauges, or controls.

TS 42.3 Storage Box

Storage Box

An enclosed driver storage area shall be provided with a positive latching door and/or lock. The minimum size is 2750 in

TS 43. Windshield Wipers and Washers

TS 43.1 Windshield Wipers

The bus shall be equipped with a windshield wiper for each half of the windshield. At 60 mph, no more than 10 percent of the wiped area shall be lost due to windshield wiper lift. For two-piece windshields, both wipers shall park along the center edges of the windshield glass. For single-piece windshields, wipers shall park along the bottom edge of the windshield. Windshield wiper motors and mechanisms shall be easily accessible for repairs or service. The fastener that secures the wiper arm to the drive mechanism shall be corrosion resistant.

Single-control, electric two-speed intermittent wiper.

TS 43.2 Windshield Washers

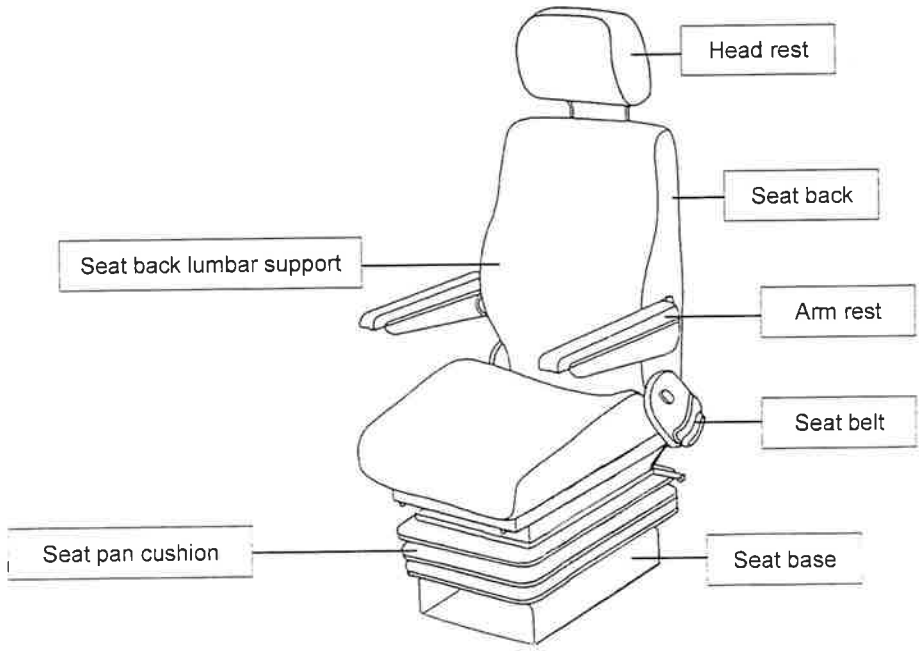
The windshield washer system, when used with the wipers, shall deposit washing fluid evenly and completely wet the entire wiped area.

The windshield washer system shall have a minimum 3-gallon reservoir, located for easy refilling from outside the bus. Reservoir pumps, lines and fittings shall be corrosion-resistant and must include a means to determine fluid level.

TS 44. Air Ride Driver's Seat

USSC Evolution G-2A with ABS Air Operated or approved equal

FIGURE 5
Driver's Seat



TS 44.1 Dimensions

The driver's seat shall be comfortable and adjustable so that people ranging in size from a 95th-percentile male to a 5th-percentile female may operate the bus.

TS 44.1.1 Seat Pan

Cushion 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 less than 16.5 in.at its minimum length and no more than 20.5 in.at its maximum length.

Seat Pan Cushion 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 of14 in., with a minimum 6 in. vertical range of adjustment.

TS 44.1.2 Seat Pan Cushion 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 deg). The seat pan shall adjust in its slope from no less than plus 12 deg (rearward "bucket seat" incline) to no less than minus 5 deg (forward slope).

TS 44.1.3 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 in.). On all low-floor buses, the seat base shall travel horizontally a minimum of 9 in. It shall adjust no closer to the heel point than 6 in. On all high-floor buses, the seat base shall travel a minimum of 9 in. and adjust no closer to the heel point than 6 in.

TS 44.1.4 Seat Pan Cushion Width

Measurement is the horizontal distance across the seat cushion. The seat pan cushion shall be 17 to 21 in. across at the front edge of the seat cushion and 20 to 23 in. across at the side bolsters.

TS 44.1.5 Seat Suspension

The driver's seat shall be air ride and appropriately dampened to support a minimum weight of 380 lbs. The suspension shall be capable of dampening adjustment in both directions.

Rubber bumpers shall be provided to prevent metal-to-metal contact.

TS 44.1.6 Seat Back

Width

Measurement is the distance between the outermost 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 in. Seat back will include dual recliner gears on both sides of the seat.

Height

Standard height seat back.

TS 44.1.7 Headrests

Adjustable headrest.

TS 44.1.8 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 cushioning. The seat back shall provide adjustable-depth lumbar back support with three individual operating lumbar cells within a minimum range of 7 to 11 in.

TS 44.1.9 Seat Back Angle Adjustment

The seat back angle shall be measured relative to a level seat pan, where 90 deg is the upright position and 90 deg-plus represents the amount of recline.

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

TS 44.2 Seat Belt

The seat belts shall be fluorescent orange.

The belt assembly should be an auto-locking retractor (ALR). All seat belts should be stored in automatic retractors.

The belts shall be mounted to the seat frame so that the driver may adjust the seat without resetting the seat belt.

The seat and seatbelt assemblies as installed in the bus shall withstand static horizontal forces as required in FMVSS 207 and 210.

Lap and Shoulder (Three-Point) Seat Belt
Belts shall be florescent orange.

Seat belts shall be provided across the driver's lap and diagonally across the driver's chest. The driver shall be able to use both belts by connecting a single buckle on the right side of the seat cushion. Three-point seatbelts must be emergency locking retractor (ELR) in design.

All seatbelt assemblies shall come equipped with a warning switch device to remind operators to buckle up.

Orange three-point seatbelt webbing.

Lap Belt Length
The lap belt assembly shall be a minimum of 72 in. in length.

TS 44.3 Adjustable Armrest

Two armrests.

TS 44.4 Seat Control Locations

While seated, the driver 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.

TS 44.5 Seat Structure and Materials

Cushions
Cushions shall be fully padded with at least 3 in. of materials in the seating areas at the bottom and back.

Cushion Materials
Open-cell polyurethane (FMVSS 302).

TS 44.6 Pedestal

Powder-coated steel.

TS 44.7 Seat Options

Choose among the following:

- heated seat
- seat alarm
- fabric options
- seat air vent
- side bolsters adjustments
- silicone seat cushion

TS 44.8 Mirrors

TS 44.8.1 Exterior Mirrors

The bus shall be equipped with corrosion-resistant, outside rearview mirrors mounted with stable supports to minimize vibration. Mirrors shall be firmly attached to the bus to minimize vibration and to prevent loss of adjustment with a breakaway mounting system. Mirrors shall permit the driver to view the roadway along the sides of the bus, including the rear wheels. Mirrors should be positioned to prevent blind spots.

Mirrors shall retract or fold sufficiently to allow bus washing operations but avoid contact with windshield.

Exterior mirrors shall be installed with a breakaway mounting system.

Combination of flat and convex mirrors referred to as transit specific.

Curbside Mirrors
The curbside rearview mirror shall be mounted so that its lower edge is no less than 76in. above the street surface. A lower mount may be required due to mirror configuration requests.

Remote Adjustment of Curbside Mirror
The driver shall be able to adjust the curb-side mirror remotely while seated in the driving position. The control for remote positioning of the mirror shall be a single switch or device.

Heated and Remote Mirrors
The heaters shall be energized whenever the driver's heater and/or defroster is activated independently.

Street-Side Mirrors

Remote Adjustment of Mirror
The driver shall be able to adjust the street-side mirror remotely while seated in the driving position. The control for remote positioning of the mirror shall be a single switch or device.

Heated Street-Side Mirrors
The street-side mirrors shall have heaters that energize whenever the driver's heater and/or defroster is activated independently.

TS 44.8.2 Interior Mirrors

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

WINDOWS

TS 45. General

Use with 30ft length: A minimum of 6000 sq in. of window area, including operator and door windows, shall be required on each side of the standard configuration bus.
Use with 35ft length: A minimum of 8000 sq in. of window area, including operator and door windows, shall be required on each side of the standard configuration bus.
Use with 40ft length: A minimum of 10,000 sq in. of window area, including operator and door windows, shall be required on each side of the standard configuration bus.

TS 46. 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 14deg, measured above the horizontal and excluding any shaded band.

The vertically downward view shall permit detection of an object 3½ft high no more than 2 ft in front of the bus. The horizontal view shall be a minimum of 90 deg above the line of sight. Any binocular obscuration due to a center divider may be ignored when determining the 90deg requirement, provided that the divider does not exceed a 3deg angle in the operator's field of view. Windshield pillars shall not exceed 10 deg of binocular obscuration. The windshield shall be designed and installed to minimize external glare as well as reflections from inside the bus.

The windshield shall be easily replaceable by removing zip-locks from the windshield retaining moldings. Bonded-in-place windshields shall not be used. Winglets may be bonded.

TS 46.1 Glazing

The windshield glazing material shall have a ¼ in. nominal thickness laminated safety glass conforming to the requirements of ANSI Z26.1 Test Grouping AS-1 and the recommended practices defined in SAE J673.

No band required.

Two-piece windshield.

TS 47. Driver's Side Window

The driver's side window shall be the sliding type, requiring only the rear half of the 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. 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 driver's view, perpendicular through the operator's side window glazing, should extend a minimum of 33 in. (840 mm) 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 26 in. (560 mm) above the operator's floor to ensure visibility of an under-mounted convex mirror. Driver's window construction shall maximize ability for full opening of the window.

The driver's side window glazing material shall have a ¼ in. nominal thickness laminated safety glass conforming to the requirements of ANSI Z26.1-1996 Test Grouping AS-2 and the recommended practices defined in SAE J673.

The design shall prevent sections from freezing closed in the winter. Light transmittance shall be 75 percent on the glass area below 53 in. from the operator platform floor. On the top-fixed-over-bottom-slider configuration, the top fixed area above 53 in. may have a maximum 5 percent light transmittance.

Hidden Frame (Flush "Euro-Look") Driver's Side Window
Agency to choose from the following options:

- full slider
- egress
- non-egress
- top fixed over bottom slider
- egress
- non-egress

TS 48. Side Windows

TS 48.1 Configuration

Side windows shall not be bonded in place but 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. All aluminum and steel material will be treated to prevent corrosion.

TS 48.2 Emergency Exit (Egress) Configuration

Minimum Egress
All side windows shall be fixed in position, except as necessary to meet the emergency escape requirements.
Standard Passenger Side Window Configurations

- openable windows with inward-opening transom panels.

TS 48.3 Configuration

Operable Windows with Inward-Opening Transom Panels (Fixed Bottom, Tip-In Top)

Each operable side window shall incorporate an upper transom portion. The transom shall be between 25 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.

TS 48.4 Materials

Safety Glass Glazing Panels

Side windows glazing material shall have a minimum of 3/16 in. nominal thickness tempered safety glass. The material shall conform to the requirements of ANSI Z26.1-1996 Test Grouping 2 and the recommended practices defined in SAE J673.

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. Luminous transmittance shall be measured by ASTM D-1003. Windows over the destination signs shall not be tinted.

(Light) 55 percent luminous transmittance.

(Dark) 27 percent luminous transmittance.

Safety Glass Glazing Panels

Side windows glazing material shall have a minimum of 3/16 in. 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.

NOTE: All glass treatments must be permanent, within the glass and/or in the center membrane. Surface films are not permitted.

SHGC and light transmission performance shall be defined by the National Fenestration Rating Council.

TS 48.5 Rear Window

No requirement for rear window.

HEATING, VENTILATING AND AIR CONDITIONING

TS 49. Capacity and Performance

The HVAC climate control system shall be capable of controlling the temperature and maintaining the humidity levels of the interior of the bus as defined in the following paragraphs.

HVAC equipped. See below for configuration.

Allow Either Roof- or Rear-Mounted HVAC Unit
The HVAC unit may either be roof or rear mounted. Note that a rear-mounted unit will preclude a rear window and that the term "roof-mounted unit" includes units mounted on top of or beneath the roof surface.

With the bus running at the design operating profile with corresponding door opening cycle and carrying a number of passengers equal to150 percent of the seated load, the HVAC system shall control the average passenger compartment temperature within arrange between 65and80 °F, while maintaining 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 the range of 10 to 95 °F and at any ambient relative humidity levels between 5 and 50 percent.

When the bus is operated in outside ambient temperatures of 95 to 115 °F, the interior temperature of the bus shall be permitted to rise 0.5°F for each degree of exterior temperature in excess of 95 °F.

When the bus is operated in outside ambient temperatures in the range of -10 to 20 °F, the interior temperature of the bus shall not fall below 55 °F while the bus is running on the design operating profile.

System capacity testing, including pull-down/warm-up, stabilization and profile, shall be conducted in accordance with APTA's *Recommended Practice* "Transit Bus HVAC System Instrumentation and Performance Testing."

> **NOTE: 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 THE IMMEDIATE PATH OF AN 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.

Hotter Ambient Conditions
The air conditioning portion of the HVAC system shall be capable of reducing the passenger compartment temperature from 110to 75°F ±3°F in less than 43 minutes after system engagement for 30, 35 and 40ft buses. 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 at three-quarters max governed speed that may be activated by a driver-controlled device. During the cool-down period, the refrigerant pressure shall not exceed safe high-side pressures, and the condenser discharge air temperature, measured 6 in. from the surface of the coil, shall be less than 45 °F above the condenser inlet air temperature. No simulated solar load shall be used. There shall be no passengers on board, and the doors and windows shall be closed.

R134a
The air conditioning system shall meet these performance requirements using R134a.

TS 50. Controls and Temperature Uniformity

The HVAC system excluding the driver's heater/defroster shall be centrally controlled with an advanced electronic/diagnostic control system with provisions for extracting/reading data. The system shall be compliant with J1939 Communication Protocol for receiving and broadcasting of data.

Hot engine coolant water shall be delivered to the HVAC system driver's defroster/heater and other heater cores by means of an auxiliary coolant pump, sized for the required flow, which is brushless and seamless having a minimum maintenance-free service life for both the brushless motor and the pump of at least 40,000 hours at full power.

Manual Mode Selection of Climate Control System
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 °F of specified temperature control set point.

Single Control Set point at 70 °F
The temperature control set point for the system shall be 70 °F.

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 to 72 in. above the floor, shall not vary by more than 5 °F with doors closed. The interior temperatures, measured at the same height above the floor, shall not vary more than ±5 °F from the front to the rear from the average temperature determined in accordance with APTA's "Recommended Instrumentation and Performance Testing for Transit Bus Air Conditioning System." Variations of greater than ±5 °F will be allowed for limited, localized areas provided that the majority of the measured temperatures fall within the specified requirement.

TS 50.1 Auxiliary Heater

No auxiliary heater.

TS 51. Air Flow

TS 51.1 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 ft. 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 ft. 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 ensure at least 70 °F air outlet temperature. The heating air outlet temperature shall not exceed 120 °F under any normal operating conditions.

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

No "Fresh Air" Requirements
To be used by agencies that have an operating profile where the door opening cycle results in effectively providing an adequate "fresh air" mixture.

TS 51.2 Driver's Area

The bus interior climate control system shall deliver at least 100 cfm of air to the driver'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 driver's feet and legs.

The defroster or interior climate control system shall maintain visibility through the driver's side window.

TS 51.3 Controls for the Climate Control System (CCS)

The controls for the driver's compartment for heating, ventilation and cooling systems shall be integrated and shall meet the following requirements:

- 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 Agency, an "on/off" switch shall be located to the right of or near the main defroster switch.
- A manually operated control valve shall control the coolant flow through the heater core.
- If a cable-operated manual control valve is used, then 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 Agency project manager.

TS 51.4 Driver's Compartment Requirements

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

- The heater and defroster system shall provide heating for the driver and heated air to completely defrost and defog the windshield, driver's side window, and the front door glass in all operating conditions. Fan(s) shall be able to draw air from the bus body interior and/or exterior through a control device and pass it through the heater core to the defroster system and over the driver's feet. A minimum capacity of 100 cfm shall be provided. The driver shall have complete control of the heat and fresh airflow for the driver's area.
- The defroster supply outlets shall be located at the lower edge of the windshield. These outlets shall be durable 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 or louvers shall be provided at the left of the driver's position to allow direction of air onto the side windows.

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

TS 51.5 Driver's Cooling

Separate Dedicated Evaporator

Using a separate, dedicated evaporator, the climate control system shall be designed to maintain the driver's compartment temperatures within the range specified for the passenger compartment. The unit shall operate when the climate control switch is in the "Cool" position. It shall have a separate thermostatic control.

TS 52. Air Filtration

Air shall be filtered before entering the AC system and being discharged 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 g per 1000 cfm cell. Air filters shall be easily removable for service.

Cleanable Filters
Air filters shall be cleanable.

TS 53. Roof Ventilators

Each ventilator shall be easily opened and closed manually. When open with the bus in motion, this ventilator shall provide fresh air inside the bus. The ventilator shall cover an opening area no less than 425 sq in. and shall be capable of being positioned as a scoop with either the leading or trailing edge open no less than 4 in., or with all four edges raised simultaneously to a height of no less than 3½ in. An escape hatch shall be incorporated into the roof ventilator.

Roof ventilator(s) shall be sealed to prevent entry of water when closed.

Two Roof Ventilators
Two roof ventilators shall be provided in the roof of the bus, one approximately over or just forward of the front axle and the other approximately over the rear axle.

A tool shall be provided to manually open and close the hatch.

TS 54. Maintainability

Manually controlled shut-off 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 in. of floor level shall be constructed to resist damage and corrosion.

High and low refrigerant pressure electronic gauges to be located in the return air area.

> **NOTE:** The Agency may include the following sections if an alternative for colder ambient performance is specified above.

TS 55. Entrance/Exit Area Heating

No requirements for entrance/exit area heating.

TS 56. Floor-Level Heating

TS 56.1 Transit Coach

Floor-Level Heating

Sufficient floor-level heaters shall be provided to evenly supply heated forced air. Control of the floor-level heating shall be through the main heating system electronic control.

EXTERIOR PANELS, FINISHES AND EXTERIOR LIGHTING

TS 57. Design

The bus shall have a clean, smooth, simple design, primarily derived from bus performance requirements and passenger service criteria. 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 anybody feature to freeze or bleed out onto the bus after leaving the washer. The body and windows shall be sealed to prevent leaking 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. When panels are lapped, the upper and forward panels shall act as a watershed. However, if entry of moisture into the interior of the vehicle is prevented by other means, then rear cap panels may be lapped otherwise. The windows, hatches and doors shall be able to be sealed. Accumulation of spray and splash generated by the bus's wheels shall be minimized on windows and mirrors.

TS 57.1 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, and add-on devices and trim shall be minimized and integrated into the basic design.

No requirement for protection against graffiti/vandalism for body material surfaces.

TS 57.2 Roof-Mounted Equipment (Transit Coach)

A non-skid, clearly marked walkway or steps shall be incorporated on the roof to provide access to equipment without damaging any system or bus paneling.

TS 58. Pedestrian Safety

Exterior protrusions along the side and front of the bus greater than ½ in. and within 80 in. of the ground shall have a radius no less than the amount of the protrusion. The exterior rearview mirrors, cameras and required lights and reflectors are exempt from the protrusion requirement. Advertising frames shall protrude no more than ⅞ in. from the body surface. Grilles, doors, bumpers and other features on the sides and rear of the bus shall be designed to minimize toeholds or handholds.

Exterior protrusions shall not cause a line-of-sight blockage for the driver.

TS 59. Repair and Replacement

TS 59.1 Side Body Panels (Transit Coach)

Structural elements supporting exterior body panels shall allow side body panels below the windows to be repaired in lengths not greater than 12.5 ft.

Easily Replaceable Lower Side Body Panels
The lower section (approximately 17.5 in.) of the side body panels (low-floor buses) or skirt panels (high-floor buses) shall be made of impact-resistant material and shall be easily and quickly replaceable.

TS 59.2 Side Body Panels (Commuter Coach)

Structural elements supporting exterior body panels shall allow side body panels below the windows to be repaired.

TS 60. Rain Gutters

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

TS 61. License Plate Provisions

Provisions shall be made to mount standard-size U.S./Canada license plates per SAE J686 on the front and 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. The rear license plate provision shall be illuminated per SAE J587.

TS 61.1 Rub rails

No requirement for rub rails.

> **NOTE:** Installation of rub rails may preclude the installation and/or size of exterior advertising signs or racks.

TS 62. Fender Skirts

Features to minimize water spray from the bus in wet conditions shall be included in the wheel housing design. Any fender skirts shall be easily replaceable. They shall be flexible if they extend beyond the allowable body width. Wheels and tires shall be removable with the fender skirts in place.

TS 63. Wheel Covers (Transit Coach)

Wheel covers are not required.

TS 63.1 Splash Aprons

Full width rear splash apron.

Other Locations Required

Splash apron in front of either or both front wheels to reduce splashing on ramp/lift and left mirror.

TS 64. Service Compartments and Access Doors

TS 64.1 Access Doors (Transit Coach)

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. 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. All access doors shall be retained in the open position by props or counterbalancing with over-center or gas-filled springs with safety props and shall be easily operable by one person.

Springs and hinges shall be corrosion resistant. Latch handles shall be flushed 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.

If precluded by design, the manufacturer shall provide door design information specifying how the requirements are met.

TS 64.2 Access Door Latch/Locks

Other Locks and Latches

Agency may define any required locks or latches for access doors.

TS 65. Bumpers

TS 65.1 Location

Bumpers shall provide impact protection for the front and rear of the bus, with the top of the bumper being 27 in. ±2 in., 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.

TS 65.2 Front Bumper

No part of the bus, including the bumper, shall be damaged as a result of a 5mph impact of the bus at curb weight with a fixed, flat barrier perpendicular to the bus's 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 4000lbs parallel to the longitudinal centerline of the bus. It shall protect the bus from damage as a result of 5.5mph impacts into the corners at a 30deg 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 by no more than 7 in.

Mounting provisions for integrated bike rack. The City of Huntsville prefers the 3-station rack by SportWorks.

TS 65.3 Rear Bumper

No part of the bus, including the bumper, shall be damaged as a result of a 2mph 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 ft 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 in. 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 4000 lbs., at 4 mph parallel to or up to a 30degangle to the longitudinal centerline of the bus. The rear bumper shall be shaped to preclude unauthorized riders standing on the bumper. The bumper 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 by no more than 7 in.

TS 65.4 Bumper Material

Bumper material shall be corrosion-resistant and withstand repeated impacts of the specified loads without sustaining damage. These bumper qualities shall be sustained throughout the service life of the bus.

TS 66. Finish and Color

TS 66.1 Appearance

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 ensure 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, where possible, to prevent corrosion. The bus shall be 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 visible dirt and the following other imperfections:

- blisters or bubbles appearing in the topcoat film.
- chips, scratches, or gouges of the surface finish
- cracks in the paint film
- craters where paint failed to cover due to surface contamination.
- overspray
- peeling
- runs or sags from excessive flow and failure to adhere uniformly to the surface.
- chemical stains and water spots
- dry patches due to incorrect mixing of paint activators
- buffing swirls

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.
Proper adhesion between the basic surface and successive coats of the original paint shall be measured using an Elcometer adhesion tester as outlined in ASTM D4541-85. Adhesion shall be a minimum of 300 ft-lbs. The bus manufacturer shall supply test samples of the exterior surface for each step of the painting process that may be subject to adhesion testing per ASTM G4541-87 and ASTM D4145-85. ASTM D4541-93 may be used for inspection testing during assembly of the vehicle.

High Gloss External Paint Finish Quality
Painted surfaces shall have a minimum 95 gloss and an orange peel rating of 7 or more on the Advanced Coating Technologies, Inc., orange peel standard panels set #APR 14941 or Agency accepted wave scan equipment. Paint shall last a minimum of six years with a minimum gloss of 90 as measured in ASTM E97-92, "Standard Test Method For Directional Reflectance."

NOTE: The Agency should insert approved paints, color scheme and graphics.

TS 67. Decals, Numbering and Signing

Monograms, numbers, and other special signs 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 installed per the decal Supplier recommendations. Signs shall be provided in compliance with the ADA requirements defined in 49 CFR Part 38, Subpart B, 38.27.

NOTE: The Agency should supply a list of interior and exterior decals including size and location.

TS 67.1 Passenger Information

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

Requirements for a public information system in accordance with 49 CFR shall be provided.

TS 68. Exterior Lighting

All exterior lights shall be designed to prevent entry and accumulation of moisture or dust. Lamps, lenses and fixtures shall be interchangeable to the extent practicable. Two hazard lamps at the rear of the bus shall be visible from behind when the engine service doors are opened. Light lenses shall be designed and located to prevent damage when running the vehicle through an automatic bus washer.

Larger Size
LED lamps used for tail, brake and turn signal lamps shall be a minimum of 7 in. in diameter.

LED Front marker (clearance) lights along with 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.

TS 68.1 Backup Light/Alarm (LED)

Visible and audible warnings 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.

TS 68.2 Doorway Lighting (LED)

Lamps at the front and rear passenger doorways (if applicable) 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 ft 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.

TS 68.3 Turn Signals (LED)

Standard Turn Signals

Turn-signal lights shall be provided on the front, rear, curb, and street sides of the bus in accordance with federal regulations.

TS 68.4 Headlights

Headlamps shall be designed for ease of replacement.

Daytime Running Lights
Headlamps shall incorporate a daytime running light feature.

LED
Headlamps shall be LED/halogen, sealed beam.

TS 68.5 Brake Lights

TS 68.5.1 Transit Coach

Brake lights shall be provided in accordance with federal regulations.

High and Center Mount Red Brake Lamp
Bus shall include red, high, and center mount brake lamp(s) along the backside of the bus in addition to the lower brake lamps required under FMVSS. The high and center mount brake lamp(s) shall illuminate steadily with brake application. Agency to specify the size of the high and center mount brake lamp(s).

TS 68.6 Service Area Lighting (Interior and Exterior)

LED lamps 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. These service areas shall include, but not be limited to, the engine compartment, the communication box, junction/apparatus panels and passenger door operator compartments. Lighting shall be adequate to light the space of the service areas to levels needed to complete typical emergency repairs and adjustments. The service area lamps shall be suitable for the environment in which they are mounted.

Engine compartment lamps shall be controlled by a switch mounted near the rear start controls. All other service area lamps shall be controlled by switches mounted on or convenient to the lamp assemblies. Power to the service area lighting shall be programmable. Power shall latch on with activation of the switch and shall be automatically discontinued (timed out) after 30 minutes to prevent damage caused by inadvertently leaving the service area lighting switch in the "on" position after repairs are made.

INTERIOR PANELS AND FINISHES

TS 69. General Requirements

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

Interior surfaces more than 10 in. 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. Any components and other electrical components within proximity to these surfaces shall also be resistant to this cleaning method.

No requirement for anti-graffiti/vandalism surface treatments.

TS 70. Interior Panels

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.

Interior panel required to meet FMVSS 302.

TS 70.1 Driver Area Barrier

AROWGuard or Approved Equal (See Diagram Below)

TS 70.1.1 Transit Coach

A barrier or bulkhead between the driver 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. Location and shape must permit full seat travel and reclining possibilities that can accommodate the shoulders of a 95th-percentile male. The partition shall have a side return and stanchion to prevent passengers from reaching the driver by standing behind the driver's seat. The lower area between the seat and panel must be accessible to the driver. The partition must be strong enough in conjunction with the entire partition assembly for mounting of such equipment as flare kits, fire extinguishers (1.2kg), microcomputer, public address amplifier, etc. The panel should be properly attached to minimize noise and rattles.

Full-Height (Floor-to-Ceiling) Configuration of Driver's Barrier
The driver's barrier shall extend continually from the floor area to the ceiling and from the bus wall to the first stanchion immediately behind the driver to provide security to the driver and to limit passenger conversation.

An additional Driver's enclosure or door shall be provided between the driver's seat and the farebox.

TS 70.2 Modesty Panels

Sturdy divider panels constructed of durable, unpainted, corrosion-resistant material complementing the interior shall be provided to act as both a physical and visual barrier for seated passengers.

Design and installation of modesty panels located in front of forward-facing seats shall include a handhold or grab handle 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 from at least the window opening of the side windows, and those forward of transverse seats shall extend downward to 1 and 1½ in. above the floor. Panels forward of longitudinal seats shall extend to below the level of the seat cushion. Dividers positioned at the doorways, where applicable, shall provide no less than a 2½ in. clearance between the modesty panel and a fully open, inward opening door, or the path of a deploying flip-out ramp to protect passengers from being pinched. Modesty panels installed at doorways shall be equipped with grab rails if passenger assists are not provided by other means.
The modesty panel and its mounting shall withstand a static force of 250 lbs. applied to a 4 × 4 in. area in the center of the panel without permanent visible deformation.

Additional floor clearances for cleaning, toe clearance.

Clear non-glass panel from above the modesty panel to the top of the daylight opening and attach it to the stanchion.

TS 70.3 Front End

The entire front end of the bus shall be sealed to prevent debris accumulation behind the dash and to prevent the driver's feet from kicking or fouling wiring and other equipment. The front end shall be free of protrusions that are hazardous to passengers standing at the front of the standee line area of the bus during rapid decelerations. Paneling across the front of the bus and any trim around the driver's compartment shall be formed metal or composite material.

Composite dash panels shall be reinforced as necessary, vandal-resistant, and replaceable. All colored, painted, and plated parts forward of the driver's barrier shall be finished with a surface that reduces glare. Any mounted equipment must have provision to support the weight of equipment.

TS 70.4 Rear Bulkhead

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, composite, scratch-resistant plastic or carpeting and trimmed with stainless steel, aluminum, or composite.

The rear bulkhead paneling shall be contoured to fit the ceiling, side walls and seat backs so that any litter or trash 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 litter being thrown or drawn through the grille. If it is necessary to remove the panel to service components located on the rear bulkhead, then the panel shall be hinged or shall be able to be easily removed and replaced. Grilles where access to or adjustment of equipment is required shall be heavy duty and designed to minimize damage and limit unauthorized access.

TS 70.5 Headlining

Ceiling panels shall be made of durable, corrosion resistant, easily cleanable 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.

TS 70.6 Fastening

Interior panels shall be attached so that there are no exposed unfinished or rough edges or rough surfaces. Fasteners should be corrosion resistant. Panels and fasteners shall not be easily removable by passengers. Exposed interior fasteners should be minimized, and where required shall be tamper resistant.

TS 70.7 Insulation

Any insulation material used between the inner and outer panels shall minimize the 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.

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 thermal insulation sufficient to meet the interior temperature requirements. The bus body shall be thoroughly sealed so that the driver or passengers cannot feel drafts during normal operations with the passenger doors closed.

FTA Docket 90-A

All insulation materials shall comply with the Recommended Fire Safety Practices defined in FTA Docket 90-A, dated October 20, 1993. And, they meet the requirements of FMVSS 302.

TS 70.8 Floor Covering

The floor covering shall have a non-skid walking surface that remains effective in all weather conditions. 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. Seams shall be sealed/welded per manufacturer's specifications. The standee line shall be approximately 2 in. wide and shall extend across the bus aisle. The color and pattern shall be consistent throughout the floor covering.

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

The floor shall be easily cleaned and shall be arranged to minimize debris accumulation.

A one-piece center strip shall extend from the vertical wall of the rear settee between the aisle sides of transverse seats to the standee line. If the floor is of a bi-level construction, then the center strip shall be one piece at each level. The covering between the center strip and the wheel housings may be separate pieces. At the rear door, however, a separate strip as wide as the door shall extend from the center strip to the outboard edge of the rear/exit area.

The floor under the seats shall be covered with smooth surface flooring material. The floor covering shall closely fit the sidewall in a fully sealed butt joint or extend to the top of the cove.

TS 70.9 Interior Lighting

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

The lens material shall be translucent polycarbonate. Lenses shall be designed to effectively "mask" the light source. Lenses shall be sealed to inhibit incursion of dust and insects yet be easily removable for service. Access panels shall be provided to allow servicing of components located behind light panels. If necessary, the entire light fixture shall be hinged.

TS 70.10 Passenger

First Row Lights
The first light on each side (behind the driver 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 switch is in the "on" position.

All interior lighting shall be turned off whenever the transmission selector is in reverse, and the engine run switch is in the "on" position.

The interior lighting design shall require the approval of the Agency.

LED lights.

First Light Modules Dim/Extinguish When Front Door is Closed
When the master switch is in the "run" or "night/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.

TS 70.11 Driver's Area

The driver's area shall have a light to provide general illumination, and it shall illuminate the half of the steering wheel nearest the driver to a level of 5 to 10 foot-candles.

TS 70.12 Seating Areas (Transit Coach)

The interior lighting system shall provide a minimum of 15 foot-candle illumination on a 1 sq ft plane at an angle of 45 degrees from horizontal, centered 33 in. above the floor and 24 in. in front of the seat back at each seat position. Allowable average light level for the rear bench seats shall be 7 foot-candles.

TS 70.13 Vestibules/Doors (Transit Coach)

Floor surface in the aisles shall be a minimum of 10 foot-candles, and the 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 the rear door is unlocked.

TS 70.14 Step Lighting

Step lighting for the intermediate steps between lower and upper floor levels shall be a minimum of 4 foot-candles and shall illuminate in all engine run positions. The step lighting shall be low profile to minimize tripping and snagging hazards for passengers and shall be shielded as necessary to protect passengers' eyes from glare.

TS 70.15 Ramp Lighting (Transit Coach)

Exterior and interior ramp lighting shall comply with federal regulations.

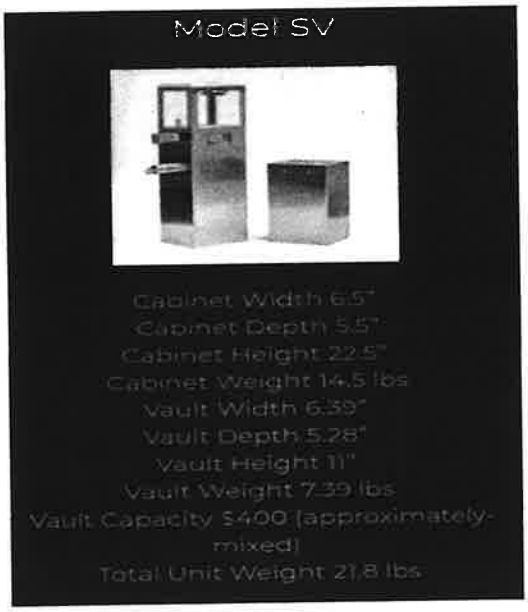
TS 70.16 Farebox Lighting

TS 70.16.1 Transit Coach

No farebox light.

TS 71. Fare Collection

Diamond Mfg. Inc. Model SV or approved equal (See Diagram below)



The contractor shall provide the fare collection installation layout to the Agency for approval.

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

The proposer should propose an electronic farebox with smart card reader as an option.

TS 72. Interior Access Panels and Doors (Transit Coach)

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. Panels shall prevent entry of mechanism lubricant into the bus interior. All fasteners that retain access panels shall be captive in the cover.

Access Doors with Locks

Access doors shall be secured with locks. The locks shall be standardized so that only one tool is required to open access doors on the bus.

TS 72.1 Floor Panels

Access openings in the floor shall be sealed to prevent entry of fumes and water into the bus interior. Flooring material at or around access openings shall be flush with the floor and shall be edge-bound with stainless steel or another material that is acceptable to the 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.

The number of special fastener tools required for panel and access door fasteners shall be minimized.

Passenger Accommodations

TS 73. Passenger Seating

TS 73.1 Arrangements and Seat Style (Transit Coach)

The passenger seating arrangement on the bus shall be such that seating capacity is maximized and in compliance to the following requirements.

> **NOTE:** The Agency recognizes that ramp location, foot room, hip-to-knee room, doorway type, width, seat construction, floor level type, seat spacing requirements, ramp or lift, number of wheelchair positions, etc. ultimately affect seating capacity and layout.

Forward-Facing Seat Configuration

Passenger seats shall be arranged in a transverse, forward-facing configuration, except at the wheel housings and turntable, if applicable, where aisle-facing seats may be arranged as appropriate with due regard for passenger access and comfort. Other areas where aisle-facing seats may be provided are at wheelchair securement areas and platforms (such as for fuel tank storage space).

TS 73.2 Rearward Facing Seats (Transit Coach)

Rearward facing seats not allowed.

TS 73.3 Padded Inserts/Cushioned Seats (Transit Coach)

Non-padded inserts – upholstered

The seats shall be equipped with upholstered vandal resistant inserts throughout the bus.

TS 73.4 Drain Hole in Seats

No requirements for drain hole provision in seat inserts.

TS 73.5 Hip-to-Knee Room

Hip-to-knee room measured from the center of the seating position, from the front of one seat back horizontally across the highest part of the seat to a vertical surface immediately in front, shall be a minimum of 26 in. At all seating positions in paired transverse seats immediately behind other seating positions, hip-to-knee room shall be no less than 27 in.

TS 73.6 Foot Room

The foot room, measured at the floor forward from a point vertically below the front of the seat cushion, shall be no less than 14 in. Seats immediately behind the wheel housings and modesty panels may have foot room reduced.

TS 73.7 Aisles (Transit Coach)

The aisle between the seats shall be no less than 20 in. wide at seated passenger hip height. Seat backs shall be shaped to increase this dimension to no less than 24 in. at 32 in. above the floor (standing passenger hip height)

TS 73.8 Dimensions (Transit Coach)

FIGURE 6
Seating Dimensions and Standard Configuration

Seat dimensions for the various seating arrangements shall have the dimensions as follows (refer to Figure 6):

- The width, W, of the two-passenger transverse seat shall be a minimum 35 in.
- The length, L, shall be 17 in., ±1 in.
- The seat back height, B, shall be a minimum of 15 in.
- The seat height, H, shall be 17 in., ± 1 in. For the rear lounge (or settee) and longitudinal seats, and seats located above raised areas for storage of under-floor components, a cushion height of up to 18 in., ±2 in., will be allowed. This shall also be allowed for limited transverse seats, but only with the expressed approval of the Agency.
- Foot room = F.
- The seat cushion slope, S, shall be between 5 and 11 deg.
- The seat back slope, C, shall be between 8 and 17 deg.
- Hip to knee room = K.
- The pitch, P, is shown as reference only.

TS 73.9 Structure and Design (Transit Coach)

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

Seats, structures, and restraints around the securement area should not infringe into the mobility device envelope or maneuverability.

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 in. of the aisle shall be at least 10 in. above the floor.

In locations at which cantilevered installation is precluded by design and/or structure, other seat mounting may be allowed.

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 1000lbs 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 0.05 to0.015 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 in., measured at the aisle side of the seat frame at height H. The seat back should not deflect more than 14 in., 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 lbs. applied to the top of the seat cushion in each seating position with less than ¼in. permanent deformation in the seat or its mountings. The seat assembly shall withstand static horizontal forces of 500 lbs. evenly distributed along the top of the seat back with less than ¼in. 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-lb 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 36in. pendulum and shall strike the seat back 10,000 times each from distances of 6, 8, 10 and 12 in. Seats at both seating positions shall withstand 4000 vertical drops of a 40-lb sandbag without visible deterioration. The sandbag shall be dropped 1000 times each from heights of 6, 8, 10 and 12 in. Seat cushions shall withstand 100,000 randomly positioned 3½ in. drops of a squirming, 150-lb, smooth-surfaced, buttocks-shaped striker with only minimal wear on the seat covering and no failures to seat structure or cushion suspension components.

The back of each transverse seat shall incorporate a handhold no less than ⅞ in. 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 in. 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. The upper rear portion of the seat back and the seat back handhold immediately forward of transverse seats shall be padded and/or constructed of energy-absorbing materials. 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 a vertical assist is provided.

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 driver's barrier, or a modesty panel, when 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 3½ in. of the end of the seat cushion. Armrests shall be located from 7 to 9 in. above the seat cushion surface. The area between the armrest and the seat cushion shall be closed by a barrier or panel. The top and sides of the armrests shall have a minimum width of 1 in. 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 lbs. applied anywhere along their length with less than ¼ in. permanent deformation. Seat back handhold and armrests shall withstand 25,000 impacts in each direction of a horizontal force of 125 lbs. with less than ¼in. permanent deformation and without visible deterioration.

TS 73.10 Construction and Materials (Transit Coach)

Selected materials shall minimize damage from vandalism and shall reduce cleaning time. The seats shall be attached to the frame with tamper-resistant fasteners. Coloring shall be consistent throughout the seat material, with no visually exposed portion painted. Any exposed metal touching the sides, or the floor of the bus shall be stainless steel. The seat, pads and cushions shall be contoured for individuality, lateral support and maximum comfort and shall fit the framework to reduce exposed edges.

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 ¼in.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, to allow the passenger to deform the seating materials in the impact areas. Complete seat assemblies shall be interchangeable to the extent practicable.

TS 74. Passenger Assists (Transit Coach)

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 the seat back assist 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 the front doorway, around the farebox, and at interior steps for bi-level designs shall be powder-coated in a high-contrast yellow color.

The forward-most vertical stanchions on either side of the aisle immediately behind the driver's area shall be a stainless-steel finish.

TS 74.1 Assists (Transit Coach)

Excluding those mounted on the seats and doors, the assists shall have a cross-sectional diameter between 1¼ and 1½ in. or shall provide an equivalent gripping surface with no corner radii less than ¼ in. All passenger assists shall permit a full hand grip with no less than 1½ in. 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. 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 lbs. applied over a 12in. lineal dimension in any direction normal to the assist without permanent visible deformation. All passengers 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.

TS 74.2 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 in. 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.

TS 74.3 Vestibule (Transit Coach)

The aisle side of the driver'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 in. 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. The assist shall be no less than 36 in. 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 driver's barrier, wheel housings or front modesty panel.

TS 74.4 Rear Doorway(s) (Transit Coach)

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 having a cross-sectional diameter between 1¼ and 1½ in. or providing an equivalent gripping surface with no corner radii less than ¼ in., and shall provide at least 1½ in. 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 in. from the outside edge of the rear doorway step.

> **NOTE:** For an articulated bus, passenger assists will be provided to aid in the transition between the front and rear sections of the bus.

TS 74.5 Overhead (Transit Coach)

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

Grab straps or other extensions as necessary shall be provided for sections where vertical assists are not available and for use by passengers that cannot reach to 70 in.

Grip straps shall be leather.

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

TS 74.6 Longitudinal Seat Assists (Transit Coach)

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 in. apart or functionally continuous for a 5th percentile female passenger.

TS 74.7 Wheel Housing Barriers/Assists (Transit Coach)

Unless passenger seating is provided on top of wheel housings, 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 housings.

TS 75. Passenger Doors

TS 75.1 Transit Coach

Doorways will be provided in the locations and styles as follows. Passenger doors and doorways shall comply with ADA requirements.

TS 75.1.1 Front door

The door shall be forward of the front wheels and under direct observation of the driver.

TS 75.1.2 Rear Door(s)

The curbside doorway centerline located rearward of the point midway between the front door centerline and the rearmost seat back.

In cases where street-side and curbside doors are chosen, provisions shall be made for operating the front door, curbside rear door(s) and street-side rear door(s) independently or in the combinations shown in Table 7while providing positive tactile feedback to the operator identifying the door control selection.

If air-powered, the door system shall operate per specification at air pressures between 90 and 130 psi.

TABLE 7

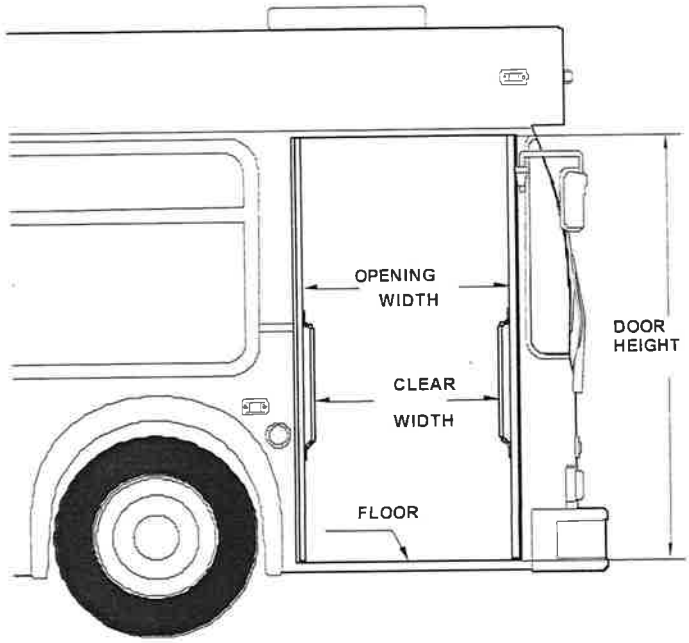
Door Operating Combinations

Front	Curbside Rear	Street-Side Rear
Closed	Closed	Closed
Open	Closed	Closed
Open	Open	Closed
Open	Closed	Open
Open	Open	Open
Closed	Open	Closed
Closed	Closed	Open
Closed	Open	Open

TS 75.2 Dimensions

TS 75.2.1 Transit Coach

FIGURE 7
Transit Bus Minimum Door Opening



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

Doorway Clear Width Greater than 31¾ in.
The front door clear width shall be a minimum of 36" in. with the doors fully opened. The rear door clear width shall be a minimum of 36" in. with the doors fully opened. Electric powered wheelchair ramp will be provided at the rear door.

If the Agency requires a minimum rear door clear width of 31¾ in. or greater and an outward opening (swing) door is specified, then the maximum outboard excursion of 13 in. may be exceeded.

TS 75.3 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.

Door glazing shall be easily replaceable.

Zip type glazing rubber.
The front door panel glazing material shall have a nominal ¼ in. 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 defined by the Agency.

TS 75.4 Door Projection (Transit Coach)

TS 75.4.1 Exterior

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 14 in. during the opening or closing cycles or when doors are fully opened.

TS 75.4.2 Interior

Projection inside the bus shall not cause an obstruction of the rear door mirror or cause a hazard for standees.

TS 75.5 Door Height Above Pavement

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

TS 75.6 Closing Force

The closing door edge speed shall not exceed 12 in. per second, and opening door speed shall not exceed 19 in. per second. Power doors shall not slam closed under any circumstance, even if the door is obstructed during the closing cycle. If a door is obstructed during the closing cycle, the pressure exerted on the obstruction shall not increase once initial contact has been made.

Doors closed by a return spring or counterweight-type device shall be equipped with an obstruction-sensing device that, at a minimum, alerts the driver if an obstruction is detected between the closing doors. Doors closed by a return spring or counterweight type device, when unlocked, shall be capable of being pushed to the point where the door starts to open with a force not to exceed 25 lbs. 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 1½ in. diameter cylinder from between the center edges of a closed and locked door with an outward force not greater than 35 lbs.

TS 75.6.1 Rear Door Closing Force (Transit Coach)

Power-close rear doors shall be equipped with an obstruction-sensing system such that if an obstruction is within the path of the closing doors, the doors will stop and/or reverse direction prior to imparting a 10-lb force on 1 sq in. of that obstruction. If a contactless obstruction sensing system is employed, it shall be capable of discriminating between the normal doorway environment and passengers or other obstructions within the doorway, and of altering the zones of detection based upon the operating state of the door system.

TS 75.7 Actuators

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.

Door actuators shall be adjustable so that the door opening and closing speeds can be independently adjustable to satisfy the above requirements. Actuators and the complex door mechanism shall be concealed from passengers but shall be easily accessible for servicing. The door actuators shall be rebuildable. If powered by compressed air, 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 the air system and to muffle sound.

Door actuators and associated linkages shall maximize door holding forces in the fully open and fully closed positions to provide firm, non-rattling, non-fluttering door panels while minimizing the force exerted by the doors on an obstruction midway between the fully open and closed positions.

The rear doors shall be passenger controlled. The vehicle operator shall unlock and enable the opening mechanism, which shall be annunciated by illumination of a green light near the door. After enabling and unlocking, the doors shall be opened by either the passenger manually pushing the door open, or by a powered mechanism actuated by passenger activation of a touch bar or touch switch, or by passenger activation of a contactless sensing system. A switch located within reach of the seated operator shall, when actuated, restore rear door function to complete operator control, as described in the Default.

Doors that employ a "swing" or pantograph geometry and/or are closed by a return spring or counterweight-type device shall be equipped with a positive mechanical holding device that automatically engages and prevents the actuation mechanism from being back-driven from the fully closed position. The holding device shall be overcome only when the driver's door control is moved to an "Exit Door Enable" position and the vehicle is moving at a speed of less than 2 mph, or in the event of actuation of the emergency door release.

Locked doors shall require a force of more than 300 lbs. 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, actuators, or complex mechanism.

TS 75.7.1 Rear Door Interlocks (Transit Coach)

See "Hardware Mounting" for door system interlock requirements.

TS 75.8 Emergency Operation

In the event of an emergency, it shall be possible to manually open doors designated as emergency exits from inside the bus using a force of no more than 25 lbs. after actuating an unlocking device. The unlocking device 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 doorway area. The unlocking device shall be easily reset by the operator without special tools or opening the door mechanism enclosure. Doors that are required to be classified as "emergency exits" shall meet the requirements of FMVSS 217.

TS 75.9 Door Control

The door control shall be in the operator's area within the hand reach envelope described in SAE Recommended Practice J287, "Driver Hand Control Reach." The driver's door control shall provide tactile feedback to indicate commanded door position and resist inadvertent door actuation.

Door control located on street side.

The front door shall remain in commanded state position even if power is removed or lost.

TS 75.10 Door Controller

TS 75.10.1 Transit Coach

Five-Position Driver's Door Controller
The control device shall be protected from moisture. The mounting and location of the door control device handle shall be designed so that it is within comfortable, easy arm's reach of the seated driver. The door control device handle shall be free from interference by other equipment and have adequate clearance so as not to create a pinching hazard.
Position of the door control handle shall result in the following operation of the front and rear doors:

- Center position: Front door closed, rear door(s) closed or set to lock.
- First position forward: Front door open, rear door(s) closed or set to lock.
- Second position forward: Front door open, rear door(s) open or set to open.
- First position back: Front door closed, rear door(s) open or set to open.
- Second position back: Front door open, rear door(s) open or set to open.

TS 75.11 Door Open/Close

Operator-Controlled Front and Passenger-Controlled Rear Doors with Provision for Driver Override
Operator has the option to control both doors; or allow passengers to open rear doors.

The operation of, and power to, the front passenger doors shall be completely controlled by the operator. Power to rear doors shall be controlled by the operator. After enabling, the rear doors shall be opened by the passenger. A switch shall be provided to enable the driver to obtain full control of the rear doors.

TS 76. Accessibility Provisions

Space and body structural provisions shall be provided at the front or rear door of the bus to accommodate a wheelchair loading system.

TS 76.1 Loading Systems

- low-floor ramp

TS 76.2 Lift

The wheelchair lift control system must be capable of receiving multiplex commands from vehicle interlocks.
An automatically controlled, power-operated wheelchair lift system compliant to requirements defined in 49 CFR 571.403(FMVSS 403) 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.

Electric Powered Heavy-Duty Ramp System.

TS 76.3 Loading System for 30 to 60ft Low-Floor Bus

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.

Front Door Location of Loading System, Flip-Out Design Ramp with 6:1 Slope
The wheelchair loading system shall be located at the front door, with the ramp being a flip-out type design capable of deploying to the ground at a maximum 6:1 slope.

TS 76.4 Loading System for Level Boarding on a 45 to 60ft Low-Floor BRT

For level-entry boarding in applications such as BRT, where the vertical transition from the vehicle floor and the boarding and alighting surface is no more than 3 in., a bridge plate shall be used .Bridge plates 30 in. or longer shall support a load of 600 lbs., placed at the centroid of the ramp or bridge plate distributed over an area of 26 × 26 in., with a safety factor of at least 3, based on the ultimate strength of the material. Bridge plates shorter than 30 in. shall support a load of 300 lbs. When deployed to boarding and alighting surface, the slope of the bridge plate shall not exceed 6:1.

Front Door Location of Bridge plate Loading System
The bridge plate loading system shall be located at the front door.

TS 76.5 Wheelchair Accommodations

NOTE: Agency will approve acceptable securement system.

One (1) forward-facing Q-POD or equal; and one (1) rear-facing electric powered automated securement system, 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.

All passenger securement devices must be stowed off the floor and out of the way when not in use.

TS 76.6 Interior Circulation

The maneuvering room inside the bus shall accommodate easy travel for a passenger in a wheelchair from the loading device and from the designated securement area. It shall be designed so that no portion of the wheelchair protrudes into the aisle of the bus when parked in the designated parking space(s). When the positions are fully utilized, an aisle space of no less than 20 in. shall be maintained. As a guide, no width dimension should be less than 34 in. Areas requiring 90deg turns of wheelchairs should have a clearance arc dimension no less than 45 in., and in the parking area where 180deg turns are expected, space should be clear in a full 60in.diameter circle. A vertical clearance of 12in. above the floor surface should be provided on the outside of turning areas for wheelchair footrests.

SIGNAGE AND COMMUNICATION

TS 77. Destination Signs

A destination sign system shall be furnished on the front, on the right side near the front door.

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 driver within reach of the seated driver.

The driver shall be able to access the sign while seated.

The destination sign compartments shall meet the following minimum requirements:

- Compartments shall be designed to prevent condensation and entry of moisture and dirt.
- Compartments shall be designed to prevent fogging of both compartment window and glazing on the unit itself.
- Access shall be provided to allow cleaning of the inside compartment window and unit glazing.
- The front window shall have an exterior display area of no less than 8.5 in. high by 56 in. wide.

TS 78. Passenger Information and Advertising (Transit Coach)

TS 78.1 Interior Displays

Provisions shall be made on the rear of the driver's barrier or equipment box located on the wheel well for a frame to retain information such as routes and schedules.

Advertising media 11 in. high and 0.09 in. 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 light system.

TS 78.2 Exterior Displays

Provisions shall be made to integrate advertising 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.

TS 79. Passenger Stop Request/Exit Signal

TS 79.1 Transit Coach

Use for Touch Tape Passenger 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 accessible to all seated passengers, with provisions for standees. 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.

TS 79.2 Signal Chime

TS 79.2.1 Transit Coach

A single "stop requested" chime shall sound when the system is first activated. A double chime shall sound anytime the system is activated from wheelchair passenger areas.

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

TS 80. Communications

TS 80.1 Camera Surveillance System

Wiring, Cameras, DVR, and other SEON Video Surveillance System. Provide all wiring and mounting locations for an 8-camera surveillance system, including the installation of cameras, recorder, microphone, etc.

TS 80.2 Public Address System

A public address system shall be provided on each bus for facilitating radio system and driver-originated announcements to passengers.

TS 80.2.1 Speakers

Six (6) interior loudspeakers shall be provided, semi-flush mounted, on alternate sides of the bus passenger compartment, installed with proper phasing. Total impedance seen at the input connecting end shall be 8 Ohms. Mounting shall be accomplished with rive-nuts and machine screws.

TS 80.3 Automatic Passenger Counter (APC)

No APC system shall be installed.

TS 80.4 Radio Handset and Control System

TS 80.4.1 Drivers Speaker

Each bus shall have a recessed speaker in the ceiling panel above the driver. This speaker shall be the same component used for the speakers in the passenger compartment. It shall have 8 Ohms of impedance.

TS 80.4.2 Handset

The contractor will install a handset for driver use.

TS 80.4.3 Driver Display Unit (DDU)

The contractor shall install a driver display unit as close to the driver's instrument panel as possible.

TS 80.4.4 Emergency Alarm

The contractor shall install an emergency alarm that is accessible to the driver but hidden from view.

TS 81. Event Data Recorders (EDR)

No EDR shall be installed.

TS 82. Approved Equals

Table 8 lists products that have been approved for bus procurement. The list contains products that are of interest to the Agency and is not intended to be a comprehensive listing of every product required for the manufacture of the subject buses. Product categories not listed are left to the discretion of the Contractor so long as the product complies with the specifications. Product specification information is for reference only and may not reflect the latest or future improvements by manufacturers. Any change, revision or substitution of specified products requires approval of the agency. To add to or revise this list, Contractor must submit a written request per the Specification by the due date found in the RFP for approved equals.

NOTE: Transit agencies are encouraged to list as many suppliers as possible.

TABLE 8
Approved Equals Products

Product	Manufacturer	Product Specification
Alarm		A 67dba alarm is acceptable
Fire Suppression	Amerex Corporation	The City of Huntsville approves of Amerex Fire Suppression systems
Engine	Cummins	L9 2021/2022 Emissions-standard diesel engine. 280 horsepower with 925 lb ft torque is acceptable
Surge Tank		Coolant can be filled via a coolant recovery tank located in the rear engine compartment as acceptable
Diesel Fuel Tank		Cross-linked polyethylene without protective shield is acceptable
Frame		A partial Stainless steel frame structure with semi-monocoque design is acceptable with structural warranty
Corrosion Coating		Axalta Tufcote UC-1006 is acceptable
Jacking Pads		The City of Huntsville will accept jacking pads that are on the structure
Front axle and suspension		MANVOK-07-F low floor axle complete with wheel hub assembly is acceptable
Discharge Lines		Teflon braided sst jacket is acceptable
Air Dryer		Haldex Gemini Air Dryer is acceptable

SECTION 7: WARRANTY REQUIREMENTS

WR 1. Basic Provisions

WR 1.1 Warranty Requirements

WR 1.1.1 Contractor Warranty

Warranties in this document are in addition to any statutory remedies or warranties imposed on the Contractor. Consistent with this requirement, the Contractor warrants and guarantees to the original Agency each complete bus and specific subsystems and components as follows. Performance requirements based on design criteria shall not be deemed a warranty item.

WR 1.1.2 Complete Bus

The complete bus, propulsion system, components, major subsystems and body and chassis structure are warranted to be free from Defects and Related Defects for one year or 50,000 miles, whichever comes first, beginning on the date of revenue service but not longer than 15 days after acceptance under "Inspection, Testing and Acceptance." The warranty is based on regular operation of the bus under the operating conditions prevailing in the Agency's locale.

WR 1.1.3 Body and Chassis Structure

Body, body structure, structural elements of the suspension and engine cradle are warranted to be free from Defects and Related Defects for three years or 150,000 miles, whichever comes first.
Primary load-carrying members of the bus structure, including structural elements of the suspension, are warranted against corrosion failure and/or Fatigue Failure sufficient to cause a Class 1 or Class 2 Failure for a period of 12 years or 500,000 miles, whichever comes first.

WR 1.1.4 Propulsion System

Propulsion system components, including the engine, transmission or drive motors, and generators (for hybrid technology) and drive and non-drive axles shall be warranted to be free from Defects and Related Defects for the standard two years or 100,000 miles, whichever comes first. An Extended Warranty for a maximum of five years or 300,000 miles, whichever comes first, may be purchased at an additional cost. The propulsion system manufacturer's standard warranty, delineating items excluded from the Extended Warranty, should be submitted in accordance with the Request for Pre-Offer Change or Approved Equal or with the Form for Proposal Deviation.

WR 1.1.5 Emission Control System (ECS)

The Contractor warrants the emission control system for five years or 100,000 miles, whichever comes first. The ECS shall include, but is not limited to, the following components:

- complete exhaust system, including catalytic converter (if required)
- after treatment device
- components identified as emission control devices.

WR 1.1.6 Subsystems

Other subsystems shall be warranted to be free from Defects and Related Defects for two years or 100,000 miles, whichever comes first. Other subsystems are listed below:

- **Brake system:** Foundation brake components, including advancing mechanisms, as supplied with the axles, excluding friction surfaces.
- **Destination signs:** All destination sign equipment for the front, side and rear signs, power modules and operator control.
- **Heating, ventilating:** Roof and/or rear main unit only, excluding floor heaters and front defroster.
- **AC unit and compressor:** Roof and/or rear main unit only, excluding floor heaters and front defroster.
- **Door systems:** Door operating actuators and linkages.
- **Air compressor.**
- **Air dryer.**
- **Wheelchair lift and ramp system:** Lift and/or ramp parts and mechanical only.
- **Starter.**
- **Alternator:** Alternator only. Does not include the drive system.
- **Charge air cooler:** Charge air cooler including core, tanks and including related surrounding framework and fittings.

- **Fire suppression:** Fire suppression system including tank and extinguishing agent dispensing system.
- **Hydraulic systems:** Including radiator, fan drive and power steering as applicable.
- **Engine cooling systems:** Radiator including core, tanks, and related framework, including surge tank. **Transmission cooler.**
- **Passenger seating excluding upholstery.**
- **Fuel storage and delivery system.**
- **Surveillance system including cameras and video recorders.**

Approved Equal: Coolant can be filled via a coolant recovery tank, located in the rear engine compartment and accessible via the rear engine door.

WR 1.1.7 Serial Numbers

Upon delivery of each bus, the Contractor shall provide a complete electronic list of serialized units installed on each bus to facilitate warranty tracking. The list shall include, but is not limited to the following:

- engine
- transmission
- alternator
- starter
- A/C compressor and condenser/evaporator unit
- drive axle
- power steering unit
- fuel cylinders (if applicable)
- air compressor
- wheelchair ramp (if applicable)

The Contractor shall provide updated serial numbers resulting from warranty campaigns. The format of the list shall be approved by the Agency prior to delivery of the first production bus.

WR 1.1.8 Extension of Warranty

If, during the warranty period, repairs or modifications on any bus are made necessary by defective design, materials or workmanship but are not completed due to lack of material or inability to provide the proper repair for thirty (30) calendar days, then the applicable warranty period shall be extended by the number of days equal to the delay period.

WR 1.2 Voiding of Warranty

The warranty shall not apply to the failure of any part or component of the bus that directly results from misuse, negligence, accident, or repairs not conducted in accordance with the Contractor-provided maintenance manuals and with workmanship performed by adequately trained personnel in accordance with recognized standards of the industry. The warranty also shall be void if the Agency fails to conduct normal inspections and scheduled preventive maintenance procedures as recommended in the Contractor's maintenance manuals and if that omission caused the part or component failure. The Agency shall maintain documentation, auditable by the Contractor, verifying service activities in conformance with the Contractor's maintenance manuals.

WR 1.3 Exceptions and Additions to Warranty

The warranty shall not apply to the following items:

- scheduled maintenance items
- normal wear-out items
- items furnished by the Agency.

Should the Agency require the use of a specific product and has rejected the Contractor's request for an alternate product, then the standard Supplier warranty for that product shall be the only warranty provided to the Agency. This product will not be eligible under "Fleet Defects," below.

The Contractor shall not be required to provide warranty information for any warranty that is less than or equal to the warranty periods listed.

WR 1.3.1 Pass-Through Warranty

Should the Contractor elect not to administer warranty claims on certain components and wish to transfer this responsibility to the sub-suppliers, or to others, the Contractor shall request this waiver.

The contractor shall state in writing that the Agency's warranty reimbursements will not be impacted. The Contractor also shall state in writing any exceptions and reimbursement including all costs incurred in transport of vehicles and/or components. At any time during the warranty period, the Contractor may request approval from the Agency to assign its warranty obligations to others, but only on a case-by-case basis approved in writing by the Agency. Otherwise, the Contractor shall be solely responsible for the administration of the warranty as specified. Warranty administration by others does not eliminate the warranty liability and responsibility of the Contractor.

WR 1.3.2 Superior Warranty

The Contractor shall pass on to the Agency any warranty offered by a component Supplier that is superior to that required herein. The Contractor shall provide a list to the Agency noting the conditions and limitations of the Superior Warranty no later than the start of production. The Superior Warranty shall not be administered by the Contractor.

WR 1.4 Fleet Defects

WR 1.4.1 Occurrence and Remedy

A Fleet Defect is defined as cumulative failures of twenty-five (25) percent of the same components in the same or similar application in a minimum fleet size of twelve (12) or more buses where such items are covered by warranty. A Fleet Defect shall apply only to the base warranty period in sections entitled "Complete Bus," "Propulsion System" and "Major Subsystems." When a Fleet Defect is declared, the remaining warranty on that item/component stops. The warranty period does not restart until the Fleet Defect is corrected.

For the purpose of Fleet Defects, each option order shall be treated as a separate bus fleet. In addition, should there be a change in a major component within either the base order or an option order, the buses containing the new major component shall become a separate bus fleet for the purposes of Fleet Defects.

The Contractor shall correct a Fleet Defect under the warranty provisions defined in "Repair Procedures." After correcting the Defect, the Agency and the Contractor shall mutually agree to, and the Contractor shall promptly undertake and complete a work program reasonably designed to prevent the occurrence of the same Defect in all other buses and spare parts purchased under this Contract. Where the specific Defect can be solely attributed to particular identifiable part(s), the work program shall include redesign and/or replacement of only the defectively designed and/or manufactured part(s). In all other cases, the work program shall include inspection and/or correction of all the buses in the fleet via a mutually agreed-to arrangement. The Contractor shall update, as necessary, technical support information (parts, service and operator's manuals) due to changes resulting from warranty repairs. The Agency may immediately declare a Defect in design resulting in a safety hazard to be a Fleet Defect. The Contractor shall be responsible to furnish, install and replace all defective units.

WR 1.4.2 Exceptions to Fleet Defect Provisions

The Fleet Defect warranty provisions shall not apply to Agency-supplied items, such as radios, fare collection equipment, communication systems and tires. In addition, Fleet Defects shall not apply to interior and exterior finishes, hoses, fittings, and fabric.

WR 2. Repair Procedures

WR 3.

WR 3.1 Repair Performance

The Contractor is responsible for all warranty-covered repair Work. To the extent practicable, the Agency will allow the Contractor or its designated representative to perform such Work. At its discretion, the Agency may perform such Work if it determines it needs to do so based on transit service or other requirements. Such Work shall be reimbursed by the Contractor.

WR 3.2 Repairs by the Contractor

If the Agency detects a Defect within the warranty periods defined in this section, it shall, within thirty (30) days, notify the Contractor's designated representative. The Contractor or its designated representative shall, if requested, begin Work on warranty-covered repairs within five calendar days after receiving notification of a Defect from the Agency. The Agency shall make the bus available to complete repairs timely with the Contractor's repair schedule.

The Contractor shall provide at its own expense all spare parts, tools and space required to complete repairs. At the Agency's option, the Contractor may be required to remove the bus from the Agency's property while repairs are being done. If the bus is removed from the Agency's property, then repair procedures must be diligently pursued by the Contractor's representative.

WR 3.3 Repairs by the Agency

WR 3.3.1 Parts Used

If the Agency performs the warranty-covered repairs, then it shall correct or repair the Defect and any Related Defects utilizing parts supplied by the Contractor specifically for this repair. At its discretion, the Agency may use Contractor-specified parts available from its own stock if deemed in its best interests.

WR 3.3.2 Contractor-Supplied Parts

The Agency may require that the Contractor supply parts for warranty-covered repairs being performed by the Agency. Those parts may be remanufactured but shall have the same form, fit, and function, and warranty. The parts shall be shipped prepaid to the Agency from any source selected by the Contractor within fourteen (14) days of receipt of the request for said parts and shall not be subject to an Agency handling charge.

WR 3.3.3 Defective Component Return

The Contractor may request that parts covered by the warranty be returned to the manufacturing plant. The freight costs for this action shall be paid by the Contractor. Materials should be returned in accordance with the procedures outlined in "Warranty Processing Procedures."

WR 3.3.4 Failure Analysis

The Contractor shall, upon specific request of the Agency, provide a failure analysis of Fleet Defect or safety-related parts, or major components, removed from buses under the terms of the warranty that could affect fleet operation.

Such reports shall be delivered within 60 days of receipt of failed parts.

WR 3.3.5 Reimbursement for Labor and Other Related Costs

The Agency shall be reimbursed by the Contractor for labor. The amount shall be determined by the Agency for a qualified mechanic at the most recent agency straight time wage rate per hour, which includes fringe benefits and overhead adjusted for the Agency's most recently published rate in effect at the time the Work is performed, plus the cost of towing the bus if such action was necessary and if the bus was in the normal service area. These wage and fringe benefit rates shall not exceed the rates in effect in the Agency's service garage at the time the Defect correction is made.

WR 3.3.6 Reimbursement for Parts

The Agency shall be reimbursed by the Contractor for defective parts and for parts that must be replaced to correct the Defect. The reimbursement shall be at the current price at the time of repair and shall include taxes where applicable, plus fifteen (15) percent handling costs. Handling costs shall not be paid if parts are supplied by the Contractor and shipped to the Agency.

WR 3.3.7 Reimbursement Requirements

The Contractor shall respond to the warranty claim with an accept/reject decision including necessary failure analysis no later than sixty (60) days after the Agency submits the claim and defective part(s), when requested. Reimbursement for all accepted claims shall occur no later than sixty (60) days from the date of acceptance of a valid claim. The Agency may dispute rejected claims or claims for which the Contractor did not reimburse the full amount. The parties agree to review disputed warranty claims during the following quarter to reach an equitable decision to permit the disputed claim to be resolved and closed. The parties also agree to review all claims at least once per quarter throughout the entire warranty period to ensure that open claims are being tracked and properly dispositioned.

WR 3.4 Warranty after Replacement/Repairs

If any component, unit or subsystem is repaired, rebuilt or replaced by the Contractor or by the Agency with the concurrence of the Contractor, then the component, unit or subsystem shall have the unexpired warranty period of the original. Repairs shall not be warranted if Contractor-provided or authorized parts are not used for the repair, unless the Contractor has failed to respond within five days, in accordance with "Repairs by the Contractor."
If an item is declared to be a Fleet Defect, then the warranty stops with the declaration of the Fleet Defect. Once the Fleet Defect is corrected, the item(s) shall have three (3) months or remaining time and/or miles of the original warranty, whichever

is greater. This remaining warranty period shall begin on the repair/replacement date for corrected items on each bus if the repairs are completed by the Contractor or on the date the Contractor provides all parts to the Agency.

WR 3.4.1 Warranty Processing Procedures

The following list represents requirements by the Contractor to the Agency for processing warranty claims. One failure per bus per claim is allowed.

- bus number and VIN
- total vehicle life mileage at time of repair
- date of failure/repair
- acceptance/in-service date
- Contractor part number and description
- component serial number
- description of failure
- all costs associated with each failure/repair (invoices may be required for third-party costs):
    - towing
    - road calls
    - labor
    - materials
    - parts
    - handling
    - troubleshooting time

WR 3.5 Forms

The Agency's forms will be accepted by the Contractor if all the above information is included. Electronic submittal may be used if available between the Contractor and the Agency.

WR 3.6 Return of Parts

When returning defective parts to the Contractor, the Agency shall tag each part with the following:

- bus number and VIN
- claim number
- part number
- serial number (if available)

WR 3.7 Timeframe

Each claim must be submitted no more than thirty (30) days from the date of failure and/or repair, whichever is later. All defective parts must be returned to the Contractor, when requested, no more than forty-five (45) days from the date of repair.

WR 3.8 Reimbursements

Reimbursements are to be transmitted to the following address:
Attn: Transit Manager
City of Huntsville, Alabama
Department of Parking & Public Transit
500 B Church Street NW
Huntsville, Alabama 35801

SECTION 8: QUALITY ASSURANCE

QA 1. Contractor's In-Plant Quality Assurance Requirements

QA 1.1 Quality Assurance Organization

QA 1.1.1 Organization Establishment

The Contractor shall establish and maintain an effective in-plant quality assurance organization. It shall be a specifically defined organization and should be directly responsible to the Contractor's top management.

QA 1.1.2 Control

The quality assurance organization shall exercise quality control over all phases of production, from initiation of design through manufacture and preparation for delivery. The organization shall also control the quality of supplied articles.

QA 1.1.3 Authority and Responsibility

The quality assurance organization shall have the authority and responsibility for reliability, quality control, inspection planning, establishment of the quality control system, and acceptance/rejection of materials and manufactured articles in the production of the transit buses.

QA 1.2 Quality Assurance Organization Functions

QA 1.2.1 Minimum Functions

The quality assurance organization shall include the following minimum functions:

- **Work instructions:** The quality assurance organization shall verify inspection operation instructions to ascertain that the manufactured product meets all prescribed requirements.
- **Records maintenance:** The quality assurance organization shall maintain and use records and data essential to the effective operation of its program. These records and data shall be available for review by the resident inspectors. Inspection and test records for this procurement shall be available for a minimum of one year after inspections and tests are completed.
- **Corrective action:** The quality assurance organization shall detect and promptly ensure correction of any conditions that may result in the production of defective transit buses. These conditions may occur in designs, purchases, manufacture, tests, or operations that culminate in defective supplies, services, facilities, technical data or standards.

QA 1.2.2 Basic Standards and Facilities

The following standards and facilities shall be basic in the quality assurance process:

- **Configuration control:** The Contractor shall maintain drawings, assembly procedures and other documentation that completely describe a qualified bus that meets all of the options and special requirements of this procurement. The quality assurance organization shall verify that each transit bus is manufactured in accordance with these controlled drawings, procedures and documentation.
- **Measuring and testing facilities:** The Contractor shall provide and maintain the necessary gauges and other measuring and testing devices for use by the quality assurance organization to verify that the buses conform to all specification requirements. These devices shall be calibrated at established periods against certified measurement standards that have known, valid relationships to national standards.
- **Production tooling as media of inspection:** When production jigs, fixtures, tooling masters, templates, patterns and other devices are used as media of inspection, they shall be proved for accuracy at formally established intervals and adjusted, replaced or repaired as required to maintain quality.
- **Equipment use by resident inspectors:** The Contractor's gauges and other measuring and testing devices shall be made available for use by the resident inspectors to verify that the buses conform to all specification requirements. If necessary, the Contractor's personnel shall be made available to operate the devices and to verify their condition and accuracy.

QA 1.2.3 Maintenance of Control

The Contractor shall maintain quality control of purchases:

- **Supplier control:** The Contractor shall require each Supplier to maintain a quality control program for the services and supplies that it provides. The Contractor's quality assurance organization shall inspect, and test materials

provided by Suppliers for conformance to specification requirements. Materials that have been inspected, tested, and approved shall be identified as acceptable to the point of use in the manufacturing or assembly processes. Controls shall be established to prevent inadvertent use of nonconforming materials.

- **Purchasing data:** The Contractor shall verify that all applicable specification requirements are properly included or referenced in purchase orders of articles to be used on transit buses.

QA 1.2.4 Manufacturing Control

- **Controlled conditions:** The Contractor shall ensure that all basic production operations, as well as all other processing and fabricating, are performed under controlled conditions. Establishment of these controlled conditions shall be based on the documented Work instructions, adequate production equipment and special working environments if necessary.
- **Completed items:** A system for final inspection and test of completed transit buses shall be provided by the quality assurance organization. It shall measure the overall quality of each completed bus.
- **Nonconforming materials:** The quality assurance organization shall monitor the Contractor's system for controlling nonconforming materials. The system shall include procedures for identification, segregation and disposition.
- **Statistical techniques:** Statistical analysis, tests and other quality control procedures may be used when appropriate in the quality assurance processes.
- **Inspection status:** A system shall be maintained by the quality assurance organization for identifying the inspection status of components and completed transit buses. Identification may include cards, tags or other normal quality control devices.

QA 1.2.5 Inspection System

The quality assurance organization shall establish, maintain, and periodically audit a fully documented inspection system. The system shall prescribe inspection and test of materials, Work in process and completed articles. As a minimum, it shall include the following controls:

- **Inspection personnel:** Sufficient trained inspectors shall be used to ensure that all materials, components, and assemblies are inspected for conformance with the qualified bus design.
- **Inspection records:** Acceptance, rework or rejection identification shall be attached to inspected articles. Articles that have been accepted as a result of approved materials review actions shall be identified. Articles that have been reworked to specified drawing configurations shall not require special identification. Articles rejected as unsuitable, or scrap shall be plainly marked and controlled to prevent installation on the bus. Articles that become obsolete as a result of engineering changes or other actions shall be controlled to prevent unauthorized assembly or installation. Unusable articles shall be isolated and then scrapped. Discrepancies noted by the Contractor or resident inspectors during assembly shall be entered by the inspection personnel on a record that accompanies the major component, subassembly, assembly or bus from start of assembly through final inspection. Actions shall be taken to correct discrepancies or deficiencies in the manufacturing processes, procedures or other conditions that cause articles to be in nonconformity with the requirements of the Contract specifications. The inspection personnel shall verify the corrective actions and mark the discrepancy record. If discrepancies cannot be corrected by replacing the nonconforming materials, then the Agency shall approve the modification, repair or method of correction to the extent that the Contract specifications are affected.
- **Quality assurance audits:** The quality assurance organization shall establish and maintain a quality control audit program. Records of this program shall be subject to review by the Agency.

QA 2. Inspection

QA 2.1 Inspection Stations

Inspection stations shall be at the best locations to provide for the Work content and characteristics to be inspected. Stations shall provide the facilities and equipment to inspect structural, electrical, hydraulic, and other components and assemblies for compliance with the design requirements.

Stations shall also be at the best locations to inspect or test characteristics before they are concealed by subsequent fabrication or assembly operations. These locations shall minimally include underbody structure completion, body framing completion, body prior to paint preparation, water test, engine installation completion, underbody dress-up and completion, bus prior to final paint touchup, bus prior to road test and bus final road test completion.

QA 2.2 Resident Inspectors

QA 2.2.1 Resident Inspector's Role

The Agency shall be represented at the Contractor's plant by resident inspectors, as required by FTA. Resident inspectors may be Agency employees or outside contractors. The Agency shall provide the identity of each inspector and shall also identify his or her level of authority in writing. They shall monitor, in the Contractor's plant, the manufacture of transit buses built under the procurement. The presence of these resident inspectors in the plant shall not relieve the Contractor of its responsibility to meet all the requirements of this procurement. The Agency shall designate a primary resident inspector, whose duties and responsibilities are delineated in "Pre-Production Meetings," "Authority" and "Pre-Delivery Tests," below. Contractor and resident inspector relations shall be governed by the guidelines included as Attachment A to this section.

QA 2.2.2 Pre-Production Meetings

The primary resident inspector may participate in design review and Pre-Production Meetings with the Agency. At these meetings, the configuration of the buses and the manufacturing processes shall be finalized, and all Contract documentation provided to the inspector.

No less than thirty (30) days prior to the beginning of bus manufacture, the primary resident inspector may meet with the Contractor's quality assurance manager and may conduct a pre-production audit meeting. They shall review the inspection procedures and finalize inspection checklists. The resident inspectors may begin monitoring bus construction activities two weeks prior to the start of bus fabrication.

QA 2.2.3 Authority

Records and data maintained by the quality assurance organization shall be available for review by the resident inspectors. Inspection and test records for this procurement shall be available for a minimum of one year after inspections and tests are completed.

The Contractor's gauges and other measuring and testing devices shall be made available for use by the resident inspectors to verify that the buses conform to all specification requirements. If necessary, the Contractor's personnel shall be made available to operate the devices and to verify their condition and accuracy.

Discrepancies noted by the resident inspector during assembly shall be entered by the Contractor's inspection personnel on a record that accompanies the major component, subassembly, assembly, or bus from start of assembly through final inspection. Actions shall be taken to correct discrepancies or deficiencies in the manufacturing processes, procedures or other conditions that cause articles to be in nonconformity with the requirements of the Contract specifications. The inspection personnel shall verify the corrective actions and mark the discrepancy record. If discrepancies cannot be corrected by replacing the nonconforming materials, then the Agency shall approve the modification, repair, or method of correction to the extent that the Contract specifications are affected.

The primary resident inspector shall remain in the Contractor's plant for the duration of bus assembly Work under this Contract. Only the primary resident inspector or designee shall be authorized to release the buses for delivery. The resident inspectors shall be authorized to approve the pre-delivery acceptance tests. Upon request to the quality assurance supervisors, the resident inspectors shall have access to the Contractor's quality assurance files related to this procurement. These files shall include drawings, assembly procedures, material standards, parts lists, inspection processing and reports, and records of Defects.

QA 2.2.4 Support Provisions

The Contractor shall provide office space for the resident inspectors in close proximity to the final assembly area. This office space shall be equipped with desks, outside and interplant telephones, Internet access, filing cabinet and chairs.

QA 2.2.5 Compliance with Safety Requirements

At the time of the Pre-Production Meeting, the Contractor shall provide all safety and other operational restrictions that govern the Contractor's facilities. These issues will be discussed, and the parties will agree which rules/restrictions will govern the Agency's inspector(s) and any other Agency representatives during the course of the Contract.

QA 3. Acceptance Tests

QA 3.1 Responsibility

Fully documented tests shall be conducted on each production bus following manufacture to determine its acceptance to the Agency. These acceptance tests shall include pre-delivery inspections and testing by the Contractor and inspections and testing by the Agency after the buses have been delivered.

QA 3.2 Pre-Delivery Tests

The Contractor shall conduct acceptance tests at its plant on each bus following completion of manufacture and before delivery to the Agency. These pre-delivery tests shall include visual and measured inspections, as well as testing the total bus operation. The tests shall be conducted and documented in accordance with written test plans approved by the Agency.

Additional tests may be conducted at the Contractor's discretion to ensure that the completed buses have attained the required quality and have met the requirements in "Section 6: Technical Specifications." The Agency may, prior to commencement of production, demand that the Contractor demonstrate compliance with any requirement in that section if there is evidence that prior tests have been invalidated by the Contractor's change of Supplier or change in manufacturing process. Such demonstration shall be by actual test, or by supplying a report of a previously performed test on similar or like components and configuration. Any additional testing shall be recorded on appropriate test forms provided by the Contractor and shall be conducted before acceptance of the bus.

The pre-delivery tests shall be scheduled and conducted with thirty (30) days' notice so that they may be witnessed by the resident inspectors, who may accept or reject the results of the tests. The results of pre-delivery tests, and any other tests, shall be filed with the assembly inspection records for each bus. The underfloor equipment shall be available for inspection by the resident inspectors, using a pit or bus hoist provided by the Contractor. A hoist, scaffold or elevated platform shall be provided by the Contractor to inspect bus roofs easily and safely. Delivery of each bus shall require written authorization of the primary resident inspector. Authorization forms for the release of each bus for delivery shall be provided by the Contractor. A copy of the authorization shall accompany the delivery of each bus.

QA 3.2.1 Visual and Measured Inspections

Visual and measured inspections shall be conducted with the bus in a static condition. The purpose of the inspection testing includes verification of overall dimension and weight requirements, that required components are included and are ready for operation, and that components and subsystems designed to operate with the bus in a static condition do function as designed.

QA 3.2.2 Total Bus Operation

Total bus operation shall be evaluated during road tests. The purpose of the road tests is to observe and verify the operation of the bus as a system and to verify the functional operation of the subsystems that can be operated only while the bus is in motion.

Each bus shall be driven for a minimum of fifteen (15) miles during the road tests. If requested, computerized diagnostic printouts showing the performance of each bus shall be produced and provided to the Agency. Observed Defects shall be recorded on the test forms. The bus shall be retested when Defects are corrected, and adjustments are made. This process shall continue until Defects or required adjustments are no longer detected.

APPENDIX B
CITY OF HUNTSVILLE, ALABAMA
EVALUATION CRITERIA

1. EVALUATION PROCESS

After the proposal's closing date, the City will perform an evaluation of each Proposal. During the evaluation, the City may conduct interviews with Proposer, and request Proposer to participate in a mandatory teleconference, or to make presentations to the City and/or demonstrate its products that are the subject of this RFP. Concerning a teleconference, presentation or demonstration, Proposer will be given at least ten (10) days' notice of the date and time for such, and the City may consider a Proposer non-responsive or non-responsible if it does not participate in such to the City's satisfaction. Also, the City may interview and/or visit other customers who have purchased similar goods and services from Proposer.

2. AWARD INTENTION

The City intends to award a contract to one or more responsive, responsible Proposer(s) whose Proposal offers the best value for the City, after selection and negotiation.

3. EVALUATION CRITERIA

Proposers shall submit the following information / documents in its proposal and this same information shall be the basis for the proposal evaluation:

1. Price proposal to include unit price per bus. – 25 Points
2. Technical. - 25 Points
3. Complete Altoona Test (Evaluated for Tested and Demonstrated Durability). – 10 Points
4. Delivery Date (Lead Time) in months. – 15 Points
5. Compliance with Specifications (including all local, state, ADA and Federal Transit Administration (FTA) requirements and certifications. - 5 Points
6. Financial Stability and Qualifications of Manufacturer, Experience with the manufacturing and service of bus model proposed including Years and numbers of same model units. - 10 Points
7. Warranties, Quality Assurance Statement, Parts Availability and Service. – 10 Points

The City reserves the right to enter negotiations with the successful Proposer(s) with regard to specifications, terms, and cost.

APPENDIX C
CITY OF HUNTSVILLE, ALABAMA
PROPOSAL PREPARATION CHECKLIST

The checklist is for general guidance only and not intended to provide an all-inclusive list of response requirements, which Proposers must determine from this RFP.

Description	**Reference**	
RFP Schedule	Section 1.3 & Cover	_____
General Terms & Conditions	Section 2	_____
Proposer Responsibilities	Section 2	_____
Bid Bond Requirements	Appendix D	_____
Performance Bond & Insurance Requirements	Appendix D	_____
Business Licensing Requirements	Section 2.23	_____
Alabama Immigration Law	Appendix H & J	_____
Proposal Instructions:	Section 3	_____
Proposer Information Form	Appendix H	_____
Price Proposal Instructions and Form	Section 3.12 & Appendix G	_____
Addenda Acknowledgement	Appendix G	_____
Proposal Submission Requirements	Section 3	_____
Evaluation Criteria	Appendix B	_____
Scope of Work	Appendix A	_____
Special Terms and Conditions	Appendix E	_____

APPENDIX D
CITY OF HUNTSVILLE, ALABAMA
BONDS & INSURANCE REQUIREMENTS

1. BID BOND

An original Bid Bond is required in the amount of five (5) percent of the total price specified in the Proposal Pricing Form (Appendix G) unless another amount is specified or waived on the cover of this RFP. Any bid submitted without an original Bid Bond will not be considered. A company check is not an acceptable bid bond.

2. PERFORMANCE & PAYMENT BOND

A Performance Bond must remain in effect for the entire term of the Contract in the amount of 100% of the annual contract amount. A Payment Bond shall be included with the Performance Bond, or separately provided.

3. INSURANCE REQUIREMENTS

The Contractor shall carry insurance of the following kinds and amounts (exceptions are noted) in addition to any other forms of insurance or bonds required under the terms of the bid specifications. The Contractor shall procure and maintain for the duration of the Contract or as later indicated, insurance against claims for injuries to persons or damages to property which may arise from or in connection with this agreement by the Contractor, his agents, representatives, employees or subcontractors.

A. MINIMUM SCOPE OF INSURANCE:

1. General Liability:

Insurance will be written on an occurrence basis. Claims-made coverage will be accepted only on an exception basis after Risk Management approval.

Commercial General Liability

Products and Completed Operations
Contractual
Personal Injury
Explosion, Collapse and Underground
Broad Form Property Damage

2. Automobile Liability:

Business Automobile Liability providing coverage for all owned, hired and non-owned autos. Coverage for loading and unloading shall be provided under either automobile liability or general liability policy forms.

3. Workers' Compensation Insurance:

Statutory protection against bodily injury, sickness or disease or death sustained by an employee in the scope of employment. Protection shall be provided by a commercial insurance company or a recognized self-insurance fund authorized before the State of Alabama Industrial Board of Relations. Subrogation shall be waived as respects Workers' Compensation.

4. Employers Liability Insurance:

Covering common law claims of injured employees made in lieu of or in addition to a worker's compensation claim.

CITY OF HUNTSVILLE, ALABAMA
BONDS & INSURANCE REQUIREMENTS

B. LIMITS OF INSURANCE:

1. General Liability:

Commercial General Liability on an "occurrence form" for bodily injury and property damage:

$2,000,000 General Aggregate Limit
$1,000,000 Products - Completed Operations Aggregate
$1,000,000 Personal & Advertising Injury
$1,000,000 Each Occurrence

2. Automobile Liability:

$1,000,000 Combined Single Limit per accident for bodily injury and property damage.

3. Workers' Compensation:

As Required by the State of Alabama Statute. If statutory exemption to this coverage is asserted, an explanation shall be attached to the bidder's Certificate of Liability Insurance.

4. Employers Liability:

$500,000 Bodily Injury by Accident
$500,000 Bodily Injury by Disease
$500,000 Policy Limit by Disease

C. OTHER INSURANCE PROVISIONS:

The City is hereby authorized to adjust the requirements set forth in this document in the event it is determined that such adjustment is in the City's best interest. If the insurance requirements are not adjusted by the City prior to the City's release of RFP specifications, then the limits stated herein shall apply.

1. General Liability and Automobile Liability Coverages Only:

a. The Contractor's insurance coverage shall be primary insurance as respects the City, its officers, employees, agents, and specified volunteers, as their interests may appear. Any insurance or self-insurance maintained by the City, its officers, officials, employees, agents or specified volunteers shall be excess of the Contractor's insurance and shall not contribute to it.

b. The Contractor's insurance shall apply separately to each insured against whom claim is made or suit is brought, except with respect to the limits of the insurer's liability.

2. All Coverages:

a. Contractors are responsible to pay all deductibles. Each insurance policy required by this clause shall be endorsed to state that coverage shall not be suspended, voided, cancelled by either party, reduced in coverage or in limits except after thirty (30) days' prior written notice by certified mail, return receipt requested, has been given to the City. Cancellation of coverage for non-payment of premium will require ten (10) days' written notice to the City.

b. Any failure to comply with reporting provisions of the policies shall not affect coverage provided to the City, its officers, employees, agents or specified volunteers.

CITY OF HUNTSVILLE, ALABAMA
BONDS & INSURANCE REQUIREMENTS

D. ACCEPTABILITY OF INSURERS:

Insurance is to be placed with insurers with an A. M. Best's rating of no less than B+ V.

E. VERIFICATION OF COVERAGE:

The City shall be indicated as a Certificate Holder and the Contractor shall furnish the City with Certificates of Insurance reflecting the coverage required by this document. The A. M. Best Rating and deductibles, if applicable, shall be indicated on the Certificate of Insurance for each insurance policy. The certificates for each insurance policy are to be signed by a person authorized by that insurer to bind coverage on its behalf. All certificates are to be received and approved by the City before Award Notification is issued by the City. The City reserves the right to require complete, certified copies of all required insurance policies at any time.

F. SUBCONTRACTORS WORKING FOR THE CONTRACTOR:

The Contractor shall include all subcontractors as insured under its policies or shall furnish separate certificates and/or endorsements for each subcontractor. Subcontractors working for the Contractor shall be required to carry insurance.

G. HOLD HARMLESS AGREEMENT:

The Contractor, to the fullest extent permitted by law, shall indemnify and hold harmless the City of Huntsville, its elected and appointed officials, employees, agents and specified volunteers against all claims, damages, losses and expenses, including, but not limited to, attorney's fees, arising out of or resulting from the performance of this contract, provided that any such claim, damage, loss or expense (1) is attributable to personal injury, including bodily injury sickness, disease or death, or to injury to or destruction of tangible property, including loss of use resulting there from, and (2) is caused by any negligent act or omission of the Contractor, or any of their subcontractors, sub-consultants, or anyone directly or indirectly employed by any of them or anyone for whose acts they are legally liable. Such obligation should not be construed to negate, abridge, or otherwise reduce any other right or obligation of indemnity which would otherwise exist as to any party or person described in this paragraph.

APPENDIX E
CITY OF HUNTSVILLE, ALABAMA
SPECIAL TERMS & CONDITIONS

Concerning the RFP of which this Appendix is a part, the following special terms and conditions shall apply:

This contract is partially funded with 49 U.S.C., Chapter 53, Title 23, Section 5307, CFDA 20.507, and/or Section 5339, CFDA 20.526 Federal Transit Grant Funds. The attached Federal Compliance items must be certified. All proposals that do not have the certifications attached will be disqualified.

Of Note, the awarded Contractor is certifying compliance to all *relevant* clauses herein and that all sub-contractors under this contract shall certify all *relevant* clauses herein, if applicable.

1. NO FEDERAL GOVERNMENT OBLIGATION – This article applies to all federally funded purchase orders over $3,000.00 and contracts.

(1) the City of Huntsville Public Transit Department 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 City of Huntsville Public Transit Department, 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.

2. PROGRAM FRAUD AND FALSE STATEMENTS OR CLAIMS (31 U.S.C. §3801 et seq., 49 CFR Part 31 18 U.S.C. §1001) – This article applies to all federally funded purchase orders over $3,000.00 and contracts. – The Contractor, subrecipients, subcontractors, agree to 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 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, and 49 U.S.C. §5323(1), 18 U.S.C. §1001 may apply to a subcontractor at any tier.

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.

3. ACCESS TO RECORDS AND REPORTS (49 U.S.C. §5325 et seq., 49 CFR 633.15 – 633.17) – This article applies to all federally funded purchase orders over $3,000.00 and contracts.

1) The Contractor will retain and will require its sub-contractors of all tiers to retain, complete and readily accessible records related in whole or in part to the contract, including, but not limited to, data, documents, reports, statistics, sub-agreements, leases, subcontracts, arrangements, other third-party agreements of any type, and supporting materials related to those records.

2) The Contractor agrees to comply with the record retention requirements in accordance with 2 C.F.R. §200.333. 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).

3) The Contractor agrees to provide sufficient access to FTA and its contractors to inspect and audit records and information related to performance of this contract as reasonably may be required.

4) The Contractor agrees to permit FTA and its contractors' access to the sites performance under this contract as reasonably may be required.

4. FEDERAL REQUIREMENT CHANGES – The 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 City of Huntsville, AL Huntsville Transit 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. The Contractor shall require subcontractors, at all tiers, to comply with all the applicable federal changes as listed above.

5. TERMINATION PROVISIONS – ***(Applicable to contracts exceeding $10,000).*** **The termination clauses extend to Contractors, sub-contractors, and sub-recipients at every level.**

1) Termination for Convenience (General Provision) - The City of Huntsville 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 City of Huntsville to be paid the Contractor. If the Contractor has any property in its possession belonging to the City of Huntsville, the Contractor will account for the same, and dispose of it in the manner the City of Huntsville directs.

2) 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 City of Huntsville 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 City of Huntsville 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 City of Huntsville, 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.

3) Opportunity to Cure (General Provision) - The City of Huntsville 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 City of Huntsville's satisfaction the breach or default or any of the terms, covenants, or conditions of this Contract within [ten (10) days] after receipt by Contractor or written notice from City of Huntsville setting forth the nature of said breach or default, the City of Huntsville 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 the City of Huntsville from also pursuing all available remedies against Contractor and its sureties for said breach or default.

4) Waiver of Remedies for any Breach - In the event that the City of Huntsville elects to waive its remedies for any breach by Contractor of any covenant, term or condition of this Contract, such waiver by The City of Huntsville shall not limit City of Huntsville's remedies for any succeeding breach of that or of any other term, covenant, or condition of this Contract.

5) 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 City of Huntsville may terminate this contract for default. The City of Huntsville 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 City of Huntsville.

6. INCORPORATION OF FEDERAL TRANSIT ADMINISTRATION (FTA) TERMS (FTA Circular 4220.1F) - This article applies to all federally funded purchase orders over $3,000.00 and contracts. The preceding provisions include, in part, certain Standard Terms and Conditions required by DOT, whether or not expressly set forth in the preceding contract provisions. All contractual provisions required by 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 City requests which would cause City to be in violation of the FTA terms and conditions.

7. DISADVANTAGED BUSINESS ENTERPRISE (49 CFR Part 26) - This article applies to all federally funded purchase orders over $3,000.00 and contracts. - The contractor, subrecipient or subcontractor 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 C.F.R. part 26 in the award and administration of DOT-assisted contracts. 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 recipient deems appropriate, which may include, but is not limited to:

1) Withholding monthly progress payments;
2) Assessing sanctions;
3) Liquidated damages; and/or
4) Disqualifying the contractor from future bidding as non-responsible. 49 C.F.R. § 26.13(b).

In accordance with 49 CFR 26.13(b), the Contractor also agrees that each subcontract the Contractor signs with a Subcontractor must include the assurances of Disadvantaged Business Enterprise (49 CFR Part 26).

8. CIVIL RIGHTS (29 U.S.C. § 623, 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.) - This article applies to all federally funded purchase orders over $10,000.00 and contracts. The Contractor, subrecipient or subcontractor must comply with the following Federal Laws:

1) Nondiscrimination - In accordance with 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, religion, national origin, sex, disability, or age, and all other applicable regulations as required by FTA.

2) Race, Color, Religion, National Origin, Sex - In accordance with Title VII of the Civil Rights Act, as amended, 42 U.S.C. § 2000e et seq., 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. chapter 60, and Executive Order No. 11246, "Equal Employment Opportunity in Federal Employment," September 24, 1965, 42 U.S.C. § 2000e note, as amended by any later Executive Order that amends or supersedes it, referenced in 42 U.S.C. § 2000e note.

3) Age - In accordance with the Age Discrimination in Employment Act, 29 U.S.C. §§ 621-634, U.S. Equal Employment Opportunity Commission (U.S. EEOC) regulations, "Age Discrimination in Employment Act," 29 C.F.R. part 1625, the Age Discrimination Act of 1975, as amended, 42 U.S.C. § 6101 et seq., U.S. Health and Human Services regulations, "Nondiscrimination on the Basis of Age in Programs or Activities Receiving Federal Financial Assistance," 45 C.F.R. part 90, 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, and any other requirements that FTA may issue.

4) Disabilities - In accordance with section 504 of the Rehabilitation Act of 1973, as amended, 29 U.S.C. § 794, the Americans with Disabilities Act of 1990, as amended, 42 U.S.C. § 12101 et seq., the Architectural Barriers Act of 1968, as amended, 42 U.S.C. §4151 et seq., and Federal transit law at 49 U.S.C. § 5332, the Contractor agrees that it will not discriminate against individuals on the basis of disability. In addition, the Contractor agrees to comply with any implementing requirements FTA may issue.

9. VETERANS PREFERENCE – This article applies to all federally funded purchase orders and cotracts. - As provided in 49 U.S.C. § 5325(k), to the extent practicable, the Contractor agrees:

1) give a hiring preference, to the extent practicable, to veterans (as defined in section 2108 of title 5) who have the requisite skills and abilities to perform the construction work required under the contract.

2) This subsection shall not be understood, construed, or enforced in any manner that would require an employer to give a preference to any veteran over any equally qualified applicant who is a member of any racial or ethnic minority, female, an individual with a disability, or a former employee.

10. ENERGY CONSERVATION (42 U.S.C. §6321 et seq., 10 CFR Part 431) – This article applies to all federally funded purchase orders over $3,000.00 and contracts. 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. Complying with and facilitating compliance with: (1) Section 6002 of the Resource Conservation and Recovery Act, as amended, 42 U.S.C. § 6962, and (2) U.S. Environmental Protection Agency (U.S. EPA), "Comprehensive Procurement Guideline for Products Containing Recovered Materials," 40 C.F.R. part 247.

11. TRAFFICKING in PERSONS – The contractor agrees that it and its employees, may not:

1) Engage in severe forms of trafficking in persons during the period of time that the agreement is in effect;
2) Precure a commercial sex act during the period of time that that the agreement is in effect, or
3) Use forced labor in the performance of the contract or sub-contracts.

12. FEDERAL TAX LIABILITY and RECENT FELONY CONVICTIONS – The contractor agrees to comply with Consolidated Appropriations Act, 2019, Pub. L. 116-6, div. D, title VII, §§ 744–745), U.S. DOT Order 4200.6. The undersigned certifies, to the best of his or her knowledge and belief, that:

1) Does not have any unpaid Federal tax liability that has been assessed, for which all judicial and administrative remedies have been exhausted or have lapsed, and that is not being paid in a timely manner pursuant to an agreement with the authority responsible for collecting the tax liability; and
2) Was not convicted of the felony criminal violation under any Federal law within the preceding 24 months.
3) The undersigned shall require that the language of this certification be included in the award documents for all sub-awards at all tiers (including subcontracts, sub-grants, and contracts under grants, loans, and cooperative agreements) and that all subrecipients shall certify and disclose accordingly.

I. _____ Signature of Contractor's Authorized Official
II. _____ Name and Title of Contractor's Authorized Official
III. _____ Date

13. SAFE OPERATIONS of MOTOR VEHICLES – The contractor is encouraged to have safe operations of motor vehicle policies:

1) Seat Belt Use – Adopting and promoting on-the-job seat belt use policies and programs for its employees and other personnel that operate company-owned vehicles, company-rented vehicles, or personally operated vehicles; (23 U.S.C. §402, Executive Order 13043)
2) Consistent with Executive Order No. 13513, "Federal Leadership on Reducing Text Messaging While Driving," October 1, 2009, 23 U.S.C. Section 402 note, and DOT Order 3902.10 "Text Messaging While Driving," December 30, 2009, FTA encourages each third party contractor to promote policies and initiatives for its employees and other personnel that adopt and promote safety policies that decrease crashes by distracted drivers, including policies to ban text messaging while driving, and to include this provision in each third party subcontract involving the project.
    - Safety. Adopt and enforce workplace safety policies to decrease crashes caused by distracted drivers, including policies to ban text messaging while using an electronic device supplied by an employer, and driving a vehicle the driver owns or rents, a vehicle Contractor owns, leases, or rents, or a privately-owned vehicle when on official business in connection with the Agreement, or when performing any work for or on behalf of the Agreement; and
    - Contractor Size. Conduct workplace safety initiatives in a manner commensurate with its size, such as establishing new rules and programs to prohibit text messaging while driving, re-evaluating the existing programs to prohibit text messaging while driving, and providing education, awareness, and other outreach to employees about the safety risks associated with texting while driving; and
    - Extension of Provision. Include this Special Provision in each third party subagreement at each tier supporting this agreement.

14. ADA ACCESS - This article applies to all federally funded purchase orders over $3,000.00 and contracts for architectural & engineering, operations/management, rolling stock purchases and construction contracts. – Contractor shall comply with 49 U.S.C. §5301(d); all applicable requirements of section 504 of the Rehabilitation Act of 1973, as amended, 29 U.S.C. §794; The American Disabilities Action of 1990 (ADA), as amended, 42 U.S.C. §12101 *et seq.*; The Architectural Barriers Act of 1968, as amended, 42 U.S.C. §4151 *et seq.*; and all applicable requirements of the following regulations and any subsequent amendments thereto:

(1) U.S. DOT regulations, "Transportation Services for Individuals with Disabilities (ADA)," 49 CFR Part 37;

(2) U.S. DOT regulations, "Nondiscrimination on the Basis of Handicap in Programs and Activities Receiving or Benefiting from Federal Financial Assistance," 49 CFR Part 27;

(3) Join U.S. Architectural and Transportation Barriers Compliance Board (U.S. TBCB)/U.S. DOT regulations, "Americans with Disabilities (ADA) Accessibility Specifications for Transportation Vehicles," 36 CFR Part 1192 and 49 CFR Part 38;

(4) U.S.DOJ regulations, "Nondiscrimination on the Basis of Disability in State and Local Government Services," 28 CFR Part 35;

(5) U.S. DOJ regulations, "Nondiscrimination on the Basis of Disability by Public Accommodations and in Commercial Facilities," 28 CFR Part 36;

(6) U.S. General Services Administration (U.S. GSA) regulations, "Accommodations for the Physically Handicapped," 41 CFR Subpart 101-19;

(7) U.S. Equal Employment Opportunity Commission, "Regulations to Implement the Equal Employment Provisions of the Americans with Disabilities Act," 29 CFR Part 1630;

(8) U.S. Federal Communications Commission regulations, "Telecommunications Relay Services and Related Customer Premises Equipment for the Hearing and Speech Disabled," 47 CFR Part 64, Subpart F and

(9) U.S. ATBCB regulations, "Electronic and Information Technology Accessibility Standards," 36 CFR Part 1194;

(10) FTA regulations, "Transportation for Elderly and Handicapped Persons," 49 CFR Part 609; and

(11) Any implementing requirements FTA may issue.

15. SAFETY SENSITIVE INFORMATION – The contractor must protect, and take measures to ensure that its sub-contractor(s) at each tier protect, "sensitive security information" made available during the administration of a contract or sub-contract to ensure compliance with 49 U.S.C. Section 40119(b) and implementing DOT regulations, "Protection of Sensitive Security Information," 49 C.F.R. Part 15, and with 49 U.S.C. Section 114(r), and implementing Department of Homeland Security regulations, 49 C.F.R. Part 1520.

16. DEBARMENT AND SUSPENSION ***(Applicable to Procurements Exceeding $25,000)*** - The contractor agrees to comply with applicable provisions of Executive Orders Nos. 12549 and 12689, "Debarment and Suspension," 31 U.S.C. § 6101 note, and U.S. DOT Regulations, "Nonprocurement Suspension and Debarment," 2 C.F.R. Part 1200, and "Guidelines to Agencies on Government Wide Debarment and Suspension (Nonprocurement)," 2 C.F.R. Part 180. When applicable, contractors, at any tier, will review the "Excluded Parties Listing System" at www.sam.gov , and will include a similar term or condition in each of its covered transactions. The Contractor shall verify that its principals, affiliates, and subcontractors are eligible to participate in this federally funded contract and are not presently declared by any Federal department or agency to be:

1) Debarred from participation in any federally assisted Award;
2) Suspended from participation in any federally assisted Award;
3) Proposed for debarment from participation in any federally assisted Award;

4) Declared ineligible to participate in any federally assisted Award;
5) Voluntarily excluded from participation in any federally assisted Award; or
6) Disqualified from participation in ay federally assisted Award

17. LOBBYING AND CERTIFICATION DISCLOSURE ***(Applicable to Procurements Equal to or Exceeding $100,000)*** - 31 U.S.C. 1352 (a), 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 $100,000 or more 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. **The undersigned certifies, to the best of his or her knowledge and belief, that**:

1) No Federal appropriated funds have been paid or will be paid, by or on behalf of the undersigned, to any person for influencing or attempting to influence an officer or employee of an agency, a Member of Congress, an officer or employee of Congress, or an employee of a Member of Congress in connection with the awarding of any Federal contract, the making of any Federal grant, the making of any Federal loan, the entering into of any cooperative agreement, and the extension, continuation, renewal, amendment, or modification of any Federal contract, grant, loan, or cooperative agreement.

2) If any funds other than Federal appropriated funds have been paid or will be paid to any person for influencing or attempting to influence 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.
3) The undersigned shall require that the language of this certification be included in the award documents for all sub-awards at all tiers (including subcontracts, sub-grants, and contracts under grants, loans, and cooperative agreements) and that all subrecipients shall certify and disclose accordingly.
4) 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 section 1352, title 31, U.S. Code. 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.

I. _____
Signature of Contractor's Authorized Official
II. _____
Name and Title of Contractor's Authorized Official
III. _____
Date

18. BUY AMERICA FOR STEEL, IRON, AND MANUFACTURED PRODUCTS – ***This article applies to all federally funded rolling stock purhcases, construction contracts; and contracts for material and supplies for steel, iron, or manufactured products over $150,000.00-*** The contractor agrees to comply with 49 U.S.C. 5323(j) and 49 C.F.R. Part 661, and any later amendments, which provide that Federal funds may not be obligated unless steel, iron, and manufactured products used in FTA-funded projects are produced in the United States, unless a waiver has been granted by FTA or the product is subject to a general waiver. General waivers are listed in 49 C.F.R. 661.7. Separate requirements for rolling stock are set out at 49 U.S.C. 5323(j)(2)(C) and 49 C.F.R. §661.11.

In accordance with 49 C.F.R. §661.6, for the procurement of steel, iron or manufactured products, use the certifications below.

1) **Certificate of Compliance with Buy America Requirements** - The bidder or offeror hereby certifies that it will meet the requirements of 49 U.S.C. 5323(j) (1) and the applicable regulations in 49 C.F.R. Part 661.
   I. Date _____
   II. Signature _____
   III. Company Name _____
   IV. Printed Name _____
   V. Title _____

2) **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)(1), as amended, and 49 C.F.R. 661.5, but it may qualify for an exception pursuant to 49 U.S.C. 5323(j)(2),as amended, and the applicable 49 C.F.R. 661.7.
   I. Date _____
   II. Signature _____
   III. Company Name _____
   IV. Printed Name _____
   V. Title _____

19. BREACHES AND DISPUTE RESOLUTION ***(Applicable to Procurements Exceeding $25,000)***

1) 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 the City of Huntsville's Attorney. 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 City Attorney. 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 City Attorney shall be binding upon the Contractor and the Contractor shall abide be the decision.
2) Performance During Dispute - Unless otherwise directed by the City of Huntsville, Contractor shall continue performance under this Contract while matters in dispute are being resolved.
3) 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 thereof shall be made in writing to such other party within a reasonable time after the first observance of such injury of damage.
4) Remedies - Unless this contract provides otherwise, all claims, counterclaims, disputes, and other matters in question between the City of Huntsville 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 City of Huntsville is located.
5) 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 City of Huntsville, 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.

20. CLEAN AIR and FEDERAL WATER POLLUTION CONTROL ACT ***(Applicable to Procurements Exceeding $150,000)*** - 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 through 7671q and 33 U.S.C. §§ 1251 through 1388, as amended;

1) Report the use of facilities placed on or likely to be placed on the U.S. EPA "List of Violating Facilities,"
2) Refrain from using any violating facilities,
3) Report violations to FTA and the Regional U.S. EPA Office, and
4) Comply with the inspection and other applicable requirements of the Clean Air Act, as amended, 42 U.S.C. §§ 7401-7671q; and the Federal Water Pollution Control Act, as amended, 33 U.S.C. §§ 1251-1387
5) The Contractor also agrees to include these requirements in each subcontract exceeding $150,000 financed in whole or in part with Federal assistance provided by FTA.

21. Recycled Products (42 U.S.C. §6962, 40 CFR Part 247, Executive Order 12873) - This article applies to federally funded operations/management, construction, or materials and supplies purchase orders or contracts for items designated by the Environmental Protection Agency, when procuring $10,000 or more per year.

The Contractor agrees to comply with all the requirements of Section 6002 of the Resource Conservation and Recovery Act, 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

22. SUBSTANCE ABUSE TESTING ***(Applicable to Contracts with Safety Sensitive Work Performed, Maintenance on Revenue Vehicles)*** – - Drug and Alcohol Testing Policy-U.S. Department of Transportation (DOT), 49 C.F.R., part 40; Federal Transit Administration (FTA), 49 C.F.R., part 655; and the Federal Motor Carrier Safety Administration (FMCSA), 49 C.F.R., part 382.

1) The Contractor agrees to establish and implement a drug and alcohol testing program that complies with 49 C.F.R. parts 655, produce any documentation necessary to establish its compliance with part 655, and permit any authorized representative of the United States Department of Transportation or its operating administrations, the State Oversight Agency of Alabama, or The City of Huntsville, to inspect the facilities and records associated with the implementation of the drug and alcohol testing program as required under 49 C.F.R. part 655 and review the testing process. The Contractor agrees to submit the Management Information System (MIS) reports before January 31st of the following calendar year to the City of Huntsville's Employee Clinic & Resource Coordinator, 2227 Drake Avenue SW, Suite 26, Huntsville, AL 35805.
2) The Contractor agrees to comply and assures compliance of its Sub-Contractor(s) or other participants, with all Drug and Alcohol Testing Policies as required under the above referenced DOT, FTA, and FMCSA mandates. These requirements are outlined in the Scope of Work, section XI. Contractor's Personnel.

23. CONTRACT WORK HOURS AND SAFETY STANDARDS ACT – NON-CONSTRUCTION – ***This article applies to all federally funded rolling stock purchases, construction contracts and operations./management over $100,000.00*** - The contractor or subcontractor agrees to comply with Sections 102 of the Contract Work Hours and Safety Standards Act, 40 U.S.C. Section 3702, and Department of Labor (DOL) regulations, "Labor Standards Provisions Applicable to Contracts Governing 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 CFR Part 5. Section 4104(c) of the Federal Acquisition Streamlining Act of 1994, 40 U.S.C. Section 3701(b)(3)(A)(iii), increased the wage and hour thresholds of $2,000 for construction work and $2,500 for non-construction work set forth in the Common Grant Rules to $100,000. A federally assisted contract must exceed $100,000 before these wage and hour requirements apply to that contract.

24. CARGO PREFERENCE - This article applies to all federally funded rolling stock purchases, construction contracts; and contracts for material and supplies which may be transported by ocean vessels. *(46 U.S.C. §55302, 46 CFR Part 381)* - Use of United States-Flag Vessels - The contractor agrees:

1) 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;

2) 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 leading for shipments originating outside the United States, a legible copy of a rated, "on-board" commercial ocean bill-of -lading in English for each shipment of cargo described in the preceding paragraph to the Division of National Cargo, Office of Market Development, Maritime Administration, Washington, DC 20590 and to the FTA recipient (through the contractor in the case of a subcontractor's bill-of-lading.)

3) 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.

25. FLY AMERICA REQUIREMENTS (49 U.S.C. § 40118, 41 CFR Part 301-10) This article applies to all federally funded if the purchase order is over $3,000; contracts; or subcontracts may involve the international transportation of goods, equipment, or personnel by air. - The Contractor agrees to comply with 49 U.S.C. 40118 (the "Fly America" Act) in accordance with the General Services Administration's regulations at 41 CFR Part 301-10, which provide that recipients and sub-recipients of Federal funds and their contractors are required to use U.S. Flag air carriers for U.S Government-financed international air travel and transportation of their personal effects or property, to the extent such service is available, unless travel by foreign air carrier is a matter of necessity, as defined by the Fly America Act. The Contractor shall submit, if a foreign air carrier was used, an appropriate certification or memorandum adequately explaining why service by a U.S. flag air carrier was not available or why it was necessary to use a foreign air carrier and shall, in any event, provide a certificate of compliance with the Fly America requirements. The Contractor agrees to include the requirements of this section in all subcontracts that may involve international air transportation.

26. National Intelligent Transportation System Architecture and Standards (ITS) - This article applies to all federally funded purchase orders over $3,000 and contracts involving ITS projects.

The Contractor agrees to conform to the National Intelligent Transportation Systems (ITS) Architecture and Standards as required by SAFETEA-LU § 5307(c), 23 U.S.C. § 512 note, and follow the provisions of FTA Notice, "FTA National ITS Architecture Policy on Transit Projects," 66 Fed. Reg 1455 et seq., January 8,/2001, and any other implementing directives FTA may issue at a later date, except to the extent FTA determines otherwise in writing.

27. BUS TESTING - The Contractor/Manufacturer agrees to comply with 49 U.S.C. A 5323(c) and FTA's implementing regulation at 49 CFR Part 665 and indicate one of the following three alternatives:

1) _____ The buses offered herewith have been tested in accordance with 49 CFR Part 665 on _____ (date). If multiple buses are being proposed, provide additional bus testing information below or on attached sheet. The vehicles being sold should have the identical configuration and major components as the vehicle in the test report, which must be submitted with this Proposal. If the configuration or components are not identical, then the manufacturer shall provide with its Proposal a description of the change and the manufacturer's basis for concluding that it is not a major change requiring additional testing. If multiple buses are being proposed, testing data on additional buses shall be listed on the bottom of this page.

2) _____ The manufacturer represents that the vehicle is "grandfathered" (has been used in mass transit service in the United States before October 1, 1988, and is currently being produced without a major change in configuration or components), and submits with this Proposal the name and address of the recipient of such a vehicle and the details of that vehicle's configuration and major components.

3) _____ The vehicle is a new model, or vehicle configuration and components are not identical, and will be tested and the results will be submitted to the Agency prior to acceptance of the first bus.

The undersigned Manufacturer certifies that the vehicle offered in this procurement complies with 49 U.S.C. A 5323(c) and FTA's implementing regulation at 49 CFR Part 665.

4) **Certification of Compliance with FTA's Bus Testing Requirements -**

I. The undersigned understands that misrepresenting the testing status of a vehicle acquired with Federal financial assistance may subject the undersigned to civil penalties as outlined in the Department of Transportation's regulation on Program Fraud Civil Remedies, 49 CFR Part 31. In addition, the undersigned understands that FTA may suspend or debar a manufacturer under the procedures in 49 CFR Part 29. Certified by Authorized Official.

1. Date: _____
2. Signature: _____
3. Company Name: _____
4. Title: _____

28. PRE-AWARD AND POST-DELIVERY AUDIT REQUIREMENTS - The Contractor agrees to comply with 49 U.S.C. § 5323(l) and FTA's implementing regulation at 49 C.F.R. Part 663 and to submit the following certifications:

1) Buy America Requirements: The Contractor shall complete and submit a declaration certifying either compliance or noncompliance with Buy America. If the Bidder/Offeror certifies compliance with Buy America, it shall submit documentation which lists 1) component and subcomponent parts of the rolling stock to be purchased identified by manufacturer of the parts, their country of origin and costs; and 2) the location of the final assembly point for the rolling stock, including a description of the activities that will take place at the final assembly point and the cost of final assembly.
2) Solicitation Specification Requirements: The Contractor shall submit evidence that it will be capable of meeting the bid specifications.
3) Federal Motor Vehicle Safety Standards (FMVSS): The Contractor shall submit 1) manufacturer's FMVSS self-certification sticker information that the vehicle complies with relevant FMVSS or 2) manufacturer's certified statement that the contracted buses will not be subject to FMVSS regulations.
4) **Buy America Certification– Rolling Stock** *(Applicable to Procurements exceeding $150,000)* - The contractor agrees to comply with 49 U.S.C. 5323(j) and 49 C.F.R. Part 661, and any later amendments, which provide that Federal funds may not be obligated unless steel, iron, and manufactured products used in FTA-funded projects are produced in the United States, unless a waiver has been granted by FTA or the product is subject to a general waiver. General waivers are listed in 49 C.F.R. 661.7 and include final assembly in the United States for 15 passenger vans and 15 passenger wagons produced by Chrysler Corporation, and microcomputer equipment and software. A bidder or offeror must submit to the FTA recipient, the City of Huntsville, the appropriate Buy America certification (below) with all bids or offers on FTA-funded contracts, except those subject to a general waiver. Bids or offers that are not accompanied by a completed Buy America certification will be rejected as nonresponsive.

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 certifications below.

5) **Certificate of Compliance with Buy America Rolling Stock Requirements** - The bidder or offeror hereby certifies that it will meet the requirements of 49 U.S.C. 5323(j), as amended, and the applicable regulations in 49 C.F.R. Part 661.11.

I. Date _____
II. Signature _____
III. Company _____
IV. Name _____
V. Title _____

6) **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), as amended, but it may qualify for an exception pursuant to 49 U.S.C. 5323(j)(2)(C), as amended, and the applicable regulations in 49 C.F.R. 661.7.

I. Date _____
II. Signature _____

III. Company _____

IV. Name _____

V. Title _____

29. TRANSIT VEHICLE MANUFACTURERS (TVM) CERTIFICATION - This procurement is subject to provisions of 49 CFR Part 26. Accordingly, as a condition of permission to bid, the following certification must be completed and submitted with the bid. A bid which does not include the certification will not be considered.

1) **TVM Certification** _____(name of firm), a TVM, hereby certifies that is has complied with the requirements of 49 CFR Part 26 Section 26.49 by submitting a current DBE Goal to the Federal Transit Administration (FTA). The goals apply to fiscal year _____ and has either been approved or not disapproved by FTA.

2) **Or,** _____ (name of firm) hereby certifies that the manufacturer of the transit vehicle to be supplied _____ (name of manufacturer) has complied with the above referenced requirements of Section 26.49 of 49 CFR Part 26.

I. Date: _____

II. Signature: _____

III. Company Name: _____

IV. Printed Name: _____

V. Title: _____

30. DAVIS-BACON ACT and COPELAND ANTI-KICKBACK ACT(40 U.S.C. §3141-3146, 29 CFR §5.1-5.33, 18 U.S.C. §874, 29 CFR Part 3) This article applies to all federally funded construction contracts over $2,000 (including ferry vessels). - For all prime construction, alteration or repair contracts in excess of $2,000 awarded by FTA, the Contractor shall comply with the Davis-Bacon Act and the Copeland "Anti-Kickback" Act. Under 49 U.S.C. § 5333(a), prevailing wage protections apply to laborers and mechanics employed on FTA assisted construction, alteration, or repair projects. The Contractor will comply with the Davis-Bacon Act, 40 U.S.C. §§ 3141-3144, and 3146-3148 as supplemented by DOL regulations at 29 C.F.R. part 5, "Labor Standards Provisions Applicable to Contracts Governing Federally Financed and Assisted Construction." In accordance with the statute, the Contractor shall pay wages to laborers and mechanics at a rate not less than the prevailing wages specified in a wage determination made by the Secretary of Labor. In addition, the Contractor agrees to pay wages not less than once a week. The Contractor shall also comply with the Copeland "Anti-Kickback" Act (40 U.S.C. § 3145), as supplemented by DOL regulations at 29 C.F.R. part 3, "Contractors and Subcontractors on Public Building or Public Work Financed in Whole or in part by Loans or Grants from the United States." The Contractor is prohibited from inducing, by any means, any person employed in the construction, completion, or repair of public work, to give up any part of the compensation to which he or she is otherwise entitled. Access U.S. Department of Labor, Wage and Hour Division at https://www.dol.gov/agencies/whd.

1) Minimum wages - (i) All laborers and mechanics employed or working upon the site of the work (or under the United States Housing Act of 1937 or under the Housing Act of 1949 in the construction or development of the project), will be paid unconditionally and not less often than once a week, and without subsequent deduction or rebate on any account (except such payroll deductions as are permitted by regulations issued by the Secretary of Labor under the Copeland Act (29 CFR part 3)), the full amount of wages and bona fide fringe benefits (or cash equivalents thereof) due at time of payment computed at rates not less than those contained in the wage determination of the Secretary of Labor which is attached hereto and made a part hereof, regardless of any contractual relationship which may be alleged to exist between the contractor and such laborers and mechanics. Contributions made or costs reasonably anticipated for bona fide fringe benefits under section 1(b)(2) of the Davis-Bacon Act on behalf of laborers or mechanics are considered wages paid to such laborers or mechanics, subject to the provisions of paragraph (1)(iv) of this section; also, regular contributions made or costs incurred for more than a weekly period (but not less often than quarterly) under plans, funds, or programs which cover the particular weekly period, are deemed to be constructively made or incurred during such weekly period. Such laborers and mechanics shall be paid the appropriate wage rate and fringe benefits on the wage determination for the classification of work actually performed, without regard to skill, except as provided in 29 CFR Part 5.5(a)(4). Laborers or mechanics performing work in more than one classification may be compensated at the rate specified for each classification for the time actually worked therein: Provided that the employer's payroll records accurately set forth the time spent in each classification in which work is performed. The wage determination (including any additional classifications and wage rates conformed under paragraph (1)(ii) of this section) and the Davis-Bacon

poster (WH-1321) shall be posted at all times by the contractor and its subcontractors at the site of the work in a prominent and accessible place where it can be easily seen by the workers. (ii)(A) The contracting officer shall require that any class of laborers or mechanics, including helpers, which is not listed in the wage determination and which is to be employed under the contract shall be classified in conformance with the wage determination. The contracting officer shall approve an additional classification and wage rate and fringe benefits therefore only when the following criteria have been met:

I. Except with respect to helpers as defined as 29 CFR 5.2(n)(4), the work to be performed by the classification requested is not performed by a classification in the wage determination; and
II. The classification is utilized in the area by the construction industry; and
III. The proposed wage rate, including any bona fide fringe benefits, bears a reasonable relationship to the wage rates contained in the wage determination; and
IV. With respect to helpers as defined in 29 CFR 5.2(n)(4), such a classification prevails in the area in which the work is performed.

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

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

4) The wage rate (including fringe benefits where appropriate) determined pursuant to paragraphs (a)(1)(ii) (B) or (C) of this section, shall be paid to all workers performing work in the classification under this contract from the first day on which work is performed in the classification. (iii) Whenever the minimum wage rate prescribed in the contract for a class of laborers or mechanics includes a fringe benefit which is not expressed as an hourly rate, the contractor shall either pay the benefit as stated in the wage determination or shall pay another bona fide fringe benefit or an hourly cash equivalent thereof. (iv) If the contractor does not make payments to a trustee or other third person, the contractor may consider as part of the wages of any laborer or mechanic the amount of any costs reasonably anticipated in providing bona fide fringe benefits under a plan or program, Provided, That the Secretary of Labor has found, upon the written request of the contractor, that the applicable standards of the Davis-Bacon Act have been met. The Secretary of Labor may require the contractor to set aside in a separate account assets for the meeting of obligations under the plan or program. (v)(A) The contracting officer shall require that any class of laborers or mechanics which is not listed in the wage determination and which is to be employed under the contract shall be classified in conformance with the wage determination. The contracting officer shall approve an additional classification and wage rate and fringe benefits therefore only when the following criteria have been met:

I. The work to be performed by the classification requested is not performed by a classification in the wage determination; and
II. The classification is utilized in the area by the construction industry; and
III. The proposed wage rate, including any bona fide fringe benefits, bears a reasonable relationship to the wage rates contained in the wage determination.

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

6) In the event the contractor, the laborers or mechanics to be employed in the classification or their representatives, and the contracting officer do not agree on the proposed classification and wage rate (including the amount designated for fringe benefits, where appropriate), the contracting officer shall refer the questions, including the

views of all interested parties and the recommendation of the contracting officer, to the Administrator for determination. The Administrator, or an authorized representative, will issue a determination with 30 days of receipt and so advise the contracting officer or will notify the contracting officer within the 30-day period that additional time is necessary.

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

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

II. Payrolls and basic records - (i) Payrolls and basic records relating thereto shall be maintained by the contractor during the course of the work and preserved for a period of three years thereafter for all laborers and mechanics working at the site of the work (or under the United States Housing Act of 1937, or under the Housing Act of 1949, in the construction or development of the project). Such records shall contain the name, address, and social security number of each such worker, his or her correct classification, hourly rates of wages paid (including rates of contributions or costs anticipated for bona fide fringe benefits or cash equivalents thereof of the types described in section 1(b) (2) (B) of the Davis-Bacon Act), daily and weekly number of hours worked, deductions made and actual wages paid. Whenever the Secretary of Labor has found under 29 CFR 5.5(a)(1)(iv) that the wages of any laborer or mechanic include the amount of any costs reasonably anticipated in providing benefits under a plan or program described in section 1(b)(2)(B) of the Davis-Bacon Act, the contractor shall maintain records which show that the commitment to provide such benefits is enforceable, that the plan or program is financially responsible, and that the plan or program has been communicated in writing to the laborers or mechanics affected, and records which show the costs anticipated or the actual cost incurred in providing such benefits. Contractors employing apprentices or trainees under approved programs shall maintain written evidence of the registration of apprenticeship programs and certification of trainee programs, the registration of the apprentices and trainees, and the ratios and wage rates prescribed in the applicable programs. (ii)(A) The contractor shall submit weekly for each week in which any contract work is performed a copy of all payrolls to the [City of Huntsville] for transmission to the Federal Transit Administration. The payrolls submitted shall set out accurately and completely all of the information required to be maintained under section 5.5(a)(3)(i) of Regulations, 29 CFR part 5. This information may be submitted in any form desired. Optional Form WH-347 is available for this purpose and may be purchased from the Superintendent of Documents (Federal Stock Number 029-005-00014-1), U.S. Government Printing Office, Washington, DC 20402. The prime contractor is responsible for the submission of copies of payrolls by all subcontractors.

1. Each payroll submitted shall be accompanied by a "Statement of Compliance," signed by the contractor or subcontractor or his or her agent who pays or supervises the payment of the persons employed under the contract and shall certify the following:
    a. That the payroll for the payroll period contains the information required to be maintained under section 5.5(a)(3)(i) of Regulations, 29 CFR part 5 and that such information is correct and complete;
2. That each laborer or mechanic (including each helper, apprentice, and trainee) employed on the contract during the payroll period has been paid the full weekly wages earned, without rebate, either directly or indirectly, and that no deductions have been made either directly or indirectly from the full wages earned, other than permissible deductions as set forth in Regulations, 29 CFR part 3;

3. That each laborer or mechanic has been paid not less than the applicable wage rates and fringe benefits or cash equivalents for the classification of work performed, as specified in the applicable wage determination incorporated into the contract.
4. The weekly submission of a properly executed certification set forth on the reverse side of Optional Form WH-347 shall satisfy the requirement for submission of the "Statement of Compliance" required by paragraph (a)(3)(ii)(B) of this section.
5. The falsification of any of the above certifications may subject the contractor or subcontractor to civil or criminal prosecution under section 1001 of title 18 and section 231 of title 31 of the United States Code. (iii) The contractor or subcontractor shall make the records required under paragraph (a)(3)(i) of this section available for inspection, copying, or transcription by authorized representatives of the Federal Transit Administration or the Department of Labor, and shall permit such representatives to interview employees during working hours on the job. If the contractor or subcontractor fails to submit the required records or to make them available, the Federal agency may, after written notice to the contractor, sponsor, applicant, or owner, take such action as may be necessary to cause the suspension of any further payment, advance, or guarantee of funds. Furthermore, failure to submit the required records upon request or to make such records available may be grounds for debarment action pursuant to 29 CFR 5.12.
6. Apprentices and trainees - (i) Apprentices - Apprentices will be permitted to work at less than the predetermined rate for the work they performed when they are employed pursuant to and individually registered in a bona fide apprenticeship program registered with the U.S. Department of Labor, Employment and Training Administration, Bureau of Apprenticeship and Training, or with a State Apprenticeship Agency recognized by the Bureau, or if a person is employed in his or her first 90 days of probationary employment as an apprentice in such an apprenticeship program, who is not individually registered in the program, but who has been certified by the Bureau of Apprenticeship and Training or a State Apprenticeship Agency (where appropriate) to be eligible for probationary employment as an apprentice. The allowable ratio of apprentices to journeymen on the job site in any craft classification shall not be greater than the ratio permitted to the contractor as to the entire work force under the registered program. Any worker listed on a payroll at an apprentice wage rate, who is not registered or otherwise employed as stated above, shall be paid not less than the applicable wage rate on the wage determination for the classification of work actually performed. In addition, any apprentice performing work on the job site in excess of the ratio permitted under the registered program shall be paid not less than the applicable wage rate on the wage determination for the work actually performed. Where a contractor is performing construction on a project in a locality other than that in which its program is registered, the ratios and wage rates (expressed in percentages of the journeyman's hourly rate) specified in the contractor's or subcontractor's registered program shall be observed. Every apprentice must be paid at not less than the rate specified in the registered program for the apprentice's level of progress, expressed as a percentage of the journeymen hourly rate specified in the applicable wage determination. Apprentices shall be paid fringe benefits in accordance with the provisions of the apprenticeship program. If the apprenticeship program does not specify fringe benefits, apprentices must be paid the full amount of fringe benefits listed on the wage determination for the applicable classification. If the Administrator of the Wage and Hour Division of the U.S. Department of Labor determines that a different practice prevails for the applicable apprentice classification, fringes shall be paid in accordance with that determination. In the event the Bureau of Apprenticeship and Training, or a State Apprenticeship Agency recognized by the Bureau, withdraws approval of an apprenticeship program, the contractor will no longer be permitted to utilize apprentices at less than the applicable predetermined rate for the work performed until an acceptable program is approved.
7. Trainees - Except as provided in 29 CFR 5.16, trainees will not be permitted to work at less than the predetermined rate for the work performed unless they are employed pursuant to and individually registered in a program which has received prior approval, evidenced by

formal certification by the U.S. Department of Labor, Employment and Training Administration. The ratio of trainees to journeymen on the job site shall not be greater than permitted under the plan approved by the Employment and Training Administration. Every trainee must be paid at not less than the rate specified in the approved program for the trainee's level of progress, expressed as a percentage of the journeyman hourly rate specified in the applicable wage determination. Trainees shall be paid fringe benefits in accordance with the provisions of the trainee program. If the trainee program does not mention fringe benefits, trainees shall be paid the full amount of fringe benefits listed on the wage determination unless the Administrator of the Wage and Hour Division determines that there is an apprenticeship program associated with the corresponding journeyman wage rate on the wage determination which provides for less than full fringe benefits for apprentices. Any employee listed on the payroll at a trainee rate who is not registered and participating in a training plan approved by the Employment and Training Administration shall be paid not less than the applicable wage rate on the wage determination for the classification of work actually performed. In addition, any trainee performing work on the job site in excess of the ratio permitted under the registered program shall be paid not less than the applicable wage rate on the wage determination for the work actually performed. In the event the Employment and Training Administration withdraws approval of a training program, the contractor will no longer be permitted to utilize trainees at less than the applicable predetermined rate for the work performed until an acceptable program is approved.

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

31. COMPLIANCE with COPELAND ANTI-KICK BACK ACT requirements (40 U.S.C. §3141-3146, 29 CFR §5.1-5.33, 18 U.S.C. §874, 29 CFR Part 3) This article applies to all federally funded construction contracts over $2,000 (including ferry vessels). - The contractor shall comply with the requirements of 29 CFR part 3, which are incorporated by reference in this contract.

1) Subcontracts - The contractor or subcontractor shall insert in any subcontracts the clauses contained in 29 CFR 5.5(a)(1) through (10) and such other clauses as the Federal Transit Administration may by appropriate instructions require, and also a clause requiring the subcontractors to include these clauses in any lower tier subcontracts. The prime contractor shall be responsible for the compliance by any subcontractor or lower tier subcontractor with all the contract clauses in 29 CFR 5.5.
2) Contract termination: debarment - A breach of the contract clauses in 29 CFR 5.5 may be grounds for termination of the contract, and for debarment as a contractor and a subcontractor as provided in 29 CFR 5.12.

32. COMPLIANCE with DAVIS-BACON and RELATED ACT requirements - All rulings and interpretations of the Davis-Bacon and Related Acts contained in 29 CFR parts 1, 3, and 5 are herein incorporated by reference in this contract.

1) Disputes concerning labor standards - Disputes arising out of the labor standards provisions of this contract shall not be subject to the general disputes clause of this contract. Such disputes shall be resolved in accordance with the procedures of the Department of Labor set forth in 29 CFR parts 5, 6, and 7. Disputes within the meaning of this clause include disputes between the contractor (or any of its subcontractors) and the contracting agency, the U.S. Department of Labor, or the employees or their representatives.
2) Certification of eligibility - (i) By entering into this contract, the contractor certifies that neither it (nor he or she) nor any person or firm who has an interest in the contractor's firm is a person or firm ineligible to be awarded Government contracts by virtue of section 3(a) of the Davis-Bacon Act or 29 CFR 5.12(a)(1).
3) No part of this contract shall be subcontracted to any person or firm ineligible for award of a Government contract by virtue of section 3(a) of the Davis-Bacon Act or 29 CFR 5.12(a)(1).
4) The penalty for making false statements is prescribed in the U.S. Criminal Code, 18 U.S.C., 2001.

33. CONTRACT WORK HOURS and SAFETY STANDARDS – CONSTRUCTION - 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.

34. BONDING REQUIREMENTS - *(Applicable to Construction exceeding $250,000)* A bid guarantee from each bidder equivalent to five (5) percent of the bid price. The "bid guarantees" shall consist of a firm commitment such as a bid bond, certifies check, or other negotiable instrument accompanying a bid as assurance that the bidder will, upon acceptance of his bid, execute such contractual documents as may be required within the time specified.

1) A performance bond on the part to the Contractor for 100 percent of the contract price.
2) A payment bond on the part of the contractor for 100 percent of the contract price. Payment bond amounts required from Contractors are as follows:
    I. 50% of the contract price if the contract price is not more than $1 million;
    II. 40% of the contract price if the contract price is more than $1 million but not more than $5 million; or
    III. $2.5 million if the contract price is more than $5 million.
3) A cash deposit, certified check or other negotiable instrument may be accepted by a grantee in lieu of performance and payment bonds, provided the grantee has established a procedure to assure that the interest of FTA is adequately protected. An irrevocable letter of credit would also satisfy the requirement for a bond.

35. SEISMIC SAFETY - The contractor agrees that any new building or addition to an existing building will be designed and constructed in accordance with the standards for Seismic Safety required in Department of Transportation Seismic Safety Regulations 49 CFR Part 41 and will certify to compliance to the extent required by the regulation. The contractor also agrees to ensure that all work performed under this contract including work performed by a subcontractor is in compliance with the standards required by the Seismic Safety Regulations and the certification of compliance issued on the project.

36. *ADDITIONAL NOTICE TO U.S. DOT INSPECTOR GENERAL - The Contractor agrees to promptly notify the U.S. DOT Inspector General in addition to the FTA Chief Counsel or Regional Counsel for the Region in which the Contractor is located, if the Contractor has knowledge of potential fraud, waste, or abuse occurring on a this project receiving assistance from FTA. The notification provision applies if a person has or may have submitted a false claim under the False Claims Act, 31 U.S.C. § 3729, et seq., or has or may have committed a criminal or civil violation of law pertaining to such matters as fraud, conflict of interest, bid rigging, misappropriation or embezzlement, bribery, gratuity, or similar misconduct involving federal assistance. This responsibility also applies to subcontractors at any tier.

37. *PROHIBITION ON CERTAIN TELECOMMUNICATIONS AND VIDEO SURVEILLANCE SERVICES OR EQUIPMENT

1) The Contractor and Sub-Contractors are prohibited from obligating or expending Federal Transit Administration funds under this contract funds to:
2) Procure or obtain;
3) Extend or renew a contract to procure or obtain; or
4) Enter into a contract (or extend or renew a contract) to procure or obtain equipment, services, or systems that uses covered telecommunications equipment or services as a substantial or essential component of any system, or as critical technology as part of any system. As described in Public Law 115-232, section 889, covered telecommunications equipment is telecommunications equipment produced by Huawei Technologies Company or ZTE Corporation (or any subsidiary or affiliate of such entities).
5) For the purpose of public safety, security of government facilities, physical security surveillance of critical infrastructure, and other national security purposes, video surveillance and telecommunications equipment produced by Hytera Communications Corporation, Hangzhou Hikvision Digital Technology Company, or Dahua Technology Company (or any subsidiary or affiliate of such entities).
6) Telecommunications or video surveillance services provided by such entities or using such equipment. Telecommunications or video surveillance equipment or services produced or provided by an entity that the Secretary of Defense, in consultation with the Director of the National Intelligence or the Director of the Federal Bureau of Investigation, reasonably believes to be an entity owned or controlled by, or otherwise connected to, the government of a covered foreign country.
7) In implementing the prohibition under Public Law 115-232, section 889, subsection (f), paragraph (1), heads of executive agencies administering loan, grant, or subsidy programs shall prioritize available funding and technical support to assist affected businesses, institutions and organizations as is reasonably necessary for those affected entities to transition from covered communications equipment and services, to procure replacement equipment and services, and to ensure that communications service to users and customers is sustained.

38. PATENT AND RIGHTS DATA - Contracts involving experimental, developmental, or research work ($10,000 or less, except for construction contracts over $2,000).

Patent Rights

A. General. The Recipient agrees that:

(1) Depending on the nature of the Project, the Federal Government may acquire patent rights when the Recipient or Third Party Participant produces a patented or patentable:

(a) Invention,

(b) Improvement, or

(c) Discovery,

(2) The Federal Government's rights arise when the patent or patentable information is:

(a) Conceived under the Project, or

(b) Reduced to practice under the Project, and

(3) When a patent is issued or patented information becomes available as described in Patent Rights section A(2), the Recipient agrees to:

(a) Notify FTA immediately, and

(b) Provide a detailed report satisfactory to FTA,

B. Federal Rights. The Recipient agrees that:

(1) Its rights and responsibilities, and the rights and responsibilities of each Third Party Participant, in that federally funded invention, improvement, or discovery will be determined as provided by applicable Federal laws, regulations, and guidance, including any waiver thereof, and

(2) Unless the Federal Government determines otherwise in writing, irrespective of the Recipient's status or the status of any Third Party Participant as a large business, a small business, a State government, a State instrumentality, a local government, an Indian tribe, a nonprofit organization, an institution of higher education, or an individual, the Recipient agrees to transmit the Federal Government's patent rights to FTA as specified in:

(a) 35 U.S.C. § 200 et seq., and

(b) U.S. Department of Commerce regulations, "Rights to Inventions Made by Nonprofit Organizations and Small Business Firms Under Government Grants, Contracts and Cooperative Agreements," 37 C.F.R. part 401, and

C. License Fees and Royalties. As permitted by 49 C.F.R. parts 18 and 19:

(1) License fees and royalties for patents, patent applications, and inventions derived from the Project are program income, and

(2) The Recipient has no obligation to the Federal Government with respect to those license fees or royalties, except:

(a) For compliance with 35 U.S.C. § 200 et seq., which applies to patent rights developed under a federally funded research-type project, and

(b) As FTA determines otherwise in writing.

Rights in Data and Copyrights

A. Definition of "Subject Data." means recorded information:

(1) Copyright. Whether or not copyrighted, and

(2) Delivery. That is delivered or specified to be delivered under the Underlying Agreement,

B. Examples of "Subject Data." Examples of "subject data":

(1) Include, but are not limited to:

(a) Computer software,

(b) Standards,

(c) Specifications,

(d) Engineering drawings and associated lists,

(e) Process sheets,

(f) Manuals,

(g) Technical reports,

(h) Catalog item identifications, and

(i) Related information, but

(2) Do not include:

(a) Financial reports,

(b) Cost analyses, or

(c) Other similar information used for Project administration

C. General Federal Restrictions. The following restrictions apply to all subject data first produced in the performance of the Recipient's Project supported by the Underlying Agreement:

(1) Prohibitions. - The Recipient may not:

(a) Publish or reproduce any subject data in whole or in part, or in any manner or form, or

(b) Permit others to do so, but

(2) Exceptions. The prohibitions of Rights in Data and Copyrights C(1) do not apply to:

(a) Publications or reproductions for the Recipient's own internal use,

(b) An institution of higher learning,

(c) The portion of subject data that the Federal Government has previously released or approved for release to the public, or

(d) The portion of data that has the Federal Government's prior written consent for release,

D. Federal Rights in Data and Copyrights. The Recipient agrees that:

(1) License Rights. The Recipient must provide a license to its "subject data" to the Federal Government, which license is:

(a) Royalty-free,

(b) Non-exclusive, and

(c) Irrevocable,

(2) Uses. The Federal Government's license must permit the Federal Government to take the following actions provided those actions are taken for Federal Government purposes:

(a) Reproduce the subject data,

(b) Publish the subject data,

(c) Otherwise use the subject data, and

(d) Permit other entities or individuals to use the subject data, and

k. Special Federal Rights in Data for Research, Development, Demonstration, Deployment, and Special Studies Projects. In general, FTA's purpose in providing Federal funds for a research, development, demonstration, deployment, or special studies Project is to increase transportation knowledge, rather than limit the benefits of the Project to the Recipient and its Third Party Participants, therefore, the Recipient agrees that:

(1) Publicly Available Report. When the Project is completed, it must provide a Project report that FTA may publish or make available for publication on the Internet,

(2) Other Reports. It must provide other reports pertaining to the Project that FTA may request,

(3) Availability of Subject Data. FTA may make available to any FTA Recipient or any of its Third Party Participants at any tier of the Project, either FTA's copyright license to the subject data or a copy of the subject data, except as the Federal Government determines otherwise in writing,

(4) Identification of Information. It must identify clearly any specific confidential, privileged, or proprietary information submitted to FTA,

(5) Incomplete Project. If the Project is not completed for any reason whatsoever, all data developed under the Project becomes "subject data" and must be delivered as the Federal Government may direct, but

(6) Exception. Rights in Data and Copyrights Section E does not apply to an adaptation of automatic data processing equipment or program that is both:

(a) For the Recipient's use, and

(b) Acquired with FTA capital program funding

l. License Fees and Royalties. As permitted by 49 C.F.R. parts 18 and 19:

(1) License fees and royalties for copyrighted material or trademarks derived from Project are program income, and

(2) The Recipient has no obligation to the Federal Government with respect to those license fees or royalties, except:

(a) For compliance with 35 U.S.C. § 200 et seq., which applies to patent rights developed under a federally funded research-type project, and

(b) As FTA determines otherwise in writing

m. Hold Harmless. Upon request by the Federal Government, the Recipient agrees that:

(1) Violation by Recipient.

(a) If it willfully or intentionally violates any: 1 Proprietary rights, 2 Copyrights, or 3 Right of privacy, and

(b) Its violation occurs from any of the following uses of Project data: 1 Publication, 2 Translation, 3 Reproduction, 4 Delivery, 5 Use, or 6 Disposition, then

(c) It will indemnify, save, and hold harmless against any liability, including costs and expenses of:

(1) The Federal Government's officers acting within the scope of their official duties, 2 The Federal Government's employees acting within the scope of their official duties, and 3 Federal Government's agents acting within the scope of their official duties, but

(2) Exceptions. The Recipient will not be required to indemnify the Federal Government for any liability described in Rights in Data and Copyrights section G(1) if:

(a) Violation by Federal Officers, Employees or Agents. The violation is caused by the wrongful acts of Federal employees or agents, or

(b) State law. If indemnification is prohibited or limited by applicable State law,

n. Restrictions on Access to Patent Rights. Nothing in this Rights in Data and Copyrights section pertaining to rights in data either:

(1) Implies a license to the Federal Government under any patent, or

(2) May be construed to affect the scope of any license or other right otherwise granted to the Federal

Government under any patent,

o. Data Developed Without Federal Funding or Support. The Recipient understands and agrees that in certain circumstances it may need to provide data developed without any Federal funding or support to FTA. Nevertheless:

(1) Protections. Rights in Data and Copyrights Sections A, B, C, and D generally do not apply to data developed without Federal funding, even though that data may have been used in connection with the Project, and

(2) Identification of Information. The Recipient understands and agrees that the Federal Government will not be able to protect data developed without Federal funding from unauthorized disclosure unless that data is clearly marked "Proprietary" or "Confidential," and

p. Requirements to Release Data. The Recipient understands and agrees that the Federal Government may be required to release Project data and information the Recipient submits to the Federal Government as required by:

(1) The Freedom of Information Act, 5 U.S.C. § 552,

(2) Another applicable Federal law requiring access to Project records, (3) U.S. DOT regulations, "Uniform

Administrative Requirements for Grants and Agreements with Institutions of Higher Education, Hospitals, and Other Non-Profit Organizations," specifically 49 C.F.R. § 19.36(d), or

(3) Other applicable Federal regulations and guidance pertaining to access to Project records.

39. STATE and LOCAL LAW DISCLAIMER - The use of many of the suggested clauses may not be governed by Federal Law, but may be significantly affected by State law. Contractors should consult with their attorneys before using language in the sub-contractors procurement documents.

40. Transit Employee Protective Agreements - This article applies to all federally funded purchase orders over $3,000 and contracts for transit operations. - The Contractor agrees to comply with the requirements as set forth in 49 U.S.C. 5310 (Formula Grants for Special Needs of Elderly Individuals and Individuals with Disabilities), 49 U.S. 5311 (Formula Grants for Other than Urbanized Areas), 49 U.S.C. 5333 (Labor Standards), and 29 CFR part 215 (Guidelines, Section 5333(b), Federal Transit Law).

41. PUBLIC TRANSIT PROTEST PROCEDURES – Authority to Resolve Protested Solicitations and Awards, including the process of submitting a protest, is available upon request to the City of Huntsville, Huntsville Transit, Accountant III, 500 B Church Street, Huntsville, AL, 35801, 256-427-6811.

CERTIFICATION:

The Contractor, _____, certifies that all the above referenced federal requirements will be complied with as stated herein, as applicable. FAILURE TO CERTIFY IS TO DISQUALIFY THE ACCOMPANYING BID PROPOSAL.

_____
Legal Name of Firm

_____
Signature of Bidder

_____
Print or Type Name of Bidder

_____
Date

AFFIDAVIT OF NON-COLLUSION

I hereby swear (or affirm) under penalty for perjury:

1. That I am the bidder (if the bidder is an individual), a partner in the bid (if the bidder is a partnership), or an officer or employee of the bidding corporation having the authority to sign on behalf (if the bidder is a corporation);

2. That the attached bid or bids have been arrived at by the bidder independently, and have been submitted without collusion, and without any agreement, understanding, or planned common course of action with any other vendor of materials, supplies, equipment, or services described in the invitation to bid, designed to limit independent bidding or competition;

3. That the contents of the bid have not been communicated by the bidder or it's employees or agents to any person not an employee or agent of the bidder or it's surety or any bond furnished with the bid or bids, and will not be communicated to any such person prior to the official opening of the bid or bids; and

4. That I have fully informed myself regarding the accuracy of the statement made in the affidavit.

Firm Name: _____

Address: _____

Authorized by: _____

Signature: _____

Title: _____

Date: _____

Subscribed and sworn to me this _____ day of _____, 20___.

_____

Notary Public

My commission expires _____, 20___.

APPENDIX F
CITY OF HUNTSVILLE, ALABAMA
DETAILED FUNCTIONAL OBJECTIVES

NOT APPLICABLE

APPENDIX G
CITY OF HUNTSVILLE, ALABAMA
PROPOSAL PRICING FORM

Proposer shall acknowledge receipt of all addenda in the space provided on the Proposal Pricing Form below. Failure to acknowledge receipt of addenda shall not relieve Proposer of full responsibility for all requirements contained in addenda.

We acknowledge receipt of the following addenda: _____

PRICING MUST BE SUBMITTED IN A SEPARATE SEALED ENVELOPE

PLEASE REFER TO EXHIBIT B FOR PRICING FORM

APPENDIX H
CITY OF HUNTSVILLE, ALABAMA
PROPOSER INFORMATION & ACKNOWLEDGEMENTS

3.1 PROPOSER INFORMATION

Business Organization

Name of Proposer (exactly as it would appear on an agreement):

_____

Doing-Business-As Name of Proposer:

_____

Principal Office Address:

_____

_____

_____

Telephone Number: _____

Fax Number: _____

Form of Business Entity [check one ("X"]

Corporation ____
Partnership ____
Individual ____
Joint Venture ____
Other (describe): ____ _____

Corporation Statement

If a corporation, answer the following:

Date of incorporation: _____
Location of incorporation: _____
The corporation is held: Publicly ___ Privately ___

Names and titles of corporate officers:

_____

_____

_____

Partnership Statement

If a partnership, answer the following:

Date of organization: _____
Location of organization: _____
The partnership is: General ___ Limited ___

Name, address, and ownership share of each general partner owning more than five percent (5%) of the partnership:

_____

_____

_____

_____

Joint Venture Statement

If a Joint Venture, answer the following:

Date of organization: _____
Location of organization: _____
JV Agreement recorded? Yes ___ No ___

Name, address of each Joint Venturer and percent of ownership of each:

_____

_____

_____

_____

3.2 CITY OF HUNTSVILLE EMPLOYEE, MEMBER OF HOUSEHOLD OR BUSINESS ASSOCIATE

Code of Ala. 1975§36-25-11 requires that contracts entered into with a public official, a public employee, a member of the household of the public official or public employee, or a business with which a public official or public employee associates be filed with the Alabama Ethic Commission. If you are awarded the contract, and if you are a City employee, or if a member of your household is a City employee or public official, or if your business associates with a City employee or public official, you must comply with the provisions of Code al Ala. 1975§36-25-11.

City Employee Yes _____ No _____
If "Yes," Department _____

Member of Household City Employee Yes _____ No _____
If "Yes," Name (s) _____

Anyone associated with your
company a City Employee Yes _____ No _____
If "Yes," Name (s) _____

3.3 CONTRACTOR E-VERIFY – NOTICE

The Beason-Hammon Alabama Taxpayer and Citizen Protection Act, Act No. 2011-535, Code of Alabama (1975) § 31-13-1 through 31-13-30 (also known as and hereinafter referred to as " the Alabama Immigration Act") as amended by Act No. 2012-491 on May 16, 2012 is applicable to all competitively bid contracts with the City of Huntsville. As a condition for the award of a contract and as a term and condition of the contract with the City of Huntsville, in accordance with § 31-13-9 (a) of the Alabama Immigration Act, as amended, any business entity or employer that employs one or more employees shall not knowingly employ, hire for employment, or continue to employ an unauthorized alien within the State of Alabama.

During the performance of the contract, such business entity or employer shall participate in the E-Verify program and shall verify every employee that is required to be verified according to the applicable federal rules and regulations. The business entity or employer shall assure that these requirements are included in each subcontract in accordance with §31-13-9(c). Failure to comply with these requirements may result in breach of contract, termination of the contract or subcontract, and possibly suspension or revocation of business licenses and permits in accordance with §31-13-9 (e) (1) & (2).

Code of Alabama (1975) § 31-13-9 (k) requires that the following clause be included in all City of Huntsville contracts that have been competitively bid and is hereby made a part of this contract:

"By signing this contract the contracting parties affirm, for the duration of the agreement, that they will not violate federal immigration law or knowingly employ, hire for employment, or continue to employ an unauthorized alien within the State of Alabama. Furthermore, a contracting party found to be in violation of this provision shall be deemed in breach of the agreement and shall be responsible for all damages resulting therefrom."

3.4 ACKNOWLEDGEMENTS

I hereby certify that I have read and understand the City of Huntsville's General Terms and Conditions. I hereby certify that I agree to comply with all of the General Terms and Conditions of this RFP. I also understand that the General Terms & Conditions are standard and that any contradicting requirements of the RFP supercede.

I affirm that I have not been in any agreement or collusion among Proposers or prospective Proposers in restraint of freedom of competition.

In accordance with Alabama Act 2016-312 as adopted and approved on May 5, 2016, on behalf of the firm named below I do hereby certify and represent that this business is not currently engaged in, and will not engage in, the boycott of a person or an entity based in or doing business with a jurisdiction with which this state can enjoy open trade.

Upon award of this bid, I will not substitute any item on this bid under any circumstances.

I affirm that I understand and agrees that any form of electronic signature, including but not limited to signatures via facsimile, scanning, or electronic mail, may substitute for the original signature and shall have the same legal effect as the original signature.

_____
Signature of Proposer

_____
Print or Type Name of Proposer

_____
Date

_____
Legal Name of Firm

_____
Mailing Address

_____
City State Zip Code

_____
Phone Fax

_____
Email Address

_____
Website Address

APPENDIX I
MAILING LABELS

The below mailing labels are provided to assist you in submitting your Proposal and to insure proper identification of Proposal documents. Please cut out the label you desire for either the City's mailing or physical address, fill in the blanks, and affix to your envelope.

MAILING ADDRESS:

FROM: _____ _____ _____ IFB/RFP# _____ FOR _____ OPENING DATE _____ **2:00:00 PM local time** GC LICENSE # (If applicable) _____	**TO:** **THE CITY OF HUNTSVILLE** **PROCUREMENT SERVICES - 4th FLOOR** **P. O. BOX 308** **HUNTSVILLE, AL 35804**

PHYSICAL ADDRESS:

FROM: _____ _____ _____ IFB/RFP# _____ FOR _____ OPENING DATE _____ **2:00:00 PM local time** GC LICENSE # (If applicable) _____	**TO:** **THE CITY OF HUNTSVILLE** **PROCUREMENT SERVICES – 4TH FLOOR** **308 FOUNTAIN CIRCLE** **HUNTSVILLE, AL 35801**

APPENDIX J
REPORT OF OWNERSHIP FORM

CITY OF HUNTSVILLE, ALABAMA REPORT OF OWNERSHIP FORM

A. **General Information.** Please provide the following information:

- Legal name(s) (include "doing business as", if applicable): _____.

- City of Huntsville current taxpayer identification number (if available): _____.

(Please note that if this number has been assigned by the City and if you are renewing your business license, the number should be listed on the renewal form.)

B. **Type of Ownership**. Please complete the un-shaded portions of the following chart by checking the appropriate box below and entering the appropriate Entity I.D. Number, if applicable (for an explanation of what an entity number is, please see paragraph C below):

Type of Ownership ***(check appropriate box)***	**Entity I. D. Number & Applicable State**
❑ Individual or Sole Proprietorship	Not Applicable
❑ General Partnership	Not Applicable
❑ Limited Partnership (LP)	Number & State:
❑ Limited Liability Partnership (LLP)	Number & State:
❑ Limited Liability Company (LLC) (Single Member)	Number & State:
❑ LLC (Multi-Member)	Number & State:
❑ Corporation	Number & State:
❑ Other, please explain:	Number & State (if a filing entity under state law):

C. **Entity I.D. Numbers.** If an Entity I.D. Number is required and if the business entity is registered in this state, the number is available through the website of Alabama's Secretary of State at: www.sos.state.al.us/, under "Government Records". If a foreign entity is not registered in this state please provide the Entity I.D. number (or other similar number by whatever named called) assigned by the state of formation along with the name of the state.

D. **Formation Documents.** Please note that, with regard to entities, the entity's formation documents, including articles or certificates of incorporation, organization, or other applicable formation documents, as recorded in the probate records of the applicable county and state of formation, ***are not required unless***: (1) specifically requested by the City, or (2) an Entity I.D. Number is required and one has not been assigned or provided.

Please date and sign this form in the space provided below and either write legibly or type your name under your signature. If you are signing on behalf of an entity please insert your title as well.

Signature: _____ Title (if applicable): _____

Type or legibly write name: _____ Date: _____

APPENDIX K
CITY OF HUNTSVILLE, ALABAMA
DETAILED PROPOSER INFORMATION

Proposer must provide information to demonstrate its qualifications and experience in providing goods and services similar to those the City desires, and such information shall include the below. The City reserves the right to request and require additional information during its evaluation.

NOT APPLICABLE

Exhibit B - Pricing Schedule

City of Huntsville Parking and Public Transit
RFP – Bus Purchase

	All prices are to be in United States dollars
	Unit Price
Group A - 40' Diesel buses	$597,328.00
Manuals	Electronic PDF Included in Base
Training*	See GILLIG Training Pricing Page
Test equipment, maintenance, and repair tools. **	$14,117.00 per set
Delivery charges	$4,994.00
TOTAL PROPOSED PRICE (Group A + Manuals + Test Equipment + Delivery)	$616,439.00

Delivery Lead Time: 11 months

	All prices are to be in United States dollars
	Unit Price
Group B - 40'Hybrid/Diesel buses	$888,424.00
Manuals	Electronic PDF Included in Base
Training*	See GILLIG Training Pricing Page
Test equipment, maintenance, and repair tools. **	$81,966.00 per set
Delivery charges	$4,944.00
TOTAL PROPOSED PRICE (Group B + Manuals + Test Equipment + Delivery)	$975,334.00

Delivery Lead Time: 12 months

The contract (s) will be for one year, with two (2) one-year renewable options. The second- and third-year pricing will be based on the latest published preliminary index number prior to Notice of Exercise of Option/Index number on effective date of the contract. ADA equipment is to be included in the above price. The City of Huntsville is tax exempt and will provide the awarded proposer with a copy of the tax-exempt certificate at contract completion.

* Please provide a separate detailed cost of training. (i.e. number of hours, number of trainers, etc)

** Provide a separate sheet listing all test equipment, maintenance, and repair tools.

This form is to be completed and included in the Price Package.

This Price Form is hereby submitted by the undersigned:

GILLIG, LLC
Printed Legal Name of Bidder

Signature

William F. Fay, Jr., Vice President, Sales
Printed Name of Individual/Corporate Officer/ General Partner/Joint Venturer and Title

3/21/2024
Date

Exhibit B Cont. - Pricing Schedule

City of Huntsville Parking and Public Transit
RFP – Bus Purchase

	All prices are to be in United States dollars
	Unit Price
Group C - 35' Diesel buses	$593,128.00
Manuals	Electronic PDF Included in Base
Training*	See GILLIG Training Price Page
Test equipment, maintenance, and repair tools. **	$14,117.00
Delivery charges	$4,994.00
TOTAL PROPOSED PRICE(Group C + Manuals + Test Equipment + Delivery)	$612,239.00

Delivery Lead Time: 11 months

	All prices are to be in United States dollars
	Unit Price
Group D - 35'Hybrid/Diesel buses	$884,224.00
Manuals	Electronic PDF Included in Base
Training*	See GILLIG Training Price Page
Test equipment, maintenance, and repair tools. **	$81,966.00
Delivery charges	$4,994.00
TOTAL PROPOSED PRICE(Group D + Manuals + Test Equipment + Delivery)	$971,184.00

Delivery Lead Time: 12 months

The contract (s) will be for one year, with two (2) one-year renewable options. The **second- and third-year pricing will be based on the latest published preliminary index number prior to Notice of Exercise of Option/Index number on effective date of the contract. ADA equipment is to be** included in the above price. The City of Huntsville is tax exempt and will provide the awarded proposer with a copy of the tax-exempt certificate at contract completion.

* Please provide a separate detailed cost of training. (i.e. number of hours, number of trainers, etc)

* *Provide a separate sheet listing all test equipment, maintenance, and repair tools.

This form is to be completed and included in the Price Package.

This Price Form is hereby submitted by the undersigned:

GILLIG, LLC
Printed Legal Name of Bidder

Signature

William F. Fay, Jr., Vice President, Sales
Printed Name of Individual/Corporate Officer/ General Partner/Joint Venturer and Title

3/21/2024
Date

Exhibit B Cont - Pricing Schedule

City of Huntsville Parking and Public Transit
RFP – Bus Purchase

	All prices are to be in United States dollars
	Unit Price
Group E - 30' Diesel buses	$589,928.00
Manuals	Electronic PDF Included in Base
Training*	See GILLIG Training Price Page
Test equipment, maintenance, and repair tools. **	$14,117.00
Delivery charges	$4,994.00
TOTAL PROPOSED PRICE (Group E + Manuals + Test Equipment + Delivery)	$609,039.00

Delivery Lead Time: 11 months

	All prices are to be in United States dollars
	Unit Price
Group F - 30'Hybrid/Diesel buses	Not Available / No Bid
Manuals	- - - -
Training*	- - - -
Test equipment, maintenance, and repair tools. **	- - - -
Delivery charges	- - - -
TOTAL PROPOSED PRICE	- - - -

Delivery Lead Time: - - - -

The contract (s) will be for one year, with two (2) one-year renewable options. The second- and third-year pricing will be based on the latest published preliminary index number prior to Notice of Exercise of Option/Index number on effective date of the contract. ADA equipment is to be included in the above price. The City of Huntsville is tax exempt and will provide the awarded proposer with a copy of the tax-exempt certificate at contract completion.

* Please provide a separate detailed cost of training. (i.e. number of hours, number of trainers, etc)

* *Provide a separate sheet listing all test equipment, maintenance, and repair tools.

This form is to be completed and included in the Price Package.

This Price Form is hereby submitted by the undersigned:

GILLIG, LLC
Printed Legal Name of Bidder

Signature

William F. Fay, Jr., Vice President, Sales
Printed Name of Individual/Corporate Officer/ General Partner/Joint Venturer and Title

3/21/2024
Date