SFMTA-2025-22-FTA

Agreement

Appendix A, Item A1

Washington State Cooperative Purchasing Schedule Master Contract

No. 06719-01

Transit Buses: Heavy Duty, 35 Ft Diesel, 40 Ft Diesel, 60 Ft Diesel, 35 Ft Hybrid, 40 Ft Hybrid, 60 Ft Hybrid, 35 Ft CNG, 40 Ft CNG, 60 Ft CNG, 35 Ft Electric, 40 Ft Electric, 60 Ft Electric, 40 Ft Hydrogen, 60 Ft Hydrogen Categories For Use by Washington State Transit Bus Cooperative Participants By and Between State of Washington Department of Enterprise Services and New Flyer of America Inc.

WASHINGTON STATE TRANSIT BUS COOPERATIVE

STATE COOPERATIVE PURCHASING SCHEDULE

MASTER CONTRACT

NO. 06719-01

TRANSIT BUSES: HEAVY DUTY

35 FT DIESEL, 40 FT DIESEL, 60 FT DIESEL, 35 FT HYBRID, 40 FT HYBRID, 60 FT HYBRID, 35 FT CNG, 40 FT CNG, 60 FT CNG, 35 FT ELECTRIC, 40 FT ELECTRIC, 60 FT ELECTRIC, 40 FT HYDROGEN, 60 FT HYDROGEN CATEGORIES

For Use by Washington State Transit Bus Cooperative Participants

By and Between

STATE OF WASHINGTON

DEPARTMENT OF ENTERPRISE SERVICES

and

NEW FLYER OF AMERICA, INC.

Dated April 1, 2021

WASHINGTON STATE TRANSIT BUS COOPERATIVE

STATE COOPERATIVE PURCHASING SCHEDULE

MASTER CONTRACT

NO. 06719

TRANSIT BUS – HEAVY DUTY

35 FT DIESEL, 40 FT DIESEL, 60 FT DIESEL, 35 FT HYBRID, 40 FT HYBRID, 60 FT HYBRID, 35 FT CNG, 40 FT CNG, 60 FT CNG, 35 FT ELECTRIC, 40 FT ELECTRIC, 60 FT ELECTRIC, 40 FT HYDROGEN, 60 FT HYDROGEN CATEGORIES

This Master Contract ("Master Contract") is made and entered into by and between the State of Washington acting by and through the Department of Enterprise Services, a Washington State governmental agency ("Enterprise Services") and New Flyer of America Inc., a North Dakota corporation ("Contractor") and is dated and effective as of April 1, 2021.

RECITALS

A. Whereas, pursuant to Legislative direction codified in RCW chapter 39.26, Enterprise Services, on behalf of the State of Washington, is authorized to develop, solicit, and establish master contracts for goods and/or services for general use by Washington state agencies and certain other entities (eligible Participants).

B. Whereas, pursuant to RCW 39.26.060, Enterprise Services may develop, solicit, and establish cooperative purchasing agreements for procurement of any goods or services with one or more states, state agencies, local governments, local government agencies, federal agencies, or tribes located in the state, in accordance with an agreement entered into between the participants.

C. Whereas, pursuant to Section 3019 of the FAST Act, the State of Washington acting by and through Enterprise Services, may enter into a cooperative procurement contract with one or more vendors if the vendors agree to provide an option to purchase rolling stock and related equipment to such State government and any other participant and such State government acts throughout the term of the contract as the lead procurement agency.

D. The State of Washington, acting by and through Enterprise Services is a member of and the lead procurement for the Washington State Transit Bus Cooperative. The Washington State Transit Bus Cooperative is a cooperative purchasing agreement for eligible participants to procure transit buses through a competitively solicited and awarded Cooperative Master Contract.

E. Whereas, on behalf of the State of Washington, Enterprise Services, as part of a competitive governmental procurement, issued a Competitive Solicitation No. 06719-01 dated March 4, 2020 regarding Heavy Duty Transit Buses**.**

F. Whereas, Enterprise Services evaluated all responses to the Competitive Solicitation and identified Contractor as an apparent successful bidder.

G. Whereas, Enterprise Services has determined that entering into this Master Contract will meet the identified needs and be in the best interest of the State of Washington and the Washington State Transit Bus Cooperative.

H. Whereas, the purpose of this Master Contract is to enable eligible Participants to purchase Transit Buses as set forth herein.

AGREEMENT

NOW THEREFORE, in consideration of the mutual promises, covenants, and conditions set forth herein, the parties hereto hereby agree as follows:

1. TERM.

The term of this Master Contract is twenty-four (24) months, commencing April 1, 2021 and ending March 31, 2023; Provided, however, that Enterprise Services at is sole discretion may extend the term for three (3) subsequent twelve (12) month extensions if Contractor is not in default; and provided further, that in no event shall such term be extended if Contractor cannot meet the required certifications of this Contract. The maximum contract term is sixty (60) months, ending March 31, 2026.

2. ELIGIBLE PARTICIPANTS. This Master Contract may be utilized by any of the following types of entities ("Participants"):

2.1. WASHINGTON STATE AGENCIES. All Washington state agencies, departments, offices, divisions, boards, and commissions.

2.2. WASHINGTON STATE INSTITUTIONS OF HIGHER EDUCATION (COLLEGES). Any the following institutions of higher education in Washington:

- State universities – i.e., University of Washington & Washington State University;
- Regional universities – i.e., Central Washington University, Eastern Washington University, & Western Washington University
- Evergreen State College;
- Community colleges; and
- Technical colleges.

2.3. MCUA PARTIES. Any of the following types of entities that have executed a Master Contract Usage Agreement with Enterprise Services:

- Political subdivisions (e.g., counties, cities, school districts, public utility districts) in the State of Washington;
- Federal governmental agencies or entities;
- Public-benefit nonprofit corporations (i.e., § 501(c)(3) nonprofit corporations that receive federal, state, or local funding); and
- Federally-recognized Indian Tribes located in the State of Washington.

2.4. TRANSIT BUS COOPERATIVE PARTIES. Any authorized entity that has executed a Washington State Transit Bus Cooperative Purchasing Agreement with Enterprise Services. The following types of

entities are anticipated to execute a Washington State Transit Bus Cooperative Purchasing Agreement:

- State agencies, local governments, local government agencies, or political subdivisions (e.g., counties, cities, school districts, public utility districts, ports) of any state or territory of the United States;
- Federal governmental agencies or entities located in any state or territory of the United States; and
- Federally-recognized Indian Tribes located in any state or territory of the United States

3. SCOPE – INCLUDED GOODS AND PRICE.

3.1. CONTRACT SCOPE. Pursuant to this Master Contract, Contractor is authorized to sell only those Transit Buses within the scope of their authorized goods meeting the requirements set forth in *Exhibit A – Included Transit Buses* for the prices set forth in *Exhibit B – Prices*. Contractor shall not represent to any Participant under this Master Contract that Contractor has contractual authority to sell any Transit Buses beyond those meeting the requirements set forth in *Exhibit A – Included Transit Buses*.

3.2. STATE'S ABILITY TO MODIFY SCOPE OF MASTER CONTRACT. Subject to mutual agreement between the parties, Enterprise Services reserves the right to modify the goods included in this Master Contract; *Provided*, however, that any such modification shall be effective only upon thirty (30) days advance written notice; and *Provided further*, that any such modification must be within the scope of this Master Contract. Enterprise Services may, at any time, without notice to Contractor by written order designated or indicated to be a change order, make changes within the general scope of the contract to adjust the quantities of Transit Buses purchased under this Master Contract.

3.3. PARTICIPANT CHANGE ORDERS.

(a) Participants may, at any time, by written order designated or indicated to be a change order, make changes in their Purchase Order within the general scope of this Master Contract, including changes: (1) In the specifications; (2) In the method or manner of performance of the work; (3) In the price sheet to include additional options within the scope of the contract; (4) In the delivery performance of the work; or (5) In additional requirements for compliance with state or federal law.

(b) Any other written or oral order (which includes direction, instruction, interpretation, or determination) from the Participant that causes a change shall be treated as a change order under this clause; provided, that Contractor gives the Participant written notice stating (1) the date, circumstances, and source of the order and (2) that Contractor regards the order as a change order.

(c) Except as provided in this clause, no order, statement, or conduct of the Participant shall be treated as a change under this clause or entitle Contractor to an equitable adjustment.

(d) If any change under this clause causes an increase or decrease in Contractor's cost of, or the time required for, the performance of any part of the work under this Master Contract, whether or not changed by any such order, the Participant will make an equitable adjustment and modify the Purchase Order in writing. However, except for an adjustment based on defective specifications, no adjustment for any change under this clause shall be made for any costs incurred more than twenty (20) days before Contractor

gives written notice as required. In the case of defective specifications for which the Participant is responsible, the equitable adjustment shall include any increased cost reasonably incurred by the Contractor in attempting to comply with the defective specifications.

(e) Contractor will assist Participant in obtaining all of the requested cost details as may be required for FTA assisted purchases. Failure to respond or provide needed details may be grounds for the Participant to cancel the purchase without penalty.

(f) The Contractor must assert its right to an adjustment under this clause within 30 days after

1. receipt of a written change order under paragraph (a) of this clause or

2. the furnishing of a written notice under paragraph (b) of this clause, by submitting to the Contracting Officer a written statement describing the general nature and amount of proposal, unless this period is extended by the Participant. The statement of proposal for adjustment may be included in the notice under paragraph (b) above.

(g) No proposal by the Contractor for an equitable adjustment shall be allowed if asserted after final payment under this Master Contract.

(h) This clause does not supersede FTA Circular C 4220.1F.

3.4. ECONOMIC ADJUSTMENT. Beginning twelve (12) months after the effective date of this Master Contract and for every annual anniversary thereafter, the prices set forth in *Exhibit B* shall be adjusted, based upon the percent changes (whether up or down) in the United States Department of Labor, Bureau of Labor and Statistics (BLS) indices described below, for the most recent year. The Index is the Producer Price Index for Truck and Bus Bodies, Series No. WPU 1413, published by the United States Department of Labor, Bureau of Labor Statistics, or if such Index is no longer in use, then such replacement that is most comparable to the Index as may be designated by the Bureau of Labor Statistics, or as agreed by the parties. Economic adjustment will lag one (1) calendar quarter past the Master Contract commencement date to allow for publication of BLS data. All calculations for the index shall be based upon the latest version of data published as of April 1st each year. Prices shall be adjusted on June 1st. If an index is recoded, that is the replacement is a direct substitute according to the BLS, this Master Contract will instead use the recode. If an index becomes unavailable, Enterprise Services shall substitute a proxy index. If there is not a direct substitute, the next higher aggregate index available will be used. The economic adjustment shall be calculated as follows:

New Price = Old Price x (Current Period Index/Base Period Index).

For certainty, notwithstanding anything else to the contrary contained herein, in the event that a price adjustment is required in respect of changes that are mandatory as a result of legislation or regulations that become effective after the date of the tender submission, such price adjustment shall be negotiated in good faith by the Participants and the Contractor.

3.5. PRICE CEILING. Although Contractor may offer lower prices to Participants, during the term of this Master Contract, Contractor guarantees to provide the Heavy Duty Transit Buses at no greater than the prices set forth in *Exhibit B – Prices for Heavy Duty Transit Buses* (subject to economic adjustment as set forth herein).

3.6. GOODS AND SERVICES ADDITION. Contractor may offer new goods and services within the scope of the authorized goods set forth in *Exhibit A – Included Transit Buses* to Participants to implement new technology solutions or meet specific Participant requirements. Goods and services added to purchase orders under the Master Contract must be commercially available at the time they are added and fall within the original scope of the Master Contract.

3.7. PRICING OF GOODS AND SERVICE ADDITIONS. Prices for additional Transit Bus goods and services performed under this Master Contract follow cost reimbursement rules under 4220.1F Ch VI, 2.c(1). Cost-reimbursement provides for payment of Contractor's allowable incurred costs, to the extent agreed to in the Contractor's agreement with the Participant. Participants are required to include FAR Part 31 cost principles in their cost reimbursement contracts for the purpose of determining allowable costs under the contract. Contract shall comply with Participants' requests in determining reasonable prices, including but not limited to providing a breakdown of relevant incurred costs or individual component pricing to Participant upon request. A dispute on the reimbursement costs will follow the dispute procedures of this Master Contract.

3.8. MASTER CONTRACT INFORMATION. Enterprise Services shall maintain and provide information regarding this Master Contract, including scope and pricing, to eligible Participants.

4. CONTRACTOR REPRESENTATIONS AND WARRANTIES. Contractor makes each of the following representations and warranties as of the effective date of this Master Contract and at the time any order is placed pursuant to this Master Contract. If, at the time of any such order, Contractor cannot make such representations and warranties, Contractor shall not process any orders and shall, within three (3) business days notify Enterprise Services, in writing, of such breach.

4.1. QUALIFIED TO DO BUSINESS. Contractor represents and warrants that it is in good standing and qualified to do business in the State of Washington, that it is registered with the Washington State Department of Revenue and the Washington Secretary of State, that it possesses and shall keep current all required licenses and/or approvals, and that it is current, in full compliance, and has paid all applicable taxes owed to the State of Washington. Contractor represents and warrants that it is or will be qualified to do business in other applicable states for purchases under this Master Contract with each of the Washington State Transit Bus Cooperative member states, including but not limited to Alaska, Idaho, Oregon, Colorado, Montana, and Nevada.

4.2. SUSPENSION & DEBARMENT. Contractor represents and warrants that neither it nor its principals or affiliates presently are debarred, suspended, proposed for debarment, declared ineligible, or voluntarily excluded from participation in any governmental contract by any governmental department or agency within the United States.

4.3. QUALITY OF GOODS OR SERVICES. Contractor represents and warrants that any Transit Bus sold pursuant to this Master Contract shall be merchantable, shall conform to this Master Contract and Participant's Purchase Order, shall be fit and safe for the intended purposes, shall be free from defects in materials and workmanship, and shall be produced and delivered in full compliance with applicable law. Contractor further represents and warrants it has clear title to the goods and that the same shall be delivered free of liens and encumbrances and that the same do not infringe any third party patent. The rights and remedies of the parties under this warranty are in addition to any other rights and remedies of the parties provided by law or equity, including, without limitation, actual damages, and, as applicable and awarded under the law, to a prevailing party, reasonable attorneys' fees and costs. Whenever under the Master Contract or Purchase Order it is provided that Contractor shall furnish materials or manufactured components or shall do work for which no detailed specifications are set forth, the work

performed shall be in full conformity and harmony with the intent to secure the best standards of manufacture in the work as a whole or in part. No advantage shall be taken by Contractor in the omission of any part or detail which goes to make the Transit Buses complete and ready for service, even though such part or detail is not mentioned in the specifications or in Contractor's approved design.

4.4. EXECUTIVE ORDER 18-03 – WORKERS' RIGHTS (MANDATORY INDIVIDUAL ARBITRATION). Contractor represents and warrants, as previously certified in Contractor's bid submission, that Contractor does NOT require its employees, as a condition of employment, to sign or agree to mandatory individual arbitration clauses or class or collective action waivers. Contractor further represents and warrants that, during the term of this Contract, Contractor shall not, as a condition of employment, require its employees to sign or agree to mandatory individual arbitration clauses or class or collective action waivers.

4.5. OREGON REVISED STATUTE 279A.112. Contractor represents and warrants, as previously certified in Contractor's bid submission, that their firm has a written policy and practice preventing sexual harassment, sexual assault and discrimination against employees who are members of a protected class.

4.6. EMISSIONS INFORMATION. Contractor represents and warrants, as previously certified in Contractor's bid submission, that their firm has a written policy and practice to assess and provide accurate emission information on products to Participants.

4.7. SUSTAINABILITY POLICY. Contractor represents and warrants, as previously certified in Contractor's bid submission, that their firm has a written policy and practice, detailing own sustainability policies and programs in place and to provide services in line with the principles established therein.

4.8. PROCUREMENT ETHICS & PROHIBITION ON GIFTS. Contractor represents and warrants that it complies fully with all applicable procurement ethics restrictions including, but not limited to, restrictions against Contractor providing gifts or anything of economic value, directly or indirectly, to Participants' employees.

4.9. WASHINGTON'S ELECTRONIC BUSINESS SOLUTION (WEBS). Contractor represents and warrants that it is registered in Washington's Electronic Business Solution (WEBS), Washington's contract registration system and that, all of its information therein is current and accurate and that throughout the term of this Master Contract, Contractor shall maintain an accurate profile in WEBS.

4.10. STATEWIDE PAYEE DESK. Contractor represents and warrants that it is registered with the Statewide Payee Desk, which registration is a condition to payment.

4.11. COOPERATIVE MASTER CONTRACT PROMOTION; ADVERTISING AND ENDORSEMENT. Contractor represents and warrants that it shall use commercially reasonable efforts both to promote and market the use of this Master Contract with eligible Participants and to ensure that those entities that utilize this Master Contract are eligible Participants. Contractor understands and acknowledges that neither Enterprise Services nor Participants are endorsing Contractor's goods and/or services or suggesting that such goods and/or services are the best or only solution to their needs. Accordingly, Contractor represents and warrants that it shall make no reference to Enterprise Services, any Participant, or the State of Washington in any promotional material without the prior written consent of Enterprise Services.

4.12. MASTER CONTRACT TRANSITION. Contractor represents and warrants that, in the event this Master Contract or a similar contract resulting from the Cooperative, is transitioned to another contractor (e.g., Master Contract expiration or termination), Contractor shall use commercially reasonable efforts to assist Enterprise Services for a period of sixty (60) days to effectuate a smooth transition to another contractor to minimize disruption of service and/or costs to the State of Washington.

4.13. VEHICLE TITLE & REGISTRATION. Contractor represents and warrants that upon payment in full, Contractor shall convey to Participant all necessary paperwork, including a "manufacturer's statement of origin" (MSO) and applicable state title application to register the Transit Bus with the Participant's applicable state licensing authority at the time of acceptance. Title to the bus shall pass to the Participant upon acceptance of the bus by the Participant.

4.14. WAGE VIOLATIONS. Contractor represents and warrants that, during the term of this Master Contract and the three (3) year period immediately preceding the award of the Master Contract, it is not determined, by a final and binding citation and notice of assessment issued by the Washington Department of Labor and Industries or through a civil judgment entered by a court of limited or general jurisdiction, to be in willful violation of any provision of Washington state wage laws set forth in RCW chapters 49.46, 49.48, or 49.52.

4.15. PAY EQUITY. Contractor represents and warrants that, among its workers, similarly employed individuals are compensated as equals. For purposes of this provision, employees are similarly employed if the individuals work for the same employer, the performance of the job requires comparable skill, effort, and responsibility, and the jobs are performed under similar working conditions. Job titles alone are not determinative of whether employees are similarly employed. Contractor may allow differentials in compensation for its workers based in good faith on any of the following: a seniority system; a merit system; a system that measures earnings by quantity or quality of production; a bona fide job-related factor or factors; or a bona fide regional difference in compensation levels. A bona fide job-related factor or factors may include, but not be limited to, education, training, or experience that is: consistent with business necessity; not based on or derived from a gender-based differential; and accounts for the entire differential. A bona fide regional difference in compensation level must be consistent with business necessity; not based on or derived from a gender-based differential; and account for the entire differential. Notwithstanding any provision to the contrary, upon breach of warranty and Contractor's failure to provide satisfactory evidence of compliance within thirty (30) days, Enterprise Services may suspend or terminate this Master Contract and any Participant hereunder similarly may suspend or terminate its use of the Master Contract and/or any agreement entered into pursuant to this Master Contract.

4.16. SUBJECT DATA. All "subject data", including specifications, technical data, records and reports, engineering drawings (including shop drawings and working drawings), manuals and instruction materials and computer or microprocessor software that is delivered or specified to be delivered under this contract shall remain the property of the Contractor; provided however, the Participants shall have a royalty-free, non-exclusive, non-transferable and irrevocable license to use such subject data only for the purposes of operating and maintaining the Transit Buses. The Participants grant the Contractor the right to inspect, examine, download, and otherwise obtain any information or data available from components provided by the Contractor, including, but not limited to, any electronic control modules or other data-collection devices, to the extent necessary to enable the Contractor to perform reliability maintenance analysis, corrective action and/or other engineering-type work for the Transit Buses.

5. USING THE MASTER CONTRACT – PURCHASES.

5.1. ORDERING REQUIREMENTS. Participants shall order Transit Buses from this Master Contract, consistent with the terms hereof and by using any ordering mechanism agreeable both to Contractor and Participant but, at a minimum, including the use of a purchase order. When practicable, Contractor and Participant also shall use telephone orders, email orders, web-based orders, and similar procurement methods (collectively "Purchase Order"). All order documents must reference the Master Contract number. Consistent with Participant's procurement authority, Participant may propose and negotiate additional terms with the applicable Contractor to meet Participant's needs, subject to agreement with the applicable Contractor. Under no circumstances will Participant's agreements change or modify the contract obligations of this Master Contract. The terms of this Master Contract shall apply to any Purchase Order and, in the event of any conflict, the terms of this Master Contract shall prevail. Notwithstanding any provision to the contrary, in no event shall any 'click-agreement,' software or web-based application terms and conditions, or other agreement modify the terms and conditions of this Master Contract.

5.2. APPROVAL OF PURCHASES. Enterprise Services and, if the Participant is using FTA funds, the Participant's respective authorization authority for use of those FTA funds shall approve the Participant's initial Purchase Order. Enterprise Services shall review the Purchase Order and approve that the purchase is within the Scope of the Master Contract. The Participant's respective authorization authority for use of those FTA funds will approve the purchase according to their own policies and procedures. Participant and Contractor shall provide timely information as requested by Enterprise Services for the approval process.

5.3. CONTRACTOR COOPERATIVE USE APPROVAL. Pursuant to RCW 39.26.060, the intent of this Contract is to allow for cooperative procurement to the maximum extent possible. Accordingly, any authorized entity that has executed a Washington State Transit Bus Cooperative Purchasing Agreement with Enterprise Services may place orders under this Master Contract. Participation in the cooperative is voluntary. If agreed to by Contractor, this Contract may be used by any participant in the cooperative to procure the Transit Buses. Contractor has the right to refuse initial orders by cooperative participants on a capacity basis, if the Contractor cannot fulfill the complete order based on delivery deadlines. Orders under this Contract will be fulfilled on a first come, first serve basis of the initial order date. If Contractor rejects an order for capacity, Enterprise Services may request additional information from the Contract regarding Contractor's capacity to fulfill orders.

5.4. FTA PRE-AWARD AND POST-DELIVERY CERTIFICATIONS. Contractor shall take all reasonable steps assist Participants in completing all required pre-award and post-delivery certifications required by federal or state law or policy for purchases under this Master Contract. Contractor shall provide all requested information to complete the certifications in a reasonable time to ensure certifications are completed in a timely manner.

5.5. DELIVERY REQUIREMENTS. Contractor must ensure that delivery of Transit Buses will be made as required by this Master Contract, the Purchase Order used by Participants, or as otherwise mutually agreed in writing between the Participant and Contractor. The following apply to all deliveries:

(a) Contractor shall make all deliveries to the applicable delivery location specified in the Purchase Order by the delivery date. The delivery date must be within 18 months of the initial order date, as stated in the Purchaser Order or agreement between Participant and

Contractor; provided however that the Participant and Contractor may amend the delivery date by mutual agreement. Deliveries shall occur during Participant's normal work hours and within the time period mutually agreed in writing between Participant and Contractor at the time of order placement.

(b) Contractor shall deliver all buses with a full tank of fuel and clean inside and out. For any bus not meeting this requirement, Contractor will be assessed $300. When Transit Buses are delivered, certificates or releases signed by Participant simply acknowledge receipt of the Transit Buses and do not constitute acceptance by the Participant of the condition of the Transit Buses, or its conformance with the terms of the Master Contract or Participant's Purchase Order. Acceptance by Participant occurs subsequent to final inspection when Participant provides Contractor with a written Notice of Acceptance.

(c) Contractor shall ship or deliver all goods and/or services purchased pursuant to this Master Contract, freight charges prepaid by Contractor, FOB Participant's specified destination with all transportation and handling charges included. Contractor shall bear all risk of loss, damage, or destruction of the goods and/or services ordered hereunder that occurs prior to delivery, except loss or damage attributable to Participant's negligence. Contractor shall use a qualified and experienced common or contract carrier who is properly licensed and insured. Contractor shall make all arrangements for shipment.

(d) All packing lists, packages, instruction manuals, correspondence, shipping notices, shipping containers, and other written materials associated with this Master Contract shall be identified by the Master Contract number set forth on the cover of this Master Contract and the applicable Participant's Purchase Order number. Packing lists shall be included with each shipment and clearly identify all contents and any backorders.

5.6. PROTOTYPE BUSES. If requested by Participant, Contractor shall produce one prototype bus for each type of bus with respect to the Purchase Order for inspection and testing at the Participant's facilities. The prototype bus will demonstrate that the bus fully meets all requirements of the Purchase Order. Contractor shall produce and deliver the prototype bus to Participant for inspection and testing a minimum of one-hundred twenty (120) days prior to initiation of any production activities for the remaining buses unless otherwise authorized in writing by Participant. The cost of transporting the prototype bus to and from the Participant's facilities shall be at the expense of Contractor. Contractor shall schedule the prototype review with the Participant when a vehicle has been completed with all equipment and furnishings installed, but early enough so design changes resulting from the review will not delay production or cause scrapping of production material.

In the event of nonconformity Participant shall, to the extent practicable, notify Contractor of said nonconformity. No later than seven (7) days after the end of the fourteen (14) day test, Participant shall issue a written report to the Contractor that advises the Contractor of any noncompliance issues and/or any proposed modifications or changes required on the remaining vehicles. Any failure by Participant to detect any defects or omissions in this testing period will in no way relieve Contractor from fully complying with the specifications of the Master Contract and Participant Order. All prototype buses shall be brought up to the final production bus configuration in all respects at no additional cost to Participant, except as may be agreed by change orders.

5.7. NOTIFICATION OF DELAY. Contractor shall provide prompt notice to Participant and Enterprise Services for any delay in the manufacturing process that will affect the expected delivery date. Contractor will provide notice of the delay within fourteen (14) days of discovery of the potential delay. This notice of delay must include a reasonable expectation of when the delay will be resolved, the reason for the delay, whether the delay will cause the delivery to exceed the delivery date, and any other applicable information regarding the delay.

- Participant shall provide Contractor with notice of acceptance of the reasonable delay or notice that the delay is determined to be non-excusable within seven (7) days of receipt of the notice of delay.
- If there is a dispute between Contractor and Participant as to whether the delay is reasonable, Contractor may appeal Participant's decision to Enterprise Services within seven (7) days of receipt of the notice that the delay is non-excusable. Enterprise Services will review the provided information and make a final determination as to whether the delay is reasonable or non-excusable. If a dispute remains after this procedure, parties shall follow the dispute resolution process of Section 16.
- Contractor shall promptly comply with any request from Enterprise Services or Participant for additional information in making the delay determination. A request for more information from Enterprise Services or Participant tolls the time for required response until the time that Contractor responds to the request for more information.
- Reasonable delay is a delay for which the Contractor is not responsible. A reasonable delay must arise from unforeseeable causes, be beyond the control of Contractor, and be without the fault of the Contractor. A reasonable delay will extend the delivery date by the agreed upon length of the delay. For certainty, the reasons for such reasonable delay shall include but not be limited to, the neglect or failure of the Participant or by delay or failure of the Contractor caused by an event beyond its control, including, but not limited to, natural disasters, floods, fires, acts of war or terrorism, labor shortages, strikes or lock-outs or shortages or loss of transportation, then the time for completion of the work and/or the delivery dates shall be extended by the Participant by a reasonable period of time after such event of delay has ended in order that the Contractor may complete the work or deliver the buses.
- Non-excusable delay is a delay for which Contractor is wholly or partially responsible. A non-excusable delay is a delay that arises from a foreseeable cause, is within the control of Contractor, or is due to the fault of Contractor. A non-excusable delay will not extend the agreed upon delivery date.

5.8. DELAY DAMAGES. Participant will be damaged by any failure on the part of Contractor to deliver the buses within the time specified in delivery date. The amount of damages for delay of beyond the delivery date is difficult if not impossible to ascertain. The amount of such damages Contractor shall pay to Participant is fixed at the amount of $250.00 per day for each bus not delivered in substantially good condition as inspected by the Participant. Participant may elect to deduct the amount of the damages from the amount due to Contractor under the Purchase Order or may notify Contractor of the amount due based on the delay. If Participant requires Contractor to pay the delay damages, Contractor shall pay the entire amount within thirty (30) days after receipt of a written demand by Participant. The payment of damages will be in lieu of any damages for any loss of profit, loss of revenue, loss of use, or for any other direct, indirect, special or consequential losses or damages of any kind that may be suffered by Participant arising at any time from the failure of Contractor to fulfill the delivery obligations in a timely manner.

5.9. INSPECTION AND ACCEPTANCE OF TRANSIT BUSES. Transit Buses purchased under this Master Contract are subject to Participant's reasonable inspection, testing, and approval at Participant's destination for a period of fourteen (14) days from the date that the Transit Buses are received at the place of delivery. Participant reserves the right to reject and refuse acceptance of Transit Buses that are not in accordance with this Master Contract and the Participant's Purchase Order during this inspection period. Representatives of Contractor may witness acceptance inspections and testing if so requested by Contractor. Participant retains the right to complete as thorough an inspection as it deems necessary to determine if each bus is in conformance with Master Contract and Purchase Orders requirements for configuration and performance parameters. Contractor shall coordinate and manage Contractor's post-delivery inspection process and notify the Participant of scheduling and availability of buses ready for pre-acceptance inspection. Acceptance by the Participant occurs when Participant provides Contractor with a written Notice of Acceptance, which will be subsequent to final inspection by responsible assigned employees of the Participant. All acceptances are subject to the warranty requirements of this Master Contract. For certainty, if the Transit Buses pass these tests or if the Participants do not notify the Contractor of non-acceptance within 14 calendar days after delivery of the Transit Buses, acceptance of the Transit Buses by the Participants shall be deemed to have occurred on the 14th day after delivery. Acceptance shall occur earlier if the Participants notify the Contractor of early acceptance or places the Transit Buses into revenue service.

5.10. INSPECTION DEFECTS. If there are any apparent defects in the goods and/or services within the inspection period, Participant will promptly notify Contractor. At Participant's option, and without limiting any other rights, Participant may:

- Require Contractor to repair or replace, at Contractor's expense, any or all of the damaged goods; or
- Require Contractor to refund the price of any or all of the damaged goods; or
- Participant may note any damage to the goods on the receiving report, decline acceptance, and deduct the cost of rejected goods from final payment.

Payment for any goods under such Purchase Order shall not be deemed acceptance of the goods. If Participant discovers defects during the inspection process, the requirement for timely delivery under 6.2(a) will continue to run until Contractor resolves the defects and provides Participant with the applicable goods free of defects. The period for the delivery date for the goods will be tolled for the length of time Participant was in the inspection period until the time that Participant provided notice of defect to Contractor.

5.11. POST-INSPECTION REPAIR BY CONTRACTOR. In the event of non-acceptance of the bus, Contractor must begin Work within five (5) working days after receiving notification from Participant of failure of acceptance tests. Participant shall make the bus available to complete repairs timely with the Contractor repair schedule. If Contractor fails or refuses to begin the repairs within five (5) days, then the repair work may be done by Participant's personnel with reimbursement by Contractor. Contractor shall provide, at its own expense, all spare parts, tools and space required to complete the repairs. At Participant's option, Contractor may be required to remove the bus from Participant's property while repairs are being made. If the bus is removed from Participant's property, then repair procedures must be diligently pursued by Contractor's representatives, and Contractor shall assume risk of loss while the bus is under its control. Upon completion of repairs, the forteen (14) calendar day acceptance period shall re-commence as per section 5.9.

5.12. CONTRACTOR SERVICE AND PARTS SUPPORT. For each Participant Order, Contractor shall supply Participant with a completed *Exhibit D - Contractor Service and Parts Support Data* with contact information on the representatives responsible for assisting Participant, as well as the location of the nearest distribution center, which shall furnish a complete supply of parts and components for the repair and maintenance of the buses to be supplied. Contractor shall also submit its policy on transportation charges for parts other than those covered by warranty.

5.13. PARTS AVAILABILITY GUARANTEE. Contractor guarantees to provide the spare parts, software, and all equipment necessary to maintain and repair the buses supplied under this Master Contract for a period of at least twelve (12) years after the date of acceptance. Parts will be interchangeable with the original equipment and will be manufactured in accordance with the quality assurance provisions of this Master Contract. Prices shall not exceed the Contractor's then-current published catalog prices.

Where the parts ordered by the Participant are not received within two (2) working days of the agreed-upon time and date and a bus procured under this Master Contract is out of service due to the lack of said ordered parts, then the Contractor shall provide the Participant, within eight (8) hours of the Participant's verbal or written request, the original suppliers' and/or manufacturers' parts numbers, company names, addresses, telephone numbers and contact persons' names for all of the specific parts not received by the Participant.

In the event Contractor fails to honor this parts guarantee or parts ordered by the Participant are not received within thirty (30) days of the agreed-upon delivery date, then Contractor shall provide to Participant, within seven (7) days of the Agency's verbal or written request, the design and manufacturing documentation for those parts manufactured by the Contractor and the original suppliers' and/or manufacturers' parts numbers, company names, addresses, telephone numbers and contact persons' names for all of the specific parts not received by the Participant. Contractor's design and manufacturing documentation provided to the Participant shall be for its sole use in regard to the buses procured under this Master Contract and for no other purpose.

5.14. TERMINATION FOR WITHDRAWAL OF FUNDING. If any Participant's expected or actual funding for purchases under this Master Contract are withdrawn, reduced, or limited in any way prior to the payment for the last bus accepted, Participant may, upon written notice to Contractor, terminate their Purchase Order for Transit Buses not yet accepted. If the Purchase Order is terminated as provided in this subsection: (1) Participant will be liable only for payment in accordance with the terms of this Contract for work performed satisfactorily up to the date of termination and materials on order that cannot be canceled; and (2) Contractor shall be released from any obligation to provide additional buses as are affected by the termination. The Contractor shall be paid its costs, including contract close-out costs, and profit on work performed up to the time of termination

5.15. FACILITY INSPECTIONS. Contractor shall provide right of access to its facilities to Enterprise Services, any Enterprise Services agents, Participant, any of Participants agents, or to any other authorized agent or official of the state of Washington or the federal government, at all reasonable times, in order to monitor and evaluate performance, compliance, and/or quality assurance under this Contract.

5.16. ON SITE REQUIREMENTS. While on Participant's premises, Contractor, its agents, employees, or subcontractors shall comply, in all respects, with Participant's physical, fire, access, safety, or other security requirements.

6. INVOICING & PAYMENT.

6.1. CONTRACTOR INVOICE. Contractor shall submit to Participant's designated invoicing contact properly itemized invoices. Such invoices shall itemize the following:

(a) Master Contract No. 06719

(b) Contractor name, address, telephone number, and email address for billing issues (i.e., Contractor Customer Service Representative)

(c) Contractor's Federal Tax Identification Number

(d) Date(s) of delivery

(e) Invoice amount; and

(f) Payment terms, including any available prompt payment discounts.

Contractor's invoices for payment shall reflect accurate Master Contract prices. Invoices will not be processed for payment until receipt of a complete invoice as specified herein.

6.2. PAYMENT. Payment is the sole responsibility of, and will be made by, the Participant. Payment is due within thirty (30) days of invoice. If Participant fails to make timely payment(s), Contractor may invoice Participant in the amount of one percent (1%) per month on the amount overdue or a minimum of $1. Payment will not be considered late if a check or warrant is mailed within the time specified. Contractor provides a prompt payment discount of 0.2192% for payments within 10 days of receipt of the invoice. This discount will only be provided for Participant payments within the stated time.

6.3. MILESTONE PAYMENTS. Participant and Contractor may condition payment on the achievement of various agreed upon milestones for the Transit Buses. Milestone payments will be mutually agreed upon by Participant and Contractor in regard to timing of milestone, acceptance of milestone, and amounts for milestone payments. Payment for milestones will follow the procedure for invoice payment.

6.4. OVERPAYMENTS. Contractor promptly shall refund to Participant the full amount of any erroneous payment or overpayment. Such refunds shall occur within thirty (30) days of written notice to Contractor; *Provided*, however, that Participant shall have the right to elect to have either direct payments or written credit memos issued. If Contractor fails to make timely payment(s) or issuance of such credit memos, Participant may impose a one percent (1%) per month on the amount overdue thirty (30) days after notice to the Contractor.

6.5. NO ADVANCE PAYMENT. No advance payments shall be made for any goods or services furnished by Contractor pursuant to this Master Contract.

6.6. NO ADDITIONAL CHARGES. Unless otherwise specified herein, Contractor shall not include or impose any additional charges including, but not limited to, charges for shipping, handling, or payment processing.

6.7. TAXES/FEES. Contractor promptly shall pay all applicable taxes on its operations and activities pertaining to this Master Contract. Failure to do so shall constitute breach of this Master Contract. Unless otherwise agreed, Participant shall pay applicable sales tax imposed by the tax jurisdictions in which delivery occurs on purchased goods and/or services. Contractor, however, shall not make any charge for federal excise taxes and Participant agrees to furnish Contractor with an exemption certificate where appropriate.

7. CONTRACT MANAGEMENT.

7.1. CONTRACT ADMINISTRATION & NOTICES. Except for legal notices, the parties hereby designate the following contract administrators as the respective single points of contact for purposes of this Master Contract. Enterprise Services' contract administrator shall provide Master Contract oversight. Contractor's contract administrator shall be Contractor's principal contact for business activities under this Master Contract. The parties may change contractor administrators by written notice as set forth below.

Any notices required or desired shall be in writing and sent by U.S. mail, postage prepaid, or sent via email, and shall be sent to the respective addressee at the respective address or email address set forth below or to such other address or email address as the parties may specify in writing:

Enterprise Services	**Contractor**
Attn: David Mgebroff Washington Dept. of Enterprise Services PO Box 41411 Olympia, WA 98504-1411	Attn:
Tel: (360) 407-8049	Tel:
Email: david.mgebroff@des.wa.gov	Email:

Notices shall be deemed effective upon the earlier of receipt, if mailed, or, if emailed, upon transmission to the designated email address of said addressee.

7.2. CONTRACTOR CUSTOMER SERVICE REPRESENTATIVE. Contractor shall designate a customer service representative (and inform Enterprise Services of the same) who shall be responsible for addressing Participant issues pertaining to this Master Contract.

7.3. LEGAL NOTICES. Any legal notices required or desired shall be in writing and delivered by U.S. certified mail, return receipt requested, postage prepaid, or sent via email, and shall be sent to the respective addressee at the respective address or email address set forth below or to such other address or email address as the parties may specify in writing:

Enterprise Services	**Contractor**
Attn: Legal Services Manager Washington Dept. of Enterprise Services PO Box 41411 Olympia, WA 98504-1411	Attn:
Email: greg.tolbert@des.wa.gov	Email:

Notices shall be deemed effective upon the earlier of receipt when delivered, or, if mailed, upon return receipt, or, if emailed, upon transmission to the designated email address of said addressee.

8. CONTRACTOR SALES REPORTING; VENDOR MANAGEMENT FEE; & CONTRACTOR REPORTS.

8.1. MASTER CONTRACT SALES REPORTING. Contractor shall report total Master Contract sales quarterly to Enterprise Services, as set forth below.

(a) Master Contract Sales Reporting System. Contractor shall report quarterly Master Contract sales in Enterprise Services' Master Contract Sales Reporting System. Enterprise Services will provide Contractor with a login password and a vendor

number. The password and vendor number will be provided to the Sales Reporting Representative(s) listed on Contractor's Bidder Profile.

(b) Data. Each sales report must identify every authorized Participant by name as it is known to Enterprise Services and its total combined sales amount invoiced during the reporting period (i.e., sales of an entire agency or political subdivision, not its individual subsections). The "Miscellaneous" option may be used only with prior approval by Enterprise Services. Upon request, Contractor shall provide contact information for all authorized Participants specified herein during the term of the Master Contract. If there are no Master Contract sales during the reporting period, Contractor must report zero sales.

(c) Due dates for Master Contract Sales Reporting. Quarterly Master Contract Sales Reports must be submitted electronically by the following deadlines for all sales invoiced during the applicable calendar quarter:

FOR CALENDAR QUARTER ENDING	MASTER CONTRACT SALES REPORT DUE
March 31:	April 30
June 30:	July 31
September 30:	October 31
December 31:	January 31

8.2. VENDOR MANAGEMENT FEE. Contractor shall pay to Enterprise Services a vendor management fee ("VMF") of 0.15 percent on the purchase price for all Master Contract sales (the purchase price is the total invoice price less applicable sales tax).

(a) The sum owed by Contractor to Enterprise Services as a result of the VMF is calculated as follows:

> Amount owed to Enterprise Services = Total Master Contract sales invoiced (not including sales tax) x .00150.

(b) The VMF must be rolled into Contractor's current pricing. The VMF must not be shown as a separate line item on any invoice unless specifically requested and approved by Enterprise Services.

(c) Enterprise Services will invoice Contractor quarterly based on Master Contract sales reported by Contractor. Contractors are not to remit payment until they receive an invoice from Enterprise Services. Contractor's VMF payment to Enterprise Services must reference this Master Contract number, work request number (if applicable), the year and quarter for which the VMF is being remitted, and the Contractor's name as set forth in this Master Contract, if not already included on the face of the check.

(d) Failure to accurately report total net sales, to submit a timely usage report, or remit timely payment of the VMF, may be cause for Master Contract suspension or termination or the exercise of other remedies provided by law. Without limiting any other available remedies, the Parties agree that Contractor's failure to remit to Enterprise Services timely payment of the VMF shall obligate Contractor to pay to Enterprise Services, to offset the administrative and transaction costs incurred by the

State to identify, process, and collect such sum, the sum of $200.00 or twenty-five percent (25%) of the outstanding amount, whichever is greater, or the maximum allowed by law, if less.

(e) Enterprise Services reserves the right, upon thirty (30) days advance written notice, to increase, reduce, or eliminate the VMF for subsequent purchases, and reserves the right to renegotiate Master Contract pricing with Contractor when any subsequent adjustment of the VMF might justify a change in pricing.

8.3. ANNUAL MASTER CONTRACT SALES REPORT. Contractor shall provide to Enterprise Services a detailed annual Master Contract sales report. Such report shall include, at a minimum: Product description, part number or other Product identifier, per unit quantities sold, and Master Contract price. This report must be provided in an electronic format that can be read by MS Excel.

9. RECORDS RETENTION & AUDITS.

9.1. RECORDS RETENTION. Contractor shall maintain books, records, documents, and other evidence pertaining to this Master Contract and orders placed by Participants under it to the extent and in such detail as shall adequately reflect performance and administration of payments and fees. Contractor shall retain such records for a period of six (6) years following expiration or termination of this Master Contract or final payment for any order placed by a Participant against this Master Contract, whichever is later; *Provided*, however, that if any litigation, claim, or audit is commenced prior to the expiration of this period, such period shall extend until all such litigation, claims, or audits have been resolved.

9.2. AUDIT. Enterprise Services reserves the right to audit, or have a designated third party audit, applicable records to ensure that Contractor has properly invoiced Participants and that Contractor has paid all applicable contract management fees. Accordingly, Contractor shall permit Enterprise Services, any Participant, and any other duly authorized agent of a governmental agency, to audit, inspect, examine, copy and/or transcribe Contractor's books, documents, papers and records directly pertinent to this Master Contract or orders placed by a Participant under it for the purpose of making audits, examinations, excerpts, and transcriptions. This right shall survive for a period of six (6) years following expiration or termination of this Master Contract or final payment for any order placed by a Participant against this Master Contract, whichever is later; *Provided*, however, that if any litigation, claim, or audit is commenced prior to the expiration of this period, such period shall extend until all such litigation, claims, or audits have been resolved. The Participants and their representatives and agents agree to enter into a confidentiality agreement with the Contractor prior to commencing an audit, review or analysis in order to protect and maintain the confidentiality of the Contractor's information.

9.3. OVERPAYMENT OF PURCHASES OR UNDERPAYMENT OF FEES. Without limiting any other remedy available to any Participant, Contractor shall (a) reimburse Participants for any overpayments inconsistent with the terms of this Master Contract or orders, at a rate of 125% of such overpayments, found as a result of the examination of the Contractor's records; and (b) reimburse Enterprise Services for any underpayment of fees, at a rate of 125% of such fees found as a result of the examination of the Contractor's records (e.g., if Contractor underpays the Vendor Management Fee by $500, Contractor would be required to pay to Enterprise Services $500 x 1.25 = $625).

10. INSURANCE.

10.1. REQUIRED INSURANCE. During the Term of this Master Contract, Contractor, at its expense, shall maintain in full force and effect the insurance coverages set forth in *Exhibit C – Insurance Requirements*. All costs for insurance, including any payments of deductible amounts, shall be considered incidental to and included in the prices for goods/services and no additional payment shall be made.

10.2. WORKERS COMPENSATION. Contractor shall comply with applicable workers compensation statutes and regulations (e.g., RCW Title 51, Industrial Insurance). If Contractor fails to provide industrial insurance coverage or fails to pay premiums or penalties on behalf of its employees as may be required by law, Enterprise Services may terminate this Master Contract. This provision does not waive any of the Washington State Department of Labor and Industries (L&I) rights to collect from Contractor. In addition, Contractor waives its immunity under RCW Title 51 to the extent it is required to indemnify, defend, and hold harmless the State of Washington and its agencies, officials, agents, or employees.

11. WARRANTY.

11.1. CONTRACTOR WARRANTY. Warranties in this document are in addition to any statutory remedies or warranties imposed on Contractor. Consistent with this requirement, Contractor warrants and guarantees to Participant each complete Transit Bus and specific subsystems and components as follows.

Contractor warrants the Transit Buses are of good material and workmanship and agrees to promptly replace any part or parts, at no cost to the Participant, which by reason of defective materials or workmanship fail under normal use, free of negligence or accident during the applicable warranty period. Contractor warranties include the replacement of parts and services associated with the replacement and repair, including but not limited to any diagnostic, refurbishment, shipping, or travel costs.

Performance requirements based on design criteria will not be deemed a warranty item. Contractor shall insure in its procurement arrangements that the warranty requirements of this Master Contract are enforceable through and against the Contractor's suppliers, vendors, material men, and subcontractors. Any inconsistency or difference between the warranties extended to Participants by Contractor and those extended to Contractor by its suppliers, vendors, material men, and subcontractors, are at the risk and expense of Contractor. Such inconsistency or difference will not excuse Contractor's full compliance with its obligations under this Contract.

11.2. WARRANTY INFORMATION. Upon Participant's request, Contractor promptly shall provide complete copies of all written warranties or guarantees and documentation of any other arrangement relating to such warranties or guarantees extended by Contractor's suppliers, sub-suppliers, vendors, material men, and subcontractors covering parts, components, and systems utilized in the bus. Contractor shall ensure that such suppliers, sub-suppliers, vendors, material men, and subcontractors satisfactorily perform warranty related work when requested to do so by Participant.

11.3. SYSTEM WARRANTIES. The following systems are warranted to be free from defects and related defects for the years and mileage listed in the table below, whichever comes first. Each warranty is based on regular operation of the bus under the operating conditions prevailing in Participant's locale.

Warranty	Description	Years/Mileage
Complete Bus	Complete bus, propulsion system, components, major subsystems, and body and chassis structure	2 years, 100,000 miles; Class 1 or 2 Failures: 12 years, 500,000 miles
Body And Chassis Structure	Body, body structure, structural elements of the suspension and engine cradle	3 years, 150,000 miles
Body and Chassis Corrosion Failure or Fatigue Failure	Primary load-carrying members of the bus structure, including structural elements of the suspension	Class 1 or 2 Failures: 12 years, 500,000 miles
Propulsion System (Diesel, CNG, Hybrid)	engine, transmission or drive motors, and generators (for hybrid technology) and drive and non-drive axles	2 years, 100,000 miles
Propulsion System (Electric)	traction motors, traction motor controllers, transmission, drive motors, drive and non-drive axles, and any other propulsion system-related replacement component	5 years, 300,000 miles
Energy Storage System	traction battery, Battery Management System, and any other ESS-related replacement component	2 years, unlimited miles
Emission Control System	complete exhaust system, including catalytic converter (if required), after treatment device, components identified as emission control devices	5 years, 100,000 miles

The ESS is warranted to remain within warrantable end of life during the warranty period. The ESS original specified energy storage capacity and warrantable end of life, as a percentage of the original specified energy capacity, must be clearly defined by the Contractor. Acceptable methods for measuring or obtaining ESS storage capacity with respect to its original specified capacity must be clearly identified by the manufacturer. The manufacturer will propose the test method, and certify the results are true and accurate. The test will be performed according to a documented test procedure. Participant may engage third-parties for capacity testing.

11.4. SUBSYSTEMS WARRANTY. The Contractor warrants the following subsystems to be free from defects and related defects for at least two years or 100,000 miles, whichever comes first.

- 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.
- Propulsion cooling systems: Radiator including core, tanks and related framework, including surge tank. Transmission cooler.
- Power electronics: DC/DC converters, inverters, if supplied
- Passenger seating excluding upholstery.
- Fuel storage and delivery system.
- Surveillance system including cameras and video recorders.

Contractor warrants the following subsystems to be free from defects and related defects for at least 2 years or 100,000 miles, whichever comes first:

- Low voltage and high voltage electrical wiring and harnesses

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

- Engine
- Transmission or Traction Motor
- Alternator
- Starter
- Destination/Luminator (Major components)
- Drive axle and non-drive axle(s)
- DVR unit, supporting electronics (Monitors)
- Driver's seat
- Battery equalizer
- Radiator package
- Exhaust emission components
- A/C compressor and condenser/evaporator unit
- Power steering unit
- Fuel cylinders (if applicable)
- Air compressor
- Wheelchair ramp (if applicable)

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

11.6. 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.

11.7. VOIDING OF WARRANTY. The warranty will 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 will be void if Participant 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. Participant should maintain documentation, auditable by Contractor, verifying service activities in conformance with the Contractor's maintenance manuals.

11.8. EXCEPTIONS AND ADDITIONS TO WARRANTY. Warranties will not apply to the following items:

- scheduled maintenance items
- normal wear-out items, such as brake linings, filters, belts, and wiper blades
- items furnished by Participant

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

11.9. PASS-THROUGH/SUPERIOR WARRANTY. If any vendor to the Contractor offers, at no additional cost, a warranty on a component that is longer or more comprehensive than the required warranties on this Contract, Contractor shall inform Participant of the additional warranty and pass it through to Participant at no additional cost.

Contractor shall state in writing that Participant's warranty reimbursements will not be impacted. 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, Contractor may request approval from Participant to assign its warranty obligations to others, but only on a case-by-case basis approved in writing by Participant. Otherwise, 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 Contractor.

11.10. FLEET DEFECTS. "Fleet Defect" means cumulative failures of twenty (20%) 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 applies only to the base warranty period in for Complete Bus, Propulsion System, and Subsystems Warranty. When a Fleet Defect is declared, the remaining warranty period on that item/component is suspended. The warranty period does not resume until the Fleet Defect is corrected.

For the purpose of Fleet Defects, each order shall be treated as a separate bus fleet. In addition, if there is a change in a major component within the order, the buses containing the new major component will become a separate bus fleet for the purposes of determining Fleet Defects.

Contractor shall correct a Fleet Defect under the warranty provisions defined in Section 13 Repair Procedure. After correcting the Fleet Defect, Participant and Contractor shall mutually agree to and Contractor shall promptly undertake and complete a work program reasonably designed to prevent the occurrence of the same Fleet Defect in all other buses and spare parts purchased under the order. Where the specific Fleet Defect is solely attributed to particular identifiable parts, the work program will include redesign and/or replacement of only the defectively designed and/or manufactured parts. In all other cases, the work program will include inspection and/or correction of all the buses in the fleet via a mutually agreed-to arrangement. Contractor shall update, as necessary, technical support information (parts, service and operator's manuals) due to changes resulting from warranty repairs. Participant may immediately declare a defect in design resulting in a safety hazard to be a Fleet Defect. Contractor shall be responsible to furnish, install and replace all defective units.

The Fleet Defect warranty provisions do not apply to Participant-supplied items, such as radios, fare collection equipment, communication systems, and tires. In addition, Fleet Defects do not apply to interior and exterior finishes, hoses, fittings, and fabric.

12. REPAIR PROCEDURE.

12.1. REPAIR PERFORMANCE. Contractor is responsible for all warranty-covered repair work, including diagnostics of warranty covered parts. To the extent practicable, Participant will allow Contractor or its designated representative to perform repair work. At its discretion, Participant may perform such repair work if it determines it needs to do so based on transit service or other requirements. Contractor shall reimburse Participant for any warranty-covered repair work it performs. Minor/Major Warranty-covered repairs may be carried out by the Purchaser and reimbursed through New Flyer's on-line warranty system. New Flyer is available to assist in completing these warranty-covered repairs if needed. Whenever feasible and mutually beneficial, the Purchser may provide a work space for New Flyer to accomplish the repair onsite as needed. This allows us to work with the Purchaser to return the bus to revenue service as quickly as possible. If shop space is unavailable, New Flyer will utilize one of its three subcontractors (Top Tempo, Tri-State, Coach Retrofit) with their own service facilities within the State of Washington area to perform the repairs and get the buses back into revenue service as soon as possible. In addition, Contractor can utilize its service centers for repairs within the State of Washington as needed. Major Component Warranty repairs should be carried out by the equipment suppliers (Engine, Transmission, Propulsion System, High Voltage Batteries, HVAC and Destination Sign Suppliers) in order to adhere to their mandate that all warranty repairs be performed by an authorized dealer unless the Purchaser is an authorized warranty center. If the Purchaser elects to perform these repairs, without the written permission of the original equipment manufacturer, the remaining warranty coverage may be voided

12.2. REPAIRS BY THE CONTRACTOR. Participant shall notify Contractor's designated representative within thirty (30) days if Participant detects a defect within the warranty periods defined in this Master Contract or the applicable Participant Order. Contractor or its designated representative shall, if requested, begin repair work on warranty-covered repairs within five (5) calendar days after receiving notification of a defect from Participant. Participant will make the bus available to complete repairs timely with the Contractor's repair schedule.

Contractor shall provide at its own expense all spare parts, tools, and space required to complete repairs. At Participant's option, Contractor may be required to remove the bus from Participant's property while repairs are made. If the bus is removed from Participant's property, then repair procedures must be diligently pursued by Contractor's representative.

12.3. REPAIRS BY PARTICIPANT. If Participant performs the warranty-covered repairs, then it must correct or repair the defect and any related defects utilizing parts supplied by Contractor specifically for this repair. At its discretion, Participant may use Contractor-specified parts available from its own stock if deemed in its best interests. Parts supplied by Contractor may be remanufactured but must have the same form, fit and function, and warranty. The parts will be shipped prepaid to Participant from any source selected by Contractor within fourteen (14) days of receipt of the request for said parts and shall not be subject to a handling charge.

12.4. DEFECTIVE COMPONENT RETURN. Contractor may request that parts covered by the warranty be returned to the manufacturing plant. Contractor will pay the freight costs for this action.

12.5. FAILURE ANALYSIS. Upon specific request of Participant, Contractor will 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 will be delivered within 60 days of the receipt of failed parts.

12.6. REIMBURSEMENT FOR LABOR AND OTHER RELATED COSTS. Contractor shall reimburse Participant for repair labor. The amount is determined by Participant for a qualified mechanic at a straight time wage rate per hour, which includes fringe benefits and overhead adjusted for Participant's most recently published rate in effect at the time the repair 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 Participant's service garage at the time the defect correction is made.

12.7. REIMBURSEMENT FOR PARTS. Contractor shall reimburse Participant for defective parts and for parts that must be replaced to correct the defect. The reimbursement will be at the current price at the time of repair and include taxes where applicable, plus fifteen (15) percent handling costs. Handling costs will not be paid if parts are supplied by Contractor and shipped to Participant.

12.8. REIMBURSEMENT REQUIREMENTS. Contractor shall respond to parts warranty claims with an accept/reject decision including necessary failure analysis no later than sixty (60) days after Participant 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. Participant may dispute rejected claims or claims for which Contractor did not reimburse the full amount. Contractor and Participant will review disputed warranty claims during the following quarter to reach an equitable decision to permit the disputed claim to be resolved and closed. Contractor and Participant will review all claims at least once per quarter throughout the entire warranty period to ensure that open claims are being tracked and properly dispositioned.

12.9. WARRANTY AFTER REPLACEMENT/REPAIRS. If any component, unit, or subsystem is repaired, rebuilt, or replaced by Contractor or by Participant with the concurrence of Contractor, then the component, unit, or subsystem will have the unexpired warranty period of the original. Repairs will not be warranted if Contractor-provided or authorized parts are not used for the repair, unless Contractor has failed to respond within five days, in accordance with Section 13.2 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 items shall have three (3) months or the remaining time and/or miles of the original warranty, whichever is greater. This remaining warranty period will begin on the repair/replacement date for corrected items on each bus if the repairs are completed by Contractor or on the date Contractor provides all parts to Participant if repairs are completed by Participant.

12.10. WARRANTY PROCESSING PROCEDURES. The following list represents information required by Contractor from the Participant 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

The Participant's forms will be accepted by Contractor if all of the above information is included. Electronic submittal may be used if available between Contractor and Participant.

12.11. RETURN OF PARTS. When returning defective parts to Contractor, Participant will tag each part with the following:

- bus number and VIN
- claim number
- part number
- serial number (if available)

12.12. 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.

13. QUALITY ASSURANCE

13.1. QUALITY ASSURANCE ORGANIZATION ESTABLISHMENT. Contractor shall establish and maintain an effective in-plant quality assurance organization.

13.2. QUALITY 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.

13.3. 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.

13.4. 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.

13.5. BASIC STANDARDS AND FACILITIES. The following standards and facilities shall be basic in the quality assurance process:

- Configuration control: 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 each Purchase Order. 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: 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: 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.

13.6. MAINTENANCE OF CONTROL. Contractor shall maintain quality control of purchases:

- Supplier control: Contractor shall require each supplier to maintain a quality control program for the services and supplies that it provides. 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: Contractor shall verify that all applicable specification requirements are properly included or referenced in purchase orders of articles to be used on transit buses.

13.7. MANUFACTURING CONTROL. Contractor shall maintain quality control of production:

- Controlled conditions: 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.

13.8. 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. At 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.

14. CLAIMS.

14.1. ASSUMPTION OF RISKS; CLAIMS BETWEEN THE PARTIES. Contractor assumes sole responsibility and all risks of personal injury or property damage to itself and its employees, and agents in connection with its operations under this Master Contract. For certainty, the Participants shall assume risk of loss of the bus on delivery. Prior to delivery, the Contractor shall have risk of loss of the bus. Neither Enterprise Services nor any Participant has made any representations regarding any factor affecting Contractor's risks. Contractor shall pay for all damage to any Participant's property resulting directly or indirectly from its acts or omissions under this Master Contract.

14.2. THIRD-PARTY CLAIMS; INDEMNITY. To the fullest extent permitted by law, Contractor shall defend, indemnify, and hold harmless Enterprise Services and any Participant and their employees and agents from and against all claims, demands, judgments, assessments, damages, penalties, fines, costs, liabilities or losses including, without limitation, sums paid in settlement of claims, attorneys' fees, consultant fees, and expert fees (collectively "claims") arising from any act or omission of Contractor or its successors, agents, and subcontractors under this Master Contract, except claims caused solely by Enterprise Services or any Participants' negligence. Contractor

shall take all steps needed to keep Participant's property free of liens arising from Contractor's activities, and promptly obtain or bond the release of any such liens that may be filed.

15. DISPUTE RESOLUTION.

15.1. DISPUTE PROCEDURE. The parties shall cooperate to resolve any dispute pertaining to this Master Contract efficiently, as timely as practicable, and at the lowest possible level with authority to resolve such dispute. If, however, a dispute persists and cannot be resolved, it may be escalated within each organization. In such situation, upon notice by either party, each party, within five (5) business days shall reduce its description of the dispute to writing and deliver it to the other party. The receiving party then shall have three (3) business days to review and respond in writing. In the event that the parties cannot then agree on a resolution of the dispute, the parties shall schedule a conference between the respective senior manager of each organization to attempt to resolve the dispute. In the event the parties cannot agree, either party may resort to court to resolve the dispute.

15.2. PERFORMANCE DURING DISPUTE. Unless otherwise directed by Enterprise Services, Contractor shall continue performance under this Master Contract while matters in dispute are being resolved.

16. SUSPENSION & TERMINATION.

16.1. SUSPENSION & TERMINATION FOR DEFAULT. Enterprise Services may suspend Contractor's operations under this Master Contract immediately by written cure notice of any default. In such case, the notice of suspension will state the time period in which cure is permitted and other appropriate conditions. Suspension shall continue until the default is remedied to Enterprise Services' reasonable satisfaction; *Provided*, however, that, if after thirty (30) days from such a suspension notice, Contractor remains in default, Enterprise Services may terminate Contractor's rights under this Master Contract. All of Contractor's obligations to Enterprise Services and Participants survive termination of Contractor's rights under this Master Contract, until such obligations have been fulfilled.

16.2. DEFAULT. Each of the following events shall constitute default of this Master Contract by Contractor:

(a) Contractor fails to perform or comply with any of the terms or conditions of this Master Contract including, but not limited to, Contractor's obligation to pay vendor management fees when due;

(b) Contractor breaches any representation or warranty provided herein; or

(c) Contractor enters into proceedings relating to bankruptcy, whether voluntary or involuntary.

16.3. REMEDIES FOR DEFAULT.

(a) Enterprise Services' rights to suspend and terminate Contractor's rights under this Master Contract are in addition to all other available remedies.

(b) In the event of termination for default, Enterprise Services may exercise any remedy provided by law including, without limitation, the right to procure for all Participants replacement goods and/or services. In such event, Contractor shall be liable to Enterprise Services for damages as authorized by law including, but not limited to, any price difference between the Master Contract price and the replacement or cover price.

16.4. LIMITATION ON DAMAGES. Notwithstanding any provision to the contrary, the parties agree that in no event shall any party or Participant be liable to the other for exemplary or punitive damages.

16.5. GOVERNMENTAL TERMINATION.

(a) Termination for Withdrawal of Authority. Enterprise Services may suspend or terminate this Master Contract if, during the term hereof, Enterprise Services' procurement authority is withdrawn, reduced, or limited such that Enterprise Services, in its judgment, would lack authority to enter into this Master Contract; *Provided*, however, that such suspension or termination for withdrawal of authority shall only be effective upon twenty (20) days prior written notice; and *Provided further*, that such suspension or termination for withdrawal of authority shall not relieve any Participant from payment for goods and/or services already ordered as of the effective date of such notice. Except as stated in this provision, in the event of such suspension or termination for withdrawal of authority, neither Enterprise Services nor any Participant shall have any obligation or liability to Contractor.

(b) TERMINATION FOR CHANGE OF AUTHORITY. Enterprise Services may suspend or terminate this Master Contract if, during the term hereof, federal procurement authority is withdrawn, reduced, or limited such that Enterprise Services, in its judgment, would lack authority to enter into this Master Contract as a State Cooperative Purchasing Schedule under applicable federal law; Provided, however, that such suspension or termination for withdrawal of authority shall only be effective upon twenty (20) days prior written notice; and Provided further, that such suspension or termination for withdrawal of authority shall not relieve any Participant from payment for goods and/or services already ordered as of the effective date of such notice. Except as stated in this provision, in the event of such suspension or termination for withdrawal of authority, neither Enterprise Services nor any Participant shall have any obligation or liability to Contractor.

(c) TERMINATION FOR PUBLIC CONVENIENCE. Enterprise Services, for public convenience, may terminate this Master Contract; *Provided*, however, that such termination for public convenience must, in Enterprise Services' judgment, be in the best interest of the State of Washington; and *Provided further*, that such termination for public convenience shall only be effective upon sixty (60) days prior written notice; and *Provided further*, that such termination for public convenience shall not relieve any Participant from payment for goods and/or services already ordered as of the effective date of such notice. Except as stated in this provision, in the event of such termination for public convenience, neither Enterprise Services nor any Participant shall have any obligation or liability to Contractor.

(d) PAYMENT UPON TERMINATION. In the event of termination for any reason under this Section 16, the Contractor shall be paid its costs, including contract close-out costs, and profit on work performed up to the time of termination.

16.6. TERMINATION PROCEDURE. Regardless of basis, in the event of suspension or termination (in full or in part), the parties shall cooperate to ensure an orderly and efficient suspension or termination. Accordingly, Contractor shall deliver to Participants all goods and/or services that are complete (or with approval from Enterprise Services, substantially complete) and Participants shall inspect, accept, and pay for the same in accordance with this Master Contract and the applicable

Purchase Order. Unless directed by Enterprise Services to the contrary, Contractor shall not process any orders after notice of suspension or termination inconsistent therewith.

17. FTA ROLE IN DISPUTES, BREACHES, DEFAULTS, OR OTHER LITIGATION.

17.1. FTA INTEREST. The U.S. Federal Transit Administration ("FTA") has a vested interest in the settlement of any violation of federal law, regulation, or requirement, or any disagreement involving the award, this Master Contract, and any amendments thereto including, but not limited to, a default, breach, major dispute, or litigation. Accordingly, FTA shall have the right to concur in such any settlement or compromise.

17.2. NOTIFICATION TO FTA. If a current or prospective legal matter that may affect the Federal Government emerges, Enterprise Services and Participant promptly shall notify the FTA Chief Counsel, or FTA Regional Counsel for the Region in which Enterprise Services and Participant are located.

1. The types of legal matters that require notification include, but are not limited to, a major dispute, breach, default, litigation, or naming the Federal Government as a party to litigation or a legal disagreement in any forum for any reason.

2. Matters that may affect the Federal Government include, but are not limited to, the Federal Government's interests in the award, this Master Contract, and any amendments thereto, or the Federal Government's administration or enforcement of federal laws, regulations, and requirements.

3. If Enterprise Services or Participant have credible evidence that a Principal, Official, Employee, Agent, or Third Party Participant of Enterprise Services or Participant, or other person has submitted a false claim under the False Claims Act, 31 U.S.C. § 3729 et seq., or has committed a criminal or civil violation of law pertaining to such matters as fraud, conflict of interest, bribery, gratuity, or similar misconduct involving federal assistance, Enterprise Services and Participant promptly shall notify the U.S. DOT Inspector General, in addition to the FTA Chief Counsel or Regional Counsel for the Region in which the Enterprise Services and Participant are located.

17.3. FEDERAL INTEREST IN RECOVERY. The Federal Government retains the right to a proportionate share of any proceeds recovered from any third party, based on the percentage of the federal share for this Master Contract.

18. GENERAL PROVISIONS.

18.1. TIME IS OF THE ESSENCE. Time is of the essence for each and every provision of this Master Contract.

18.2. COMPLIANCE WITH LAW. Contractor shall comply with all applicable law.

18.3. INTEGRATED AGREEMENT. This Master Contract constitutes the entire agreement and understanding of the parties with respect to the subject matter and supersedes all prior negotiations, representations, and understandings between them. There are no representations or understandings of any kind not set forth herein.

18.4. AMENDMENT OR MODIFICATION. Except as set forth herein, this Master Contract may not be amended or modified except in writing and signed by a duly authorized representative of each party.

18.5. AUTHORITY. Each party to this Master Contract, and each individual signing on behalf of each party, hereby represents and warrants to the other that it has full power and authority to enter

into this Master Contract and that its execution, delivery, and performance of this Master Contract has been fully authorized and approved, and that no further approvals or consents are required to bind such party.

18.6. NO AGENCY. The parties agree that no agency, partnership, or joint venture of any kind shall be or is intended to be created by or under this Master Contract. Neither party is an agent of the other party nor authorized to obligate it.

18.7. ASSIGNMENT. Contractor may not assign its rights under this Master Contract without Enterprise Services' prior written consent and Enterprise Services may consider any attempted assignment without such consent to be void; *Provided*, however, that, if Contractor provides written notice to Enterprise Services within thirty (30) days, Contractor may assign its rights under this Master Contract in full to any parent, subsidiary, or affiliate of Contractor that controls or is controlled by or under common control with Contractor, is merged or consolidated with Contractor, or purchases a majority or controlling interest in the ownership or assets of Contractor. Unless otherwise agreed, Contractor guarantees prompt performance of all obligations under this Master Contract notwithstanding any prior assignment of its rights.

18.8. BINDING EFFECT; SUCCESSORS & ASSIGNS. This Master Contract shall be binding upon and shall inure to the benefit of the parties hereto and their respective successors and assigns.

18.9. PUBLIC INFORMATION. This Master Contract and all related documents are subject to public disclosure as required by Washington's Public Records Act, RCW chapter 42.56. The Purchase Order and all related documents are subject to the public disclosure requirements of the Participant's jurisdiction.

18.10. ASSIGNMENT OF ANTITRUST RIGHTS REGARDING PURCHASED GOODS/SERVICES. Contractor irrevocably assigns to Enterprise Services, on behalf of the State of Washington, or any applicable Participant any claim for relief or cause of action which the Contractor now has or which may accrue to the Contractor in the future by reason of any violation of state or federal antitrust laws in connection with any Transit Buses provided in Washington for the purpose of carrying out the Contractor's obligations under this Master Contract, including, at Enterprise Services' option, the right to control any such litigation on such claim for relief or cause of action.

18.11. FEDERAL FUNDS. To the extent that any Participant uses federal funds to purchase goods and/or services pursuant to this Master Contract, such Participant shall specify, with its order, any applicable requirement or certification that must be satisfied by Contractor at the time the order is placed or upon delivery.

18.12. SEVERABILITY. If any provision of this Master Contract is held to be invalid or unenforceable, such provision shall not affect or invalidate the remainder of this Master Contract, and to this end the provisions of this Master Contract are declared to be severable. If such invalidity becomes known or apparent to the parties, the parties agree to negotiate promptly in good faith in an attempt to amend such provision as nearly as possible to be consistent with the intent of this Master Contract.

18.13. WAIVER. Failure of either party to insist upon the strict performance of any of the terms and conditions hereof, or failure to exercise any rights or remedies provided herein or by law, or to notify the other party in the event of breach, shall not release the other party of any of its obligations under this Master Contract, nor shall any purported oral modification or rescission of this Master Contract by either party operate as a waiver of any of the terms hereof. No waiver by either party of any breach, default, or violation of any term, warranty, representation,

contract, covenant, right, condition, or provision hereof shall constitute waiver of any subsequent breach, default, or violation of the same or other term, warranty, representation, contract, covenant, right, condition, or provision.

18.14. SURVIVAL. All representations, warranties, covenants, agreements, and indemnities set forth in or otherwise made pursuant to this Master Contract shall survive and remain in effect following the expiration or termination of this Master Contract, *Provided*, however, that nothing herein is intended to extend the survival beyond any applicable statute of limitations periods.

18.15. GOVERNING LAW. The validity, construction, performance, and enforcement of this Master Contract shall be governed by and construed in accordance with the laws of the State of Washington, without regard to its choice of law rules. The validity, construction, performance, and enforcement of Purchase Orders shall be governed by and construed in accordance with the laws of the Participant's jurisdiction.

18.16. JURISDICTION & VENUE. In the event that any action is brought to enforce any provision of this Master Contract, the parties agree to exclusive jurisdiction in Thurston County Superior Court for the State of Washington and agree that in any such action venue shall lie exclusively at Olympia, Washington. In the event that any action is brought to enforce any provision of a Purchase Order, the parties agree to submit to exclusive jurisdiction and venue in the Participant's jurisdiction.

18.17. ATTORNEYS' FEES. Should any legal action or proceeding be commenced by either party in order to enforce this Master Contract or any provision hereof, or in connection with any alleged dispute, breach, default, or misrepresentation in connection with any provision herein contained, the prevailing party shall be entitled to recover reasonable attorneys' fees and costs incurred in connection with such action or proceeding, including costs of pursuing or defending any legal action, including, without limitation, any appeal, discovery, or negotiation and preparation of settlement arrangements, in addition to such other relief as may be granted.

18.18. FAIR CONSTRUCTION & INTERPRETATION. The provisions of this Master Contract shall be construed as a whole according to their common meaning and not strictly for or against any party and consistent with the provisions contained herein in order to achieve the objectives and purposes of this Master Contract. Each party hereto and its counsel has reviewed and revised this Master Contract and agrees that the normal rules of construction to the effect that any ambiguities are to be resolved against the drafting party shall not be construed in the interpretation of this Master Contract. Each term and provision of this Master Contract to be performed by either party shall be construed to be both a covenant and a condition.

18.19. FURTHER ASSURANCES. In addition to the actions specifically mentioned in this Master Contract, the parties and any applicable Participant shall each do whatever may reasonably be necessary to accomplish the transactions contemplated in this Master Contract including, without limitation, executing any additional documents reasonably necessary to effectuate the provisions and purposes of this Master Contract.

18.20. EXHIBITS. All exhibits referred to herein are deemed to be incorporated in this Master Contract in their entirety.

18.21. CAPTIONS & HEADINGS. The captions and headings in this Master Contract are for convenience only and are not intended to, and shall not be construed to, limit, enlarge, or affect the scope or intent of this Master Contract nor the meaning of any provisions hereof.

18.22. ELECTRONIC SIGNATURES. A signed copy of this Master Contract or any other ancillary agreement transmitted by facsimile, email, or other means of electronic transmission shall be deemed to have the same legal effect as delivery of an original executed copy of this Master Contract or such other ancillary agreement for all purposes.

18.23. COUNTERPARTS. This Master Contract may be executed in any number of counterparts, each of which shall be deemed an original and all of which counterparts together shall constitute the same instrument which may be sufficiently evidenced by one counterpart. Execution of this Master Contract at different times and places by the parties shall not affect the validity thereof so long as all the parties hereto execute a counterpart of this Master Contract.

EXECUTED as of the date and year first above written.

STATE OF WASHINGTON
Department of Enterprise Services

By: Elena McGrew
Elena McGrew
Its: Enterprise Procurement Manager

NEW FLYER OF AMERICA INC.,
a North Dakota corporation

By: Jennifer McNeill
Jennifer McNeill
Its: Vice President, Sales and Marketing

NEW FLYER OF AMERICA INC.,
a North Dakota corporation

By: Chris Stoddart
Chris Stoddart
Its: President, New Flyer

Included Transit Buses

Contractor is authorized to sell Heavy Duty Transit Buses in the categories awarded, including applicable accessories, components, subsystems, and replacement parts necessary for operation of the transit buses for its operational life. Transit buses offered under this Master Contract will comply with the specifications listed in the attached specification document.

[attached as a separate document]

Exhibit B

Prices for Heavy Duty Transit Buses

Prices for Heavy Duty Transit Buses as listed in the attached Heavy Duty Price Sheet.

[attached as a separate document]

Exhibit C

Insurance Requirements

1. **INSURANCE OBLIGATION**. During the Term of this Master Contract, Contractor shall possess and maintain in full force and effect, at Contractor's sole expense, the following insurance coverages:

    a. COMMERCIAL GENERAL LIABILITY INSURANCE. Commercial general liability insurance (and, if necessary, commercial umbrella liability insurance) covering bodily injury and property damage, personal injury, and advertising injury liability on an 'occurrence form' that shall be no less comprehensive and no more restrictive than the coverage provided by Insurance Services Office (ISO) under the most recent version of form CG 00 01 in the amount of not less than $2,000,000 per occurrence and $4,000,000 general aggregate. This coverage shall include blanket contractual liability coverage. This coverage shall include a cross-liability clause or separation of insured condition.

    b. WORKERS' COMPENSATION INSURANCE & EMPLOYER'S LIABILITY (STOP GAP). Contractor shall comply with applicable Workers' Compensation or Industrial Accident insurance providing benefits to statutory limits, including Employer's or Stop-Gap Liability with a minimum limit of $1,000,000 per accident/bodily injury by disease; $1,000,000 policy limit/Bodily injury by disease; and $1,000,000 each employee.

    c. PRODUCTS-COMPLETED OPERATIONS LIABILITY INSURANCE. Products-completed operations liability insurance in the amount of not less than $2,000,000 combined single limit per occurrence, $4,000,000 general annual aggregate for a period of five (5) years after acceptance of the last bus delivered under this Contract. Products Liability coverage may be effected through one or more excess liability policies.

    d. COMMERCIAL AUTOMOBILE LIABILITY INSURANCE. 'Symbol 1' Commercial Automobile Liability coverage (and, if necessary, commercial umbrella liability insurance) including coverage for all owned, hired, and non-owned vehicles. The combined single limit per accident shall not be less than $2,000,000.

    e. PROFESSIONAL LIABILITY (ERRORS & OMISSIONS) INSURANCE. Professional liability insurance in the amount of not less than $2,000,000 combined single limit per occurrence, $4,000,000 general annual aggregate.

    f. UMBRELLA INSURANCE. Umbrella coverage in the sum of $_____ shall be provided and shall apply over all liability policies, without exception, including but not limited to Commercial General Liability, Employers' Liability, Products-Completed Operations Liability, Automobile Liability, and Professional Liability.

    Claims Made Policies (applicable only to professional liability). If any of the required policies provide claims-made coverage:

    1. The Retroactive Date must be shown, and must be before the date of the contract or the beginning of contract work

    2. Insurance must be maintained and evidence of insurance must be provided for at least five (5) years after completion of the contract work.

3. If coverage is canceled or non-renewed, and not replaced with another claims-made policy form with a Retroactive Date prior to the contract effective date, the Contractor must purchase "extended reporting" coverage for a minimum of five (5) years after completion of work.

The insurance coverage limits set forth herein are the minimum. Contractor's insurance coverage shall be no less than the minimum amounts specified. Coverage in the amounts of these minimum limits, however, shall not be construed to relieve Contractor from liability in excess of such limits. Contractor waives all rights against the State of Washington for the recovery of damages to the extent such damages are covered by any insurance required herein.

2. **INSURANCE CARRIER RATING**. Coverages provided by the Contractor must be underwritten by an insurance company deemed acceptable to the State of Washington's Office of Risk Management. Insurance coverage shall be provided by companies authorized to do business within the State of Washington and rated A- Class VII or better in the most recently published edition of Best's Insurance Rating. Enterprise Services reserves the right to reject all or any insurance carrier(s) with an unacceptable financial rating.

3. **ADDITIONAL INSURED**. Except for Workers' Compensation, Commercial Automobile Liability, and Professional Liability (Errors and Omissions), all required insurance shall include the State of Washington (and its agents, officers, and employees) and the applicable Participant as an Additional Insureds evidenced by copy of the Additional Insured Endorsement attached to the Certificate of Insurance on such insurance policies.

4. **CERTIFICATE OF INSURANCE**. Prior to execution of the Master Contract, Contractor shall furnish to Enterprise Services, as evidence of the insurance coverage required by this Master Contract, a certificate of insurance satisfactory to Enterprise Services that insurance, in the above-stated kinds and minimum amounts, has been secured. In addition, no less than ten (10) days prior to coverage expiration, Contractor shall furnish to Enterprise Services an updated or renewed certificate of insurance, satisfactory to Enterprise Services, that insurance, in the above-stated kinds and minimum amounts, has been secured. Failure to maintain or provide proof of insurance, as required, will result in contract cancellation. All policies and certificates of insurance shall include the Master Contract number stated on the cover of this Master Contract.

5. **PRIMARY COVERAGE**. Contractor's insurance shall apply as primary and shall not seek contribution from any insurance or self-insurance maintained by, or provided to, the additional insureds listed above including, at a minimum, the State of Washington and/or any Participant. All insurance or self-insurance of the State of Washington and/or Participants shall be excess of any insurance provided by Contractor or subcontractors.

6. **SUBCONTRACTORS**. Contractor shall include all subcontractors as insureds under all required insurance policies. Alternatively, prior to utilizing any subcontractor, Contractor shall cause any such subcontractor to provide insurance that complies will all applicable requirements of the insurance set forth herein and shall furnish separate Certificates of Insurance and endorsements for each subcontractor. Each subcontractor must comply fully with all insurance requirements stated herein. Failure of any subcontractor to comply with insurance requirements does not limit Contractor's liability or responsibility.

7. **WAIVER OF SUBROGATION**. Contractor waives all rights of subrogation against the State of Washington and any Participant for the recovery of damages to the extent such damages are or would be covered by the insurance specified herein.

8. **NOTICE OF CHANGE OR CANCELLATION**. There shall be no cancellation, material change, exhaustion of aggregate limits, or intent not to renew insurance coverage, either in whole or in part, without at least sixty (60) days prior written Legal Notice by Contractor to Enterprise Services. Failure to provide such notice, as required, shall constitute default by Contractor. Any such written notice shall include the Master Contract number stated on the cover of this Master Contract.

Exhibit D

Federal Transit Administration Clauses

1.1. NO FEDERAL GOVERNMENT OBLIGATIONS TO THIRD PARTIES.

(a) Participant 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 Participant, Contractor, or any other party (whether or not a party to that contract) pertaining to any matter resulting from the underlying Contract.

(b) 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.

1.2. FALSE STATEMENTS OR CLAIMS CIVIL AND CRIMINAL FRAUD.

(a) Contractor acknowledges that the provisions of the Program Fraud Civil Remedies Act of 1986, as amended, 31 U.S.C. § 3801 et seq. and U.S. DOT regulations, "Program Fraud Civil Remedies," 49 C.F.R. Part 31, apply to its actions pertaining to this Project. Upon execution of the underlying contract, 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, 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 Contractor to the extent the Federal Government deems appropriate.

(b) 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 Contractor, to the extent the Federal Government deems appropriate.

(c) 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.

1.3. ACCESS TO THIRD PARTY CONTRACT RECORDS.

(a) Where the Participant is not a State but a local government and is the FTA Recipient or a subgrantee of the FTA Recipient in accordance with 49 C.F.R. 18.36(i), the Contractor agrees to provide the Participant, the FTA Administrator, the Comptroller General of the United States or any of their authorized representatives access to any books, documents, papers and records of the Contractor which are directly pertinent to this contract for the purposes of making audits, examinations, excerpts and transcriptions. Contractor also agrees, pursuant to 49 C.F.R. 633.17 to provide the FTA Administrator or his

authorized representatives including any PMO Contractor access to Contractor's records and construction sites pertaining to a major capital project, defined at 49 U.S.C. 5302(a)1, which is receiving federal financial assistance through the programs described at 49 U.S.C. 5307, 5309 or 5311.

(b) Where the Participant is a State and is the FTA Recipient or a subgrantee of the FTA Recipient in accordance with 49 C.F.R. 633.17, Contractor agrees to provide the Participant, the FTA Administrator or his authorized representatives, including any PMO Contractor, access to the Contractor's records and construction sites pertaining to a major capital project, defined at 49 U.S.C. 5302(a)1, which is receiving federal financial assistance through the programs described at 49 U.S.C. 5307, 5309 or 5311. By definition, a major capital project excludes contracts of less than the simplified acquisition threshold currently set at $100,000.

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

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

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

(f) 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 Participant, 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).

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

1.4. CHANGES TO FEDERAL REQUIREMENTS. 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 Participant 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.

1.5. TERMINATION. See Section 16 Suspension & Termination and Section 18.13 Waiver.

1.6. CIVIL RIGHTS.

(a) Nondiscrimination. In accordance with Title VI of the Civil Rights Act, as amended, 42 U.S.C. § 2000d, section 303 of the Age Discrimination Act of 1975, as amended, 42 U.S.C. § 6102, section 202 of the Americans with Disabilities Act (ADA) of 1990, 42 U.S.C. § 12132, and Federal transit law at 49 U.S.C. § 5332, Contractor agrees that it will not discriminate against any employee or applicant for employment because of race, color, creed, national origin, sex, age, or disability. In addition, Contractor agrees to comply with applicable Federal implementing regulations and other implementing requirements FTA may issue.

(b) Equal Employment Opportunity. The following equal employment opportunity requirements apply to the underlying contract:

1. Race, Color, Creed, National Origin, Sex. In accordance with Title VII of the Civil Rights Act, as amended, 42 U.S.C. § 2000e, and Federal transit laws at 49 U.S.C. § 5332, the Contractor agrees to comply with all applicable equal employment opportunity requirements of U.S. Department of Labor (U.S. DOL) regulations, "Office of Federal Contract Compliance Programs, Equal Employment Opportunity, Department of Labor," 41 C.F.R. Parts 60 et seq., (which implement Executive Order No. 11246, "Equal Employment Opportunity," as amended by Executive Order No. 11375, "Amending Executive Order 11246 Relating to Equal Employment Opportunity," 42 U.S.C. § 2000e note), and with any applicable Federal statutes, executive orders, regulations, and Federal policies that may in the future affect construction activities undertaken in the course of the Project. Contractor agrees to take affirmative action to ensure that applicants are employed, and that employees are treated during employment, without regard to their race, color, creed, national origin, sex, or age. Such action shall include, but not be limited to, the following: employment, upgrading, demotion or transfer, recruitment or recruitment advertising, layoff or termination; rates of pay or other forms of compensation; and selection for training, including apprenticeship. In addition, Contractor agrees to comply with any implementing requirements FTA may issue.

2. Age. In accordance with section 4 of the Age Discrimination in Employment Act of 1967, as amended, 29 U.S.C. §§ 623 and Federal transit law at 49 U.S.C. § 5332, Contractor agrees to refrain from discrimination against present and prospective employees for reason of age. In addition, Contractor agrees to comply with any implementing requirements FTA may issue.

3. Disabilities. In accordance with section 102 of the Americans with Disabilities Act, as amended, 42 U.S.C. § 12112, Contractor agrees that it will comply with the requirements of U.S. Equal Employment Opportunity Commission, "Regulations to Implement the Equal Employment Provisions of the Americans with Disabilities Act," 29 C.F.R. Part 1630, pertaining to employment of persons with disabilities. In addition, Contractor agrees to comply with any implementing requirements FTA may issue.

(c) Contractor also agrees to include these requirements in each subcontract financed in whole or in part with Federal assistance provided by FTA, modified only if necessary to identify the affected parties.

1.7. DISADVANTAGED BUSINESS ENTERPRISES. The Disadvantaged Business Enterprise (DBE) requirements of 49 CFR Part 26 and USDOT's official interpretations (i.e., Questions & Answers) apply to this Contract. As such, the requirements of this Contract are to make affirmative efforts to solicit DBEs, provide information on who submitted a Bid or quote and to report DBE participation. No

preference will be included in the evaluation of Bids/Proposals, no minimum level of DBE participation shall be required as a Condition of Award and Bids/Proposals may not be rejected or considered non-responsive on that basis.

Transit Vehicle Manufacturer Compliance with DBE Requirements. Before a transit vehicle manufacturer (TVM) may submit a bid or proposal to provide vehicles to be financed with FTA assistance, 49 C.F.R. § 26.49 requires the TVM to submit a certification that it has complied with FTA's DBE requirements.

1.8. ADA ACCESS. Contractor shall comply with the requirements of 49 CFR FTA C 4710.1 as applicable to this Contract. Equal access and the opportunity should be given to individuals with disabilities to fully participate in or benefit from the goods, services, facilities, privileges, advantages, or accommodations.

Contractor must comply with the accessibility requirements of DOT regulations, "Transportation Services for Individuals with Disabilities (ADA)," 49 C.F.R. part 37, and Joint Access Board/DOT regulations, "Americans with Disabilities (ADA) Accessibility Specifications for Transportation Vehicles," 36 C.F.R. part 1192 and 49 C.F.R. part 38.

1.9. INCORPORATION OF FEDERAL TRANSIT ADMINISTRATION (FTA) TERMS. 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. Contractor shall not perform any act, fail to perform any act, or refuse to comply with any (name of grantee) requests which would cause (name of grantee) to be in violation of the FTA terms and conditions.

1.10. DEBARMENT AND SUSPENSION. This Contract is a covered transaction for purposes of 49 CFR Part 29. As such, the contractor is required to verify that none of the contractor, its principals, as defined at 49 CFR 29.995, or affiliates, as defined at 49 CFR 29.905, are excluded or disqualified as defined at 49 CFR 29.940 and 29.945. Contractor is required to comply with 49 CFR 29, Subpart C and must include the requirement to comply with 49 CFR 29, Subpart C in any lower tier covered transaction it enters into. By signing and submitting its bid or proposal, the bidder or proposer certifies as follows:

The certification in this clause is a material representation of fact relied upon by Enterprise Services. If it is later determined that the bidder or proposer knowingly rendered an erroneous certification, in addition to remedies available to Enterprise Services, the Federal Government may pursue available remedies, including but not limited to suspension and/or debarment. The bidder or proposer agrees to comply with the requirements of 49 CFR 29, Subpart C while this offer is valid and throughout the period of any contract that may arise from this offer. The bidder or proposer further agrees to include a provision requiring such compliance in its lower tier covered transactions.

1.11. BUY AMERICA. Contractor agrees to comply with 49 U.S.C. 5323(j) and 49 C.F.R. Part 661, which provide that Federal funds may not be obligated unless steel, iron, and manufactured products used in FTA-funded projects are produced in the United States, unless a waiver has been granted by FTA or the product is subject to a general waiver. General waivers are listed in 49 C.F.R. 661.7. Separate requirements for rolling stock are set out at 49 U.S.C. 5323(j)(2)(C) and 49 C.F.R. § 661.11. Rolling stock must be assembled in the United States and have at least a 65 percent

domestic stock content for rolling stock procurements with the first vehicle scheduled for delivery in fiscal years 2018 and 2019 and at least 70 percent domestic content for rolling stock procurements with the first vehicle scheduled for delivery in 2020 or thereafter.

Contractor must submit to Participants the appropriate Buy America Certification with all offers on FTA-funded contracts, except those subject to a general waiver. Proposals that are not accompanied by a properly completed Bus America certification are subject to the provisions of 49 CFR 661.13 and will be rejected as nonresponsive.

Pursuant to Appendix A to §661.7(b), a general public interest waiver from the Buy America requirements applies to microprocessors, computers, microcomputers, or software, or other such devices, which are used solely for the purpose of processing or storing data. This general waiver does not extend to a product or device which merely contains a microprocessor or microcomputer and is not used solely for the purpose of processing or storing data.

1.12. RESOLUTION OF DISPUTES, BREACHES, OR OTHER LITIGATION. See Section 15.

1.13. LOBBYING. Byrd Anti-Lobbying Amendment, 31 U.S.C. 1352, as amended by the Lobbying Disclosure Act of 1995, P.L. 104-65 [to be codified at 2 U.S.C. § 1601, et seq.]. Contractors who apply or bid for an award of $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.

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

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

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

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

1.16. CARGO PREFERENCE - Use of United States-Flag Vessels. Contractor agrees to:

(a) Use privately owned United States-Flag commercial vessels to ship at least 50 percent of the gross tonnage (computed separately for dry bulk carriers, dry cargo liners, and tankers) involved, whenever shipping any equipment, material, or commodities pursuant

to the underlying contract to the extent such vessels are available at fair and reasonable rates for United States-Flag commercial vessels;

(b) Furnish within 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.)

(c) 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.

1.17. ENERGY CONSERVATION. 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.

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

1.19. PRE-AWARD AND POST-DELIVERY AUDIT REQUIREMENTS. Contractor agrees to comply with 49 U.S.C. § 5323(m) and FTA's implementing regulation at 49 C.F.R. part 663. Contractor shall comply with the Buy America certification(s) submitted with its proposal/bid. Contractor agrees to participate and cooperate in any pre-award and post-delivery audits performed pursuant to 49 C.F.R. part 663 and related FTA guidance. Contractor shall submit manufacturer's FMVSS self-certification, Federal Motor Bus Safety Standards, that the bus complies with relevant FMVSS or manufacturer's certified statement that the contracted buses will not be subject to FMVSS regulations.

1.20. FLY AMERICA. Contractor agrees to comply with 49 USC 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. 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. Contractor agrees to include the requirements of this section in all subcontracts that may involve international air transportation.

1.21. CONTRACT WORK HOURS AND SAFETY STANDARDS ACT. For all contracts in excess of $100,000 that involve the employment of mechanics or laborers, Contractor shall comply with the Contract Work Hours and Safety Standards Act (40 U.S.C. §§ 3701- 3708), as supplemented by the

Department of Labor regulations at 29 C.F.R. part 5. Under 40 U.S.C. § 3702 of the Act, 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, Contractor and any subcontractor responsible therefor shall be liable for the unpaid wages. In addition, 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. Liquidated damages will 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 Participant will 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.

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.

Exhibit E

Federal Transit Administration Certifications

[attached as a separate document from Solicitation Exhibit A-3]

SFMTA-2025-22-FTA

Agreement

Appendix A, Item A2

Exhibit B-1 – State of Washington Technical Specifications

Heavy Duty Bus

Exhibit B-1 Specifications

Heavy Duty Bus

Table of Contents

1 GENERAL

1.1 Scope

The State of Washington Department of Enterprise Services in collaboration with the Washington State Department of Transportation; Alaska Department of Transportation; Idaho Department of Transportation; Oregon Department of Transportation; and Nevada Department of Transportation, as initial members of the Transit Bus Purchasing Cooperative, intend to establish a Master Contract for the purchase of heavy-duty transit buses that will provide the best value and selection to purchasers that maximizes passenger appeal in appearance, comfort, and safety, combined with excellence in reliability, operating characteristics, and economy of operation. Heavy-duty buses purchased under this Master Contract will be 30', 35', 40', 45' and 60' BRT articulated; with low-floor or high floor (over the road buses); and diesel power, hybrid drive, standard drive, CNG, or electric propulsion system; or any combination thereof. Buses shall have a minimum expected life of twelve (12) years or 500,000 miles, whichever comes first, and are intended for a wide possible spectrum of passengers, including children, adults, the elderly, and people with disabilities. The buses shall be Altoona tested (or have completed Altoona testing by the delivery date in accordance with 49 CFR Part 665) and meet any other bus testing requirements under MAP-21.

1.2 Definitions

Alternative: An alternative specification condition to the default bus configuration. The Purchaser 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, 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) or therms.

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 which converts a source of direct current (DC) 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 Purchaser.

Defueling: The process of removing fuel from a tank.

Defueling Port: A device which 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.

Electric Bus Definition: A vehicle that is battery powered with electrically driven motor(s). Generally referred to as battery electric buses, but may include options for electric trolley buses or similar vehicles powered by electricity.

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 high-voltage electrical energy and for which its supply of energy is rechargeable by a PPU and/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 Cell Bus: A vehicle powered by a hydrogen fuel cell.

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 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 that protrudes 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, wastegate).

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: 150 lbs. for every designed passenger seating position, for the driver, and for each 1.5 square feet 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 Contractor, 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 volts (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 PPU 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 crack. See *Rupture*.

Line: All tubes, flexible and hard, that 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 volts 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: 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, the HDS, energy storage system and the hybrid system controller.

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: 150 lbs. for every designated 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-volt systems).

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 Purchaser.

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: Standards referenced in “Part 5: 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 percent. This is a dynamic measurement used for the energy storage system. 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 “pig-tails” commonly used to absorb flexing in piping.

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

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.

Warrantable End of Life (WEOL): A measure of battery degradation determined as the point at which the batteries can no longer provide the energy or power required to meet the design operating profile. It is expressed as a percentage of remaining battery capacity as compared to gross capacity at the beginning of useful life. For purposes of this specification, WEOL measures the useful and intended life of the energy storage device. WEOL is a condition for battery replacement and to potentially initiate warranty claims.

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.

1.3 Referenced Publications

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

1.4 Legal Requirements

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 Federal Motor Vehicle Standards (FMVSS) and shall accommodate all applicable Federal Motor Carrier Safety Administration (FMCSA) regulations in effect at location of the Purchaser 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.

1.5 Overall Requirements

Contractor shall ensure that the application and installation of major bus subcomponents and systems are compliant with all such subcomponent vendors' requirements and recommendations. Contractor and Purchaser shall identify subcomponent vendors that shall submit installation/application approval documents with the completion of a pilot or

lead bus. Components used in the vehicle shall be of heavy-duty design and proven in transit service.

Chassis structure (integrity & corrosion)	12 year/500,000 Miles
Engine	2 year/unlimited Miles
Transmission	5 year/Unlimited Miles
Axle Rear & Front	5 Year/300,000 Miles
Basic Bus Structure	3 year/150,000 Miles

The buses shall afford features essential for safe, efficient and comfortable operation by the operator. This implies the utmost in road and traffic visibility under all driving conditions and adequate means for safe passenger movement. The bus must be maneuvered easily in normal and heavy traffic. All Bidders must conform to these specifications and the product they furnish shall be of first-class quality, and workmanship, and shall be of the best obtainable in the various trades. The design of the body, chassis, and equipment, which the manufacturer proposes to furnish, shall be such as to produce a vehicle of substantial and durable construction in all respects.

To the extent practical, all systems, major sub-systems, and components shall be individually and permanently labeled with Manufacturer, Part Number, and Serial Number. Label is to be located, in each instance, for easiest access for reading while installed for use in the bus. List of all systems, subsystems, and components shall accompany each bus either on paper, CD or DVD.

The manufacturer shall use high pressure hydraulic hoses that meet or exceed SAE 100R5 specifications for all flexible lines except A/C and discharge from the air compressor to the wet tank.

The manufacturer shall be responsible for providing all parts or details which make each bus complete and ready for service, even though such part(s) or details(s) are not mentioned in these specifications.

All buses shall be in compliance with the Americans with Disabilities Act (ADA). These buses shall be new, unused, current model specifically designed for ether intra or inter-city service as applicable and substantially manufactured in the United States (in accordance with "Buy America" requirements). These units must meet all Federal requirements applicable to this type of vehicle. Buses provided under this contract shall be 30-foot, 35-foot, and 40-foot, 45-foot, 60-foot articulated in length, 102 inches wide, nominal with a low or high floor designs.

1.6 Worker and Protective Measures

All bolts or rods passing through wood shall be sealed with zinc chromate or other approved sealing compound. Where wood and wood are placed together, all outer edges of wood, as well as the edges of holes, cutouts and notches shall be coated with a linseed oil and titanium dioxide sealer or zinc chromate or other appropriate sealing compound.

All exterior light fixtures shall be fitted to the contour of the bus body and adequately sealed to prevent entrance of water.

All rubber seals on ventilator doors and compartment cabinet doors shall be placed in 'U' shaped channels to firmly hold the rubber in place. Equally, self-adhering closed cell neoprene seals may be used, without 'U' channels.

All burrs and sharp edges shall be dressed to prevent injury to passengers and employees, or damage to their clothing.

All buses shall be subjected to water tests simulating the severe rain conditions experienced in the Washington State environment. Windows, escape hatches, doors, etc. are subject to an approved water test to be conducted at the manufacturer's facility by the manufacturer and shall be observed by the Resident Inspector(s). Water testing may be verified by further testing at the Purchaser's Maintenance Facility prior to the acceptance of each vehicle if test observation or verification of leak repair is missed on or not observed by the Resident Inspector on any bus built. Any bus that fails to pass the water test shall be corrected by the contractor. The retest/corrective repair cycle shall repeat until the leak(s) have been eliminated to the Purchaser's satisfaction.

1.7 Water Test Description

The roof, roof hatches, front cap, rear cap, sidewalls, passenger windows, driver's windows, destination sign windows, windshields, wheel wells and all doors of all coaches shall be water tested prior to the delivery of each unit as follows:

1. The water test shall consist of a series of nozzles which are strategically located around the perimeter of the vehicle so as to spray water over the entire surface of the vehicle.
2. The nozzles shall eject a volume of water no less than 2.6 gallons per minute per nozzle under a pressure of no less than 22 lbs. per square inch measured at the nozzle tip.
3. The contractor shall be required to water test each vehicle under the conditions described above for no less than 30 minutes (15 minutes with A/C off, then 15 minutes with A/C on) to ensure there are no water leaks in the bus.
4. Bus road testing shall be conducted immediately after the water test. All road tests shall be conducted by the OEM on-site inspectors and verified by Purchaser inspector.

Contractor shall take the necessary steps of corrective action to repair any leaks found as a result of the described test and shall repeat the 30-minute water test to ensure that corrective steps have been successful. This process shall be repeated until no leaks are found. Documentation of each bus shall be kept by the manufacturer as to the location of the leak, what caused the leak to occur and shall describe the repair action taken to prevent the leak from reoccurring.

If the Contractor's bus manufacturing process water test differs from the water test process and criteria described above, then any deviations shall be approved by the Purchaser.

1.8 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 15 miles during the road tests. The plan shall be submitted to the Purchaser for approval.

All zerk grease testing fittings shall be accessible from a pit location with a standard straight nose grease gun.

All vehicles will be road-tested.

1.9 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. All buses shall be weighed at a certified scale and weight slips will be included in the packet from the builder with each coach.

1.10 Capacity

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

1.11 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 operating at least 40,000 miles per year, including the 12th year.

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

Quantity tags shall be provided in a highly visible location next to the fill location for the engine, transmission, differential, power steering, etc. These quantity tags shall be permanently attached and will list the manufacturers recommended fill quantity.

Engines and/or Transmissions, if used, shall be supplied with the Titan Probalyzer # 0D1014 fittings or KP push button sampling valves (or equivalents) installed that are easy

to access: device and location selection to be made at pre-production meeting. (All electric powered buses are excluded from this requirement.)

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 in order 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 which 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.

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 and compartment access keys shall not be included in the special tool list and shall be furnished for each coach.

1.13 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 in 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.

In the event that the Contractor is unable to comply with the interchangeability requirement, the Contractor must notify the Purchaser and obtain the Purchaser's prior written approval, including any changing in pricing.

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

1.14 Training

Along with the purchase of new buses, it is the Purchaser's requirements to have the manufacturer provide an appropriate program of instruction targeted to the operator, servicing, and maintenance personnel. This will be accomplished through a combination of Purchaser on-site and contractor and/or supplier site training. Training will consist of Train the Trainer, Technical, and OEM.

Programs shall include training and testing materials, specific tools, equipment, and identified training aids. The Purchaser shall indicate the training desired and, by mutual agreement, when the performance period is to begin. The contractor will provide Purchaser with a CD-ROM using Portable Document Format (PDF) of all applicable lesson plans, training guides, student workbooks, along with any other videos, transparencies or additional instructional training aids. The contractor shall inform the Purchaser of any training support equipment and/or supplies required to be supplied by the Purchaser for the contractor portion of the training.

All training instructors shall be competent to teach the course area they are instructing. Further, all instructors shall speak English and have a complete understanding of the English language. If the instructor or vendor presenter lacks the skill or knowledge to provide instruction, or cannot communicate with the students, the Purchaser reserves the right to request that the instructor be replaced and the area of training be repeated.

1.15 Train the Trainer

The Contractor shall provide two (2) complete "Train the Trainer" programs of instruction for the Purchaser's training department personnel. One program, **Operator Orientation**, will be designed for Bus Operator Instructors, Street Supervisors and Dispatchers. A second program, **Maintenance Orientation**, will be designed for maintenance training personnel. This training is to be conducted at the Purchaser's facility and will be developed to encompass familiarization, operation, unique characteristics, service, and safety concerns of the vehicle and its systems. Initial training for a new bus order will be 8 hours for Operator Orientation and at least 24 hours for Maintenance Orientation, and shall be a combination of classroom instruction and hands-on instruction, the latter being presented on and around the bus. Additional training for subsequent orders of substantially similar buses will each be at least four hours in length for additional training on new systems. The Contractor shall also provide a training video, powerpoint presentation, or similar presentation for instructors to use for training bus operators on the operation of the bus.

1.16 Operator Orientation

The Contractor shall provide complete training and instruction for Purchaser designated Operations personnel. Class size is not to exceed 10 employees per session. The program shall include, but not be limited to the following:

Operator Compartment; Controls and Switches; Warning Indicators and Gauges; Seat Adjustment; Door Control; Walk Around Inspection; Compartment-by-Compartment Explanation; Mirror Adjustments; Climate Control system; Driving Instruction; Turns; Braking; Transmission; Backing; Wheelchair Ramp Equipment; Controls; Safety; Emergency Procedures; Securing Wheelchairs and Riders; Loading and Unloading.

Each trainee will be given an opportunity to operate the bus with the Contractor's instructor on board. The training shall be delivered on a schedule coordinated between the Purchaser's training department and the contractor. The number of sessions to be provided will be negotiated between the Purchaser's training personnel and the Contractor, with the base requirement being 8 hours.

1.17 Maintenance Orientation

The Contractor shall provide complete training and instruction for Purchaser designated maintenance personnel. Class size is not to exceed 10 employees per session. The program shall include, but not be limited to the following:

> All items indicated in Operator Orientation, in addition to Suspension; Steering; Axles; Electrical systems; Body; Engine & Fuel System; Parts; Engine and Vehicle Service Instruction; Air Conditioning; Doors; Towing; Brakes; Fire Suppression and Air System.

Each trainee will be given an opportunity to operate the bus with the Contractor's instructor on board. The training shall be delivered on a schedule coordinated between the Purchaser's training department and the contractor. The number of sessions to be provided will be negotiated between the Purchaser's training personnel and the Contractor, with the base requirement being 4 hours.

1.18 Technical

The contractor shall provide a structured program of technical training which will consist of specific and identifiably separate curriculum for each subject area. Each subject area training session shall be between eight (8) and forty (40) classroom/hands-on hours based on subject area, with class size being no more than (15) participants. The training will be delivered at the Purchaser's location on a schedule coordinated by the Purchaser's training department and the contractor.

The following subject areas will be offered:

> Body and Chassis, Suspension and Steering, Electrical and Electronics, Air and Brake system, HVAC/Climate Controls, Engine, Transmission, Wheelchair ramp system, Destination Signs, Doors, Axles and Tires, Hybrid Drive, and Fire Suppression. For electric buses propulsion batteries, battery systems, battery management systems, charging systems, drive motors and drive motor controllers offered.

The technical training shall be delivered on a schedule coordinated between the Purchaser's training department and the contractor. The subject area of sessions to be

provided will be negotiated between the Purchaser's training personnel and the Contractor, with the base requirement being 96 hours.

1.19 OEM

The contractor shall provide two (2) class slots at the manufacturer's suppliers training facility for a "train-the-trainer" technical instruction course on the operation, diagnostics, troubleshooting, repair, and servicing of the below listed areas:

1. Engine
2. Transmission
3. Data Communication System
4. Hybrid Drive
5. Fare Collection device.
6. Electric Drive

Each Purchaser will only be allowed to select two (2) of the six (6) training areas to send their two (2) representatives. This represents the OEM base requirement.

The Purchaser's training department shall coordinate the scheduling of training with the contractor. Each training subject area (module), to include manufacturer's supplier training facility slots, shall also be priced separately from the bus in the Price Sheet.

1.20 Operating Environment

The bus shall achieve normal operation in ambient temperature ranges of 10 ºF to 115 ºF, at relative humidity between 5 percent and 100 percent, and at altitudes up to 3000 feet above sea level. Degradation of performance due to atmospheric conditions shall be minimized at temperatures below 10 °F, above 115 °F or at altitudes above 3000 feet. Altitude requirements above 3000 feet 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 SAE J1995.

Purchasers may define operating environments different from the description.

1.21 Secure Lines, Hoses, and Wiring

All lines, hoses, wiring, and similar connective materials shall be tied and secured to not interfere with operation of the vehicle or any component system. At a minimum, electrical wiring shall be insulated. All wiring loom and all wiring harnesses shall be wrapped in weather resistant tubing or wrap material in accordance with applicable local, state, and federal regulations.

2 NOISE

2.1 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. Articulated buses shall be exempted from this requirement for the turntable area, which shall be considered a separate environment.

2.2 Exterior Noise

Airborne noise generated by the bus and measured from either side shall not exceed 80 dBA under full power acceleration when operated 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 65 dBA. If the noise contains an audible discrete frequency, a penalty of 5 dBA shall be added to the sound level measured. All noise readings shall be taken fifty (50) feet from, and perpendicular to, the centerline of the bus with all accessories operating. The Contractor shall comply with the exterior noise requirements defined in local laws and ordinances identified by the Purchaser and SAE J366.

2.3 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.

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 and FTA Docket 90, dated October 20, 1993. Materials entirely enclosed from the passenger compartment, such as insulation within the sidewalls and sub-floor, need not comply. In addition, smaller components and items, such as seat grab rails, switch knobs and small light lenses, shall be exempt from this requirement.

2.4 Fire Suppression

CNG propelled buses must have a methane gas detection system installed and shall have a fire suppression installed per manufacturer's recommendation. Other fire suppression systems may be available as options (Fog Master or similar product).

Fire suppression system shall meet the minimum life cycle of the bus bid. Cylinders should be heavy duty type that can be hydro tested and recertified 12 years after

manufacture date. Cylinders offered must come from new stock that will not affect the life cycle of the bus. Fire suppression manufacture must provide Training on inspections and service as part of the purchase price. Bus OEM shall offer actuators, sensors and other key parts of the suppression system that will need to be replaced during the life of the bus, on the spare parts list.

2.5 Respect for the Environment

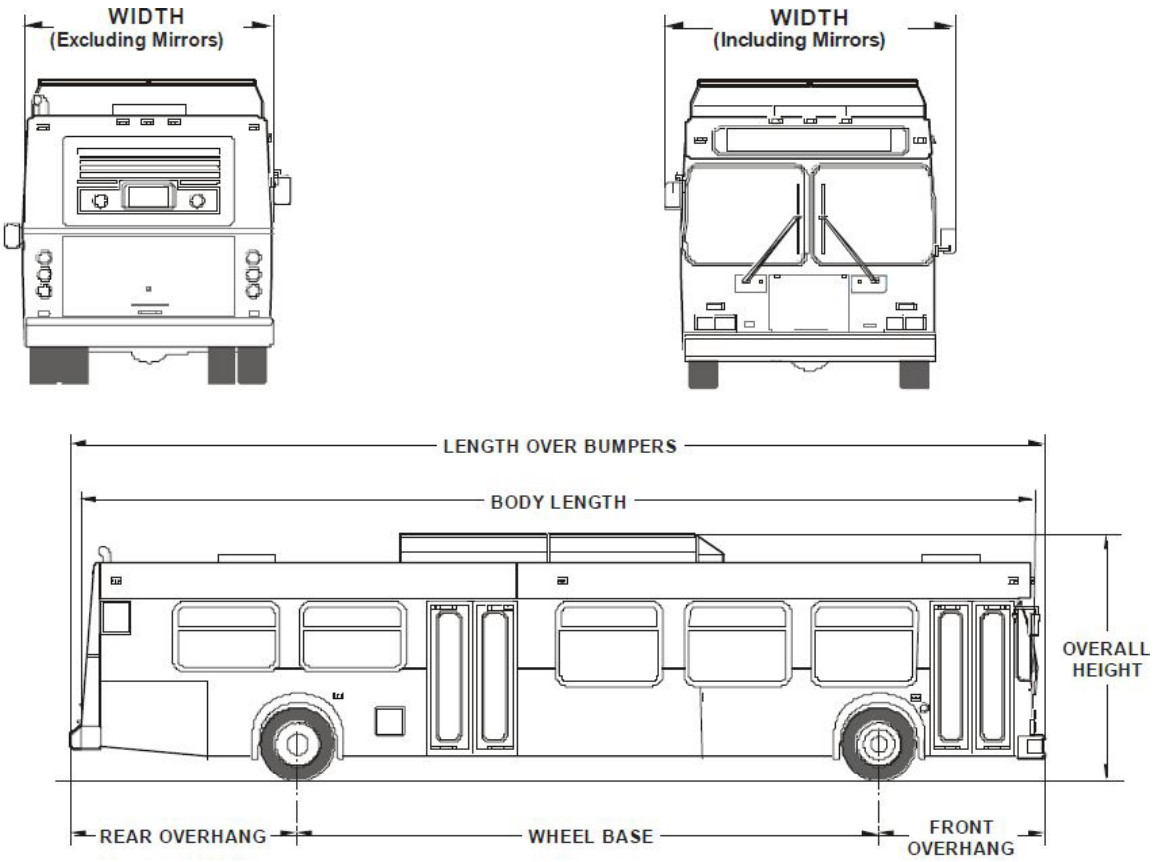
In the design and manufacture of the bus, the Contractor shall make every effort to reduce the amount of potentially hazardous waste. In accordance with Section 6002 of the Resource Conservation and Recovery Act, the Contractor shall use, whenever possible and allowed by the specifications, recycled materials in the manufacture of the bus.

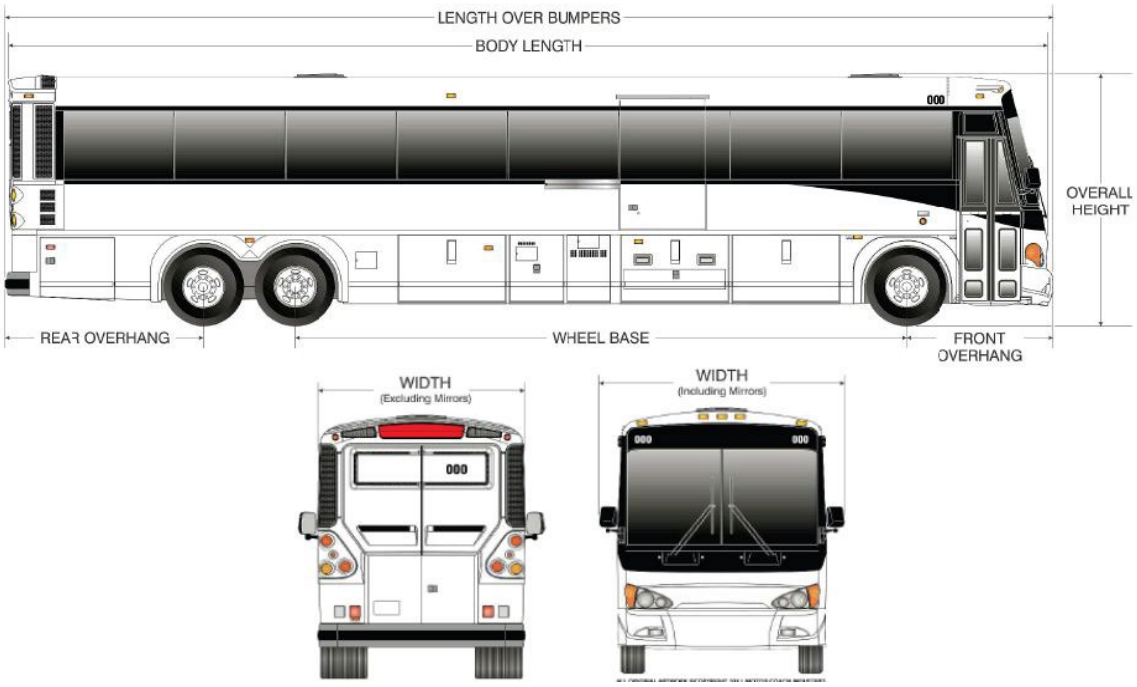
3 DIMENSIONS

3.1 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 as shown in Figure 1 at static conditions and design height.

FIGURE 1





3.2 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.

1. **30-ft bus:** 29 ft, 11 in. to 34 ft, 11 in.
2. **35-ft bus:** 35 ft to 39 ft, 11 in.
3. **40-ft bus:** 40 ft to 44 ft, 11 in.
4. **45 ft bus:** 40 to 45 ft bus:
5. **60ft (articulated) Bus**: 59 to 65 ft

3.3 Bus Width

Body width shall be 102 in. (+0, -2 in.).

3.4 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.

3.5 Step Height

The step height shall not exceed 16.5 in. (+.5, -.5 in.) at either doorway without kneeling and shall not exceed 15.5 in. at the step. A maximum of two steps is allowed to accommodate a raised aisle floor in the rear of the bus.

3.6 Underbody Clearance

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

3.7 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 breakover 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.

TABLE 2

Angle	30 to 45ft Bus	60ft Bus
Approach	8.6 degrees (min.)	8.6 degrees (min.)
Front breakover	8.0 degrees (min.)	10.2 degrees (min.
Rear breakover (articulated only)	N/A	8.7 degree (min.)
Departure	8.6 degree (min)	8.6 degree (min.)

3.8 Ground Clearance

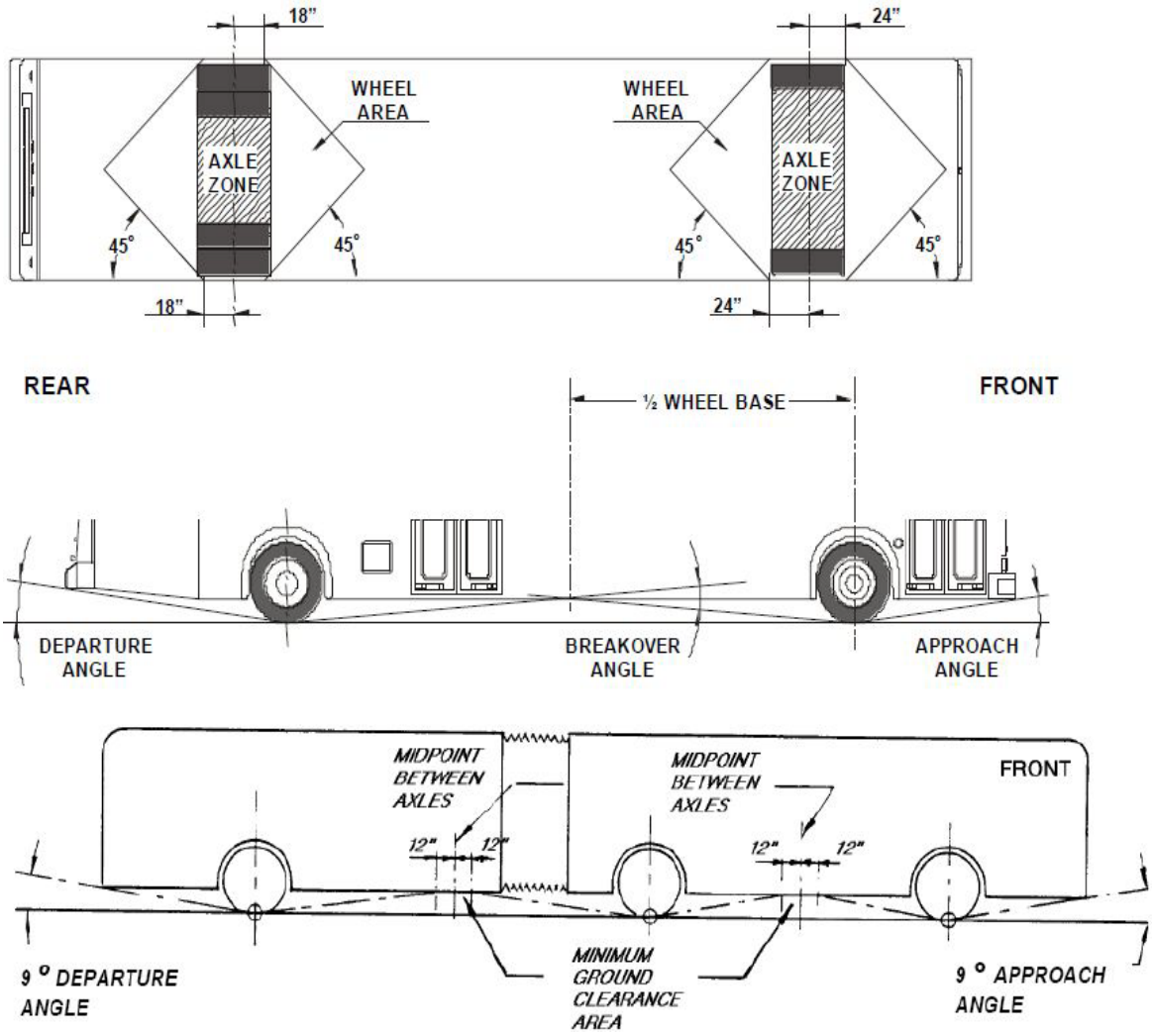
Ground clearance shall be no less than 9 in., (8 in. at jacking pad) except within the axle zone and wheel area.

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



3.9 Floor Height

Height of the step above the street shall be no more than 16 in. measured at the centerline of the front and rear doorway. The floor may be inclined along the longitudinal axis of the bus, and the incline shall not exceed 3.5 degrees off the horizontal except locally at the doors where up to 4 degree slope toward the door is allowed. All floor measurements shall be with the bus at the design running height and on a level surface and with the standard installed tires. A maximum of two steps is allowed to accommodate a raised aisle floor in the rear of the bus.

An exception shall be added for the turntable area of the Articulated Bus where it shall not exceed 5 degrees.

3.10 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.

3.11 Aisle Width

The minimum clear aisle width between pairs of transverse seats with all attached hardware shall be at least 20 in.

The aisle width between the front wheelhouses shall be at least 34 inches, and the entire area between the front wheelhouses shall be available for passengers and mobility aid devices.

4 VEHICLE PERFORMANCE

4.1 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.

4.2 Top Speed

The bus shall be capable of achieving a top speed of 65 mph when driving 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.

*Articulated bus may vary depending on the propulsion system chosen

NOTE: Values are assumed to be sustained. Contractor shall supply Purchaser with data if there is a variance between peak performance and sustained vehicle performance.

4.3 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 and drivetrain shall enable the bus to achieve and maintain a speed of 40 mph on a 2.5 percent ascending grade and 15 mph on a 10 percent ascending grade continuous.

NOTE: Values are assumed to be sustained. Contractor shall supply Purchaser with data if there is a variance between peak performance and sustained vehicle performance.

4.4 Acceleration

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

TABLE 3

Maximum Start Acceleration Times on a Level Surface[1] with full throttle and full brake applied starts.

Speed (mph)	Max Time (Seconds)
10	6
20	12
30	20
40	34
50	60
Top speed	

1. Vehicle weight = GVWR

4.5 Hybrid or Electric

The propulsion and braking systems shall meet the performance requirements of the Duty Cycle. Braking application and performance shall remain consistent regardless of system State of Charge (SOC) or other variances related to regenerative braking.

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

Electric bus must report a minimum range and operating cycle whether operating on a full charge or en route fast charging system.

4.6 Battery Charger

A cable ("pigtail") and battery charger shall be included with the purchase of each electric bus. En route charging systems will be available as an option and priced separately. The battery charger shall by manufacturer agnostic and non-proprietary.

4.7 Operating Range

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

4.8 Diesel

The operating range of the coach when run on the Altoona Test cycle described below shall be at least 350 mi (560 km) or 20 hrs. with full fuel capacity for 40' and larger bus

configurations. The operating range of the coach when run on the Altoona Test cycle described below shall be at least 290 mi (560 km) or 20 hrs. with full fuel capacity for 30’ and 35’ bus configurations.

4.9 CNG

The operating range of the coach when run on the Altoona Test cycle described below shall be at least 250 mi or 14 hrs. with an initial gas settled pressure of 3600 psi at 70 °F.

4.10 Hybrid

The operating range of the coach when run on the design operating profile “Design Operating Profile” shall be at least 350 mi on a full tank of fuel.

4.11 Battery Electric

The operating range of the coach when run on the “Design Operating Profile” shall be at least 120 miles on a full charge at any point during the 12 year useful life of the vehicle, regardless of seasonal loads and driver efficiency.

Alternatively, buses that utilize on-route charging (the ability to fast charge bus batteries while the bus is in revenue service) must be able to travel a minimum of 30 miles on a single charge and be fully chargeable within 10 minutes throughout its designated route, at any point during the 12 year useful life of the vehicle, regardless of seasonal loads and driver efficiency.

4.12 Design Operating Profile (Fuel Economy or Energy Economy/Range Test)

Test results from the Altoona fuel economy tests or other applicable test procedures shall be provided to the Purchaser, when available. Results shall include vehicle configuration and test environment information. Fuel economy data shall be provided for each design operating profile. The design operating profile is assumed to be defined by the Altoona fuel duty cycles as stated below.

Fuel economy tests shall be run on these four duty cycles.

- Duty Cycles (avg speed)
- Manhattan: 6.8 mph
- Orange County: 12.7 mph
- UDDS: 19 mph
- Idle time

Results from Testing of Battery Electric Buses shall be reported in kWh per mile.

Purchaser will provide a percentage of each duty cycle that is representative of Purchaser’s service.

4.13 Hybrid

Energy storage system state of charge correction methods stated in SAE J2711 shall be utilized.

4.14 Electric

The Design Operating Profile must be met under maximum auxiliary loads and at GVWR. It is assumed that buses will start daily duty cycle at maximum standard operating SoC. Batteries shall not be depleted below minimum standard operating SoC during operations. Minimum standard operating SoC shall allow for reserve battery capacity from which the bus can draw upon to return to the closest charging point in degraded mode. Charging of the batteries during normal operations shall not exceed maximum standard operating SoC at any time during charging.

Nominal conditions

- Ambient temperature: 68 °F
- Bus weight: SLW

Worst-case conditions

- Ambient temperature: [Purchaser Define - Worst-case heating and cooling loads when operating in local Purchaser environmental conditions (summer or winter depending on location) as defined by NOAA.com, weather.gov, or other website as specified by the Purchaser.]
- Bus weight: GVWR

The Bidder shall provide the following narratives with its Evaluation Response:

• Narrative description of the methods used to validate that the proposed system will meet the Purchaser design operating profile under nominal and worst-case conditions. Detailed results should include, at a minimum, the following for both nominal and worst-case conditions:

• expected bus range (miles)

• fuel economy (kWh/mile); and

• auxiliary loads (kW).

• Projected performance on the Purchaser design operating profile when the battery reaches end-of-life (EOL) state. The Bidder will provide specific details on EOL criteria. Detailed results should include, at a minimum, the following: expected battery life from factory delivery under normal operating conditions (months), EOL battery capacity (kWh), EOL bus range (miles).

• Description of any required or recommended charge strategies or other bus operation strategies that are necessary to meet the Purchaser design operating profile. Note that the Purchaser requires that operational impacts be minimized.

• Description of the flexibility and considerations necessary to place the proposed bus and its charging solution on any Purchaser route at the Purchaser's discretion.

• Description of any required charge strategies, on-route charge requirements, bus blocking requirements or other bus operational requirements that are necessary to meet the Purchaser design operating profile. Note that the Purchaser requires that operational impacts be minimized.

• Description of the flexibility and considerations necessary to place the proposed bus and its charging solution on any Purchaser route at the Purchaser's discretion.

5 POWERPLANT

Engine (Diesel or CNG)

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.

NOTE: For commuter coaches, minimum rating horsepower of 400 and minimum torque rating of 1400 ft-lb shall be installed.

The engine shall be equipped with an electronically controlled management system, compatible with either 12 or 24 V-power 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 Purchaser. The integration of all systems on the vehicle relative to engine idle speed shall be the responsibility of the Contractor 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 de-rate power and/or speed and initiate engine shutdown as needed.

5.1 Automatic Engine Protection/Shutdown Override Feature

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 Purchaser. The engine control system shall protect the engine against progressive damage. The system shall monitor conditions critical for safe operation and automatically de-rate power and/or speed and initiate engine shutdown as needed. The on-board diagnostic system shall trigger an audible alarm and warning light to signal the operator when the engine control unit detects a malfunction and the engine protection system is activated.

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

- Coolant Level
- Coolant Temperature
- Oil Pressure
- Oil Temperature
- 15 minutes of idling
- Exhaust Temperature
- Fire Suppression

5.2 Excessive Idle Shutdown

Provisions will be made for the automatic shutdown after 15 minutes of idling shall occur when the engine has been in idle speed or fast idle for fifteen (15) minutes with the front master switch in “Day” or “Night” position, parking brake applied, and the ramp in stow position. Also, the interior lights shall be extinguished and all the exterior lights shall be extinguished except that in “night run” the parking/marker/ID lights shall remain on. (The headlights and the daylight running headlights will be extinguished.) **Purchaser approval is required for this shutdown option, selection to be made at the pre-production meeting**. (Intermotive Engine Monitoring System or equivalent if required by the engine manufacturer)

The automatic shutdown for the Fire Suppression feature shall occur when the Fire Suppression system is discharged.

A control shall be available to the operator/driver, to allow temporary override (30-45 seconds) of the engine protection/shutdown system if engine power is required to move the bus in emergency conditions. Override action shall be recorded. This data shall be retrievable by the Purchaser.

The integration of all systems on the vehicle relative to engine idle speed shall be the responsibility of the Contractor and shall meet the requirements of the transit property.

The engine starting system shall be protected by an interlock that prevents its engagement when the engine is running.

Engine throttle operation shall be inhibited, through interlocks, whenever:

1. Front or rear door open (front door optional: selection made by Purchaser)
2. The vehicle is kneeled
3. Wheelchair ramp is in operation
4. Rear door emergency release
5. Fast Idle Operation

Failure of the engine throttle control shall not result in an unsafe condition. Loss of air or electrical throttle control shall inhibit throttle.

The engine shall have on-board diagnostic capabilities, able to monitor vital functions, store out of parameter conditions in memory, and communicate faults and vital conditions to service personnel. Diagnostic reader device connector ports, suitably protected against dirt and moisture, shall be provided in operator's area and near or inside engine compartment. The on-board diagnostic system shall inform the operator via visual and/or audible alarms when out-of-parameter conditions exist for vital engine functions. All removable caps shall be tethered including the caps for the diagnostic connector ports in the operator's area and in the engine compartment.

5.3 Fast-Idle System

The fast-idle device shall be activated and controlled automatically by the engine control system. This device will operate only when the transmission is in neutral. This is not required for electric buses.

Optional fast-idle: The engine shall be equipped with an operator-controlled fast idle device. The fast idle control shall be a guarded two-way toggle switch mounted on the dash or side console and shall activate only with the transmission in neutral and the parking brake applied.

5.4 Engine (CNG)

The engine shall meet all regulatory requirements when operating on fuel equal to CARB Specifications for Compressed Natural Gas #2292.5. The four predominant characteristics that must be met are methane, ethane, butane, and propane.

5.5 Hybrid Propulsion System

Propulsion System Description

The bus shall be powered by a hybrid propulsion system. Function and operation of the bus shall be transparent to the Bus Operator and passengers. The OEM shall assure that the bus structure can successfully accept the installation of the propulsion system and be operated on the stated duty-cycle for a period of 12 years without a structural failure. At a minimum, propulsion system shall comply with applicable local, state, and/or federal emissions and useful life requirements. The propulsion system shall comply with local, state, and federal (maintenance) and other applicable sections.

The Hybrid Drive System shall be rated for the GVWR or greater of the bus.

Labels should be posted on high-voltage devices to identify them as components conducting high voltage potential. These labels shall be applied in such a way that they can be seen when access doors are opened or closed, so as to protect both emergency and maintenance personnel.

A detailed description of the propulsion system shall be provided with the bid. The description shall include a written narrative, a block diagram showing major propulsion system components, an illustration showing the physical layout of propulsion components and high-voltage wire routing within the vehicle, and a detailed wiring

diagram and/or electrical schematic for the high-voltage system. Bidder is required to provide a list of applicable industry standards that the proposed propulsion system meets.

5.5.1 Hybrid System Controller (HSC)

The HSC regulates energy flow throughout hybrid system components in order to provide motive performance and accessory loads, as applicable, while maintaining critical system parameters (e.g., voltages, currents, temperatures, etc.) within specified operating ranges.

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

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

5.5.2 Engine (Hybrid)

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

The Contractor shall provide the Purchaser with expected durability of the engine and related emission systems.

The engine shall be equipped with an electronically controlled management system, compatible with multiplex wiring systems and either 12 or 24 V electrical systems.

The engine shall have onboard diagnostic capabilities, be able to monitor vital functions, store out-of-parameter conditions in memory, and communicate faults and vital conditions to service personnel. Diagnostic reader device connector ports, suitably protected against dirt and moisture, shall be provided in the operator's area and near or inside the engine compartment. The onboard diagnostic system shall inform the operator via visual and/or audible alarms when out-of-parameter conditions exist for vital engine functions.

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 engine when exposed to temperatures less than 30 °F (−1 °C) for a minimum of 4 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 Purchaser.

5.6 Electric Propulsion System

Propulsion System Description

The bus shall be powered by an electric propulsion system. To the greatest extent practical, the electric propulsion system shall conform to SAE J2910 and SAE J2344.

The propulsion system shall not be supplemented by any onboard range extenders, including but not limited to internal combustion engines, gas turbines and/or hydrogen fuel cells.

The Bidder shall ensure that the bus structure is suitable for the electric propulsion system and can be operated safely on the Design Operating Profile for the service life of the bus without a structural failure. The propulsion system shall comply with applicable local, state and/or federal emissions and useful life requirements.

Labels should be posted on high-voltage devices to identify them as components conducting high voltage potential. These labels shall be applied in such a way that they can be seen when access doors are opened or closed, so as to protect both emergency and maintenance personnel.

A detailed description of the propulsion system shall be provided with the bid. The description shall include a written narrative, a block diagram showing major propulsion system components, an illustration showing the physical layout of propulsion components and high-voltage wire routing within the vehicle, and a detailed wiring diagram and/or electrical schematic for the high-voltage system. Bidder is required to provide a list of applicable industry standards that the proposed propulsion system meets.

5.7 Propulsion System Service (ALL)

The propulsion system shall be arranged so that accessibility for all routine maintenance is assured. No special tools, other than dollies and hoists, shall be required to remove the propulsion system or any subsystems. However, the Purchaser shall recognize that properly rated test equipment and safe electrical work practices are essential when servicing high voltage hybrid components. The exhaust system, air cleaner, air compressor, starter (if used), alternator, radiator, all engine accessories, and any other component requiring service or replacement shall be easily removable. Contractor shall provide all specialty tools and diagnostic equipment required for maintaining the Propulsion System in accordance with Special Tools List.

5.8 Primary Propulsion Unit and Traction Motor (electric and hybrid)

The primary propulsion unit and traction motor may be configured in a variety of methods dependent upon type of drive, series and/or parallel. The definition of motor in the context of this specification assumes the device can provide or consume energy as well as provide or retard mechanical motion.

5.9 Prime Power Unit (PPU)

The PPU and related emission systems shall meet all applicable emissions and design/durability guidelines and standards.

Contractor shall provide Purchaser with expected durability of the PPU and related emission systems.

5.10 Propulsion System Service

The propulsion system shall be arranged so that accessibility for all routine maintenance is assured. No special tools, other than dollies and hoists, shall be required to remove the propulsion system or any subsystems. However, the Purchaser shall recognize that properly rated test equipment and safe electrical work practices are essential when servicing high voltage components. Contractor shall provide all specialty tools and diagnostic equipment required for maintaining the Propulsion System in accordance with Special Tools List.

5.11 Propulsion System Controller

Motor Controller(s) shall regulate energy flow throughout system components. The controller(s) shall monitor and process inputs and execute outputs as appropriate to control the operation of all propulsion system components. Controller(s) shall have bi-directional power control providing drive and charging functions with inverter and motor control.

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

Energy Storage System State of Charge (SoC) correction methods stated in SAE J2711 shall be used (for all-electric or hybrid).

5.12 Traction System

The traction system shall provide the necessary torque to meet the gradeability, startability, and acceleration specifications.

The motor(s) shall have thermal warning to prevent damage in the event there is an over temperature situation. The Contractor shall comply with all subcomponent vendor's requirements and recommendations regarding motor design, sizing, and method of cooling or loading specifications. The inverter/motor combination shall be designed to operate for not less than 200,000 miles in the anticipated duty cycle without major failure or significant deterioration.

Adequate provision for lubrication, cooling, and monitoring of these functions shall be provided. The motor(s) are to be mounted on resilient mounts to provide for maximum isolation of noise and vibration.

5.13 Energy Storage System and Controller (hybrid or electric)

The Energy Storage System (ESS) shall be of a commercial design capable of operating in the Purchaser transit environment and design operating profile. The ESS shall use battery technology with a field-proven track record of safe, reliable and durable operation in similar transit applications. The ESS shall be designed, sized and selected to ensure that

the vehicle performance specifications, compatibility with charging, and other related requirements are met or exceeded, bearing in mind cost/benefit and reliability variables as they relate to the characteristics of the different battery types.

The ESS shall comply with UN/DOT 38.3 and/or SAE J2464 requirements for lithium batteries or similar standards for non-lithium batteries.

The Contractor shall deliver the buses with an installed, functioning ESS charged with at least 25 kWh of usable energy. The ESS shall be fully formed, installed and tested in accordance with the battery manufacturer's recommended practices. The ESS design, including containers, module bracing systems, thermal-management systems, battery-management systems, watering/venting systems, interconnections, fusing and traction-controller and charger interfaces shall be adequately described in the bid. The bid shall include a description of all battery maintenance requirements including any periodic charge requirements necessary for cell balancing. The bid shall also include a comprehensive statement of the warranty terms relating to the battery, including explanation of all disclaimers within the warranty. The charge cycle and cycle life shall be stated in the bid, and a life-cycle cost analysis of the proposed battery system in the specified application shall be provided.

The battery system shall be capable of withstanding the current and voltage profiles necessary to accomplish daily recharge events within the defined operating profile.

Thermal management will be provided as needed to ensure optimal life and performance of the ESS over the environmental operating range. The battery thermal management system shall be adequate to maintain the battery within the battery manufacturer's recommended temperature range during operation in the specified duty cycle and climatic conditions.

Bids shall include complete descriptions of all life-cycle testing procedures used to validate the life of batteries used for this application at the proposed charging rates, charge durations, and expected ambient temperatures and operating profiles. Bidders shall include documented results of life-cycle testing. Bidders shall include certification of battery life-cycle testing by an independent testing agency.

The energy controller shall be provided with operating software capable of monitoring features such as temperature, voltage, current.

Propulsion batteries shall not exist within the passenger compartment of the transit bus and the impact to range and performance, per section 4.12, shall be noted, communicated and agreed upon prior to issuing a notice to proceed by the Purchaser.

5.14 Energy Storage System Capacity

The ESS shall have sufficient energy storage to meet the requirements of the intended duty cycle when new and up until the degradation has reached warrantable end of life

(WEOL). As an example if the capacity when new is 300 kWh and the WEOL is at 80 percent, then the useable capacity range shall be from 300 to 240 kWh.

The ESS shall be measured periodically during the 12-year design life of the buses per the following protocol by the Contractor at an interval of at least every 3 years. The Contractor will propose the test method, and certify the results are true and accurate. The test will be performed according to a documented test procedure. The Purchaser is allowed to engage third-parties for capacity testing.

5.15 Energy Storage System Safety

The ESS shall be placed on the bus to optimize both interior space and vehicle weight distribution. The batteries shall be load distributed within the bus to equalize weight between the wheels on the same axles and to achieve appropriate weight distribution between axles so as not to adversely affect handling of the bus.

The bus body shall be designed and constructed to ensure that passengers and the operator will not be exposed to hazardous electrical current. This design will also minimize potential exposure to hazardous electrical current in the event of a vehicle accident. Analysis and test data shall be provided to the Purchaser. The vehicle and energy storage system shall be designed and constructed to prevent gassing or fumes from the energy storage system from entering the interior of the bus, i.e., a vent path to the exterior, preferably at or above the roof, rearward.

Written confirmation from the battery manufacturer attesting to the safety of the proposed battery system in the specified application and charging profile shall be submitted as part of the proposal, and shall include full disclosure and discussion of any and all relevant issues or prior incidents relating to safety.

Proposals shall include complete descriptions of all safety standards followed in the design and manufacture of the battery system, safety testing procedures used to validate the safety of battery operation in this application, and documented results of safety testing to confirm that standards have been met.

Both automatic and manual battery disconnect devices must be included and documented. Contactors shall be rated to interrupt the full load of the bus. Service and emergency manual disconnects must be included and their usage documented. Contractor shall provide a means to isolate the high-voltage battery during maintenance operations. Manual and automatic disconnects should open both poles of each physical battery pack.

The HV system and ESS shall include isolation protection between the HV and bus chassis system, to include automatic detection of isolation faults, alerts to the operator, diagnostic system and appropriate action to prevent personnel from HV exposure. Detection, alerting, and vehicle control shall occur in accordance with SAE J2910. Detection shall be provided at two levels, as per J2910, and detection at any level shall be alerted to the operator and maintenance personnel.

The system described above may also be an integral part of the overall emergency shutdown system, with functions to include the following:

- Offers a quick, safe and organized means for the operator, maintenance personnel and/or first responders to shut down the HV system.
- Shutting down the system shall include at least:
  - "opening" all HV contactors;
  - discharging capacitors (if used); and
  - disconnecting any devices that could provide HV, during normal operation and including during charging.
- Devices used to initiate shutdown shall be located within and outside the bus to satisfy ease of use by the mentioned personnel and be clearly marked as to location and use.
- In addition to manual use, this same functionality shall extend to the charging operation in the event of a fault sensed by the GFI, to also include termination of charge.

5.16 Battery Containers

Battery containers shall be constructed to withstand the rigors of transit service for the design life of the buses. Connector and cabling design shall be such that inappropriate or unsafe connections are not possible. Vent-and-fill system components for individual packs or containers shall not require any disassembly on removal or installation of the battery packs or containers. Battery pack design shall ensure the protection of battery cabling and vent/watering system components during pack removal and installation. The batteries, when installed, shall be secured to prevent any movement while the vehicle is in operation.

5.17 Battery Management System

An imbedded battery management system (BMS) shall be provided for diagnostic and management of power to the batteries. The battery management system must be designed to ISO 26262, safety principles to control state of charge, voltage, current and temperatures on a cell-to-cell level and provide diagnostic output at the lowest field-serviceable element. The diagnostic output must be made available to the maintainer.

As a minimum, the battery management system (BMS) must perform the following functions:

1. The BMS must be capable of managing the charging and discharging of the battery power contactors, power limit, current detection, battery temperature, and voltage sampling.
2. The BMS must be capable of balancing the voltage among the individual cells within the battery modules.
3. The BMS must be capable of monitoring the voltage of cells within each battery pack. The BMS must be able to read individual battery or block voltages at a frequency of one data point per block every 15 seconds.

4. The BMS must be capable of monitoring battery temperatures, mitigating damage to the battery and surroundings, and preventing thermal runaway.
5. The BMS must be capable of communicating when a battery fault (as defined by the battery manufacturer) has occurred and must be able to identify and communicate the location of the faulty battery in order to perform maintenance.
6. The BMS must be capable of engaging prudent safety interlocks when an unsafe battery condition has been detected.
7. The BMS must be able to monitor the battery SoC and provide information to the rest of the vehicle.
8. The BMS must be able to communicate all data to the bus level information system for storage and communication

5.18 Battery Charging

The bus shall support an SAE-approved charging standard (SAE J1772 DC and/or SAE J3068 AC). Contractor shall provide a detailed description of its charging system and specify its compliance with one of the above-listed standards. Bidders shall include a description of the charging infrastructure required to install and operate the charging equipment.

All charging systems provided for use with the bus and in conjunction with the battery management system must comply with the battery manufacturer's electrical and thermal limits.

The buses must be immobilized during all charging operations. Upon successful engagement of the charging interface, the bus shall be interlocked such that propulsion is rendered nontractive and the brakes applied.

Contract can provide options for charging of the energy storage system for determination by the Purchaser. The options can include conductive charging or inductive charging options as needed to meet the required duty cycle. The charging systems can provide for options of quick charging, inductive charging, and stationary depot charging.

The Energy Storage System shall also make use of regenerative braking. The Energy Storage System shall comply with UN/DOT 38.3 requirements for lithium batteries or similar standards for non-lithium batteries.

5.19 Battery Thermal Management

If required by the battery manufacturer, thermal management via refrigeration or external cooling shall be provided to ensure optimal life and performance of the ESS over the environmental operating range.

6 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. The base bus will utilize an electric fan system. A hydraulic drive, mechanical drive or electrical drive fan system to maintain efficient operating temperatures, per engine manufacturer's specifications, will be made available as options.

6.1 Motor Cooling System (Electric)

The cooling system fan controls shall sense the temperatures of the operating fluids and the intake air, and will engage the cooling fan to ensure safe operating conditions. The fan control system shall be designed with a fail-safe mode of "fan on." The cooling fan shall be temperature controlled.

The radiator shall be of durable corrosion-resistant construction with non- removable tanks. The radiator shall be designed to withstand thermal fatigue and vibration associated with the installed configuration

The motors shall be liquid cooled. Motor temperature sensors shall be easily accessible for replacement. Motor temperature sensors shall not disable the bus at any time.

The bus shall be equipped with an electric fan drive bus cooling system. A screen guard shall be installed on electric motor fans per SAE J1308. The cooling fan and mounting bracket shall be designed to withstand thermal fatigue and vibration associated with the installed configuration.

The cooling fan shall be temperature controlled. Variable fan speed shall be used to keep the engine within operation temperature. Engine cooling, Charge Air Cooling and Hybrid Drive Cooling shall be managed has different fan groups.

6.2 Transmission Cooling

The transmission, if used, shall be cooled in order to maintain operating fluids within the transmission manufacturer's recommended parameters of flow, pressure and temperature. The cooling system shall be able to cool the transmission while operating continuously at highway speeds

6.3 Electric Drive System Cooling

Thermal management system shall maintain electric drive system components within design operating temperature limits in all driving conditions

6.4 Engine Cooling

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

Electric fans shall be brushless, variable speed, reversible and have a corrosion resistant metal shroud with finger guards that meet SAE spec J1308 200808. The fans should provide discreet fault reporting and have diagnostics capability through the standard SAE J1939 diagnostics port or the multiplex system. The cooling system shall consist of multiple electric DC brushless pusher type variable speed fans with electronic feedback controls. Electric fan motor speeds shall have a minimum operating range of 0-4100 RPM with capability of manual or automatic reverse operation in order to assist in debris removal.

The entire cooling system shall be self-purging.

If applicable, the cooling system shall be equipped with a master controller with the following capabilities; automatically reduce fan speed when the vehicle stops to minimize noise at the curbside, communicate on the J1939 CAN data link with system diagnostic reporting via DM1 messaging, review and download data via a laptop with service tool software, capable of software and calibration up-dates, receive commands from the engine or transmission ECM, report fault codes by lighting an engine compartment LED flashing light, sense engine compartment temperature and activate fans if maximum temperature is exceeded, collect and store cooling system and vehicle performance histogram data. If system controller loses communication with the engine or sensors it shall direct all fans to go into a default speed mode to avoid vehicle shutdown. If fans lose communication with system controller, they shall go into a default speed mode to avoid vehicle shutdown.

This communication shall use the industry standard RP1210 compliant data link adapters connected via the standard 9-pin diagnostic connector found in the engine compartment and interior of the bus. Diagnostic detection shall be capable of identifying which fan group is experiencing a fault condition. Report both active and previously active fault codes with the number of detections/occurrences, time of the first and most recent fault detection, and cumulative time the fault was active. Where electric fans are used for cooling there shall be ample field experience.

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. When activated, any coolant exiting this pressure relief shall drain to

the overflow tank. Both shall be accessible through the same access door. This section does not applicable to electric bus.

The radiator, and charge air cooler if integrated, shall be of durable corrosion-resistant construction. Brazed aluminum radiators shall have welded cast tanks. The radiator shall be designed so a mechanic can gain access to a substantial portion of the side facing the engine for the purpose of cleaning the radiator in five minutes or less.

Radiators shall have a fin density 10 fins per inch or less and shall not have louvered/slit designs. These are more susceptible to clogging and deteriorating cooling performance over time and shall not be used. Radiators shall utilize a bar and plate design or fin and tube type heat exchanger, so they are robust and can be cleaned with high pressure spray wash.

A secondary cooler may be used to increase the ambient temperature capacity for a cooling system. The secondary cooler shall be remote mounted, but below the coolant surge tank. Air flow should be provided with brushless electric fans. If an application requires a boost pump to maintain coolant flow to the secondary cooler, a brushless electric water pump shall 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.

6.5 Electronic Fans

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

6.6 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 in. or a 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.

6.7 Standard Requirement for Coolant Filtration

The engine cooling system shall be equipped with a properly sized water filter with a spin-on element and an automatic system for releasing supplemental coolant additives as needed to replenish and maintain protection properties. When replacing the water filter, only the water in the filter will be lost.

6.8 Self-Cleaning

Radiator and charge air cooler fan(s) shall be electrically driven and capable of automated reverse operations for periodic self-cleaning of the radiator and charge air cooler.

6.9 Standard Mounting Design

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

6.10 Cooling Fan Controls

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

6.11 Charge Air Cooling

The charge air cooling system also referred to as after-coolers or inter-coolers shall provide maximum air intake temperature reduction with minimal pressure loss. The charge air radiator shall be sized and positioned to meet engine manufacturer's requirements. The charge air radiator shall not be stacked ahead 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.

6.12 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 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.

6.13 Hybrid Drive System Cooling

Thermal management system shall maintain hybrid system components within design operating temperature limits.

6.14 Electric Drive System Cooling

Thermal management system shall maintain electric system components within design operating temperature limits.

7 Transmission (Conventional Powertrain)

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 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-volt power 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 time stamp out-of-parameter conditions in memory, and communicate faults and vital conditions to service personnel. The transmission shall contain built-in protection software to guard against severe damage. The on-board diagnostic system shall trigger a visual alarm to the driver when the electronic control unit detects a malfunction.

An electronic transmission fluid level monitoring and protection system shall be provided. Models with remote mounted transmission vents shall have vents mounted to prevent plugging and/or the entry of foreign materials. Automatic neutral functions are optional.

8 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 and shall activate the brake lights.

The retarder shall be adjustable within the limits of the powertrain and activated when the brake pedal is depressed. The Purchaser will work with the OEM/drive system manufacturer to determine retarder performance settings.

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

8.1 Retarder- Regenerative Braking (Electric Bus)

The powertrain 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 and need not activate the brake lights.

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

The system shall be designed whereby increasing the pressure on the brake pedal increases the amount of regenerative capability up until a preset point is reached within the brake pedal travel whereby the mechanical brake is engaged. Regenerative braking shall continue to operate during mechanical braking.

Red lights shall illuminate when regenerative braking is activated. The regenerative braking shall be adjustable within the limits of the powertrain and activated when the brake pedal is depressed or upon release of accelerator pedal.

8.2 Braking Resistors

The system shall include a means of maintaining dynamic braking (braking retardation) after the hybrid energy storage system can no longer accept regenerative braking energy. The system may use air cooled braking resistors, liquid cooled braking resistors, electrically back-driving the diesel engine, other means or a combination of means. The system shall be sized to dissipate sufficient energy to allow the bus to maintain a speed of no greater than 30 mph on a 6% downgrade for a minimum of 4 miles at GVWR. The system shall allow the bus to maintain this speed without engaging the service brakes.

8.3 Engine Brake (Commuter Coach)

The powertrain shall be equipped with an engine brake designed to extend brake lining service life. The application of the engine brake shall cause a smooth blending of both engine brake and service brake function and shall not activate the brake lights.

Brake lights shall not illuminate when the retarder is activated.

The retarder shall be adjustable within the limits of the powertrain and activated when the brake pedal is depressed. The Purchaser will work with the OEM/drive system manufacturer to determine retarder performance settings.

8.4 Standard Requirement for Retarder Activation

The retarder shall be adjustable within the limits of the powertrain and activated when the brake pedal is depressed. The Purchaser will work with the OEM/drive system manufacturer to determine retarder performance settings.

8.5 Accessible Retarder Disable Switch

The retarder disable switch shall be accessible to the seated driver. This requirement is not applicable to electric bus.

Disabling retarder shall be recorded for Purchaser data collection.

9 Mounting

All electrical/electronic hardware shall be serviceable. All electrical/electronic hardware mounted in the interior of the vehicle shall be resistant to tampering from passengers.

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 protective enclosure. The hardware shall be mounted in such a manner as to protect it from the environment.

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

All powerplant mounting shall be mechanically isolated to minimize transfer of vibration to the body structure and provide a minimum clearance of 0.75 inches. Mounts shall control the movement of the powerplant so as not to affect performance of belt-driven accessories or cause strain in piping and wiring connections to the powerplant.

9.1 Service (Electric)

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, air compressor, radiator, all accessories and any other component requiring service or replacement shall be easily removable.

Radiator filler caps shall be closed with spring pressure or positive locks to prevent leakage. All fluid fill locations shall be properly labeled to help ensure that correct fluid is added. All fillers shall be easily accessible with standard funnels, pour spouts and automatic dispensing equipment.

9.2 Service (Diesel, CNG or Hybrid)

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.

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

The engine and transmission shall be equipped with sufficient heavy-duty fuel and oil filters for efficient operation and to protect the engine and transmission between

scheduled filter changes. All filters shall be easily accessible and the filter bases shall be plumbed to ensure correct reinstallation.

9.3 Engine Oil Pressure and Coolant Temperature Gauges

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

9.4 Engine Air Cleaner

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 air filter. The engine air cleaner must be able to be changed out easily. The engine air cleaner shall be easily accessible without the need to disassemble other parts to access the filter.

Contract shall provide an approved air filter gauge in a location that is both approved by the engine manufacturer and approved by the Purchaser, if required by the Purchaser.

9.5 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.

9.6 Hydraulic System Sensors

Sensors in the main hydraulic system, excluding those in the power steering system, shall indicate on the driver's on-board diagnostic panel conditions of low hydraulic fluid level.

9.7 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.

All hydraulic hoses in engine compartment should have outer cover or sheath to reduce the chance of a fluid leak contacting hot exhaust.

9.8 Fittings and Clamps

All clamps shall maintain constant tension at all times, 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.

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

Charge air piping not required for electric buses.

9.10 Radiator

If liquid cooling is used, the radiator and/or heat exchanger shall be a heavy-duty metal unit, preferably constructed with a copper core. It is preferred to be of the tube type with bolted-on upper and lower tanks and with no solder-to-coolant contact. The radiator shall be accessible for cleaning. Any radiator shall be easily removable from the bus. Aluminum brazed/soldered radiator and/or heat exchanger may be used for low-temperature coolant systems only.

Radiator piping shall be stainless steel or brass tubing, and if practicable, hoses shall be eliminated. Necessary hoses shall be impervious to all bus fluids. All hoses shall be secured with stainless steel clamps that provide a complete 360-degree seal. The clamps

shall maintain constant tension at all times, expanding and contracting with the hose in response to temperature changes and aging of the hose material.

9.11 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 resistant 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.

10 FUEL

10.1 Fuel Lines

Fuel lines shall be securely mounted, braced and supported as designed by the Contractor 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. Fuel lines shall be capable of carrying the type of fuel specified by the Purchaser (i.e., up to B20 type fuel).

10.2 Fuel Lines, CNG

Fuel lines shall comply with NFPA-52. All tubing shall be a minimum of seamless Type 304 stainless steel (ASTM A269 or equivalent). Fuel lines and fittings shall not be fabricated from cast iron, galvanized pipe, aluminum, plastic, or copper alloy with content exceeding 70 percent copper. Pipe fittings and hoses shall be clear and free from cuttings, burrs or scale. Pipe thread joining material that is impervious to CNG shall be utilized as required. Fuel lines shall be identifiable as fuel lines only.

High-pressure CNG lines shall be pressure tested to a minimum of 115 percent of system working pressure prior to fueling. CNG, nitrogen or clean, dry air shall be used to pressure test the lines/assembly. The Contractor shall have a documented procedure for testing the high-pressure line assembly. Fuel lines shall be securely mounted, braced and supported using “split-block” type or stainless-steel P clamps; all mounting clamps shall be mounted to a rigid structure to minimize vibration and shall be protected against damage, corrosion or breakage due to strain, rubbing, or wear by using stress loops or “z” bends or equivalent as needed. “Floating clamps” (not mounted to a rigid structure) shall not be permitted. Fuel lines shall not be used to secure other components (wires, air lines, etc).

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

Fuel hose connections, where permitted, shall be less than 48 in. in length, made from materials resistant to corrosion and action of natural gas, and protected from fretting and high heat and shall be supported approximately every 12 in.

11 DESIGN AND CONSTRUCTION

11.1 Design and Construction, Diesel, (Not applicable to Electric Buses)

11.1.1 Fuel Tank(s)

The fuel tank(s) shall be made of corrosion resistant stainless steel. The fuel tank shall be made of sufficiently heavy gauge 300 series or ASTM Spec. A240 stainless steel.

Cross-Linked Polyethylene fuel tank with internal baffling to minimize fuel movement may be listed as an option.

11.1.2 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 ⅜-inch size and shall be located at the lowest point of the tank(s). The fuel tank(s) shall have an inspection plate or easily removable filler neck to permit cleaning and inspection of the tank(s) without removal from the bus. The tank(s) shall be baffled internally to prevent fuel-sloshing noise regardless of fill level. The baffles or fuel pickup location shall assure continuous full power operation on a 6 percent upgrade for 15 minutes starting with no more than 25 gallons of fuel over the unusable amount in the tank(s). The bus shall operate at idle on a 6 percent downgrade for 30 minutes starting with no more than 10 gallons of fuel over the unusable amount in the tank(s). All systems/engines on all model buses will be compatible with all blends of Bio-Diesel fuel based on manufacturer's recommendations up to 20% maximum.

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.

11.1.3 Labelling

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

11.1.4 Fuel Filler

The fuel filler shall be located 7 to 32 feet behind the centerline of the front door on the curbside of the bus. The filler cap shall be retained to prevent loss and shall be recessed into the body so that spilled fuel will not run onto the outside surface of the bus.

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

11.1.5 Dry-break fuel filler

The fuel filler shall accommodate a nozzle that forms a locked and sealed connection during the refueling process to eliminate spills. Fuel shall not be allowed to flow into the tank unless the nozzle has been properly coupled, locked and sealed to the filler. With the nozzle open, fuel shall enter the tank at a fill rate of not less than 40 gallons per minute of foam-free fuel without causing the nozzle to shut off before the tank is full. The nozzle shall automatically shut off when the tank is essentially full. Once disconnected, fuel shall not be allowed to flow through the nozzle at any time. Any pressure over 3 psi shall be relieved from the fuel tank automatically. An audible signal shall indicate when the tank is essentially full. The dry break system shall be compatible with the Purchaser's system. The fuel filler cap shall be hinged. Equipment will be finalized at pre-production meeting.

11.2 Design and Construction, CNG

11.2.1 Fuel Containers/Cylinders

CNG fuel containers/cylinders must satisfy current 20 years from date of manufacture rating. Fuel tanks should be visually inspected at least every 36 months or 36,000 miles, whichever comes first, and

- After an accident or fire and;
- After a dispenser malfunction that results in pressure greater than 125% service pressure.

CNG fuel containers/cylinders must also be designed, constructed, manufactured, and tested in accordance with at least one of the following:

11.2.2 U.S. Applications:

The design and construction of the fuel system supplied by the OEM shall comply with federal and local regulations.

- NFPA 52-Standard for Compressed Natural Gas (CNG) Vehicular Fuel Systems
- FMVSS 304
- Any local standard(s) specifically intended for CNG fuel containers

11.2.3 Installation

Fuel cylinders shall be installed in accordance with ANSI/IAS NGV2 - 1998, Basic Requirements for Compressed Natural Gas Vehicles (NGV) Fuel Containers and NFPA 52, Compressed Natural Gas (CNG) Vehicular Fuel Systems Code, 1998 edition Section 303. In the case of a low floor transit bus, the placement of tanks shall be limited to the roof of the vehicle or in the compartment above the engine of the vehicle.

Fuel cylinders, attached valves, pressure relief devices, and mounting brackets should be installed and protected so that their operation is not affected by bus washers and environmental agents such as rain, snow, ice or mud. These components should be protected from significant damage caused by road debris or collision.

The roof and above the engine mounted tanks shall be contained within a skeletal structure resembling a roll cage and contained within an enclosure. The enclosure shall incorporate a hinged clamshell type access. The access panels shall be designed to offer protection from weather and to be sacrificial as a means of providing an escape path to atmosphere upon rapid enclosure pressure rise. The latching method shall utilize quick release captive hardware that can be demonstrated to last the life of the bus. Additional shielding shall be provided surrounding end fittings and valves as needed. Shields shall be attached to the bus structure hinged in a manner that permits one mechanic to unlatch and swing the shield open for routine inspections. As practical, electrical components shall not be located within the roof enclosure and if unavoidable, they shall be intrinsically safe.

CNG fueled buses shall be equipped with an active automatic gas detection system which shall have an audible warning buzzer unsafe levels of methane. The automatic gas detection system shall be integrated with an onboard fire suppression system.

11.2.4 Labelling

CNG fuel systems shall be labeled in accordance with NFPA 52, “Compressed Natural Gas (CNG) Vehicular Fuel Systems Code,” 1998 edition. Fuel tanks that have reached their labeled expiration date (EO) or been condemned by inspection shall be remove from service (and destroyed).

Heavy duty buses shall be labeled at the fueling connection with the EOL date and the date for the next inspection.

11.2.5 Pressure Relief Devices (PRDs)

PRDs must be designed, constructed, manufactured and tested in accordance with ANIS/IAS PRD1 - 2013, “Pressure Relief Devices for Natural Gas Vehicle (NGV) Fuel Containers” and ANSI/IAS NGV2- 2007, “Basic Requirements for Compressed Natural Gas Vehicle (NGV) Fuel Containers.” All natural gas fuel system piping, including the PRD vent line, shall be stainless steel. All PRDs must be vented to outside. Vent lines must be plugged with rubber or other material that will prevent water from entering the vent lines, and positioned in the tube in such a manner to prevent bus washes, tree limbs etc. from knocking the plug out of the line while not being too secure to prevent the plug from blowing out in the event the relief valve opens. Vent lines must be plugged with rubber or other material that will prevent water from entering the vent lines, and positioned in the tube in such a manner to prevent bus washes, tree limbs etc. from knocking the plug out of the line while not being too secure to prevent the plug from blowing out in the event the relief valve opens.

11.2.6 Valves

Valves must be installed in accordance with ANIS/IAS NGV2 - 2007, “Basic Requirements for Compressed Natural Gas Vehicle (NGV) Fuel Containers” and NFPA 52, “Standard for Compressed Natural Gas (CNG) Vehicular Fuel Systems.”

11.2.7 Fuel Filler

The fuel filler shall be located 7 to 38 feet (on a 30-, 35- and 40-foot coach) behind the centerline of the front door on a side determined by the Purchaser. The filler cap shall be retained to prevent loss and shall be recessed into the body.

The fill and vent receptacles shall be located within an enclosure on the right side of the bus. The access door shall be sized to allow full viewing of gauges, ease of hookups and maneuver of fuel nozzle.

The fuel fill receptacle and vent receptacle attachment shall be robust and capable of routine fueling connects/disconnects without deflection or metal fatigue, and capable of

withstanding mechanical loads induced by a fueling drive away incident without attachment failure.

11.2.8 Fueling System

The CNG fueling port receptacle shall be an ANSI/AGA NGV1 or NGV2 certified receptacle as designated by the Purchaser. The coach shall be capable of being fueled by a nozzle determined by the Purchaser. The fueling port receptacle location shall be such that connection by fueling personnel can be performed without physical strain or interference. A dust cap shall be permanently "tethered" to the fueling port receptacle. The fueling port receptacle access door shall be equipped with an interlock sensor that disables the engine starting system when the access door is open, to prevent drive-aways. The interlock shall be of the type such that if the sensor fails, the coach will not start.

Within 24" of the fuel port the fuel fill line shall have a bulkhead fitting securely mounted to the frame or other substantial member with a check valve on the back side of the bulkhead fitting. This is a last chance safety measure to prevent a fuel release if all other safety measures fail and the fuel receptacle is ripped from the bus in a drive a way.

Fueling site characteristics such as pressure, flow rate, and temperature shall be provided by the Purchaser.

11.2.9 Defueling System

The CNG defueling port shall be an NGV-3.1/CGA-12.3 certified receptacle. The CNG defueling port shall be located on the curbside of the coach, in a location that is compatible with the Purchaser's defueling station operation. The de-fueling system shall incorporate the following characteristics:

- Dust cap permanently "tethered" to the defueling port.
- Device(s) to prevent inadvertent defueling. Specifications to be provided by Purchaser.
- Components compatible with Purchaser's defueling operation.
- The piping and fittings onboard the bus shall be sized to allow the fueling station to meet the following operating parameters:

12 EMISSIONS AND EXHAUST

12.1 Exhaust Emissions

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

12.2 Exhaust System

Exhaust gases and waste heat shall be discharged from the roadside rear corner of the roof. 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 into the exhaust pipe and causing damage to the after-treatment.

12.3 Exhaust After Treatment

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

12.4 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 fluid lines shall be designed to prevent the DEF from freezing. The DEF injection system shall not be damaged from a cold soak at 10 °F.

12.5 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.

12.6 Emissions and Exhaust Electric buses

The vehicle shall not have any exhaust emissions, nor the need for exhaust systems, after treatment or particulate filters

12.7 Fire Suppression System

Each vehicle shall be equipped with an automatic thematic fire suppression system to provide adequate coverage of fire suppression in the engine compartment and main electrical box areas. At a minimum, units shall consist of a 25-pound (lb.) ABC chemical cylinder, 3 stainless steel temperature sensitive weather proof thermostats, 4 nozzles,

and a control panel mounted in the driver's compartment as minimum equipment. Units shall be totally self-contained with all lines, fittings, brackets, and thermal release heads within the appropriate compartments, strategically placed, to provide the best protection.

The system shall incorporate a telltale, dash mounted operator warning light, audible indicator and switch, automatically shutting off all fans and climate control systems in the event of discharge.

The system installed shall be certified by the Contractor that it is suitable for use in the proposed vehicle in case the unit fails to function during an on-board vehicle event or fire. Each vehicle shall be delivered with a certificate identifying the vehicle identification number (VIN) for which it applies. The system shall be U.L., U.C.L., and F.M. listed and meet all D.O.T. and F.M.V.S.S. Regulations and be certified by the vehicle and equipment manufacturer.

This requirement does not apply to batteries electric buses. However, an appropriate fire suppression system to detect fire in the batteries compartment or electric motors, if available, shall be listed as an option.

13 STRUCTURE

13.1 General Design

The structure of the bus shall be designed to withstand the transit service conditions typical of an urban 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 Purchaser shall be considered for this purpose. The bus body shall be designed and constructed to ensure that passengers and the operator will not be exposed to hazardous electrical current. This design will also minimize potential exposure to hazardous electrical current in the event of a vehicle accident. Analysis and test data shall be provided to the Purchaser. The vehicle and energy storage system shall be designed and constructed to prevent gassing or fumes from the energy storage system from entering the interior of the bus, i.e., a vent path to the exterior, preferably at or above the roof, rearward.

13.2 Altoona Testing

Prior to acceptance of first bus, the vehicle must have completed any FTA-required Altoona testing. Any items that required repeated repairs or replacement must undergo the corrective action with supporting test and analysis. A report clearly describing and explaining the failures and corrective actions taken to ensure any and all such failures will not occur shall be submitted to the Purchaser. If available, the Bidder shall be provide the Altoona Test Report with the submittal. If not available, then the report shall be provided prior to acceptance of first bus.

13.3 Altoona Test Report Provided to Purchaser Prior to Start of Bus Production

Prior to the start of any bus manufacturing or assembly processes, the structure of the proposed bus model shall have undergone appropriate structural testing and/or analysis, including the complete regimen of FTA required Altoona tests. Prior to assembly of the first bus, the OEM shall provide the Purchaser with a completed report of Altoona testing for the proposed bus model along with a plan of corrective action to address deficiencies, breakdowns and other issues identified during Altoona testing. The bus model tested shall match the bus model proposed for procurement, including structure, axles and drive-train. Base model and partial Altoona test reports are acceptable when the combination of these tests adequately represents the proposed bus model per SAFETEA-LU and MAP-21.

13.4 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), if available.

13.5 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.

13.6 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.

13.7 Engine or Motor 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.

13.8 Crashworthiness

The bus body and roof structure shall withstand a static load equal to 150 percent of the curb weight evenly distributed on the roof with no more than a 6 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 4000-pound automobile at any side, excluding doorways, along either side of the bus 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 pounds applied perpendicular to the bus by a pad no larger than 5 square inches. This load shall not result in deformation that prevents installation of new exterior panels to restore the original appearance of the bus.

The transit bus, at GVWR and under static conditions, shall not exhibit deformation or deflection that impairs operation of doors, windows, or other mechanical elements. Static conditions include the vehicle at rest with any one wheel or dual set of wheels on a 6 inch curb or in a 6 inch deep hole.

The sidewall structure shall be capable of withstanding impacts of 200 foot pounds of energy from a steel faced spherical missile no less than 9 inches in diameter and of a 500 pound load applied anywhere along their length by a rigid plate 1 foot in length with no visible damage to the supporting structure. A damaged portion of the supporting structure shall be replaceable without requiring removal or replacement of the entire structure.

13.9 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 Purchaser'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.

13.10 Corrosion-Resistance Requirements for Exposed and Interior Surfaces of Tubing Below Lower Window Level

All exposed surfaces and the interior surfaces of tubing and other enclosed members below lower window line shall be corrosion resistant through application of a corrosion protection system.

13.11 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. Removal of the bike rack is permitted for attachment of towing devices.

A plug connector permanently mounted at the front of the bus shall provide for bus tail lamp, marker, stop and turn signal lamp operation as controlled from the towing vehicle. The connector shall include a spring-loaded dust- and water-resistant cap.

Shop air connectors shall be provided at the front and rear of the bus and shall be capable of supplying all pneumatic systems of the bus with externally sourced compressed air. The location of these shop air connectors shall facilitate towing operations.

13.12 Lifted (Supported) Front Axle and Flat Towing Capability (additional requirement)

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. Two rear recovery devices/tie downs shall permit lifting and towing of the bus for a short distance, such as in cases of an emergency, to allow access to provisions for front towing of bus. The method of attaching the tow bar or adapter shall require the specific approval of the Purchaser. Any tow bar or adapter exceeding 50 pounds should have means to maneuver or allow for ease of use and application. Each towing device shall accommodate a crane hook with at least a 1 in. throat. The bumper and frame shall have sufficient strength to allow another bus or a maintenance push/tow vehicle to push the bus from either end, at up to 45 deg. off axis without body or bumper damage.

13.13 Jacking

It shall be possible to safely jack up the bus, at curb weight, with a common 10-ton floor jack with or without special adapter, when a tire or dual set is completely flat and the bus is on a level, hard surface, without crawling under any portion of the bus. Jacking from a single point shall permit raising the bus sufficiently high to remove and reinstall a wheel and tire assembly. Jacking pads located on the axle or suspension near the wheels shall permit easy and safe jacking with the flat tire or dual set on a 6 inch high run-up block not wider than a single tire. The bus shall withstand such jacking at any one or any combination of wheel locations without permanent deformation or damage.

13.14 Yellow Pads

Jacking pads/points shall be painted safety yellow. Alternative jacking pad color to be specified by the Purchaser.

13.15 Hoisting

The bus axles or jacking plates shall accommodate the lifting pads of a two-post (or three-post if 60 foot articulated bus) hoist system. Jacking plates, if used as hoisting pads, shall be designed to prevent the bus from falling off the hoist. Other pads or the bus structure shall support the bus on jack stands independent of the hoist.

The Contractor shall specify the lifts and equipment necessary to lift each model of bus with the submittal documentation.

14 FLOOR

14.1 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 inch 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 in the area of the entrance and exit doors shall have a lateral slope not exceeding 4 degrees to allow for drainage. All aisles, steps, floor areas where people walk, and floors in securement locations shall have slip-resistant surfaces. Floor coverings should be continuously attached to the sub-flooring without voids or trapped debris, as far as practical. Floor coverings must be easy to clean by dry methods and wet wash with cleaning solutions. Bus floors shall be undamaged for the life of the bus by routine cleaning with wet wash methods. It is expected that the floor covering with the possible exception of step treads will last the life of the bus.

14.2 Design (Commuter)

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 in the area of the entrance and exit doors shall have a lateral slope not exceeding 2 degrees to allow for drainage.

The aisle of the bus shall be a sloped floor design and shall not exceed 5.5 degrees off the horizontal or include one step not to exceed entrance door step heights. The floor shall be a continuous plane over the wheel housings. 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.

14.3 Design (Articulated 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 in the area of the entrance and exit doors shall have a lateral slope not exceeding 2 degrees to allow for drainage.

14.4 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 inch 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 inch diameter rod, with 1/32-inch radius, without permanent visible deformation.

14.5 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.

14.6 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.

Option for composite flooring for weight reduction.

14.7 Construction (Commuter Coach)

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.

The floor deck may not be integral with the basic structure but shall be mounted on the structure securely to prevent chafing or horizontal movement. Sheet metal screws shall not be used to retain the floor. All floor fasteners shall be secured and protected from corrosion for the service life of the coach. The floor deck shall be reinforced as needed to support passenger loads. At GVWR, the floor shall have an elastic defection of no more than 0.375 in. (10 mm) from the normal plane. The floor shall withstand the application of 3.0 times gross load weight without permanent detrimental deformation.

15 Platforms

15.1 Driver's Area

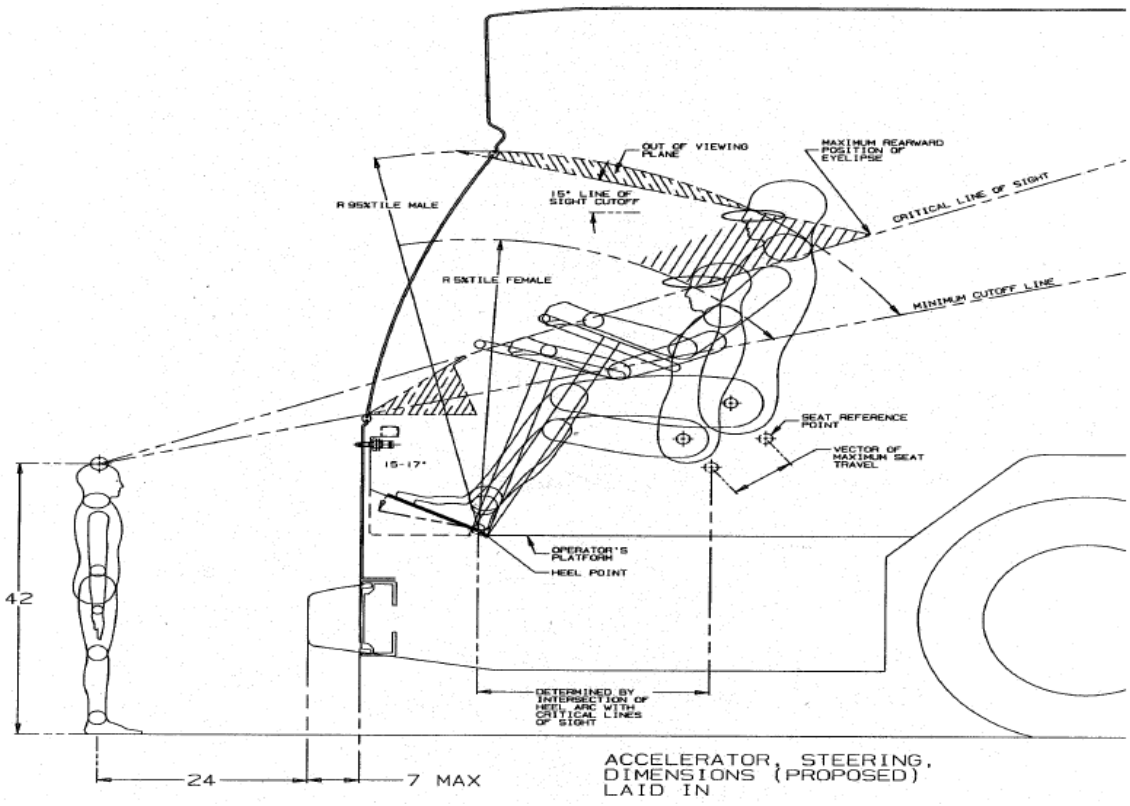
The covering of platform surfaces and risers, except where otherwise indicated, shall be the same material as specified for floor covering. Trim shall be provided along top edges of platforms unless integral nosing is provided.

15.2 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 inches above the road surface, 24 inches 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 degrees. A warning decal or sign shall be provided to alert the driver to the change in floor level. Figure 3 illustrates a means by which the platform height can be determined, using the critical line of sight.

FIGURE 3

Determining Platform Height. Applicable to high floor over the road coach only.



15.3 Farebox

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

15.4 Rear Step Area to Rear Area

If the vehicle is of a bi-level floor design, 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 inches 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.

16 WHEEL HOUSING

16.1 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.

16.2 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 housings shall be adequately reinforced where seat pedestals are installed. Wheel housings shall have sufficient sound insulation to minimize tire and road noise and meet all 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 floor shall be equipped with scuff-resistant coating or stainless steel trim.

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

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.

16.3 Articulated Joint (Articulated Transit Coach)

60 ft. articulated buses shall be equipped with a turntable that permanently joins the lead unit and trailing unit sections, allows relative motion between the sections about the pitch and yaw axes, and allows a small amount of relative roll between the sections without damage. A rotating turntable connection shall be provided between the lead unit and trailing unit to serve as a floor and to allow passenger access between the sections of the bus under all operating conditions. The turntable design shall provide for all horizontal and vertical turns that the bus is capable of making without introducing discontinuities between the turntable and adjacent vehicle floors.

The structures and finishes in the interconnecting section shall be designed to prevent passenger injury under all conditions. The turntable floor cover plate shall be supported so that there will be no honing of the floor plate, making it sharp at the outer edge. The gap between the floor and the turntable shall be minimized in order to prevent a tripping

hazard. It shall be designed for ease of access for inspection and repairs of all devices that are part of it or devices that pass through the turntable area. Under-floor turntable components shall be easily accessible. Floor plates must be easily lifted and secured in the open position by one person for inspection and repairs. Turntable seats shall be quickly and easily removable by one person. The under-floor turntable area shall be completely enclosed by the bellows and bulkheads on the lead and trailing units to prevent drafts into the passenger compartment. The area between the turntable floor and the bellows shall be closed to prevent collection of trash in the bottom of the bellows. Closeouts shall be attached with removable fasteners. An access hatch shall be provided for routine maintenance (i.e., greasing, adjusting potentiometer, maintenance items).

An anti-jackknife joint shall be provided. This joint—by sensing vehicle speed, relative angle between the lead and trailing sections, throttle and braking actions, and any other necessary inputs—will control the degree of stiffness in the joint to ensure that the bus does not jackknife or operate in a dangerous or unsafe condition. The Purchaser shall approve the anti-jackknife joint. The interconnecting structure shall be designed to prevent separation of the lead and trailing units as a result of a road accident with a commercial or private vehicle .A means shall be provided so that the driver can override the control or recover from the situation. The bus shall be equipped with a reverse speed governor that shall apply the brake and accelerator interlocks when the bus speed in reverse gear exceeds 1.5 mph, but the bus shall have sufficient power in reverse to back out of wheel locator depressions at a floor hoist. The proposed configuration of these devices and the reverse-speed requirements shall be submitted for approval of the Purchaser.

Easy access shall be provided to overhead lines (electric, air, hydraulic, refrigerant) passing through the turntable. Hydraulic fittings shall be suitable for the given application and must be compatible with other fittings throughout the vehicle. In order to prevent damage to the structure and electrical, air, hydraulic and refrigerant lines when the vertical or horizontal bending capabilities of the hinge are exceeded, the bus shall be provided with appropriate warning devices, brake interlocks and positive mechanical stops. These devices shall operate when the maximum bend angle is being approached in either plane.

16.4 Raceway (Articulated Transit Coach)

A raceway shall be provided through the turntable area to accommodate to maximum deflection of the turntable. The raceway shall prevent chafing, binding, rubbing, crimping or leakage of all hydraulic, air, fuel and system support lines, as well as all electrical and electronic cabling through or to the turntable area. Lines shall be secured, separated and labeled at the lead and trailing unit bulkheads. Separation shall be maintained on the flexible portion of all lines through the use of a raceway. All electrical terminations and hose fittings shall be easily visible and easily tightened or removed without removing any

other component. Lines, routing, securement and labeling shall be approved by the Purchaser.

Bulkhead fitting shall be provided for all lines: air coolant, electrical and AC at both ends of the raceway. The bulkhead area shall be easily accessible for servicing.

16.5 Bellows (Articulated Transit Coach)

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 Purchaser's option. Bellows shall be approved by the Purchaser.

17 CHASSIS

17.1 Suspension - General Requirements

The front, rear 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.

17.2 Alignment

All axles should be properly aligned so the vehicle tracks accurately within the size and geometry of the vehicle. Alignment must be performed after build and prior to delivery. A computerized alignment printout must be supplied with the vehicle.

17.3 Springs and Shock Absorbers - Suspension Travel

The suspension system shall permit a minimum wheel travel of 2.75 inches jounce-upward travel of a wheel when the bus hits a bump (higher than street surface), and 2.75 inches rebound-downward travel when the bus comes off a bump and the wheels fall relative to the body. Elastomeric bumpers shall be provided at the limit of jounce travel. Rebound travel may be limited by elastomeric bumpers or hydraulically within the shock absorbers. Suspensions shall incorporate appropriate devices for automatic height control so that regardless of load the bus height relative to the centerline of the wheels does not change more than ½ inch at any point from the height required. The safe operation of a bus cannot be impacted by ride height up to 1 inch from design normal ride height.

17.4 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.

17.5 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 6,000 miles.

17.6 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:

- Downward control must be held to allow downward kneeling movement.
- Release of the control during downward movement must completely stop the lowering motion and hold the height of the bus at that position.
- 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 3 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.

18 WHEELS AND TIRES

18.1 Wheels

All wheels shall be interchangeable and shall be removable without a puller. Wheels shall be compatible with tires in size and load-carrying capacity. Front wheels and tires shall be balanced as an assembly per SAE J1986.

18.2 Painted Steel

Wheels and rims shall be hub-piloted steel with white powder coat (maximum 3.5 mil) and shall resist rim flange wear. Aluminum wheels shall be priced separately as an option.

Electric bus tires rims shall be aluminum as standard.

18.3 Tires

Tires shall be suitable for the conditions of transit service and sustained operation at the maximum speed capability of the bus. Load on any tire at GVWR shall not exceed the tire Supplier's rating.

If procuring Purchaser has a tire supplier, either purchase or lease, arrangements will be made for the supplier to furnish tires. Tires will be approved for transit application with a load range appropriate to bus weight and size. Bidders should offer tires as a separately priced option for those agencies that wish to purchase under this contract.

18.4 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. Engine driven hydraulic pump shall be provided for power steering.

Electrically assisted steering shall be provided as an option to reduce steering effort. An option for using TranSynd in the power steering pump and system will be made available. A remote mounted fluid sampling port, for the KP Series Pushbutton Sampling Valve or similar, shall be provided for the hydraulic system.

18.5 Steering Axle Transit Coach - Solid Beam or Independent suspension type Axle and Grease-Type Front Bearings and Seals

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

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

18.6 Steering and Tag Axles Commuter Coach

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

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 (frontlock) wheel shall be within 2 degrees of true Ackerman up to 50 percent lock measured at the inside (backlock) wheel. The steering geometry shall be within 3 degrees of true Ackerman for the remaining 100 percent lock measured at the inside (backlock) wheel.

18.7 Steering Wheel - 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 degrees 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 pounds at the steering wheel rim, and perceived free play in the steering system shall not materially increase as a result of power assist failure. Gearing shall require no more than seven turns of the steering wheel lock-to-lock.

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

18.8 Steering Wheel - General

The steering wheel diameter shall be approximately 18-20 in.; the rim diameter shall be ⅞ in. 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. The steering wheel shall be telescoping and shall have two separate tilt locations, one near the top of the column and one at the universal joint below the floor where the column is connected to the right angle steering box; tilt and telescope are controlled by levers on the left side of the column.

18.9 Steering Column - Tilt

The steering column shall have full tilt capability with an adjustment range of no less than 40 degrees from the vertical and easily adjustable by the driver.

18.10 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 5

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 degrees	29 in.	0 degrees	34 in
15 degrees	26.2 in	15 degrees	31.2 in
25 degrees	24.6 in	25 degrees	29.6 in
35 degrees	22.5 in	35 degrees	27.5 in

1. Measured from bottom portion closest to driver.

19 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 and/or reduction 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.

19.1 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.

19.2 Tag Axles (Commuter Coach)

A tag axle shall be located behind the drive axle. The tag axle shall be a solid beam type with fixed steering. The tag axle shall have single tires the same size as the tires on the

front and drive axles. Tag axle weight shall not exceed 14,000 lbs. With full passenger seating capacity, load on any axle shall not exceed 22,400 lbs. Combined load capacity weight on the drive and tag axles shall not exceed 36,500 lbs. A tag axle unloading feature will allow full or partial unloading, or dumping of air from the tag axle air spring bellows. This feature enables weight to shift to the drive axle for more traction. Manual unloading valves are located inside the RH rear curbside service door.

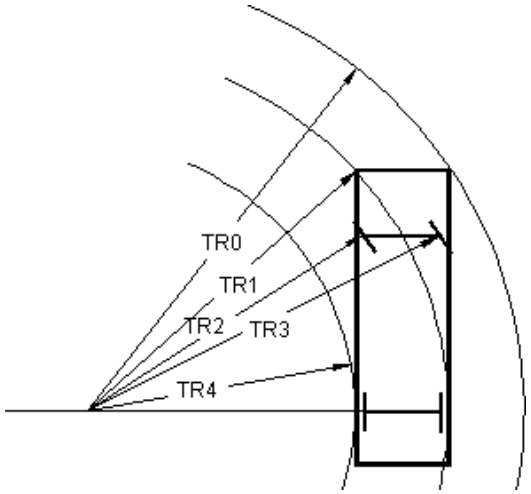
19.3 Turning Radius

The bus shall meet the standards for turning in the table below on a straight, level road at GVWR with all accessories operating. The Contractor shall provide documentation for the turning radius of the bus when the bus has a 48 in. box bike rack attached to the front end.

Bus Length(approximate)	Maximum Turning Radius(see Figure 4)
30 ft.	31 ft. (TR0)
35 ft	39 ft. (TR0)
40 ft	44 ft. (TR0)
45 ft	49 ft. (TR0)
60 ft	44.5 ft. (outside front axle, TR0) 17 ft (inside rearmost axle, TR4) ft (TR0)

FIGURE 4

Turning Radius (copy for APTA chart TS36)



20 BRAKES

20.1 Service Brake

Brakes shall be self-adjusting. Brake wear indicators (visible brake sensors) shall be provided on exposed push rods if applicable.

Visible stroke indicators may be combined with electronic brake monitoring system and vehicle brake warning system to notify driver and maintenance of unsafe brake conditions.

In addition to traditional mechanical friction service braking, the electric and hybrid buses 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.

20.2 Air-Actuated Brakes

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 70 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 between all wheels in such a ratio as to ensure equal friction material wear rate at all wheel locations. Contractor shall demonstrate compliance by providing a copy of a thermo dynamic brake balance test upon request.

20.3 Automatic Traction Control

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

20.4 Friction Material

The brake linings shall be made of non-asbestos material. In order to aid maintenance personnel in determining extent of wear, a provision such as a scribe line or chamfer indicating the thickness at which replacement becomes necessary shall be provided on each brake lining. The complete brake lining wear indicator shall be clearly visible from the hoist or pit without removing backing plates.

20.5 Hubs

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 component manufacturer's warranty or the life of the brake lining whichever is longer.

20.6 Drum Brakes

Brake shoe return springs shall be the heaviest available.

The service brakes shall be two (2) shoe, internal-expanding, air operated S-cam type brakes at each wheel. The brakes must be capable of stopping the vehicle in accordance with the performance requirements of State and Federal regulations in effect at the time of manufacture. Parking brake shall be spring applied, air released chamber mounted on the rear axle assembly. All brake linings shall be of non-asbestos material three quarters (3/4) inch thick.

Spring brake chambers shall be provided and shall comply with requirements of State and Federal regulations FMVSS 121 in effect at time of manufacture on the front and rear of these buses. At a minimum the front chamber shall be size 24 to 30 inches and the rear shall be size 30 to 36 inches depending on the length of the bus. The emergency air tank shall be piped to a service valve at the left front corner of the bus to fill the tank for towing the vehicle. Brake shoe effective area shall total a minimum of eight-hundred twenty-two (822) square inches for 30 to 35 foot buses and nine-hundred thirty-two (932) square inches for buses greater than 35 feet in length.

Brake shoes shall be operated by cams which in return are operated by automatic slack adjusters. Slack adjusters shall be equipped with grease fittings and be capable of automatic adjustments throughout the life of the lining and drum assembly. Brake lines shall be installed so that the possibility of damage is minimized. Lines and hoses shall be clamped and supported in a manner which minimizes long, unsupported hose lengths and precludes rubbing against any part of the bus.

The parking and emergency brakes shall be with a 40 PSI setting, controlled by a manual valve located convenient to the driver for safe, convenient access. Valve operation shall be "pull to set brakes" and "push to release" type brake system.

This brake shall have stopping ability that is equal to or better than required by Federal and State regulations. It shall automatically apply if air system pressure falls below half the normal value or such other value as is recommended by the component manufacturer. This parking/emergency brake shall be of spring brake design. The bidder will provide in their bid a statement of brake efficiency at empty and loaded capacity. A brake stroke and wear monitoring system will be made available as an option and be priced separately.

20.7 Disc Brakes on All Axles (optional)

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 component 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 brake linings.

Typical brake drum/shoe set up will be made available as an option and a price deduction will be given as appropriate.

20.8 Hub and Drums Commuter Coach

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 component manufacturer's warranty.

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 component manufacturer's specifications.

20.9 Parking/Emergency Brake

20.9.1 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.

20.9.2 Hydraulic Brakes

If the bus is equipped with hydraulic brakes, then the braking system must comply with FMVSS 105, including both service and parking brake features.

21 INTERLOCKS

21.1 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 and unsecured condition, unless the door master switch has been actuated to intentionally release the interlocks.

21.2 Option Requiring Accelerator Interlock Whenever Front Doors Are Open

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 whenever front doors are open, selection to be made by Purchaser at pre-production meeting.

21.3 Pneumatic System - 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 5 psi 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 fitting against dirt and moisture when not in use. Air for the compressor shall be filtered. The air system shall be protected per FMVSS 121.

21.4 Air Compressor

For diesel and hybrid buses, an engine-driven air compressor shall be sized to charge the air system from 40 psi to the governor cutoff pressure in less than 4 minutes while not exceeding the fast-idle speed setting of the engine.

For electric bus, the electrically driven air compressor shall be sized to charge the air system from 40 psi to the governor cutoff pressure in less than 4 minutes while not exceeding the fast-idle speed setting of the engine. The electrically driven air compressor shall be available as an option for diesel and hybrid buses if available.

21.5 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 5-ft intervals. Nylon lines may be grouped and shall be supported at 30 in. intervals or less.

The compressor discharge line between powerplant and body-mounted equipment shall be flexible convoluted copper or stainless-steel line, or may be flexible Teflon hose with a braided stainless steel jacket. Other lines necessary to maintain system reliability shall be flexible Teflon hose with a braided stainless-steel jacket. End fittings shall be standard SAE or JIC brass or steel, flanged, swivel-type fittings. Flexible hoses shall be as short as practicable and individually supported. They shall not touch one another or any part of the bus except for the supporting grommets. Flexible lines shall be supported at 2-ft 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. All air lines shall be installed and routed in such a way as to eliminate any chance for water buildup in the lines.

21.6 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. All air tanks and drain valves shall be clearly labeled.

21.7 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.

The air system shall be equipped with an air dryer located before the no. 1 air tank and as far from the compressor as possible to allow air to cool prior to entering the air dryer.

22 ELECTRICAL, ELECTRONIC AND DATA COMMUNICATION SYSTEMS

22.1 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 the 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.

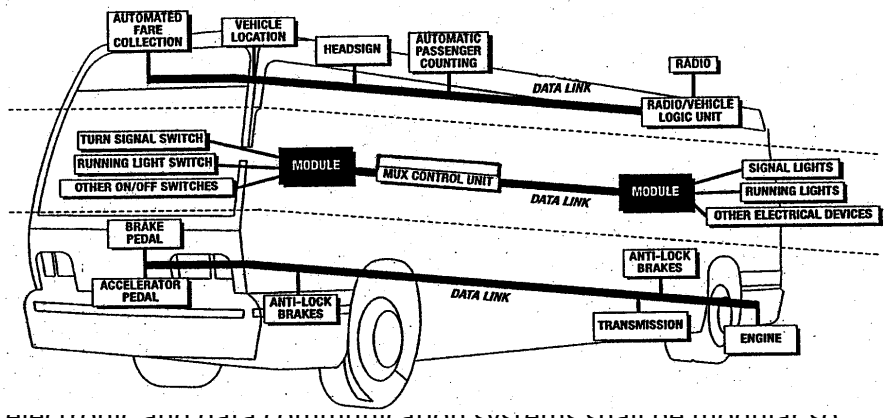
Information level systems that require vehicle information for their operations or provide information shall adhere to J1939 data standard.

Data communications systems are divided into three levels to reflect the use of multiple data networks:

- **Drivetrain level:** Components related to the drivetrain including the propulsion system components (engine, transmission and hybrid units or electric energy storage, motors, inverters/converters), and anti-lock braking system (ABS), which may include traction control.
- **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, fare boxes, 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; and gateway devices.

FIGURE 5

Data Communications Systems Levels



22.2 Modular Design

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.

Powerplant 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.

22.3 Environmental and Mounting Requirements

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

Electrical and electronic equipment shall not be located in an environment that will reduce the performance or shorten the life of the component or electrical system 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 SAE J1113 and UNECE Council Directive 95/54 (R 10).

The Purchaser shall follow recommendations from Contractors and subsystem Suppliers regarding methods to prevent damage from voltage spikes generated from welding, jump starts, shorts, etc.

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

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

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

The voltage regulator shall be a solid-state type coordinated with and adjusted for the alternator and batteries used. The regulator shall be remotely mounted and be easily accessible for maintenance purposes. The stainless-steel battery tray and slide shall be protected against the accumulation of debris and road spray. The battery tray shall slide out, on stainless steel rollers, with less than 50 lbs. of effort.

The battery tray shall have drain holes. Two twelve volt lead acid filled thermal battery units, size 8D, with side post or top post connectors with minimum 1300 cold cranking amps at zero degrees Fahrenheit with a reserve capacity of 425 minutes or greater will be required, except for electric buses which shall be supplied with at minimum two group AGM Group 31 batteries each with a minimum of 1150 cold cranking amps. Protective interlocks or programming shall be provided so the starter will not operate if the engine is running or the transmission is not in neutral. Electrical cables and wiring shall be adequate for all anticipated loads. The main wiring harness shall, to the maximum extent practical, be installed inside the bus body passenger compartment and, where that is not practical, shall be secured in frame rail raceways. The Contractor shall route and secure all wiring so that it does not rub anywhere. Routing of step well light wiring shall be such as to avoid rubbing door posts, etc. When wires or looms pass through metal, the wires shall be protected by a rubber grommet. Each electrical panel i.e. front and exit door panels, battery compartment, and front electrical panel shall provide an explanation of the respective electrical circuits and components contained within and shall be furnished in a silk-screened or water/oil proof diagram on the inside of the door panel.

Four AGM batteries or equivalent shall be an option in lieu of two size 8D batteries.

All engine compartment wiring and light wiring shall be insulated from the heat and be resistant to oil and grease. Electrical equipment, junction boxes and connectors shall not be placed where they are subjected to excessive heat, oil, grease, or road spray. All multiple terminal connectors shall be military (cannon plug) type, fully sealed and protected with a potting compound to prevent outside dirt and corrosives from entering the wiring, connectors, or plugs.

All main power supply terminals shall be covered with electric post rubber cover. All electrical end plugs shall be covered. The wiring harnesses shall incorporate 10% spare wires. 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. All cables and harnesses shall be secured to prevent chafing or shorting against each other or any part of the vehicle. Clamps shall be rubber or PVC clad aircraft type. Grommets or other protective material shall be installed at points where wiring penetrates metal structures.

All wiring shall start and end at a junction block or component. All inline and bulkhead connectors are to be of the weather pack sealed type.

Multi-pin connectors shall be protected internally from corrosion with silicone dielectric grease (Dow Corning #4), if required. All circuits except the engine emergency shut-off and speedometer circuits must be protected by reset circuit breakers that clearly indicate

their position when tripped. Each breaker must be labeled. Circuit breakers must have plastic dust caps or be environmentally sealed. Provide constant power for powering systems, such as but not limited to the fire suppression, radio, farebox, and DC-DC converter that require constant power when battery cutoff switch is off.

The vehicle shall be equipped with a 12VDC and 24VDC quick disconnect switch. The battery compartment door shall conveniently accommodate operation of the 12VDC and 24VDC quick disconnect switch.

The battery switch 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.

Remote (divorce) mount alternator voltage regulator A2-377 or equivalent with jumper cable and 5 amp fuse shall be provided. This requirement does not apply to battery electric buses.

The windshield wiper and headlamps electric circuit shall be protected by modified auto-reset circuit breakers sized to the requirement of the load or run through the multiplex - programmable logic controller (PLC), and are fuse protected.

Rubber Covers shall be provided for all the Electric Posts.

All junction boxes located in the engine compartment shall be designed to allow thorough steam cleaning of the engine compartment area without intrusion of water.

An optional voltage spike arrestor, S.K.I. Products SKI241-101445, or approved equal, shall be provided in the main power circuit and be priced separately.

Major junction panels shall be readily accessible for maintenance, not located behind or alongside seat or other fixed/semi-fixed obstructions. Access panels and junction box covers shall have seals which will preclude entry of rain, wash water, road debris, etc. All wiring and junction panel terminals shall be numbered and color coded for easy identification. A diagram showing the coding as the bus was built shall be furnished.

The Contractor shall supply at least two spare circuits in the main harness between the front and rear of the bus. The main harness from the engine compartment shall be equipped with multiple circuit cannon type connectors.

22.4 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 inaccessible to passengers and hidden from view unless intended to be viewed. The hardware shall be mounted in such a manner as to protect it from splash or spray.

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

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

23 GENERAL ELECTRICAL REQUIREMENTS BATTERIES

23.1 Low-Voltage Batteries (24V)

23.2 Two 8D Battery Units

Two 8D battery units with side post or top post connectors, conforming to SAE Standard J537, shall be provided. Each battery shall have a minimum of 1300 cold cranking amps. Each battery shall have a purchase date no more than 120 days from the date of release and shall be fully maintained prior to shipment to the Purchaser. The battery compartment must be well-ventilated to prevent hydrogen buildup while protecting the compartment from road spray, water intrusion and de-icing chemicals.

Hybrid Electric buses that do not utilize the 24V coach batteries to crank the diesel engine may disregard the Cold Cranking Amp requirement and provide batteries as follows:

A minimum of 2 AGM type Group 31 batteries with a total of N Amp-hours capacity. The batteries will be of a type that is rated for deep cycle use.

The N will be calculated as follow:

The N will probably have to vary from Purchaser to Purchaser unless they would like to take the worst-case maximum and specify that number as the common requirement.

N is calculated as follows:

1) Determine the total current draw (A) for all equipment that remains powered up when the bus is turned off – Radio systems, fare-box alarms, camera systems, Fire suppression systems, etc., etc.
2) Determine the longest time interval that a bus will remain off on a regularly scheduled basis (H) - (eg. – from Friday at midnight until Monday at 5 am – 53 hours).
3) Finally, plan for a maximum battery discharge of 80% to allow some charge for system startup on Monday morning and allow for end-of-life capacity degradation. So the formula is: $A \times H \div 80\%$.

For Example:

Total “always on” current draw = 3 amps
Maximum routine bus-off time = 53 hours
Amp-Hour Requirement = $3 \times 53 \div 0.8 = 198.75$ or ≈ 200 Amp-hours

To be more conservative and allow for other factors, such as unanticipated current drain, cold weather conditions and others they could plan on 75% of usable capacity rather than 80%

23.3 Battery Cables

The battery terminal ends and cables shall be color-coded with red for the primary positive, black for negative and another color for any intermediate voltage cables. Positive and negative battery cables shall not cross each other if at all possible, be flexible and 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 on top of the batteries. Except as interrupted by the master battery switch, battery and starter wiring shall be continuous cables with connections secured by bolted terminals and shall conform to specification requirements of SAE Standard J1127 – Type SGT, SGX or GXL and SAE Recommended Practice J541.

2100 strand 4/0 cable or greater recommended.

23.4 Jump-Start Connector

A jump-start connector, red for 24V and blue for 12V, whichever is applicable, shall be provided at a location determined at the pre-production meeting and shall be equipped with dust cap and adequately protected from moisture, dirt and debris.

23.5 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 door shall be electrically insulated, as required, to prevent the battery terminals from shorting on the door if the door is damaged in an accident or if a battery comes loose.

The vehicle shall be equipped with a 12VDC and 24VDC quick disconnect switch(es). The battery compartment door shall conveniently accommodate operation of the 12VDC 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 than 3.5 × 5 in. (8.89 × 12.7 cm).

The battery hold-down bracket shall be constructed of a non-metallic 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 equivalent tray that can accommodate the size and weight of the batteries. The battery tray shall pull out easily and properly support the batteries while they are being serviced. The tray shall allow each battery cell to be easily serviced and filled. A locking device shall retain the battery tray to the stowed position.

Polyethylene battery tray and enclosure can be listed as option and priced separately.

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.

23.6 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.

23.7 Master Battery Switch

A single master switch shall be provided near the battery compartment for the disconnecting of all battery positives (12V and 24V), except for safety devices such as the fire suppression system and other systems as specified. The location of the master battery switch shall be clearly identified on the exterior access panel, be accessible in less than 10 seconds for deactivation and prevent corrosion from fumes and battery acid when the batteries are washed off or are in normal service. The access door shall be labeled "Battery Emergency Shut-Off Switch." A 12V power supply with cover shall be provided in the driver's area.

Turning the master switch off with the powerplant operating 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.

23.8 Single Switch

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

23.9 Low-Voltage Generation and Distribution

The low-voltage generating system shall maintain the charge on fully charged batteries, except when the vehicle is at standard idle with a total low voltage generator load exceeding 70 percent of the low voltage generator nameplate rating. A low voltage generating system shall be a solid-state DC/DC converter for Battery Electric and Hybrid-Electric buses.

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.

An optional 24 volt to 13.6 volt DC-DC converter, 30 ampere output, Model 1645-24-12-30, manufactured by Wilmore Electronics Co., Inc. or equivalent will be made available and priced separately. The unit shall be located in the communications equipment box and will provide power to a terminal block for the Radio, VLU, DR600 stop announcement system, CCTV system, fare-box, and destination sign. Continuous power to the DC-DC converter must be supplied with the master run switch in "off" position.

An optional 110 volt inverter shall be supplied that allows the interior dome lights to operate when connected to a 110 volt outlet, even with all other bus systems "asleep".

This system will include an external weatherproof port that a regular 110 volt extension cord can be connected to. Consideration should be given to other loads that could be included in this system such as a laptop charger or vacuum cleaner.

23.10 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 breakers or fuses shall be easily accessible for authorized personnel. Fuses shall be used only where it can be demonstrated that circuit breakers are not practicable. 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 Purchaser mechanic with visible indication of open circuits. The Purchaser 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. All manually resettable circuit breakers 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.

23.11 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 four ground ring/spade terminal connections shall be made per ground stud. Electronic equipment requiring an isolated ground to the battery (i.e., electronic ground) shall not be grounded through the chassis.

23.12 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 insulation shall be maintained as close to the junction box, electrical compartment or terminals as possible. The requirement for double insulation shall 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 present in the harness. Kinking, grounding at multiple points, stretching, and exceeding minimum bend radius shall be prevented.

Strain-relief fittings shall be provided at 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 10 percent (minimum one wire) excess wires for spares. This requirement for spare wires does not apply to data links 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 either use 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 or 1/16 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 7 AWG 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 have sufficient length and be routed to permit service without stretching or chafing the wires.

23.13 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 than 40,000 hours (except cranking motors, washer pumps and wiper motors). All electric motors shall be easily accessible for servicing.

23.14 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 serviceable from the driver's seat, vestibule or from the outside if applicable. "Rear start and run" controls shall be mounted in an accessible location in the engine compartment and shall be protected from the environment.

23.15 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.

23.16 Wiring and Terminals

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

23.17 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.

23.18 Shielding

All wiring that requires shielding shall meet the following minimum requirements. A shield shall be generated by connecting to a ground, which is sourced from a power distribution bus bar or chassis. A shield shall be connected at one location only, typically at one end of the cable. However certain standards or special requirements, such as SAE J1939 or RF applications, have separate shielding techniques that also shall be used as applicable.

NOTE: A shield grounded at both end forms a ground loop, which can cause intermittent control or faults.

When using shielded or coaxial cable, upon stripping of the insulation, the metallic braid shall be free from frayed strands, which can penetrate the insulation of the inner wires. To prevent the introduction of noise, the shield shall not be connected to the common side of a logic circuit.

23.19 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.

23.20 Radio Frequency (RF)

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

During OEM service intervals, Extremely Low frequency (ELF) electromagnetic fields (EMF) shall be monitored within safe exposure levels for all occupants and conform to

guidelines for human exposure to RF electromagnetic fields in accordance with the International Commission on Non-Ionizing Radiation Protection (ICNIRP). The Federal Communications Commission (FCC) the National Council on Radiation Protection and Measurements (NCRP) and the Institute of Electrical and Electronics Engineers (IEEE).

23.21 Audio

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

24 MULTIPLEXING

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

24.2 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.

24.3 I/O Signals

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

Discrete signals shall reflect the on/off status of switches, levers, limit switches, lights, etc. Analog signals shall reflect numerical data as represented by a voltage signal (0-12V, 10-24V, etc.) or current signal (4-20 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.

25 DATA COMMUNICATIONS

25.1 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 Purchaser 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 levels 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.

25.2 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 engine, transmission and hybrid units or electric energy storage, motors, inverters/converters 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.

25.3 Diagnostics, Fault Detection and Data Access

Drivetrain 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.

25.4 Programmability (Software)

The drivetrain level components shall be programmable by the Purchaser with limitations as specified by the sub-system Supplier.

26 MULTIPLEX LEVEL

26.1 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 Purchaser. The communication port(s) shall be located as specified by the Purchaser.

26.2 Diagnostics and Fault Detection

The multiplex system shall have a proven method of determining its status (system health and input/output status) and detecting either active (online) or inactive (offline) faults through the use of onboard 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.

26.3 Provide Mock-Up Board

An optional mock-up board, where key components of the multiplexing system are replicated on a functional model, shall be made available as a tool for diagnostic, design verification and training purposes. The mock-up board will be priced separately in the Pricing Schedule.

26.4 Programmability (Software)

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

- password protection
- limited distribution of the configuration software
- limited access to the programming tools required to change the software
- 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 of the following:

- hardware component identification where labels are included on all multiplex hardware to identify components
- hardware series identification where all multiplex hardware displays the current hardware serial number and firmware revision employed by the module
- software revision identification where all copies of the software in service displays the most recent revision number

- a method of determining which version of the software is currently in use in the multiplex system

26.5 Electronic Noise Control

Electrical and electronic sub-systems 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 sub-systems 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 the buses, ac or dc power lines and RFI/EMI emissions from other vehicles.

27 DRIVER PROVISIONS, CONTROLS AND INSTRUMENTATION

27.1 Driver's Area Controls - 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."

27.2 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.

27.3 Visors/Sun Shades Front and Side Sun Shade/Visor

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.

Optional sun visors in lieu of roller type sunscreens shall store out of the way and shall not obstruct airflow from the climate control system or interfere with other equipment, such as the radio handset or the destination control. Deployment of the visors shall not restrict vision of the rearview mirrors. Visor adjustments shall be made easily by hand with positive locking and releasing devices and shall not be subject to damage by over-tightening. Sun visor construction and materials shall be strong enough to resist breakage during adjustments.

27.4 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 for 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. 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.

27.5 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 3 represents 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. Blank spaces shall contain LEDs.

TABLE 6

Transit Bus Instruments and Alarms, as appropriate to the bus's fuel type bid.

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	
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 switch1	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 switch1	Front door remote or Dash right wing	Permits ramp and kneel activation from front door area, key required1	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. Ext alarm and Amber light
Rear door ramp/kneel enable if applicable	Two-position keyed switch1	Rear door remote	Permits ramp and kneel activation from rear door area, key required1	Red light
Rear door ramp if applicable	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
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	Detented 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 console or 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

Warning interlocks deactivated	Red indicator light	Dash panel center	Illuminates to warn drive 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-volt 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
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
Engine oil pressure indicator	Low 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

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

27.6 Driver Foot Controls

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

27.7 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 50 degrees at the point of initiation of contact and extend downward to an angle of 10 to 18 degrees at full throttle.

The location of the brake and accelerator pedals shall be determined by the Contractor, based on space needs, visibility, lower edge of windshield, and vertical H-point.

27.7.1 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.

27.7.2 1 to 2 in. Between Brake and Accelerator Pedals

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.

27.8 Brake and Accelerator Pedals

27.8.1 Adjustable Brake and Accelerator Pedals (Optional)

Both pedals shall be adjustable forward and rearward a minimum of 3 in. The adjustment shall be made by use of a dash-mounted toggle or rocker switch. The switch shall be clearly labeled to identify it as pedal adjustment and shall be within easy reach of the driver. Pedal adjustment shall be enabled only when the bus is stationary and the parking brake engaged.

This option will be made available and priced separately.

27.9 Driver Foot Switches

27.9.1 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 degrees and a maximum of 37 degrees. It shall be located no closer to the seat front than the heel point of the accelerator pedal.

27.9.2 Turn Signal Controls

Turn signal controls shall be floor-mounted, foot-controlled, water-resistant, heavy-duty, momentary contact switches.

27.9.3 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 location.

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.

27.9.4 Other Floor-Mounted Controls

The following may be floor mounted, momentary or latching, as identified by the Purchaser at the preproduction meeting.

- hazard
- silent alarm
- PA system

27.10 Driver's Amenities

27.10.1 Coat Hook

A suitable hanger shall be installed in a convenient, approved location for the driver coat. (Coat hook and loop is optional)

27.10.2 Drink Holder (Optional)

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.

This is to be selected by the Purchaser at the pre-production meeting and priced separately.

27.11 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. Electric wipers will be used.

Intermittent Wiper with Variable Control

A variable-speed feature shall be provided to allow adjustment of wiper speed for each side of the windshield between approximately five (5) and twenty-five (25) cycles per minute.

Non-Synchronized Wipers

For non-synchronized wipers, separate controls for each side shall be supplied. A single control switch for non-synchronized wipers is optional.

27.12 Windshield Washers

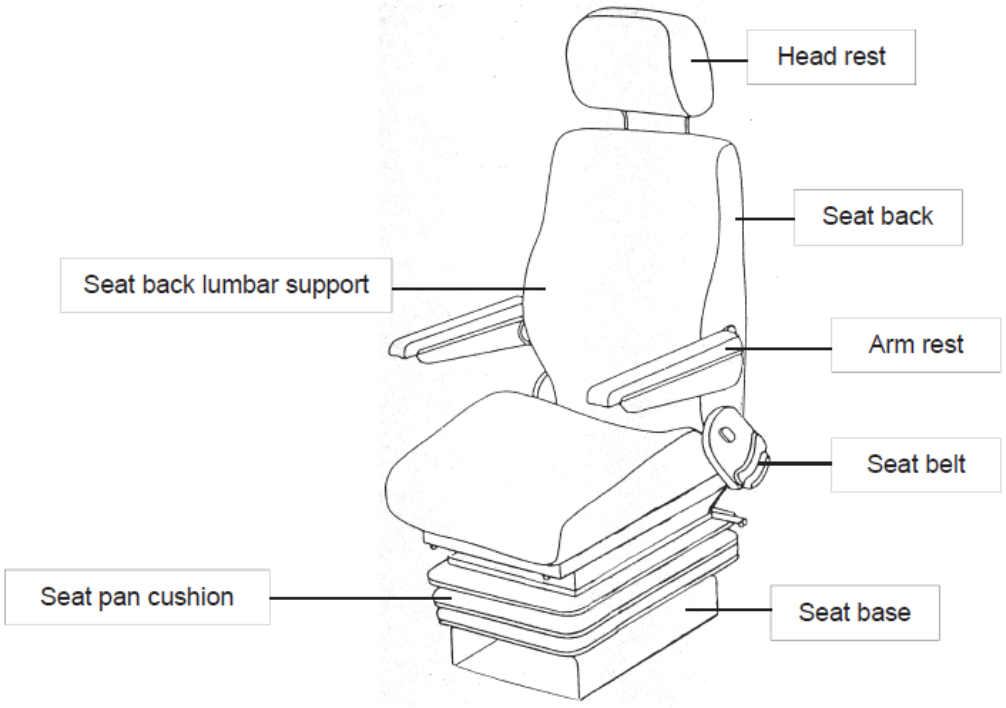
The windshield washer system, when used with the wipers, shall deposit washing fluid evenly and completely wet the entire wiped area. The windshield washer system shall have a minimum 2.5-gallon reservoir, located for easy refilling from outside of the bus.

Reservoir pumps, lines and fittings shall be corrosion-resistant and must include a means to determine fluid level.

28 DRIVER'S SEAT

FIGURE 6

Driver's Seat



28.1 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.

28.2 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.

28.3 Seat Pan Cushion Height Dimensions

Measurement shall be from the cab floor to the top of the level seat at its center midpoint. The seat shall adjust in height from a minimum of 14 in., with a minimum 6 in. vertical range of adjustment.

28.4 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 degrees). 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).

28.5 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.

28.6 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.

28.7 Seat Suspension

The driver’s seat shall be appropriately dampened to support a minimum weight of 380 lbs. The suspension shall be capable of dampening adjustment in both directions**.** Rubber snubbers shall be provided to prevent metal-to-metal contact.

28.8 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.

28.9 Height

Standard height seat back

28.10 Headrest

Adjustable headrest

28.11 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.

28.12 Seat Back Angle Adjustment

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

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

28.13 Seat Belt

The belt assembly should be an auto-locking retractor (ALR) lap seat belt only. 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 seat belt assemblies as installed in the bus shall withstand static horizontal forces as required in FMVSS 207 and 210. Seatbelt webbing shall be black in color.

28.14 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.

28.15 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.

28.16 Cushion Materials

All materials used on the seat assembly, passenger and driver's seat shall meet the flammability requirements of the FMVSS #302. Proof of Compliance must be submitted with bids.

28.17 Pedestal

Powder-coated steel.

Exposed portions of frame and hardware shall be stainless steel or chrome plated shall be listed as an option.

Bidders will make available and price separately a silicone cushion for the driver’s seat and a driver’s seat vacancy alarm system.

29 MIRRORS

29.1 Exterior Mirrors

All mirrors must conform to the current requirements of the state in which the bus is operating in. Exterior mirrors shall be remote controlled motorized with stainless steel arms that return to original position when moved.

Powder coated and heated mirrors shall be optional.

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.

Agencies will have the option of requesting a three inch convex mirror be mounted in the lower right corner of the right side flat mirror, at no charge. Mirrors must fold out of way of automatic washer. Metal mirror parts to be chrome plated or stainless steel. The backs of inside mirrors shall be painted flat black where necessary to comply with FMVSS.

An optional high mount street side mirror will be made available with selection made at the preproduction meeting. Exterior mirrors must utilize a “quick disconnect” for electrical wiring.

An optional set of manual 8" X 8" and 6” spot mirrors on stainless steel arms located on each side of the vehicle will be offered. A deduct will be issued for manual mirrors.

29.2 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, anywhere in the aisle, and in the rear seats.

A (min) 8 1/2” x 16” rear view mirror shall be provided on the front sign header. A 6" diameter adjustable convex mirror over and forward of the front door shall be provided. An adjustable convex mirror shall be provided over/above and to the rear of the rear exit door. (Convex mirrors described above are to be used in conjunction with each other.) The glass in this mirror shall be replaceable.

30 WINDOWS

30.1 General

A minimum of 6,000 sq. in. of window area, including operator and door windows, shall be required on each side of the standard 30-ft length configured bus.

A minimum of 8,000 sq. in. of window area, including operator and door windows, shall be required on each side of the standard 35-ft length configured bus.

A minimum of 10,000 sq. in. of window area, including operator and door windows, shall be required on each side of the standard 40-ft length configured bus.

A minimum of 12,000 sq. in. of window area, including operator and door windows, shall be required on each side of the standard 45-ft length configured bus.

A minimum of 16,000 sq. in. of window area, including operator and door windows, shall be required on each side of the standard 60-ft length configured bus.

30.2 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 14 degrees, measured above the horizontal and excluding any shaded band. The vertically downward view shall permit detection of an object 3½ ft high no more than 2 ft in front of the bus. The horizontal view shall be a minimum of 90 degrees above the line of sight. Any binocular obscuration due to a center divider may be ignored when determining the 90- degree requirement, provided that the divider does not exceed a 3-degree angle in the operator's field of view. Windshield pillars shall not exceed 10 degrees of binocular obscuration. The windshield shall be designed and installed to minimize external glare as well as reflections from inside the bus.

The windshield shall be easily replaceable.

30.3 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 1A and the Recommended Practices defined in SAE J673.

Shaded windshield band shall be optional.

30.4 Driver's Side Window

The driver's side window shall be the sliding type, requiring only the rear half of sash to latch upon closing, and shall open sufficiently to permit the seated operator to easily adjust the street-side outside rearview mirror. When in an open position, the window shall not rattle or close during braking. 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 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 with the requirements of ANSI Z26.1-1996 Test Grouping 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.

30.5 Side Windows

The side windows shall be fixed framed transom. With the exception of the upper portion of first right-hand and /or left-hand window where the side destination sign shall be located, all other shall be glazed with tinted, flat panel, uniform sized, transit application approved laminated safety glass (ANSI 25.1). Glazing in the sash shall be easily replaced without removing the sash from the bus. Side window sliders shall be equipped with metal latches. Components known to meet these requirements include, but are not limited to, Excel full sliders, and the Transit Care 3 minute windows.

An option of fixed frame and/or full slider style windows will be made available and be priced separately. All windows shall be of 7/32" 28% gray tinted safety glass and frame windows will have black (dark) polyester powder coat aluminum frames inside and out. Glass shall be mounted in removable rubber retaining strips/seals.

Flush mounted windows will also be accepted as an approved equal. If flush mounted windows optional, price separately.

An option of all windows being equipped with liners attached will be made available and be priced separately.

An option for windows with no sliding partition.

All tempered glass must have liners attached.

Frame shall be assembled with anti-corrosion coated screws and fasteners to enable changing glass. A positive lock type emergency latch meeting the FMVSS-217 shall be furnished on each window frame.

Emergency egress window shall have a permanent decal describing emergency window operation procedures. Side windows shall be designed to prevent the entrance of air and

water when windows are closed. The window seal rubber must be installed so that passengers cannot remove it and rubber shall be of such quality to resist adhering to other sash sill.

Color of glazing material in all side windows, with the exception of the side destination sign window, shall be of Gray 28% or equivalent. The side destination sign windows shall be clear. Windows on the bus sides and in the rear door shall be tinted a neutral color, complementary to the bus exterior. The maximum solar energy transmittance shall not exceed 37 percent, as measured by ASTM E- 424, and the luminous transmittance shall be no less than 16 percent, as measured by ASTM D-1003.

Window at the destination/location sign shall not be tinted in the vicinity of the sign.

31 HEATING, VENTILATING, AND AIR CONDITIONING

31.1 Capacity and Performance

The interior heating system shall maintain the interior of the bus at a level suitable for all climate conditions found throughout the state of Washington. The heating, ventilation, and cooling system shall maintain an average passenger compartment temperature between 65 degrees and 80 degrees Fahrenheit with a relative humidity of 50 percent or less.

Interior climate control will be automated controls capable of maintaining the interior of the bus at a level suitable for all climate conditions found in the continental United States. The heating, ventilating, and cooling systems shall maintain an average passenger compartment temperature between 65 and 80 degrees F with a relative humidity of 70 percent or less. The system shall maintain these conditions in ambient temperatures of –10 to 110 degrees F with ambient humidity of 5 to 50 percent while the bus is running on the design operating profile with a full-seated load of passengers with door openings for 30 seconds or more every 3 minutes. In ambient temperatures of 10 to –10 degrees F, the average temperature shall not fall below 65 degrees F while the bus is running on design operating profile with no passengers. The temperature measured from a height of 6 inches below the ceiling shall be within +/- 5 degrees F of the average temperature at the top surface of the seat cushions. Temperatures measured more than 3 inches above the floor shall be within +/- 5 degrees F of the average temperature at the top surface of the seat cushions. The interior temperature, from front to rear of the bus, shall not vary more than a +/- 5 degrees F from the average. System shall be programmable by each technician.

The cooling mode shall be capable of reducing the passenger compartment temperature from 100 degrees F to 80 degrees F in less than 30 minutes after the engine start up under the following conditions. Engine temperature shall be within the normal operating range at the time of startup of the cool down test and the engine speed shall be limited to fast idle that may be activated by a driver controlled device. The bus shall be parked in direct sunlight with ambient temperature at 100 degrees F and humidity less than 60 percent.

There shall be no passengers onboard and the doors shall be closed. The cooling mode may operate independent of the propulsion system and outside air may be cut off during the cool down period.

Manually controlled shutoff valves in the refrigerant lines shall allow isolation of the compressor and receiver for service. To the extent practicable, self-sealing couplings shall be used to isolate the refrigerant lines during removal of major components such as refrigerant compressor or condenser. The condenser shall be located to efficiently transfer heat to the atmosphere, and shall not ingest air warmed by the bus mechanical

equivalent above the ambient temperature or 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.

Bidders shall supply Thermo King Screw design (Intelligent Air) or equivalent. The lower A/C compressor and upper condenser/evaporator package shall be of the same manufacturer.

The door opening average is approximately every 2 minutes; the A/C system must be capable of handling the heat load by maintaining a temperature of 20 degrees less than ambient and humidity level less than 40% at any point or time with 40 plus passengers at 100 degrees in direct sun light.

Note. Air conditioning requirements for hybrid drive batteries, if necessary, shall not activate or degrade the efficiency of the passenger HVAC system.

Bidder shall provide five sets of software, including diagnostic cables, with the first production bus in each order group.

For Electric Buses provide ThermoKing Electric A/C rear or roof mounted with Intelligaire III controls and CAN Based diagnostics or equivalent.

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

Driver's control shall be an IntelligAIRE III or approved equal standard four-key keypad. Settings will not be lost when the master switch is turned off.

The HVAC unit and controls known to meet the minimum requirements are the 'Thermo King' Intelligaire III, or equivalent with standard 4 key keypad driver control, utilizing a model S616 screw compressor for 60 foot buses and model S391 for less than 60 foot buses.

Manufacturers shall provide diagnostic software, including diagnostic cables, with the first production bus in each order group. Provide an additional data port in or near the driver's area. The HVAC system excluding the operator's heater/defroster shall be centrally controlled with an advanced electronic/diagnostic control system with provisions for extracting/reading data. Settings will not be lost when the master switch is turned off.

There shall be manual shut off valves to isolate the drier, receiver, and compressor.

Manually-controlled corrosion resistant shut-off valves in the refrigerant lines shall allow isolation of the compressor and receiver for service. To the extent practicable, self-sealing couplings shall be used to break and seal the refrigerant lines during removal of major components such as the refrigerant compressor or condenser. Suction and discharge lines shall be positioned and secured not to contact each other or any part of the body or frame of the bus.

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. The HVAC unit may utilize Refrigerant R134a, R407c, or R1234YF or equivalents.

System capacity shall have a minimum of 45,000 BTU's with 1,800 CFM at 0.5" water static in duct.

The condenser fans and evaporator blowers shall be brushless motors with 3 year warranty.

Suction and discharge ports shall be easily accessible through the main engine compartment door.

Manual shutoff valves in the refrigerant lines shall allow isolation of the compressor and dryer unit for service.

A safety lanyard on overhead HVAC filter/return air grilles shall be provided.

The Air Conditioning unit installation shall be certified in writing by the Contractor as being designed, manufactured, and installed in accordance with the manufacturer’s requirements before acceptance and delivery of vehicles.

An Air Purification System will be made available as an option and be priced separately.

31.2 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, if applicable, 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 seal-less having a minimum maintenance free service life for both the brushless motor and the pump of at least 40,000 hours at full power.

31.3 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.

31.4 Manually Adjustable Temperature Control Set Point

The climate control system shall have the provision to allow the driver to adjust the temperature control set-point at a minimum of between 68 and 72 °F. From then on, all interior climate control system requirements shall be attained automatically, unless re-adjusted by driver.

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

Interior temperature distribution shall be uniform to the extent practicable to prevent hot and/or cold spots. After stabilization with doors closed, the temperatures between any two points in the passenger compartment in the same vertical plane, and 6 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 the majority of the measured temperatures fall within the specified requirement.

31.5 Air Flow - 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.

31.6 Air Flow - 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.

31.7 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 Purchaser, 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, 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 Purchaser project manager.

31.8 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 glasses in all operating conditions. Fan(s) shall be able to draw air from the bus body interior and/or the exterior through a control device and pass it through the heater core to the defroster system and over the 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 the driver's area. 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 if applicable.

The bus interior climate control system shall deliver at least 100 cubic feet per minute of air to the driver's area when operating in the ventilation, heating, and cooling modes without use of the driver's booster fan. The climate control system blower motors will

operate at the set speed during all operating modes. All return air ducts will be protected by guards constructed of a sturdy mesh which will resist damage.

Adjustable nozzles shall permit variable distribution or shut down of all air flow. The defroster and/or interior climate control system shall maintain visibility through the driver's side window. A booster fan with driver control shall be provided in the ductwork at the driver's area, forward of the operator's position, for increased air flow to the operator.

The windshield defroster unit shall meet or exceed all 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.

31.9 Air Filtration

Air shall be filtered before discharge into the passenger compartment. The filter shall meet the ANSI/ASHRAE 52.1 requirement for 5 percent or better atmospheric dust spot efficiency, 50 percent weight arrestance, and a minimum dust holding capacity of 120 g per 1000 cfm cell. Air filters shall be easily removable for service. All air filters shall be easily accessible without the need to disassemble other parts to access the filter.

31.10 Cleanable Filters

Air filters shall be cleanable.

31.11 Roof Ventilators - One Roof Ventilators

A minimum of one (1) roof ventilators shall be provided in the roof of the bus. Additional manual or power-operated roof ventilator can be added as option.

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.

31.12 Three Roof Ventilators for Articulated Bus

Three roof ventilators shall be provided in the roof of the bus, one approximately over or just forward of the front axle and the second approximately over the rear axle and the third in the trailer compartment.

31.13 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 analog gauges to be located in the return air area.

31.14 Entrance/Exit Area Heating

No requirements for entrance/exit area heating.

Optional Entrance/Exit Area Heating

Heat shall be supplied to the entrance and exit areas to maintain a tread surface temperature no less than 35 °F in an ambient of -10 °F to prevent accumulation of snow, ice or slush with the bus operating under design operating profile and corresponding door opening cycle.

31.15 Floor-Level Heating

31.15.1 Transit Coach

No requirements for floor-level heating.

Optional 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.

Optional Forced-Air Floor-Level Heating

Sufficient floor-level heaters shall be provided to evenly supply heated forced air through floor ducts across the length of the bus. Floor ducts may be discontinued at the upper level, but additional provisions to prevent cold floors and ensure temperature uniformity shall be included. Control of the floor-level heating shall be through the main heating system electronic control.

Optional Convector Air Floor-Level Heating

Sufficient floor-level heaters shall be provided that evenly supply convector air across the length of the bus. Control of the floor-level heating shall be through the main heating system's electronic control.

Optional Warm Wall Heating

Sufficient heaters shall be provided with ducting to blow warm air upward through a cavity in the wall and discharge the warm air at the base of the windows. Control of the warm wall heating shall be through the main heating system electronic control.

31.15.2 Commuter Coach

Sufficient heaters shall be provided with ducting to blow warm air upward through a cavity in the wall and discharge the warm air at the base of the windows. Control of the warm wall heating shall be through the main heating system electronic control shall be optional.

32 EXTERIOR PANELS, FINISHES AND EXTERIOR LIGHTING

32.1 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 of air, dust or water under normal operating conditions and during cleaning in automatic bus washers for the service life of the bus.

Exterior panels shall be sufficiently stiff to minimize vibration, drumming or flexing while the bus is in service. 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.

32.2 Materials

Body materials shall be selected by Contractor 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.

32.3 Roof-Mounted Equipment

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.

32.4 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.

32.5 Repair and Replacement - Side Body Panels

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.

32.6 Easily Replaceable Lower Side Body Panels

The lower section (approximately 17.5 in.) of the side body panels (low-floor buses) or skirt panels (highfloor buses) shall be made of impact-resistant material and shall be easily and quickly replaceable. This does not apply to electric buses.

32.7 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.

32.8 License Plate Provisions

Provisions shall be made to mount standard-size U.S. 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.

32.9 Fender Skirts

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

32.10 Standard Splash Aprons

Splash aprons, composed of ¼ in. minimum composition or rubberized fabric, shall be installed behind and/or in front of wheels as needed to reduce road splash and protect underfloor components. The splash aprons shall extend downward to within 6 in. off the road surface at static conditions. Apron widths shall be no less than tire widths. Splash aprons shall be bolted to the bus understructure. Splash aprons and their attachments shall be inherently weaker than the structure to which they are attached. The flexible portions of the splash aprons shall not be included in the road clearance measurements. Splash apron shall be installed as necessary to protect the wheelchair loading device from road splash. Other splash aprons shall be installed where necessary to protect bus equipment. An approved method of grounding static electricity shall be provided on each bus such as a conductive nylon grounding strap.

32.11 Service Compartments and Access Doors - Access Doors

Conventional or pantograph hinged doors shall be used for the engine compartment and for all auxiliary equipment compartments including doors for checking the quantity and adding to the engine coolant, engine lubricant and transmission fluid. Access openings shall be sized for easy performance of tasks within the compartment, including tool

operating space. Access doors shall be of rugged construction and shall maintain mechanical integrity and function under normal operations throughout the service life of the bus. They shall close flush with the body surface. 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 flush with, or recessed behind, the body contour and shall be sized to provide an adequate grip for opening. Access doors, when opened, shall not restrict access for servicing other components or systems. If precluded by design, the Contractor shall provide door design information specifying how the requirements are met. The following options will be made available and priced separately:

1. An engine oil pressure gauge and coolant temperature gauge with drag needle 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.

   Electronic gauges shall be listed as an option and priced separately.

2. Engine compartment lighting shall be provided to adequately illuminate the area for night time service, emergency repairs, or adjustments. Sealed lamp assemblies shall be provided and shall be controlled by a switch located near the rear start controls in the engine compartment. The rear engine compartment lights shall have an on/off switch.
3. Protective sleeves (high temperature resistant material) shall be provided to all fire suppression system hoses, high pressure hydraulic lines for hydraulic pump and power steering.

32.12 Access Door Latch/Locks

The engine compartment, including the exhaust duct plenum, shall be completely sealed to prevent smoke or fumes from entering the bus interior. The engine bulkhead and exhaust duct plenum shall be insulated adequately to prevent discomfort to passengers due to heat, to minimize hazard in case of fire in the engine compartment, and to aid in controlling noise to meet required levels.

An engine air intake designed to minimize noise shall be provided. Insulation shall be provided as needed in the engine compartment area for sound suppression.

An adequate number of fire detectors shall be furnished in the engine compartment, as determined by the Contractor. The detectors shall activate an alarm (visual as well as audible) at the driver's station.

Access panels to the left and right side of the engine compartment shall be provided with expanded metal inserts to provide heat dissipation in the engine compartment. Panels

shall also be constructed so that maintenance personnel can easily reach all under the floor and engine compartment equipment requiring access from outside the bus body. Access panels will be hinged to swing up and out of the way and be secured with a 5/16" square latch.

Gas operated shocks with safety locks shall secure access doors in the open position during inspection and servicing. The engine compartment doors will be equipped with handles. Louvers shall be provided in the rear engine compartment door to optimize airflow. Access doors are not required in the engine door.

Forward edge hinges with positive action hold open springs shall be provided on the fuel connector and lay flat against the adjacent panel when fully opened. The battery access door shall have top or leading edge hinges with gas operated shocks with safety devises when the battery is being serviced. A small access door shall be provided to the battery disconnect switch, if it is not easily reached through the battery main box door.

Battery disconnect switch, fuel and air tank drain valve doors will be OEM standard doors and latch. A well type securing latch shall be optional.

The following options will be made available and priced separately:

1. An engine oil pressure gauge and coolant temperature gauge with drag needle 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.
2. Engine compartment lighting shall be provided to adequately illuminate the area for night time service, emergency repairs, or adjustments. Sealed lamp assemblies shall be provided and shall be controlled by a switch located near the rear start controls in the engine compartment. When the rear engine compartment door is closed the compartment lights shall extinguish automatically.
3. Protective sleeves (high temperature resistant material) shall be provided to all fire suppression system hoses, high pressure hydraulic lines for hydraulic pump and power steering.

NOTE: option 1 is not applicable to battery electric buses.

32.13 Bumpers - 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.

32.14 Front Bumper

No part of the bus, including the bumper, shall be damaged as a result of a 5 mph impact of the bus at curb weight with a fixed, flat barrier perpendicular to the bus'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 4000 lbs. parallel to the longitudinal centerline of the bus. It shall protect the bus from damage as a result of 5.5 mph impacts into the corners at a 30-degree 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 will be made for integrating bike rack if necessary.

32.15 Bicycle Racks - Optional

An optional bicycle rack will be made available to be installed and ready for use upon delivery of buses. Racks will be identical in style to the existing racks on current procuring agencies' fleets. Racks will be unpainted stainless steel, powder coated black, or standard black. A bike rack deployed indicator light will be provided on the driver's dash. Each rack will carry the manufacturer's warranty from time of bus acceptance, and will include parts and labor. Components known to meet these requirements include, but are not limited to, Sports Works NW, Inc and Mid-West BYK-RAK. Pricing for either rack will be provided to include operating instructions in both English and Spanish. Both two and three bike rack pricing will be made available.

32.16 Rear Bumper

No part of the bus, including the bumper, shall be damaged as a result of a 2 mph impact with a fixed, flat barrier perpendicular to the longitudinal centerline of the bus. The bumper shall return to its pre-impact shape within 10 minutes of the impact. When using a yard tug with a smooth, flat plate bumper 2 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 30-degree angle to, the longitudinal centerline of the bus. The rear bumper shall be shaped to preclude unauthorized riders standing on the bumper. The bumper shall 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.

32.17 Bumper Material

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

33 FINISH AND COLOR

33.1 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 assure a proper bond between the basic surface and successive coats of original paint for the service life of the bus. Drilled holes and cutouts in exterior surfaces shall be made prior to cleaning, priming and painting, where possible, to prevent corrosion. The bus shall be completely painted prior to installation of exterior lights, windows, mirrors and other items that are applied to the exterior of the bus. Body filler materials may be used for surface dressing, but not for repair of damaged or improperly fitted panels.

Composite bus body may use gel coat as applicable.

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 patch due to incorrect mixing of paint activators
- buffing swirls
- orange peel surface

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 or ASTM D3359. Adhesion shall be a minimum 300 ft.-lbs.

The Contractor 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. Bus exteriors shall be painted and numbered to include numbers on the roof to the general design to be provided with each order. Minor variations to this color scheme may be required in order to accommodate the specific styling of the Contractor's buses. Within 30 days of execution of contract, the Contractor shall supply to Purchaser the detailed drawings of the front, rear, both sides, and roof of the bus that will be supplied.

Within 60 days of execution of the contract, the Purchaser will return these drawings to the Contractor with details of the color schemes included.

The bus exterior shall be primed as recommended by the manufacturer of the final finish and shall be finished with the color scheme specified in the order. Bidders should provide listings of available colors. Current color schemes used by the various Procuring Agencies will be provided for pricing.

There shall be no bare or exposed metal surfaces showing on the exterior of the bus, exclusive of ornamentation and accessories. The display of Contractor's name or insignia on the exterior of the bus will be as specified in the individual order.

33.2 Decals, Numbering and Signing

Monograms, numbers and other special signing 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, Subpart B, 38.27.

Buses shall have fleet numbers applied both on the interior and exterior of the bus in sequence with factory serial numbers. Each individual order will include the correct starting number and the location, size and color of numbers.

On the roof of the bus the 18 to 24 inch high numbers shall be centered on the longitude axis of the bus so they can be read from an airplane approaching from the rear of the bus. Individual orders may specify no roof number be applied.

33.3 Passenger Information

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

Requirements for a public information system in accordance with 49 CFR, Part 38.35 shall be provided.

Interior decals such as but not limited to the following, No Smoking, Exit door, Emergency Exit, Watch Your Step, Wheelchair instructions and "Reserved for Wheelchairs," etc. shall be provided . All decals shall be in English and Spanish. Optional Tri-Lingual decals will be made available, with the three languages being verified at the pre-production meeting. Decals containing identification of windows, hatches, etc., shall also be provided. All decals shall conform to Washington state law.

33.4 Exterior Lighting

Exterior lighting and reflectors shall comply, as applicable, with Part 393, Subpart B of the FMCSA and FMVSS 108.

All exterior lights shall be designed to prevent entry and accumulation of moisture or dust. Commercially available LED-type lamps shall be utilized at all exterior lamp locations

except headlights. 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. 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.

Exterior lighting shall comply with all applicable State and Federal regulations. Replacement lamps shall be readily available from commercial sources; they shall not be a Contractor unique item. Those applications which will not accommodate an LED lamp shall have a replaceable bulb with access to the bulb by removing the lens from outside the bus. LED headlamps, if available, shall be offered as standard equipment.

If LED headlamps are not available, Halogen sealed beam headlights are required with high and low beams controlled from a sealed, moisture-protected foot switch located on the floor in the driver's station.

The sealed beam units shall be of the latest heavy-duty type and be ruggedly mounted to maintain adjustment under transit operating conditions. Headlights shall be wired to operate on reduced voltage in the run position.

All other lights shall be LED as allowed by applicable State Laws. The stop lights and tail light shall be four inches, with seven inches as an option. Rear turn indicator lights shall be separate from the stop-tail lights.

Components known to meet these requirements include, but are not limited to, the Dialight Corp. An optional all LED “STOP” light shall be made available to be installed on the centerline of the bus above the top of the rear engine door. The stop light flashes the word “STOP” when brakes are applied.

Components known to meet these requirements include, but are not limited to, the JKA Enterprises light sign and should be priced separately.

The LED marker lights at the front and rear upper corners of the bus shall be of flush mounted type to preclude breakage by tree limbs, bus washers, etc.

Each doorway shall have an outside light(s) which, when the door is open, provides at least one foot-candle of illumination of the street surface for a distance of three feet perpendicular to the bottom step tread outer edge. Light (s) shall be located below window level and shielded to protect the eyes of entering and exiting passengers.

An optional “Yield To Bus” sign shall be made available and should be priced separately.

33.5 Backup Light/Alarm

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.

33.6 Doorway Lighting

Lamps at the front and rear passenger doorways shall comply with ADA requirements and shall activate only when the doors open. These lamps shall illuminate the street surface to a level of no less than 1 footcandle 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.

33.7 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.

An adequate number of LED lights located in convenient locations that fully illuminate the engine compartment shall be controlled by switches mounted near the rear start controls. All other service area lamps shall be controlled by switches mounted on or convenient to the lamp assemblies.

33.8 Deceleration Lights (Optional – If Allowed by FMVSS) (Exempt from scoring)

Four amber 4" LED deceleration lights shall be made available for installation as optional equipment. Two lights shall be at least 8 feet from ground level on the rear of the bus and two at the top of the tailgate. These lights will flash continuously as long as there is 0% throttle and the master switch is in the run position. Components known to meet these requirements include, but are not limited to, two 4".

Weldon flashing amber lights, brake activated mounted in rear of bus and 2 - Dialight 4" Brake, Stop and Turn signal. These items will be priced separately.

33.9 Transfer Beacon (Optional – If Allowed by FMVSS) (Exempt from scoring)

An optional Transfer light Beacon or Equal shall be made available to be mounted outside horizontally at the top center of each bus and within twelve (12) inches of the front of the bus. The beacon shall be a 1.5 million candle power white strobe light with 60-80 flashes per minute minimum. A 90 degree blanked out portion of the lens, on the strobe, shall be facing to the rear of the bus. The exact location of the strobe will be approved by frequency above 18,000 Hz. Interchangeability of LED lamps, lenses, fixtures, and power supplies shall be maximized.

34 INTERIOR PANELS AND FINISHES

34.1 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 close proximity to these surfaces shall also be resistant to this cleaning method.

34.2 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.

34.3 Driver Area Barrier

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 passenger 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 entire partition assembly for mounting of such equipment as flare kits, fire extinguishers (1.2 kg), microcomputer, public address amplifier, etc. Dark or black panels are preferred behind the driver's head. The panel should be isolated for noise control and attached with rubber grommets.

34.4 Wheel-Well-to-Ceiling Configuration of Driver's Barrier

The driver's barrier shall extend from the top of the wheel well to the ceiling the level of the seated driver and shall fit close to the bus side windows and wall to prevent passengers from reaching the driver or the driver's personal effects.

34.5 Full-Height (Floor-to-Ceiling) Configuration of Driver's Barrier (optional)

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 limit passenger conversation.

34.6 Driver Security Enclosure Door

Bidders will make available and price separately a Driver Security Enclosure Door.

34.7 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 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 assist is 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.

A deduct will be made available for those agencies not desiring a modesty panel at the front entry door.

34.8 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.

34.9 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 liter being thrown or drawn through the grille. If it is necessary to remove the panel to service components located on the rear bulkhead, the panel shall be hinged or shall be able to be 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.

34.10 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.

34.11 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.

34.12 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 a 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. Insulation shall meet the requirements of FMVSS 302.

34.13 Floor Covering

The floor covering shall have a non-skid walking surface that remains effective in all weather conditions, such as Altro Meta/Chroma or equivalent.

The floor covering, as well as transitions of flooring material to the main floor and to the entrance and exit area, shall be, where possible, a one piece construction with no openings for water and dirt to enter below the floor. It must be smooth and present no tripping hazards. Seams shall be welded per Contractor's specifications. The standee line shall be a Minimum of 2 inches wide and shall extend across the bus aisle. This line and the edge of the steps shall be Yellow. The color and pattern shall be consistent throughout the floor covering. The color and quality of the flooring shall be provided after award.

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.

The main floor area will be one piece and if the floor is of a bi-level construction, then it shall be one piece at each level. The covering between the center strip and the wheel housings may be separate pieces but all seams must be welded or sealed per manufacturer's specifications to prevent water and dirt intrusion. At the rear door, 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 covering shall closely fit the sidewall in a fully sealed butt joint or extend to the top of the cove with no exposed edges. Flooring must meet ASTM E662, ASTM E648, ASTM D2047 and FMVSS 302.

34.14 Interior Lighting

In general, all interior lights are to be LED. 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.

Option: Colored covers on interior lights to reduce glare at night.

34.15 Passenger

The passenger interior lighting system shall be a LED lighting system. The interior lighting system shall provide a minimum 15 foot-candle illumination on a 1 square foot plane at an angle of 45 degree from horizontal, center 33 inches above the floor and 24 inches in front of the seat back at each seat position.

Allowable average light level for the rear bench seats shall be 7 foot-candles. Floor surface in the aisles shall be a minimum of 10 foot-candles, vestibule area a minimum of 4 foot-candles with the front doors open and minimum of 2 foot-candles with the from

doors closed. The front entrance area and curb lights shall illuminate when the front door is open and master run switch is in the "Lights" positions.

Rear exit area and curb lights shall illuminate when rear door is unlocked.

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

The light source shall be located to minimize windshield glare with distribution of the light focused primarily on the passengers' reading plane while casting sufficient light onto the advertising display. The bus shall be equipped with interior advertising card tracks on each side of the interior passenger compartment, running the length of the bus, to hold 11" high ad cards. High power solid state LED strip shall be in one-foot section increment with high power LED manufactured by either Nichia or Philips or approved equal with expectation to maintain on average 60-70% of original brightness after 60,000 hours of operation. The brightness of each individual light fixture shall be software programmable to adjust the interior light level relative to ambient light for passenger comfort.

Lens material shall be clear polycarbonate. Lens shall be designed to effectively ``mask" all individual LED's to make them invisible and there shall be no "hot spot" or "dark spot". Lens shall be sealed to inhibit incursion of dust and insects yet are easily removable for service. If threaded fasteners are used they must be held captive in the lens. Access panels shall be provided to allow servicing of components located behind light panels.

Individual driver module shall be provided for each light fixture. Driver module shall have built-in self-protection of thermal shut-down and restart, PWM (Pulse Width Modulation) output to regulate light level, reverse polarity protect and re-buildable.

When the master switch is in the RUN or NITE/RUN mode, the first light module on each side of the coach shall slowly fades to darkness when the front door is in the closed position and light output shall gradually illuminate to reach maximum light level when the door is opened. Solid state LED lighting shall have unlimited on-off cycles.

Failure of any light fixture or driver module shall be broadcasted via telltale light panel or dashboard display. The system will look for supply current and lighting fixture temperature to be approximately the same for all of the driver modules, and will show which module(s) seem to have a problem.

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

Emergency backup system shall keep the light fixtures over the front and rear doors illuminated at minimum light output under a separated battery power for 10 to 15 minutes allowing passengers visibility and timely evacuation from the vehicle during emergency conditions.

34.16 Driver 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. This light shall be controlled by a toggle switch that is convenient to the driver. An optional light that illuminates the farebox will be made available as an option and priced separately. Light fixture shall be mounted in the ceiling above the farebox location. The fixture shall be capable of projecting a concentrated beam of light on the farebox.

This light will automatically come on whenever the front doors are opened and the run switch is in the "night run" or "night park" position

34.17 Seating Areas

The interior lighting system shall provide a minimum 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.

34.18 Vestibules/Doors

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.

34.19 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.

34.20 Ramp Lighting

Exterior and interior ramp lighting shall comply with CFR Part 49, Sections 19.29 and 19.31.

35 Fare Collection

Space and structural provisions shall be made for installation of currently available fare collection devices, which shall be as far forward as practicable. Location of the fare collection device shall not restrict traffic in the vestibule, including wheelchairs if a front door loading device is used, and shall allow the driver to easily reach the farebox controls and to view the fare register. The farebox shall not restrict access to the driver area, shall not restrict operation of driver controls and shall not—either by itself or in combination with stanchions, transfer mounting, cutting and punching equipment, or route

destination signs—restrict the driver's field of view per SAE Recommended Practice J1050. The location and mounting of the fare collection device shall allow use, without restriction, by passengers. The farebox location shall permit accessibility to the vault for easy manual removal or attachment of suction devices. Meters and counters on the farebox shall be readable on a daily basis. The floor under the farebox shall be reinforced as necessary to provide a sturdy mounting platform and to prevent shaking of the farebox.

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

Contractor shall provide fare collection installation layout to the Purchaser for approval.

A Purchaser may provide or request a mounting plate, terminal strip, system alarm, etc. that is not usual.

Mounting of this equipment and power lead with amperage requirements will be determined at the preproduction meeting. Power shall be available with the master run switch in any position including off.

Wire for the fare box shall be pre-wired through the floor.

Bidders should separately price the fare box. Pre-wiring and mounting structure shall be included in the base bus bid.

36 Interior Access Panels and Doors

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 shall be secured with hand screws or latches. All fasteners that retain access panels shall be captive in the cover.

36.1 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 Purchaser 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.

37 PASSENGER ACCOMMODATIONS

37.1 Passenger Seating- Arrangements and Seat Style

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

General seating requirements shall accommodate as many forward facing seats as possible. Hip-to-knee room shall be a minimum of 26.50”. Passenger seating shall be molded shell seats with padded vandal resistant fabric inserts. Installation shall be with cantilever mount and no closeout where possible.

Bidders shall indicate standard seating included with proposed bus. Passenger seats must meet APTA requirements.

Any exposed metal of the frame will be powder coated, color coordinated to match the seat inserts, or brushed aluminum, or brushed stainless steel.

NOTE: Bidders shall provide a proposed seating layout with their bid. The handholds shall be colored the same as the back panels of the passenger seats.

The top area of the seat back shell will wrap around the upper portion of the seat back (below the grab rail) in a "bubble" to form a crash pad on the rear of each seat. The crash pad will be of continuous construction with the back.

Rear seat platform shall be hinged or easily removable to gain access to engine compartment.

Bidders shall submit a certified test report as evidence of compliance with all testing activities, test diagrams, test equipment as well as test data related to loads, deflections and permanent deformation of the seat assembly as defined in the APTA Standard Bus Procurement Guidelines manual.

37.2 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 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 26.5 inches.

37.3 Foot Room

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.

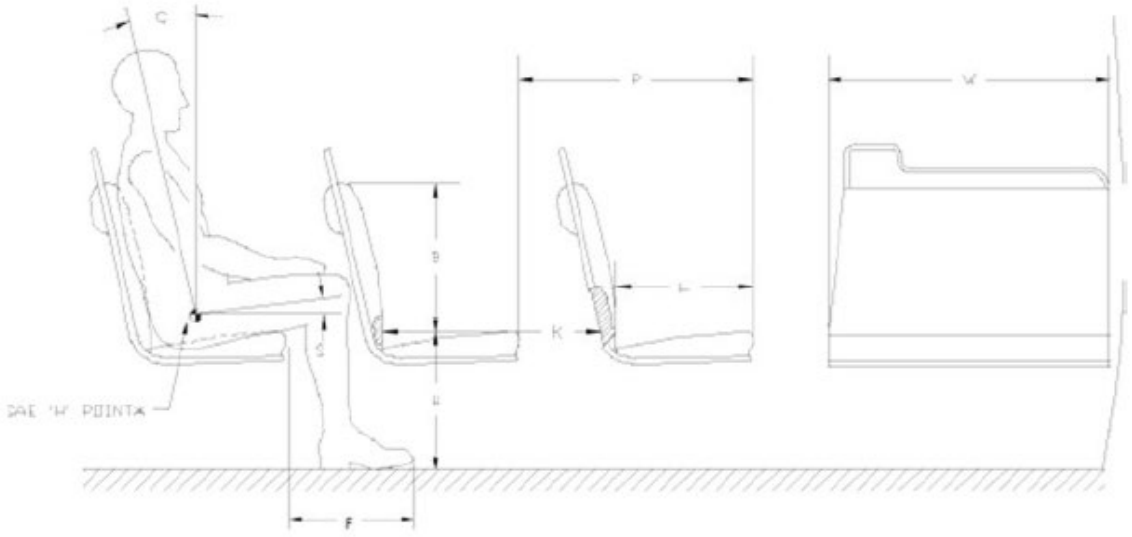
37.4 Aisles

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).

37.5 Dimensions

FIGURE 7

Seating Dimensions and Standard Configuration



37.6 Structure and Design

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 1000 lbs. 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 to 0.015 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 ¼-in. 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 ¼-in. 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 36-in. 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 ¼-in. permanent deformation and without visible deterioration.

37.7 Construction and Materials

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 ¼-in. The seat back and seat back handhold immediately forward of transverse seats shall be constructed of energy-absorbing materials to provide passenger protection and, in a severe crash, allow the passenger to deform the seating materials in the impact areas. Complete seat assemblies shall be interchangeable to the extent practicable. Purchaser to select seat fabric.

37.8 Passenger Assists

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

37.9 Assists

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 12-in. lineal dimension in any direction normal to the assist without permanent visible deformation. All passenger assist components, including brackets, clamps, screw heads and other fasteners used on the passenger assists shall be designed to eliminate pinching, snagging and cutting hazards and shall be free from burrs or rough edges.

37.10 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.

37.11 Vestibule

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. An optional Stainless steel molding to cover edges on entrance and rear riser will be made available and priced separately.

37.12 Rear Doorway(s)

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.

37.13 Overhead

Except forward of the front wheel well 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.

Vinyl coated nylon grab straps positioned throughout the bus interior mounted to the horizontal stanchions are optional and priced separately.

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

37.14 Longitudinal Seat Assists

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

37.15 Wheel Housing Barriers/Assists

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

37.16 Passenger Doors

The front door shall be a "slide glide" type inward opening, driver controlled, of corrosion-resistant construction. Minimum clear opening shall be 31.75” inches. The front door shall have a minimum height of 75” inches. The overhead clearance between the top of the door opening and the highest point of the ramp shall be a minimum of 68 inches. 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 is allowed to accommodate a raised aisle floor in the rear of the bus. Operation of, and power to, the front door shall be controlled by the driver. Door shall be opened completely in 1 to 3.5 seconds from the time of control actuation, and shall be subject to adjustment requirements of this specification. A control valve in the driver's compartment shall shut off the power to, and/or dump the power from, the front door mechanism to permit manual operation of the front door with the bus shut down.

The rear or exit door shall be a two panel swing out type designed or slide glide, if applicable, to provide a minimum clear opening of 30” inches and a minimum height of 75 inches. Rear doors shall be operator opened and spring closed or equal. The closing of the door shall begin after the control has been moved to the closed position, and after the door has been fully opened. Door opening and closing speeds shall be adjustable. The rear door shall be equipped with a sensitive edge which will open the door automatically if an object is trapped between the doors. The doors shall have handrails (1.25 inches or equivalent surface area with a 1.50 inch knuckle clearance) mounted on the door panels and/or a modesty panel in the door well/step well. The clear opening dimension shall apply inside these handrails. Handrails whether on the door panel or in the body, shall be part of the systematic set of passenger assists.

To preclude movement of the bus, an accelerator interlock shall lock the accelerator in the closed position and a brake interlock shall engage the rear axle service brake system when the front and rear door control is activated and the vehicle is moving below 3 mph. When vehicle is moving above 3 mph the rear door shall remain locked. The braking effort shall be to the maximum capability of the rear axle brakes.

Entrance and exit door motors and actuators shall be specified. At a minimum, both front and rear doors shall meet ADA requirements.

A system where rear doors shall be a passenger-controlled “Touch Bar Type” rear door will be made available as an option and be priced separately. The rear door control shall be limited to unlocking and enabling the opening mechanism, which shall be signaled by illumination of a green light near the door.

The door shall be opened by touching either of the rear door vertical passenger assists with a force of 5 to 10 pounds. The touch bars shall meet the general requirements of passenger assist size, strength and knuckle clearance, and shall not self-activate if the bus is stopped with the left side 10 inches higher than the right side. The touch bar assists shall be located near the opened edge of the door panels and extend from 36 inches above the floor surface to within 36 inches of the street surface. The doors shall close when the touch bar is released. Closing shall begin 2 seconds after the touch bar is released and the door shall close within 2 to 3 seconds from the fully opened position. A switch, convenient to the driver, shall convert the rear door to a power door with both opening and closing controlled by the driver.

An emergency door switch which is not in reach of a seated driver shall close the rear doors, deactivate the door control system, and permit only emergency operation of the doors.

A system where the rear/exit door of the vehicle shall be equipped with an acoustic sensing system such as the CLASS TM system manufactured by the Vapor Corporation will be made available as an option and be priced separately. This system shall sense passengers and other objects in the doorway and between the fully open or partially closed door panels. The system shall utilize ultrasonic acoustic waves and intelligent signal processing techniques to sense objects in selected spaces depending upon the phase of the door operating cycle. The system shall be capable of selectively requesting opening of exit doors enabled by the vehicle operator; sensing passengers approaching the door opening from the interior of the vehicle and providing a door HOLD OPEN request; and of sensing passengers or other objects that intrude within defined zones during door closing and providing a REOPEN or HOLD OPEN request. The detection zone dimensions shall be user-programmable.

The system shall be capable of resisting false detections due to environmental conditions, including rain.

The acoustic components shall be solid state devices and shall be packaged to withstand the transit bus environment.

Rear doors shall be passenger-controlled. The rear door control shall be limited to unlocking and enabling the opening mechanism, which shall be signaled by illumination of a green light near the door. The door shall be opened when a passenger attempts to touch the center edge of either door panel in the area of a decal displaying appropriate signage, optional per purchaser. This action by the passenger when the door is enabled will signal the door operator to open. The door system will be provided with passenger assists designed as to avoid interference with the detection zones of the sensors and shall meet the general requirements of passenger assist size, strength and knuckle clearance. Passenger assists shall be located near the opened edge of the door panels and extend from 36 inches above the floor surface to within 36 inches of the street surface.

The doors shall begin to close 2 seconds after the sensors cease to detect an object or passenger in the doorway. The door closing speed shall be adjustable and not exceed 12 inches per second for closing. A separate switch, convenient to the driver, shall convert the rear door to a power door with both opening and closing controlled by the driver. A master door switch which is not in reach of a seated driver shall close the rear doors, deactivate the door control system, and permit only emergency operation of the doors.

A system where the rear doors shall be passenger opened and spring closed w/ sensitive edge will be made available as an option and be priced separately.

For electric buses consideration should be given for electric powered front and rear door.

37.17 Closing Force

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.

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.

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.

37.18 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.

A switch located within reach of the seated operator shall, when actuated, restore rear door function to complete operator control.

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.

37.19 Rear Door Interlocks

See "Hardware Mounting" for door system interlock requirements.

37.20 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.

37.21 Door Control

The door control shall be located 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.

37.22 Door Controller - Five-Position or Two Momentary Push Buttons Driver's Door Controller

The control device shall be protected from moisture. 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.
- For electric buses consideration should be given for electrically or pneumatically operated door controller

37.23 Door Open/Close - Operator-Controlled Front and Passenger-Controlled Rear Doors with Provision for Driver Override

Operation of, and power to, the front passenger doors shall be completely controlled by the operator.

Power to rear doors shall be controlled by operator. After enabling, the rear doors shall be opened by the passenger, optional per purchaser selection. A switch shall be provided to enable the driver to obtain full control of the rear doors.

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

38 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.

38.1 Loading Systems

The bus shall be equipped with a front door ramp mechanism that conforms to all requirements of the Americans with Disabilities Act (ADA). It is to be an all electrically operated system which will assume the normal entrance configuration when stowed. When stowed, the ramp should not exceed any of the normal bus undercarriage clearances. All ramp components and mechanisms shall be constructed of corrosion resistant materials and incorporate a design which affords maximum protection from the elements during normal bus operations. Ease of maintenance and servicing shall be a prime consideration in system design and construction.

Wheelchair tie-downs will be incorporated and located as close to the front door of the bus as practical to ensure maximum aisle width and wheelchair maneuverability the wheelchair ramp shall have a manual release, deploy, and stow mechanism. The components involved with manual operation shall be completely accessible. If ramp provides for a nylon strap, it must be located on the forward side of the ramp to preclude a trip hazard.

38.2 Dimensions and capabilities:

Ramp Length shall provide for a minimum 1:6 slope when the bus is kneeled and the ramp deployed to ground level.

- Ramp Width 30.5 min.
- Load Capacity Must meet current ADA regulations
- Cycle Speed not to exceed 12” per sec.

The ramp shall be controlled by toggle switches, master on-off, up-down and stow-deploy. The control switches shall be of the spring loaded to a safe position type so that constant manual pressure is required by the operator during ramp operation. All controls shall be clearly identified by function and present a reasonably foolproof and natural sequence of operation.

Visual and audible warning devices shall be located immediately to the rear of the front door. The audible warning device shall be activated only when the ramp is functioning. Interlocking and fast idle provisions shall be incorporated so the ramp cannot be extended unless the entrance door is in the full open position, the transmission in neutral, and the parking brake engaged. The entrance door cannot be closed unless the ramp is in the fully stowed position. The bus service brakes shall be automatically applied when the ramp is in any position other than the stowed and locked position. All ramp components mounted under the bus shall be protected from dirt, debris, and road splash through the use of appropriate enclosures, mud flaps, or sealed compartments, subject to approval by each Purchaser.

Weatherproof access panels/doors shall be provided to allow for servicing and troubleshooting both ramp and under-floor bus components. Lubing the ramp shall be accomplished without removing the belly pan.

The electrical interfacing connections between the bus and the ramp shall be of the quick disconnect type to facilitate ramp removal and installation.

Components known to meet these requirements include, but are not limited to equipment manufactured by Lift-U Inc., the Lift U LU-18 2 dual mode, and Ricon, Inc.

38.3 Wheelchair Accommodations

NOTE: Purchaser will approve acceptable securement system.

38.4 Two Forward-Facing Wheelchair Securement Locations

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

38.5 Wheelchair Securing System

Bidder shall provide a telescope restraint system at each wheelchair position. At a minimum, all restraint systems must meet CFR 49, FMVSS, FTA and ADA standards. Components known to meet these requirements include, but are not limited to American Seating ARM, Q’Straint Q’Pod, and Q’Straint QRT systems. **If wheelchair securing strap systems are installed then the following applies:** Wheelchair securing strap assemblies and suitable compartment for storing straps for the installation on accessible transit

buses as required, to be in complete compliance with all ADA/FTA regulations in effect at time of manufacture. The securing system shall be provided by the individual seating manufacturer.

Each securing strap assembly shall include but not limited to the following: Each securing strap shall be equipped with a male and female connector. When fully extended, the strap shall be 51.5 inches long from the mounting hole to the end of the female buckle. The strap webbing shall be red in color and shall be equal to automobile seat belt webbing material.

An automotive type retractor for stowing webbing shall be provided. In the stowed position, no more than 11 inches of the securing straps shall be outside of the retractor assembly. The retractor assembly shall be black in color, or approved equal.

The securing strap assembly shall be used in a set of 2 units. A 2 unit set of securing straps shall hold a wheelchair and passenger up to the maximum load as specified by current ADA regulations.

38.6 Interior Circulation

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 90-degree turns of wheelchairs should have a clearance arc dimension no less than 45 in., and in the parking area where 180-degree turns are expected, space should be clear in a full 60-in.-diameter circle. A vertical clearance of 12 in. above the floor surface should be provided on the outside of turning areas for wheelchair footrest.

39 SIGNAGE AND COMMUNICATION

Destination Signs

An LED automatic electronic destination sign system shall be furnished and installed in each bus by the manufacturer. The destination sign system shall consist of:

- One (1) Front sign 16 rows x 160 columns; display height minimum 7.9 inches, display width 63”, or a 24 rows x 200 columns sign.
- One (1) Side sign, on the curb side, 14 rows x 108 columns; display height minimum 4.2 inches, display width 42”.
- One (1) Rear sign 16 rows x 48 columns; display height minimum 6.1 inches, display width 17”.
- Operators Control Unit (OCU)

A colored LED light sign system will be made available and be priced separately.

39.1 Cables and Accessories

The Front Sign shall be mounted on the front of the Bus, near the top edge of the body, behind windshield protection, and in an enclosed but accessible compartment. The Side Sign shall be located on the right side (curb side) of the bus near the front door, mounted near the top of an existing window. The Rear Sign (external) shall be mounted on the rear of the vehicle on an appropriate sized cutout.

The entire display area of all signs shall be readable in direct sunlight, at night, and in all lighting conditions between those two lighting extremes, with evenly distributed illumination appearance to the un-aided eye.

The system shall be microprocessor-based, utilizing approved bi-directional serial communications, such as S.A.E J1708 or IBIS, E.I.A. RS-485, between system components, and shall utilize error detection techniques within the communication protocol.

The system shall be capable of communicating with additional information devices, such as interior information Signs, Voice Annunciation devices, fare box, etc. The system shall provide for destination and/or Public Relations (P/R) message entry.

Flash memory integrated circuits shall be capable of storing and displaying up to 10,000 message lines.

Message memory shall be changeable by the use of a PCMCIA Card or USB memory stick of not less than one (1) gigabyte memory capacity but sized according to the message listing noted herein.

Twin Vision standard is now programming via USB

The System shall have the ability to sequentially display multi-line destination messages, with the route number portion remaining in a constant “on” mode at all times, if so programmed. It shall also be capable of accepting manual entry of Route Alpha/Numeric information on any/all signs.

The various Signs shall be programmable to display independent messages or the same messages; up to two destination messages and one public relations message shall be pre-selectable. The operator shall be able to quickly change between the pre-selected messages without re-entering a message code. Public relations messages shall be capable of being displayed alternately with the regular text and route messages or displayed separately.

An emergency message shall be activated by a push button or toggle switch. The emergency message shall be displayed on signs facing outside the vehicle while signs inside the vehicle, including the OCU display, remain unchanged. The emergency message shall be canceled by entering a new destination code, or power cycling (after removal of the emergency signal).

The programming software shall provide means of adjusting the length of time messages are displayed in 0.1 second increments up to twenty-five seconds.

Power to the Sign system shall be controlled by the Master Bus Run Switch. The signs shall operate in all positions of this switch except off. The signs shall be internally protected against voltage transients and RFI interference to ensure proper operation in the local environment.

39.2 Display and Display Illumination

All Sign displays shall consist of pixels utilizing High Intensity Light Emitting Diodes ("LED"), for superior outdoor environmental performance, (of Amber illumination appearance of light wavelength of 590 NM). LED should be made of AllnGaP II, superior UV resistant Epoxy lens and superior resistance to the effects of moisture. Each pixel shall have a dedicated LED for illumination of that pixel in all lighting conditions. The sign system shall have multi-level intensity changes, which adjust automatically as a function of ambient lighting conditions. There shall be no requirement for any fan or any specialized cooling or air circulation.

This LED shall be mounted such as to be visible directly to the observer positioned in the viewing cone, allowing for full readability 65 degrees either side of the destination sign centerline. The LEDs shall be the only means of illumination of the sign system. The LED illumination source shall have an operating life M.T.B.F. of not less than 100,000 hours. Each LED shall not consume more than 0.02 Watts.

The characters formed by the System shall meet the requirements of the Americans with Disabilities Act (ADA) of 1990 Reference 49 CFR Section 38.39.

39.3 Sign Enclosures

All Signs shall be enclosed in a manner such as to inhibit entry of dirt, dust, water and other contaminants during normal operation or cleaning. Access shall be provided to clean the inside of the Bus window(s) associated with the Sign and to remove or replace the Sign components. Access panels and display boards shall be mounted for ease of maintenance/replacement. Any exterior Rear Sign enclosure used shall be made of

Polycarbonate material containing fiberglass reinforcement. The Contractor shall comply with the Sign manufacturer's recommended mounting, mounting configuration, and installation procedures to assure optimum visibility and service accessibility of the Sign System and System components.

39.4 Electronic System Requirements:

All electronic circuit boards used in the Sign System shall be conformal coated to meet the requirements of military specification MIL-I-46058C. All Sign System components shall be certified to have been subjected to a "burn-in" test of a minimum of twelve (12) hours operation in a temperature of 150 degrees F. prior to final inspection.

39.5 Operator Control Unit (OCU)

The OCU Unit shall be used to view and update display messages. It shall be recess mounted on the Bus vehicle front Sign compartment access cover or door. The OCU shall utilize a multi-key conductive rubber pad keyboard and be designed for transit operating conditions. Other mounting locations for the OCU shall be made available, with selection made at the pre-production meeting.

Only one switch is required to activate the 3 systems (radio, surveillance and sign.) Integration is required if the Twin Vision Sign and the Digital Recorders Talking Bus system are selected with a single OCU to control both systems.

The OCU Unit shall contain a display of at least two-lines of 20-character capability. The OCU Unit shall contain an audio annunciation that beeps indicating that a key is depressed. The OCU Unit shall continuously display the message associated with the selected destination readings (except the emergency message feature as noted above).

If the IBIS interface is required in the Destination Sign System, an auxiliary RS232 (DB9) port shall be made optionally available on the OCU under frame for inputs from any wireless technology that might be envisioned in the future. This auxiliary RS232 port shall operate at 9600 baud and accept commands from a wireless source (such as Spread Spectrum receivers) and will set destination sign addresses as if manually operated by the OCU operator.

If the J1708 interface is selected for the Destination Sign System, an auxiliary J1708 port shall be made available on the J1708 OCU so that auxiliary J1708 commands may be provided to the Destination Sign system from a wireless source that conforms to the J1708 command structure.

39.6 Programming

A programming software package consistent with what the Purchaser currently is using shall be supplied to generate message lists for the Sign system.

39.7 Message Memory Transfer and UPDATE

The Sign system shall be reprogrammable on the Bus vehicle with the use of a data transfer device. A data transfer device slot shall be provided on the OCU face for this purpose. (Data transfer is via USB for Twin Vision) The maximum reprogramming time for a 10,000 line listing shall be one minute. A data transfer device, of appropriate memory capacity based on requirements of the message listing noted below (but not less than 0.5 Megabyte) shall be supplied at the rate of one device for each 50 systems, or fraction thereof, but in any event not less than two such devices shall be supplied. Alternate: 1 device per vehicle.

39.8 Interconnecting Cabling

Data Communication Single twisted pair (two conductors) cable.

Power Cabling, three conductors connecting to the switched and unswitched (battery) power and a return (battery).

OCU Unit cable single twisted pair cable between the OCU and front

39.9 Dash Mounted Mechanical Sign

A mechanical Transign 4 character route sign shall be provided in the lower curb side windshield secured to the dash panel. The sign shall have three characters numerical 0-9 and 1 character Alfa A-Z.

Each character shall use black lettering on white background. Lettering shall be a minimum of 6” high with minimum of 1-1/2” between readings or 4” x 3” letters. Each column shall be operated individually.

The curtain material shall be made of Mylar.

(Note Transign does have backlit LED signs available)

39.10 Passenger Information and Advertising - 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.

39.11 Exterior Displays

Provisions shall be made to integrate advertising into the exterior design of the bus. Size and locations will be provided by the Purchaser. At a minimum, bidder shall provide pricing for driver side, curb side and read 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

39.12 Passenger Stop Request/Exit Signal

The ambulatory passenger signal shall be the yellow pull cords, push button, or clear pull cords conveniently located so standing and seated passengers can easily reach it, this includes down the mullions. The pull cords shall be accessible from the exit door area, or a button to actuate the signal shall be placed on the door motor cover. There shall be a lighted display sign which indicates "STOP REQUESTED" when the signal is activated. The signal chime shall operate once, and the sign shall light and remain lit with the chime disabled until the next stop when the front doors or rear doors have been opened, resetting the system.

The chime shall be distinctive. The volume on the chime shall be adjustable between 90 and 55 Db. The lighted display shall be located on or near the ceiling at the front of the bus in view of the passengers. A light on the instrument panel shall be lit when the display sign is lit.

There shall be a second passenger signal of a different tone that meets the ADA requirements mounted to the bottom of the flip seat for the mobility aid users to alert the operator when a mobility aid user wishes to disembark. One such system that meets these minimum requirements are the Tape Switch Corp. 3.5”x7” yellow push pad. There shall be two lights on the operator’s front dash that indicate when an ambulatory or non-ambulatory passenger wishes to disembark.

39.13 Communications - Camera Surveillance System

There will be a requirement to furnish and install a complete video surveillance system or pre-wire as determined by the Purchaser. All items are to be priced separately and comply with the following: The CCTV Surveillance system shall be capable of handling 12 cameras (color, infrared, and B/W), 30 days on-board video storage, and be capable of recording at up to 240 frames per second for all connected cameras or approved equals.

Regulated 13.6 volts DC power shall be provided for the DVR system by the output of the dedicated electronics systems power supply. Tamperproof Torx screws shall be provided for all camera housings and access covers.

Loom for the facing forward camera wires located below the destination sign compartment near the top of the windshield shall be provided.

A system status indication shall be provided on the dashboard through the I/O Controls multiplex (or approved equal) warning indicator LED display. An impact sensor shall be optional.

If system is selected, the bus shall be equipped with cameras as follows:

A camera mounted below the destination sign compartment near the top of the windshield, forward facing. The camera shall be a color camera with the capability to

capture images in ambient lighting at night. If necessary, the camera may switch to black and white under very low lighting conditions. The field of view shall include the street in front of the bus, overhead traffic signal while stopped at an intersection and pedestrians on the sidewalk or at the curb approximately 8 feet in front of the bus. (4.0mm if practicable) The mounting shall be such as to prevent camera vibration, water intrusion, interference with the driver's visibility, and shall minimize color shift due to the tinting at the top of the windshield. A flexible rubber glare shield (hood) shall be provided on the camera. The housing window shall be glass or a material resistant to scratching, hazing, and cleaning chemicals. (Plastic dome housing is not acceptable.)

A color camera with infrared capability flush mounted in the panel above the driver facing the farebox and entry door. The camera shall be housed in an "angled down" box. The housing window shall be glass or a material resistant to scratching, hazing, and cleaning chemicals. The field of view shall wide angle (2.9mm if practicable) and include the driver, the farebox, and the entire entry door opening. The vestibule area shall be illuminated by an infrared emitter under low light conditions.

A color camera flush mounted in the panel above the front door facing the driver and farebox. The camera shall be housed in an "angled down" box. The housing window shall be glass or a material resistant to scratching, hazing, and cleaning chemicals. The field of view shall wide angle (2.9mm if practicable) and include the driver, driver compartment, and the farebox.

A color camera shall be flush mounted in the front destination sign compartment door facing rearward.

The camera shall be housed in a shallow, waterproof box that will not interfere with the destination sign.

The housing window shall be glass or a material resistant to scratching, hazing, and cleaning chemicals.

The field of view shall include the entire length of the front bus body section interior and the articulated joint area (6.0mm if practicable).

A color camera shall be surface mounted on the centerline of the bus ceiling at the center of the bus. The camera shall be front facing. The housing window shall be glass or a material resistant to scratching, hazing, and cleaning chemicals. The field of view shall include the entire length of the front bus body section interior (4.0mm if practicable).

A color camera shall be surface mounted on the centerline of the bus ceiling at the center of the bus. The camera shall be rear facing. The housing window shall be glass or a material resistant to scratching, hazing, and cleaning chemicals. The field of view shall include the entire length of the front bus body section interior (4.0mm if practicable).

A color camera shall be surface mounted on the bus ceiling facing the rear door. The housing window shall be glass or a material resistant to scratching, hazing, and cleaning chemicals. The field of view shall wide angle (2.9mm if practicable) and include the entire rear door opening.

A color camera shall be surface mounted on the bus exterior over the driver's window near the roofline.

The camera shall be facing rearward. The housing shall be waterproof and sealed from the exterior environment to prevent formation of condensation on the housing interior. The housing must be rugged to resist damage from tree limbs. The housing window shall be glass or a material resistant to scratching, hazing, and cleaning chemicals. The field of view shall include the entire length of the bus exterior and the traffic lane adjacent to the bus travel lane (6.0mm if practicable).

A color camera shall be surface mounted on the bus exterior over the front passenger door near the roofline. The camera shall be facing rearward. The housing shall be waterproof and sealed from the exterior environment to prevent formation of condensation on the housing interior. The housing must be rugged to resist damage from tree limbs. The housing window shall be glass or a material resistant to scratching, hazing, and cleaning chemicals. The field of view shall include the entire length of the bus exterior and the traffic lane adjacent to the bus travel lane (6.0mm if practicable).

A color camera shall be surface mounted on the bus exterior at the rear above the engine compartment. The camera shall be facing rearward. The housing shall be waterproof and sealed from the exterior environment to prevent formation of condensation on the housing interior. The housing window shall be glass or a material resistant to scratching, hazing, and cleaning chemicals. The field of view shall include the rear bumper and the ground behind the bus (2.9mm if practicable).

Cameras shall have sufficiently high resolution to allow recognition of faces and to read roadside signs.

A complete description of the CCTV Surveillance system, including installation, shall be presented to the appropriate municipality for approval prior to production of the pilot bus or first production bus.

Components known to meet these requirements include, but are not limited to, Seon TR4-OD "Trooper" with audio at driver's door and mid bus. The system will also include sensor inputs for speedometer, brakes, turn signals and a silent alarm switch that also connects to the radio system. Other optional systems include the Safety Vision Road Recorder™ 6000 MDVR product, the Transit Video Security Systems (TVSS) CLAIM SAFE product, Apollo Video Roadrunner, the March Networks 5/6000 Series MDVR product, and the Radio Engineering Industries, Inc. Bus-Watch product. Supplier shall provide schematic diagrams of the equipment with proposed camera locations.

39.14 Mobile Radio System

A separate electrical circuit protected with the circuit breaker shall be provided to the radio transceiver location. The radio circuit shall be connected and placed to minimize electrical noise and transients. The power supply should be proposed with available variations to accommodate various systems in use by the several procuring Agencies.

Each bus shall include a two-way voice communication system including radio and all other equipment necessary to regular operation of the radio. As a separately priced option, bidders should include installation of a radio system and other equipment necessary to regular operation of the radio as supplied by an individual Purchaser. When supplied, a system includes the following items; radio VLU, TCH, handset, cab speaker and cables.

39.15 Electronics/Equipment Compartment

Each bus shall be equipped a fully sealed compartment located on the left front wheelhouse to provide a mounting location for radio equipment, video recording equipment, APC equipment and other electronic equipment (this requirement does not applicable to all electric bus). The compartment shall be lockable, completely water resistant and of steel construction. It shall be accessible from inside the bus, shall have 3 slide trays that automatically lock into place for easy maintenance of the equipment. The compartment shall be water resistant when the service door is secured. The compartment shall be supplied with power and ground circuit requirements.

Plastic or ABS construction shall be list as options and priced separately.

A location convenient to the driver shall be provided for the radio control head, speaker and handset. The antenna mounting and lead termination shall be accessible from the bus interior. Conduit shall lead to the radio compartment and shall have a minimum bend radius adequate for easy pulling of coaxial cable. An access plate shall be provided in the ceiling. The compartment door shall have a lock. A sealing provision (gasket) shall be incorporated in the door of this compartment. The radio compartment finish shall be powder coated Black, standard black, or Purchaser designated color.

39.16 Radio Mounting

A suitable area shall be provided for the mounting of communication Radio. This mounting could range from a simple plate to a box to contain the radio. A factor governing the mounting of the radio is what space is available. Another provision is that the cable that connects the radio and control head switch must be routed to an area immediately accessible to the driver.

39.17 Radio Transmitter

A Radio control head and speaker mounting plate shall be installed in a location to provide easy access for driver operation. The hand set shall be hand held and be equipped with a cradle harness. The radio handset will be a telephone hand set with magnetic hang up cup. All switches and controls shall be permanently and clearly labeled.

39.18 Antenna

A single antenna will be mounted on the roof of each bus that will accommodate RF/GPS/Cellular. This antenna shall be located as close to midpoint between the two sides as practical, but not on a seam, and as close to the area of the radio, as to preclude a long

run of coaxial cable that connects the radio and the antenna, so as to provide access below, should the antenna ever need to be changed. A 1" inside diameter flexible conduit with pull cord shall be incorporated into the roof and sidewall of the bus from the immediate area of the antenna so that the coaxial cable can be easily repaired as needed.

39.19 Antenna and Access Panel

An antenna access panel shall be installed in the ceiling of each bus at a point from the centerline of the bus, four (4) feet from the front of the bus. The access panel shall be located as close to a structural member as practical in order to provide a mounting base for the radio antenna.

An option to supply and mount a low profile 800 MHz antenna (Antenna Specialist ASP-930T) with RG58 coax cable and TNC connector to the radio will be provided and priced separately.

An option to supply and mount a GPS antenna w/gasket (Trimble 502 Model 18334) with RG58 coax cable and F Type male connector to the VLU will be provided and priced separately. The Contractor shall mount the GPS antenna (P/N 801-3200-000) and cable supplied with the Stop Announcement System.

All antenna cables shall be run in 1 inch diameter conduit to the radio box. Removable access covers shall be provided in the ceiling of the bus in order to allow access to the antenna and conduit. Three antennas shall be installed on every bus. Antenna locations shall be as close as possible to the center line of the bus and have a separation of approximately 3 feet. All mounting locations shall be approved by the appropriate municipality prior to bus manufacture.

39.20 Public Address System

Each bus shall have a public announcement system. The system shall be configured so it is completely independent from the bus radio system. The system shall incorporate provisions to allow a second handheld microphone to be plugged in and used. The hand-held microphone shall have a plug in on the right end of the primary driver’s panel, but shall not be installed, but shall be shipped with the bus.

Keying either microphone shall not cause the other to be activated. Six (6) speakers flush or semi-flush mounted, shall be installed to ensure adequate sound distribution. Additional speakers can be purchased and installed as an option. The system shall have a volume control knob located on the driver's panel, unless volume is incorporated with the individual units. There shall be a minimum of one (1) external speaker on the curb side of bus to permit announcements of route and line information. Additional external speaker can be added as an option.

Components known to meet these requirements include, but are not limited to, the Speak Easy II Public Announcement (PA) system, the Digital Recorders Talking Bus DR600C, Digital Recorders DR600C W/ GPS and Stealth mic from DR, P.A. and the Boom Mic GFI 15W-7255-66.

Bidders should include, as a separately priced option, a public address system, and/or incorporation of a system supplied by a Purchaser (to allow compatibility with other system-unique equipment).

39.21 Automatic Passenger Counting

An optional UTA Automatic Passenger Counting (APC) shall be made available and priced separately.

All equipment location, accessibility, and mounting, shall be approved by Purchaser prior to production.

40 Warranty, Repairs, and Quality Assurance Requirements

40.1 Warranty.

40.1.1 Contractor Warranty.

Warranties in this document are in addition to any statutory remedies or warranties imposed on Contractor. Consistent with this requirement, Contractor warrants and guarantees to Purchaser each complete bus and specific subsystems and components as follows.

Contractor warrants the buses are of good material and workmanship and agrees to promptly replace any part or parts, at no cost to the Purchaser, which by reason of defective materials or workmanship fail under normal use, free of negligence or accident during the applicable warranty period. Contractor warranties include the replacement of parts and services associated with the replacement and repair, including but not limited to any diagnostic, refurbishment, shipping, or travel costs.

Performance requirements based on design criteria will not be deemed a warranty item. Contractor shall insure in its procurement arrangements that the warranty requirements of this Master Contract are enforceable through and against the Contractor's suppliers, vendors, material men, and subcontractors. Any inconsistency or difference between the warranties extended to Purchasers by Contractor and those extended to Contractor by its suppliers, vendors, material men, and subcontractors, are at the risk and expense of Contractor. Such inconsistency or difference will not excuse Contractor's full compliance with its obligations under this Contract.

40.1.2 Warranty Information.

Upon Purchaser’s request, Contractor shall promptly provide complete copies of all written warranties or guarantees and documentation of any other arrangement relating to such warranties or guarantees extended by Contractor's suppliers, sub-suppliers, vendors, material men, and subcontractors covering parts, components, and systems utilized in the bus. Contractor shall ensure that such suppliers, sub-suppliers, vendors, material men, and subcontractors satisfactorily perform warranty related work when requested to do so by Purchaser.

40.1.3 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 at least two years or 100,000 miles, whichever comes first, beginning on the date of revenue service. The warranty is based on regular operation of the bus under the operating conditions prevailing in Purchaser’s locale.

40.1.4 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 at least 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.

40.1.5 Propulsion System (Diesel, CNG, Hybrid).

Propulsion system components, including the engine, transmission or drive motors, and generators (for hybrid technology) and drive and non-drive axles are warranted to be free from defects and related defects for at least two years or 100,000 miles, whichever comes first. An extended warranty may be purchased at an additional cost.

40.1.6 Propulsion System (Electric).

Electric propulsion system components, including the traction motors, traction motor controllers, transmission, drive motors, drive and non-drive axles, and any other propulsion system-related replacement component, are warranted to be free from defects and related defects for at least six years or 300,000 miles, whichever comes first. An extended warranty may be purchased at an additional cost.

40.1.7 Energy Storage System (Electric or Hybrid).

The Energy Storage System (ESS), including the traction battery, Battery Management System, and any other ESS-related replacement component, are warranted to be free from defects and related defects for at least six years and unlimited mileage beginning on the date of bus acceptance. The ESS is warranted to remain within warrantable end of life during the warranty period. The ESS original specified energy storage capacity and warrantable end of life, as a percentage of the original specified energy capacity, must be clearly defined by the Contractor. Acceptable methods for measuring or obtaining ESS storage capacity with respect to its original specified capacity must be clearly identified by the Contractor. The Contractor will propose the test method, and certify the results are true and accurate. The test will be performed according to a documented test procedure. Purchaser may engage third-parties for capacity testing.

40.1.8 Emission Control System (ECS).

Contractor warrants the emission control system to be free from defects and related defects for at least five years or 100,000 miles, whichever comes first. The ECS includes, 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

40.1.9 Subsystems Warranty.

The Contractor warrants the following subsystems to be free from defects and related defects for at least two years or 100,000 miles, whichever comes first.

- 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.
- Propulsion cooling systems: Radiator including core, tanks and related framework, including surge tank. Transmission cooler.
- Power electronics: DC/DC converters, inverters, if supplied
- Passenger seating excluding upholstery.
- Fuel storage and delivery system.
- Surveillance system including cameras and video recorders.

The Contractor warrants the following subsystems to be free from defects and related defects for at least twelve years or 600,000 miles, whichever comes first:

- Low voltage and high voltage electrical wiring and harnesses

40.1.10 Serial Numbers.

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

- Engine
- Transmission
- Alternator
- Starter
- Destination/Luminator (Major components)
- Drive axle and non-drive axle(s)
- DVR unit, supporting electronics (Monitors)
- Driver's seat
- Battery equalizer
- Radiator package
- Exhaust emission components
- A/C compressor and condenser/evaporator unit
- Power steering unit
- Fuel cylinders (if applicable)
- Air compressor
- Wheelchair ramp (if applicable)

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

40.1.11 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.

40.1.12 Voiding of Warranty.

The warranty will 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 will be void if Purchaser 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. Purchaser should maintain documentation, auditable by Contractor, verifying service activities in conformance with the Contractor's maintenance manuals.

40.1.13 Exceptions and Additions to Warranty.

Warranties will not apply to the following items:

- scheduled maintenance items
- normal wear-out items, such as brake linings, filters, belts, and wiper blades
- items furnished by Purchaser

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

40.1.14 Pass-Through Warranty.

Contractor shall request a waiver by the Purchaser, if Contractor elects to not administer warranty claims on certain components and wishes to transfer this responsibility to the sub-suppliers, or to others. The waiver of Contractor's warranty responsibility is at Purchaser's discretion.

Contractor shall state in writing that Purchaser's warranty reimbursements will not be impacted. 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, Contractor may request approval from Purchaser to assign its warranty obligations to others, but only on a case-by-case basis approved in writing by Purchaser. Otherwise, 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 Contractor.

If any vendor to the Contractor offers, at no additional cost, a warranty on a component that is longer or more comprehensive than the required warranties on this Contract, Contractor shall inform Purchaser of the additional warranty and pass it through to Purchaser at no additional cost.

40.1.15 Superior Warranty.

Contractor shall pass on to Purchaser any warranty offered by a component supplier that is superior to the warranty required in the relevant section. Contractor shall provide a list to Purchaser noting the conditions and limitations of the superior warranty no later than the start of production. Contractor will not administer the superior warranty.

40.1.16 Fleet Defects.

"Fleet Defect" means cumulative failures of twenty (20) 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 applies only to the base warranty period in sections 12.3 Complete Bus, 12.X Propulsion System, and 12.X Subsystems Warranty. When a Fleet Defect is declared, the remaining warranty period on that item/component stops. The warranty period does not restart until the Fleet Defect is corrected.

For the purpose of Fleet Defects, each order shall be treated as a separate bus fleet. In addition, if there is a change in a major component within the order, the buses containing the new major component will become a separate bus fleet for the purposes of determining Fleet Defects.

Contractor shall correct a Fleet Defect under the warranty provisions defined in Section 13 Repair Procedure. After correcting the Fleet Defect, Purchaser and Contractor shall mutually agree to and Contractor shall promptly undertake and complete a work program reasonably designed to prevent the occurrence of the same Fleet Defect in all other buses and spare parts purchased under the order. Where the specific Fleet Defect is solely attributed to particular identifiable parts, the work program will include redesign and/or replacement of only the defectively designed and/or manufactured parts. In all other cases, the work program will include inspection and/or correction of all the buses in the fleet via a mutually agreed-to arrangement. Contractor shall update, as necessary, technical support information (parts, service and operator's manuals) due to changes resulting from warranty repairs. Purchaser may immediately declare a defect in design resulting in a safety hazard to be a Fleet Defect. Contractor shall be responsible to furnish, install and replace all defective units.

The Fleet Defect warranty provisions do not apply to Purchaser-supplied items, such as radios, fare collection equipment, communication systems, and tires. In addition, Fleet Defects do not apply to interior and exterior finishes, hoses, fittings, and fabric.

40.2 Repair Procedure.

40.2.1 Repair Performance.

Contractor is responsible for all warranty-covered repair work, including diagnostics of warranty covered parts. To the extent practicable, Purchaser will allow Contractor or its designated representative to perform repair work. At its discretion, Purchaser may perform such repair work if it determines it needs to do so based on transit service or other requirements. Contractor shall reimburse Purchaser for any warranty-covered repair work it performs.

40.2.2 Repairs by the Contractor.

Purchaser shall notify Contractor's designated representative within thirty (30) days if Purchaser detects a defect within the warranty periods defined in this Master Contract or the applicable Purchaser Order. Contractor or its designated representative shall, if requested, begin repair work on warranty-covered repairs or have an agreed action plan with the Purchaser within five (5) calendar days after receiving notification of a defect

from Purchaser. Purchaser will make the bus available to complete repairs timely with the Contractor's repair schedule.

Contractor shall provide at its own expense all spare parts, tools, and space required to complete repairs. At Purchaser's option, Contractor may be required to remove the bus from Purchaser's property while repairs are made. If the bus is removed from Purchaser's property, then repair procedures must be diligently pursued by Contractor's representative.

40.2.3 Repairs by Purchaser: Parts Used.

If Purchaser performs the warranty-covered repairs, then it must correct or repair the defect and any related defects utilizing parts supplied by Contractor specifically for this repair. At its discretion, Purchaser may use Contractor-specified parts available from its own stock if deemed in its best interests.

40.2.4 Repairs by Purchaser: Contractor-Supplied Parts.

Purchaser may require that Contractor supply parts for warranty-covered repairs being performed by Purchaser. Those parts may be remanufactured but must have the same form, fit and function, and warranty. The parts will be shipped prepaid to Purchaser from any source selected by Contractor within fourteen (14) days of receipt of the request for said parts and shall not be subject to a handling charge.

40.2.5 Defective Component Return.

Contractor may request that parts covered by the warranty be returned to the manufacturing plant. Contractor will pay the freight costs for this action. Materials should be returned in accordance with the procedures outlined in "Warranty Processing Procedures."

40.2.6 Failure Analysis.

Upon specific request of Purchaser, Contractor will 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 will be delivered within 60 days of the receipt of failed parts.

40.2.7 Reimbursement for Labor and Other Related Costs.

Contractor shall reimburse Purchaser for repair labor. The amount is determined by Purchaser for a qualified mechanic at a straight time wage rate per hour, which includes fringe benefits and overhead adjusted for Purchaser's most recently published rate in effect at the time the repair 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 Purchaser's service garage at the time the defect correction is made.

40.2.8 Reimbursement for Parts.

Contractor shall reimburse Purchaser for defective parts and for parts that must be replaced to correct the defect. The reimbursement will be at the current price at the

time of repair and include taxes where applicable, plus fifteen (15) percent handling costs. Handling costs will not be paid if parts are supplied by Contractor and shipped to Purchaser.

40.2.9 Reimbursement Requirements.

Contractor shall respond to the warranty claim with an accept/reject decision including necessary failure analysis no later than sixty (60) days after Purchaser 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. Purchaser may dispute rejected claims or claims for which Contractor did not reimburse the full amount. Contractor and Purchaser will review disputed warranty claims during the following quarter to reach an equitable decision to permit the disputed claim to be resolved and closed. Contractor and Purchaser will review all claims at least once per quarter throughout the entire warranty period to ensure that open claims are being tracked and properly dispositioned.

40.2.10 Warranty after Replacement/Repairs.

If any component, unit, or subsystem is repaired, rebuilt, or replaced by Contractor or by Purchaser with the concurrence of Contractor, then the component, unit, or subsystem will have the unexpired warranty period of the original. Repairs will not be warranted if Contractor-provided or authorized parts are not used for the repair, unless Contractor has failed to respond within five days, in accordance with Section 13.2 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 items shall have three (3) months or the remaining time and/or miles of the original warranty, whichever is greater. This remaining warranty period will begin on the repair/replacement date for corrected items on each bus if the repairs are completed by Contractor or on the date Contractor provides all parts to Purchaser if repairs are completed by Purchaser.

40.2.11 Warranty Processing Procedures.

The following list represents information required by Contractor from the Purchaser 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

The Purchaser's forms will be accepted by Contractor if all of the above information is included. Electronic submittal may be used if available between Contractor and Purchaser.

40.2.12 Return of Parts.

When returning defective parts to Contractor, Purchaser will tag each part with the following:

- bus number and VIN
- claim number
- part number
- serial number (if available)

40.2.13 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.

40.3 Quality Assurance

40.3.1 Quality Assurance Organization Establishment.

Contractor shall establish and maintain an effective in-plant quality assurance organization.

40.3.2 Quality 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.

40.3.3 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.

40.3.4 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.

40.3.5 Basic Standards and Facilities.

The following standards and facilities shall be basic in the quality assurance process:

- Configuration control: 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 each Purchase Order. 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: 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: 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.

40.3.6 Maintenance of Control.

Contractor shall maintain quality control of purchases:

- Supplier control: Contractor shall require each supplier to maintain a quality control program for the services and supplies that it provides. 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: Contractor shall verify that all applicable specification requirements are properly included or referenced in purchase orders of articles to be used on transit buses.

40.3.7 Manufacturing Control.

Contractor shall maintain quality control of production:

- Controlled conditions: 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.

40.3.8 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 Purchaser 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 Purchaser.

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Agreement

Appendix A, Item A3

Price Sheet Effective 07/19/24

Heavy Pricing by Sub-Category

note: does not include the software and diagnostic cables from specification 31.1 (diagnotic software is included in the option sheets)

Length	Propulsion	Base Price	6/1/22 Price Change	4/1/23 Price Change	7/19/24 Price Change	Initial Training	Prompt Payment Discount	w/n X days
30 ft	Diesel	N/A		$ -		N/A	N/A	N/A
30 ft	CNG	N/A		$ -		N/A	N/A	N/A
30 ft	Hybrid	N/A		$ -		N/A	N/A	N/A
30 ft	Electric	N/A		$ -		N/A	N/A	N/A
30 ft	Fuel Cell	N/A		$ -		N/A	N/A	N/A
				$ -				
35 ft	Diesel	$ 429,990.00	$ 480,642.82	$ 552,739.25	$ 592,260.10	Refer Training Pricing	$ (1,728.00)	10
35 ft	CNG	$ 484,990.00	$ 542,121.82	$ 623,440.10	$ 668,016.06	Refer Training Pricing	$ (1,912.00)	10
35 ft	Hybrid (Allison)	$ 588,990.00	$ 658,373.02	$ 757,128.98	$ 811,263.70	Refer Training Pricing	$ (2,384.00)	10
35 ft	Electric (430kWh)	$ 794,990.00	$ 888,639.82	$ 1,021,935.80	$ 1,021,935.80	Refer Training Pricing	$ (3,219.00)	10
35 ft	Fuel Cell	N/A		$ -	$ -	N/A	N/A	N/A
35 ft	Hybrid (BAE)	$ 591,990.00	$ 661,726.42	$ 760,985.39	$ 815,395.84	Refer Training Pricing	$ (2,384.00)	10
40 ft	Diesel	$ 434,990.00	$ 486,231.82	$ 559,166.60	$ 599,147.01	Refer Training Pricing	$ (1,749.00)	10
40 ft	CNG	$ 489,990.00	$ 547,710.82	$ 629,867.45	$ 674,902.97	Refer Training Pricing	$ (1,933.00)	10
40 ft	Hybrid (Allison)	$ 593,990.00	$ 663,962.02	$ 763,556.33	$ 818,150.60	Refer Training Pricing	$ (2,405.00)	10
40 ft	Electric (430kWh)	$ 804,990.00	$ 899,817.82	$ 1,034,790.50	$ 1,034,790.50	Refer Training Pricing	$ (3,260.00)	10
40 ft	Fuel Cell	$ 1,086,990.00	$ 1,215,037.42	$ 1,397,293.04	$ 1,397,293.04	Refer Training Pricing	$ (4,233.00)	10
40 ft	Hybrid (BAE)	$ 596,990.00	$ 667,315.42	$ 767,412.74	$ 822,282.75	Refer Training Pricing	$ (2,405.00)	10
45 ft	Diesel	N/A		$ -	$ -	N/A	N/A	N/A
45 ft	CNG	N/A		$ -	$ -	N/A	N/A	N/A
45 ft	Hybrid	N/A		$ -	$ -	N/A	N/A	N/A
45 ft	Electric	N/A		$ -	$ -	N/A	N/A	N/A
45 ft	Fuel Cell	N/A		$ -	$ -	N/A	N/A	N/A
				$ -	$ -			
60 ft	Diesel	$ 669,990.00	$ 748,914.82	$ 861,252.05	$ 922,831.57	Refer Training Pricing	$ (2,719.00)	10
60 ft	CNG	$ 811,990.00	$ 907,642.42	$ 1,043,788.79	$ 1,118,420	Refer Training Pricing	$ (2,927.00)	10
60 ft	Hybrid (Allison)	$ 894,990.00	$ 1,000,419.82	$ 1,150,482.80	-	Refer Training Pricing	$ (3,613.00)	10
60 ft	Electric (520kWh)	$ 1,224,990.00	$ 1,369,293.82	$ 1,574,687.90	$ 1,687,278.08	Refer Training Pricing	$ (4,969.00)	10
60 ft	Fuel Cell	$ 1,499,990.00	$ 1,676,688.82	$ 1,928,192.15	$ 2,066,057.88	Refer Training Pricing	$ (5,843.00)	10
60 ft	Hybrid (BAE)	$ 914,990.00	$ 1,022,775.82	$ 1,176,192.20	-	Refer Training Pricing	$ (3,613.00)	10

Delivery Costs by Sub-Category

Delivery/Freight Charge	One-Way delivery cost (per mile)	Example Cost to Olympia, WA
N/A	N/A	N/A
N/A	N/A	N/A
N/A	N/A	N/A
N/A	N/A	N/A
N/A	N/A	N/A
Included	Included	Included
Included	Included	Included
Included	Included	Included
Included	Included	Included
N/A	N/A	N/A
Included	Included	Included
Included	Included	Included
Included	Included	Included
Included	Included	Included
Included	Included	Included
Included	Included	Included
Included	Included	Included
N/A	N/A	N/A
N/A	N/A	N/A
N/A	N/A	N/A
N/A	N/A	N/A
N/A	N/A	N/A
Included	Included	Included
Included	Included	Included
Included	Included	Included
Included	Included	Included
Included	Included	Included

Parts

Category	Rate %
General Parts List	
Engine	
Transmission	
Electrical	
HVAC	
etc	
etc	

Volume Discount

# of buses ordered	Discount offered
1-4 each	0
5-9 each	-1500
>10 each	-3000

NFI Parts will provide a first-bus Recommended Stocking List (RSL) during customer's first-bus delivery.
This RSL parts listing will include part number, item description, stocking status, lead time and 30-day pricing information
which will assist the customer in stocking parts that will support both the customer's regular and preventive bus maintenance programs.
This abbreviated list is compiled using the actual bus build information that is available in the customers bus production Bill of Material (BOM)
NFI Parts will also provide the customer with a more inclusive Parts Provisioning List following last-bus delivery.
This listing will be compiled using further part assembly breakdown information identified in the customers
Parts manual and will assist in stocking additional parts that further support new bus operations and maintenance over the next 2-3 years.

Heavy Duty - 40 Foot
Options Price Sheet

Category	Item #	Description	Diesel	CNG	Hybrid	Electric	Fuel Cell	Price	6/1/122 Price Change	4/1/23 Price	June 2023 Revised Price	7/19/24 Price
Body BRT STYLING										$ -		$ -
Body – BRT STYLING	1	Standard Styling Package 40 35 passenger seats	Inc In Base	Inc In Base	Inc In Base	Inc In Base	Inc In Base	$ -		$ -	$ -	$ -
Body – BRT STYLING	2	BRT Exterior Styling Package (Front & Rear) with One Piece Windshield	N/A	N/A	N/A	N/A	N/A			$ -	N/A	N/A
Body – BRT STYLING	3	BRT Roof Fairings Front and Rear	Option	Inc In Base	Inc In Base	Inc In Base	Inc In Base	$ 2,035.00	$ 2,274.72	$ 2,615.93	$ 2,615.63	$ 2,802.65
Body – BRT STYLING	4	Curbside A Post Skid Plate	Inc in Base	Inc in Base	Inc in Base	Inc in Base	Inc in Base	$ -	$ -	$ -	$ -	$ -
BODY - PASSENGER SEATS									$ -	$ -	$ -	$ -
BODY - PASSENGER SEATS	1	35 Passenger Seating	Inc In Base	Inc In Base	Inc In Base	Inc In Base	Inc In Base	$ 650.00	$ 726.5700	$ 835.56	$ -	$ -
BODY - PASSENGER SEATS	2	ADD additional double flip seat in lieu of fixed seat	Option	Option	Option	Option	Option	$ 1,749.00	$ 1,955.03	$ 2,248.29	$ 2,248.29	$ 2,409.04
BODY - PASSENGER SEATS	3	Delete one set of fixed seats	Option	Option	Option	Option	Option	$ (624.00)	$ (697.5072)	$ (802.13)	$ (785.00)	$ (785.00)
BODY - PASSENGER SEATS	4	remove individual seat	N/A	N/A	N/A	N/A	N/A		$ -	$ -	N/A	N/A
Engine												
Engine	1	Cummins ISL-G 320 HP	N/A	N/A	N/A	N/A	N/A		$ -	$ -	N/A	N/A
Engine	2	Cummins ISX-G 12 400 HP	N/A	N/A	N/A	N/A	N/A		$ -	$ -	N/A	N/A
Engine	3	Cummins ISL 9 280 HP	Inc in Base	N/A	N/A	N/A	N/A		$ -	$ -	N/A	N/A
Engine	4	Cummins ISL 9 330 HP	N/A	N/A	N/A	N/A	N/A		$ -	$ -	N/A	N/A
Engine	5	Cummins ISB 6.7 280 HP	N/A	N/A	Inc in Base	N/A	N/A		$ -	$ -	N/A	N/A
Exhaust												$ -
Exhaust	1	none							$ -	$ -		$ -
Exhaust	2	Diesel Particulate Filter (Active)	Inc in Base	Inc in Base	Inc in Base	N/A	N/A	0	$ -	$ -	$ -	$ -
Exhaust	3	none							$ -	$ -		$ -
Exhaust	4	Diesel Particulate Filter (Active)	Inc in Base	Inc in Base	Inc in Base	N/A	N/A	0	$ -	$ -	$ -	$ -
Exhaust	5	none							$ -	$ -		$ -
Exhaust	6	Electric	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Exhaust	7	Not Available							$ -	$ -		$ -
Fuel												$ -
Fuel	1	Fuel Gauge on Dash	Inc in Base	Inc in Base	Inc in Base	Inc in Base	Option	$ 2,102.00	$ 2,349.62	$ 2,702.06	$ 2,702.06	$ 2,895.26
Fuel	2	NGV2-3 Type 3 Complete CNG Cylinder (Vendor will list GGE)	Not Available	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Fuel	3	NGV 2-4 Type 4 Complete CNG Cylinder (Vendor will list GGE)	Not Available	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Fuel	4	Hexagon Lincoln's TUFFSHELL Roof Mount Package	Inc in Base	Inc in Base	N/A	N/A	Inc in Base	N/A	N/A	N/A	$ -	$ -
Fuel	5	EMCO - WHEATON Posi/Lock 105 (Flip Cap ~~and Twist Cap~~)	Inc in Base	N/A	Inc in Base	N/A	N/A	$ -	$ -	$ -	$ -	$ -
Fuel	6	EMCO - Posi/Lock Blue Urea Dispensing System	Option	N/A	Option	N/A	N/A	$ -	$ -	$ -	$ 410.21	$ 439.54
Fuel	7	Standard Gravity Fill	Option	N/A	Option	N/A	N/A	$ -	$ -	$ -	$ -	$ -
Fuel	8	Fuel Gauge on Dash	Inc in Base	Inc in Base	Inc in Base	Inc in Base	Option	$ -	$ -	$ -	$ 2,702.06	$ 2,895.26
Fuel	9	Dual Fill (Curbside and Streetside) w/Standard Gravity Fill	Not Available	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Fuel	10	80 Gallon Net Useable Split Fuel Tanks	Not Available	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Fuel	11	EMCO - WHEATON Posi/Lock 105 (~~Flip Cap and~~ Twist Cap)	Option	N/A	Option	N/A	N/A	$ -	$ -	$ -	$ 90.75	$ 97.24
Fuel	12	EMCO - Posi/Lock Blue Urea Dispensing System	Option	N/A	Option	N/A	N/A	$ 711.86	$ 795.7171	$ 915.07	$ 410.21	$ 439.54
Fuel	13	Standard Gravity Fill	Option	N/A	Option	N/A	N/A	$ 10.00	$ 11.18	$ 12.85	$ -	$ -
Fuel	14	Fuel Gauge on Dash	Inc in Base	Inc in Base	Inc in Base	Inc in Base	Option	$ -	$ -	$ -	$ 2,702.06	$ 2,895.26
Fuel	15	Dual Fill (Curbside and Streetside) w/Standard Gravity Fill	Not Available	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Fuel	16	80 Gallon Net Useable Split Fuel Tanks for ADA Each Side	Not Available	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Fuel Filter												$ -
Fuel Filter	1	Low Fuel Alarm	rogramming Or	rogramming On	Programming Only	Programming Only	rogramming On	$ -	$ -	$ -	$ -	$ -
Fuel Filter	2	Low Fuel Alarm	rogramming Or	rogramming On	Programming Only	Programming Only	rogramming On	$ -	$ -	$ -	$ -	$ -
Fuel Filter	3	Spin on Primary and Secondary Fuel Filters	Inc in Base	N/A	Inc in Base	N/A	N/A	$ -	$ -	$ -	$ -	$ -
Fuel Filter	4	Davco Fuel Pro 384, Heated	Option	N/A	Option	N/A	N/A	$ 419.21	$ 468.59	$ 538.88	$ 561.33	$ 601.47
Fuel Filter	5	Racor 490R30 Filter W/Thumbpump	N/A	N/A	N/A	N/A	N/A	$ 338.54	$ 378.4200	$ 435.18	N/A	N/A
Fuel Filter	6	Low Fuel Alarm	rogramming Or	rogramming On	Programming Only	Programming Only	rogramming On	$ -	$ -	$ -	$ -	$ -
Fuel Filter	7	Spin on Primary and Secondary Fuel Filters	Inc in Base	N/A	Inc in Base	N/A	N/A	$ -	$ -	$ -	$ -	$ -
Fuel Filter	8	Davco Fuel Pro 384, Heated	Option	N/A	Option	N/A	N/A	$ 419.21	$ 468.59	$ 538.88	$ 561.33	$ 601.47
Fuel Filter	9	Racor 490R30 Filter W/Thumbpump	Option	N/A	Option	N/A	N/A	$ 338.54	$ 378.4200	$ 435.18	N/A	N/A
Hybrid												$ -
Hybrid	1	none							$ -	$ -		$ -
Hybrid	2	none							$ -	$ -		$ -
Hybrid	3	Auxiliary Coolant Heater	Inc in Base	Inc in Base	Inc in Base	Inc in Base	Inc in Base	$ -	$ -	$ -	$ -	$ -
Hybrid	4	Allison EP40 Electric Drive System	Inc in Base	N/A	Obsolete	N/A	N/A	$ -	$ -	$ -	$ -	$ -
Hybrid	5	Allison EP50 Electric Drive System	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Hybrid	6	BAE Hybrid System HDS 200 - APS1-01K (1Kwh Battery w/Ultracaps)	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Hybrid	7	BAE Hybrid System HDS200 - APS3-32K (32KwH Battery)	N/A	N/A	Obsolete	N/A	N/A	$ 19,250.00	$ 21,517.6500	$ 24,745.30	N/A	N/A
Hybrid	8	BAE Hybrid System HDS300 - APS1-01K (1Kwh Battery w/Ultracaps)	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Hybrid	9	BAE Hybrid System HDS300 - APS3-32K (32KwH Battery)	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Hybrid	10	BAE HDS200 - MAPS-SDM3A	N/A	N/A	Inc in Base	N/A	N/A	N/A		$ -	$ -	$ -
Hybrid	10	Mandatory Option for BAE Hybrid Purchases: EPA and Electric Accessories Change	N/A	N/A	REQUIRED for BAE Hybrid	N/A	N/A	N/A	N/A	N/A	$ 67,143.35	$ 71,944.10
Hybrid	11	Allison eGen Flex 40	N/A	N/A	Inc in Base	N/A	N/A	N/A		$ -	$ -	$ -
Hybrid	11	Mandatory Option for Allison Hybrid Purchases: EPA and Electric Accessories Change	N/A	N/A	REQUIRED for Allison Hybrid	N/A	N/A	N/A	N/A	N/A	$ 78,273.64	$ 83,870.21
Passenger Seat Options												$ -
Passenger Seat Options	1	35 Passenger Seating - Citiseat	Option	Option	Option	Option	Option	$ (1,639.00)	$ (1,832.0742)	$ (2,106.89)	Quote	Quote
Passenger Seat Options	2	AMSECO - 6468	N/A	N/A	N/A	N/A	N/A	Discontinued	N/A	N/A	N/A	N/A
Passenger Seat Options	3	AMSECO - Insight	Inc in Base	Inc in Base	Inc in Base	Inc in Base	Inc in Base	$ -	$ -	$ -	$ -	$ -
Passenger Seat Options	4	AMSECO - Metropolitan	N/A	N/A	N/A	N/A	N/A	Discontinued	N/A	N/A	N/A	N/A
Passenger Seat Options	5	AMSECO - 6466	Option	Option	Option	Option	Option	$7,611.50	$ 8,508.1347	$ 9,784.35	Quote	Quote
Passenger Seat Options	6	AMSECO - 6566	Option	Option	Option	Option	Option	$15,417.65	$ 17,233.85	$ 19,818.93	Quote	Quote
Passenger Seat Options	7	AMSECO - 2005/6466 Suburbans	Option	Option	Option	Option	Option	$8,688.05	$ 9,711.5023	$ 11,168.23	Quote	Quote
Passenger Seat Options	8	AMSECO Vision	Option	Option	Option	Option	Option	$4,533.26	$ 5,067.28	$ 5,827.37	Quote	Quote
Passenger Seat Options	9	AMSECO - Innovator 850	N/A	N/A	N/A	N/A	N/A	Discontinued	N/A	N/A	N/A	N/A
Passenger Seat Options	10	AMSECO - Premier	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Passenger Seat Options	11	AMSECO - 2000 Series Recliners	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Passenger Seat Options	12	AMSECO - VR50 Seat Inserts	Inc in Base	Inc in Base	Inc in Base	Inc in Base	Inc in Base	$ -	$ -	$ -	$ -	$ -
Passenger Seat Options	13	AMSECO - CR50 Seat Inserts	Option	Option	Option	Option	Option	$2,380.17	$ 2,660.5540	$ 3,059.64	Quote	Quote
Passenger Seat Options	14	4 One - Angel	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Passenger Seat Options	15	4 One Aries	Option	Option	Option	Option	Option	$ 4,709.11	$ 5,263.8443	$ 6,053.42	Quote	Quote
Passenger Seat Options	16	4 One Brasil	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Passenger Seat Options	17	4 One - Citiseat	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Passenger Seat Options	18	4 One - Citipro	Option	Option	Option	Option	Option	$ 2,676.47	$ 2,991.76	$ 3,440.53	Quote	Quote
Passenger Seat Options	19	4 One - Diablo	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Passenger Seat Options	20	4 One - Patriot	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Passenger Seat Options	21	4 One Gemini Seating	Option	Option	Option	Option	Option	$ (2,109.19)	$ (2,357.6548)	$ (2,711.30)	Quote	Quote
Passenger Seat Options	22	4 One Sirino G	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Passenger Seat Options	23	Kiel Ideo	Option	Option	Option	Option	Option	$ 464.41	$ 519.1139	$ 596.98	Quote	Quote
Passenger Seat Options	24	Kiel Esos	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Passenger Seat Options	25	Add (3) Passenger Seats to Curbside Wheelwell (Insight)	Option	Option	Option	Option	Option	$ 1,168.75	$ 1,306.4288	$ 1,502.39	$ 1,502.39	$ 1,609.81
Passenger Seat Options	26	Add (2) Passenger Seats to Curbside Wheelwell (Insight)	Option	Option	Option	Option	Option	$ 829.13	$ 926.80	$ 1,065.82	$ 1,065.82	$ 1,142.03
Passenger Seat Options	27	Hinged Rear Settee	Option	Option	Option	Option	Option	$ 420.75	$ 470.3144	$ 540.86	$ 540.86	$ 579.53
Passenger Seat Options	28	110 v outlets with USB charging throughout seating layout	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Passenger Seat Options	29	Dual USB charging station throughout seating layout	Option	Option	Option	Option	Option	$ 2,250.88	$ 2,516.0281	$ 2,893.43	Quote	Quote
Passenger Seat Options	30	Cup holders for each seat	N/A	N/A	N/A	N/A	N/A	$ -		$ -	N/A	N/A
Passenger Seat Options	31	Self-storing footrests for each seat	N/A	N/A	N/A	N/A	N/A	$ -		$ -	N/A	N/A
Passenger Seat Options	32	Expanding mesh magazine holder on seat back	N/A	N/A	N/A	N/A	N/A	$ -		$ -	N/A	N/A
Passenger Seat Options	33	Three (3) point passenger restraint belts for each seat	N/A	N/A	N/A	N/A	N/A	N/A		$ -	N/A	N/A
Trolley Styling Package										$ -		
Trolley Styling Package	1	Classic San Francisco	N/A	N/A	N/A	N/A	N/A			$ -	N/A	N/A
Trolley Styling Package	1.1	Wood Seats	N/A	N/A	N/A	N/A	N/A			$ -	N/A	N/A
Trolley Styling Package	1.2	Wood Trimmed Drivers Barrier	N/A	N/A	N/A	N/A	N/A			$ -	N/A	N/A
Trolley Styling Package	1.3	Wood Trimmed Electrical Box	N/A	N/A	N/A	N/A	N/A			$ -	N/A	N/A
Trolley Styling Package	1.4	Brass Powder coated Stanchions & Grab Rails	N/A	N/A	N/A	N/A	N/A			$ -	N/A	N/A
Trolley Styling Package	2	Add Vinyl Seat Cushions	N/A	N/A	N/A	N/A	N/A			$ -	N/A	N/A
Trolley Styling Package	3	Add Cow Catcher	N/A	N/A	N/A	N/A	N/A			$ -	N/A	N/A
Trolley Styling Package	4	Add Rope lights	N/A	N/A	N/A	N/A	N/A			$ -	N/A	N/A
Trolley Styling Package	5	Add Vintage Style Graphics Package	N/A	N/A	N/A	N/A	N/A			$ -	N/A	N/A
Trolley Styling Package	6	Add for Hybrid Roof Compatibility	N/A	N/A	N/A	N/A	N/A			$ -	N/A	N/A
Trolley Styling Package	7	2 Color Custom Paint for Trolley	N/A	N/A	N/A	N/A	N/A			$ -	N/A	N/A
Trolley Styling Package	8	Brown Leather Overhead Grab Straps - Each	N/A	N/A	N/A	N/A	N/A			$ -	N/A	N/A

All options listed below are the same for each bus length worksheet.

Category	Item #	Description	Designation	Propulsion (if applicable)	Price	6/1/22 Price Change	4/1/23 Price Change	June 2023 Revised Price	7/19/24 Price
Air							$ -		$ -
Air	1	Shop Air Connection (Milton S790)	Option		$ 5.33	$ 5.96	$ 6.85	$ 48.74	$ 52.22
Air	2	Bendix AD9, (300 ci Purge)	Option		$ 36.10	$ 40.35	$ 46.41	$ 61.91	$ 66.34
Air	3	Bendix Adip, Heated	Option		$ 441.00	$ 492.95	$ 566.89	$ 566.89	$ 607.42
Air	4	Bendix Puraguard Air/Oil Separator	Option		N/A	N/A	N/A	N/A	N/A
Air	5	Wabco SS 1800 Air Dryer, Heated	Option		N/A	N/A	N/A	N/A	N/A
Air	6	Chicago Rawhide T2000	Option		N/A	N/A	N/A	N/A	N/A
Air	7	Chicago Rawhide Dual Turbo 2000	Option		N/A	N/A	N/A	N/A	N/A
Air	8	Graham White QBA 15 "Sludge Buster", Heated	Option				$ -	N/A	N/A
Air	8	Graham white sludgebreaker QBA 15NX5 with 24 v heater	Option		$ 418.71	$ 468.03	$ 538.24	$ 538.24	$ 576.72
Air	9	Kingston Auto Drain Valve At Ping Tank	Discontinued		$ 198.37	$ 221.74	$ 255.00	N/A	N/A
Air	10	Terminate Kneeling Operation Sensor	Inc In Base		N/A	N/A	N/A	$ -	$ -
Air	11	Wabco 37.4 cfm twin cylinder air compressor (ISB 6.7 engine only)	Not Available		N/A	N/A	N/A	N/A	N/A
		Other Option - Specify			N/A	N/A	N/A	N/A	N/A

Category	Item #	Description	Designation	Propulsion (if applicable)	Price	6/1/22 Price Change	4/1/23 Price Change	June 2023 Revised Price	7/19/24 Price
Body- Bike Rack						$ -	$ -		$ -
Body – Bike Rack	1	Sportworks Apex 3 - 3 Position Bike, Stainless Steel	Option		$ 1,937.88	$ 2,166.16	$ 2,491.09	$ 2,491.09	$ 2,669.20
Body – Bike Rack	2	Sportworks - 2 Position Bike, Black Powder Coated (DL2-NP)	Option		$ 1,214.89	$ 1,358.00	$ 1,561.70	$ 1,561.70	$ 1,673.36
Body – Bike Rack	3	Sportworks - 2 Position Bike, Stainless Steel (DL2-NP)	Option		$ 1,491.54	$ 1,667.24	$ 1,917.33	$ 1,677.00	$ 1,796.91
Body – Bike Rack	4	Sportworks - 3 Position Bike, Black Powder Coated	Option		$ 2,590.79	$ 2,895.99	$ 3,330.38	$ 2,580.56	$ 2,765.07
Body – Bike Rack	5	Sportworks - Trilogy 3 Position Bike, Stainless Steel	Option		$ 2,427.26	$ 2,713.19	$ 3,120.17	$ 2,517.95	$ 2,697.98
Body – Bike Rack	6	Midwest Bus - BYK RYK (Stainless Steel)	Option		N/A	N/A	N/A	N/A	N/A
Body – Bike Rack	7	Bike Rack Deployed Lamp on Dash	Option		$ -	$ -	$ -	$ -	$ -
Body – Bike Rack	8	Bike Rack ~~5"~~ 6" Spot Mirror	Option		$ 70.03	$ 78.28	$ 90.02	$ 48.36	$ 51.82
Body – Bike Rack	9	Bike Rack Mounted Advertising Frame, 14"X 44"	Option		N/A	N/A	N/A	$ 332.89	$ 356.69
Body – Bike Rack	10	Velo Porter - 2 Position Bike, Stainless Steel	Option				$ -	$ 1,500.18	$ 1,607.44
Body – Bike Rack	11	Velo Porter - 3 Position Bike, Stainless Steel	Option				$ -	$ 2,335.91	$ 2,502.93
Body – Bike Rack	12	Mounting Brackets Only	Option				$ -	$ 543.22	$ 582.06
Body – Bike Rack	13	Byk Rak - 2 Position Bike, Stainless Steel, Front Mounted	Option				$ -	$ 1,964.48	$ 2,104.94
Body – Bike Rack	14	Byk Rak - 3 Position Bike, Stainless Steel, Front Mounted	Option				$ -	$ 2,003.69	$ 2,146.95
Body – Bike Rack	15	Sportworks DL2 (DL2-WP, Black Powdercoated)	Option				$ -	$ 1,628.14	$ 1,744.55
Body – Bike Rack	16	Sportworks DL2 (DL2-WP, SST)	Option				$ -	$ 1,624.05	$ 1,740.17
		Other Option - Specify			N/A	N/A	N/A		$ -
Body - Driver's Barrier						$ -	$ -		$ -
Body – Driver's Barrier	1	Wrap Around Fiberglass with Schedule Rack Cutouts	Inc In Base		$ -	$ -	$ -	$ -	$ -
Body – Driver's Barrier	2	Wrap Around Fiberglass W/O Schedule Rack Cutouts	Option		$ (138.47)	$ (154.78)	$ (178.00)	$ (178.00)	$ (178.00)
Body – Driver's Barrier	3	Plexiglass Drivers Security Enclosure (Arow Global Driver Protection System)	Option		$ 3,568.81	$ 3,989.22	$ 4,587.60	$ 8,443.04	$ 9,046.72
Body – Driver's Barrier	4	Flat Melamine, Two Piece	Not Available		N/A	N/A	N/A	N/A	N/A
Body – Driver's Barrier	5	Flat Melamine, Two Piece, w/(4) Schedule Holders	Not Available		N/A	N/A	N/A	N/A	N/A
Body – Driver's Barrier	6	Plexiglass Drivers Security Enclosure, two pieces	Option		$ 3,851.06	$ 4,304.71	$ 4,950.42	$ 7,274.58	$ 7,794.71
Body – Driver's Barrier	7	Other Option - Specify (Arow Global Enclosure) MV308 Slide/Stow door components w/ Extended glass	Option		$ 8,033.85	$ 8,980.24	$ 10,327.27	$ 12,262.80	$ 13,139.59
Body – Driver's Barrier	8	Other Option - Specify (Vapor Enclousure) vShield Driver's Barrier	Option		$ 6,744.48	$ 7,538.98	$ 8,669.83	$ 1,836.00	$ 1,967.27
Body - Driver'Seat						$ -	$ -		$ -
Body – Driver Seat	1	Recaro Ergo Metro w/Fabric Seat and Back w/Gray Fabric Boxing	Option		$ 350.63	$ 391.93	$ 450.72	$ 450.72	$ 482.95
Body – Driver Seat	2	Recaro MCII	Option		$ 1,093.13	$ 1,221.90	$ 1,405.19	$ 1,134.38	$ 1,215.49
Body – Driver Seat	3	USSC 9100 ALX w/Fabric Seat and Back w/Gray Fabric Boxing	Option		$ (52.00)	$ (58.13)	$ (66.84)	$ 261.59	$ 280.29
Body – Driver Seat	4	USSC 9100 ALX - 3 w/Fabric Seat and Back w/Gray Fabric Boxing	Option		$ 231.00	$ 258.21	$ 296.94	$ 551.99	$ 591.46
Body – Driver Seat	5	Add Headrest (Recaro Driver Seat)	Option		$ -	$ -	$ -	$ -	$ -
Body – Driver Seat	6	Add Armrest (Right Side only) (USSC)	Option		$ 185.63	$ 207.50	$ 238.62	$ 60.50	$ 64.83
Body – Driver Seat	7	Add Shoulder Belt (USSC)	Option		$ 288.75	$ 322.76	$ 371.18	$ 181.50	$ 194.48
Body – Driver Seat	8	Add 3 -Point, Horizontally Adjustable D - Loop (USSC)	Option		$ 563.75	$ 630.16	$ 724.68	$ 240.63	$ 257.84
Body – Driver Seat	9	Driver's Seat Vacancy Alarm (USSC)	Option		$ 147.13	$ 164.46	$ 189.13	$ 110.00	$ 117.87
Body – Driver Seat	10	Safety Orange Shoulder Belt (USSC ALX)	Option		$ 93.50	$ 104.51	$ 120.19	$ -	$ -
Body – Driver Seat	11	Silicon Foam At Lower Seat Cushion (USSC)	Option		$ 1,457.50	$ 1,629.19	$ 1,873.57	$ 1,113.74	$ 1,193.37
Body – Driver Seat	12	Holdsworth Fabric (USSC)	Option		$ 515.63	$ 576.37	$ 662.83	$ 206.25	$ 221.00
Body – Driver Seat	13	FR Treated Foam (Recaro)	Inc In Base		$ -	$ -	$ -	$ -	$ -
Body – Driver Seat	14	USSC Q90 ALX	Option		$ 343.75	$ 384.24	$ 441.88	$ 551.99	$ 591.46
Body – Driver Seat	15	USSC G2A -2pt Drivers Seat	Option		$ 467.50	$ 522.57	$ 600.96	$ 1,610.74	$ 1,725.91
Body – Driver Seat	16	USSC - Add Headrest	Option		N/A		$ -	$ 52.94	$ 56.73
		Other Option - Specify			N/A	N/A	N/A		$ -
Body - Exit Door						$ -	$ -		$ -
Body – Exit Door	1	Standard Melamine Panels on Lower Section Both Sides of Rear Exit Door	Inc In Base		$ 833.64	$ 931.84	$ 1,071.62	$ -	$ -
Body – Exit Door	2	Upper Clear Plexiglas Modesty Panels Both Sides of Rear Exit Door	Option		$ 1,928.74	$ 2,155.95	$ 2,479.34	$ 630.08	$ 675.13
Body - Exit Door	3	Accelerator Interlock when doors are open	Option		$ -	$ -	$ -	$ -	$ -
	4	Other Option - Road side Exit door			$ 25,000.00	$ 27,945.00	$ 32,136.75	Quote	Quote
Body - Floor Covering						$ -	$ -		
Body – Floor Covering	1	Greenwood ACQ Plywood W/RCA Rubber	Not Available		N/A	N/A	N/A	N/A	N/A
Body – Floor Covering	2	Altro Meta/Chroma Transfloor ~~OR Gerflor Terabus Sirius/Helios~~	Inc In Base		N/A	N/A	N/A	$ -	$ -
	2	Gerflor Terabus Sirius/Helios	Option		N/A		$ -	$ -	$ -
Body – Floor Covering	3	Altro wood safety (vinyl simulated woodgrain)	Option		N/A	N/A	N/A	$ -	$ -
Body – Floor Covering	4	Gerflor Tarabus Gaya Wood (vinyl simulated woodgrain)	Option		$ 379.94	$ 424.70	$ 488.40	Quote	Quote
Body – Floor Covering	5	Composite Sub Floor	Option		$ 3,468.00	$ 3,876.53	$ 4,458.01	$ 2,223.55	$ 2,382.53
Body – Floor Covering	6	Rear Seat Riser for Forward Facing Seats	Inc In Base		$ -	$ -	$ -	$ -	$ -
Body – Floor Covering	7	Front Seat Risersor for Forward Facing Seats (Each Side)	Inc In Base		$ -	$ -	$ -	$ -	$ -
Body – Floor Covering	8	Pressure-preservative treated plywood	Inc In Base		$ -	$ -	$ -	$ -	$ -
Body – Floor Covering	9	Gerflor Tarabus Sirius 6801	Option				$ -	Quote	Quote
		Other Option - Specify			N/A	N/A	N/A		$ -
Body - Mirror, Exterior						$ -	$ -		$ -
Body – Mirror, Exterior	1	~~Safe Fleet~~ B&R One Piece 8" x 8" Flat Glazing W/Stainless Steel Arms, Remote Both Sides	Option		$ (56.65)	$ (63.32)	$ (72.82)	$ 21.80	$ 23.36
Body – Mirror, Exterior	2	~~Safe Fleet~~ B&R One Piece 8" x 8" Flat Glazing W/S.S. Arms, Manual W/6" Spot Mirror	Option		$ 268.91	$ 300.59	$ 345.68	$ 127.81	$ 136.95
Body – Mirror, Exterior	3	~~Safe Fleet~~ B&R 8" x 15" 2 Piece, Heated, Remote Both Sides	Option		$ 52.57	$ 58.76	$ 67.58	$ 67.58	$ 72.41
Body – Mirror, Exterior	4	~~Safe Fleet~~ B&R 9" x 11" 2 Piece, Heated, Remote Both Sides	Discontinued		$ (375.34)	$ (419.56)	$ (482.49)	N/A	N/A
Body – Mirror, Exterior	5	~~Safe Fleet~~ B&R 9" x 13" Class "A" 2 Piece, Heated, Remote Both Sides	Option		$ 112.05	$ 125.25	$ 144.04	$ 75.15	$ 80.52
Body – Mirror, Exterior	6	~~Safe Fleet~~ B&R 10" x 13:", 2 Piece (Flat & Convex), Heated, Remote Both Sides	Option		$ 567.41	$ 634.25	$ 729.39	$ 729.39	$ 781.54
Body – Mirror, Exterior	7	~~Safe Fleet~~ B&R 10" x 11 " 1 Piece, Heated, Remote Both Sides	Option		N/A	N/A	N/A	$ 154.91	$ 165.99
Body – Mirror, Exterior	8	Rosco 8" x 15" 1 Piece, Heated Remote Both Sides	Not Available		N/A	N/A	N/A	N/A	N/A
Body – Mirror, Exterior	9	Lucerix Metagal 7" x 15" 2 Piece, Heated Remote Both Sides	Not Available		N/A	N/A	N/A	N/A	N/A
Body – Mirror, Exterior	10	Velvac View-All System (Camera Mounted in Exterior Mirror W/LCD Screen in Driver Area)	Not Available		N/A	N/A	N/A	N/A	N/A
Body – Mirror, Exterior	11	Velvac Hyperion Lane Change Guardian	Not Available		N/A	N/A	N/A	N/A	N/A
Body – Mirror, Exterior	12	Hadley 8" x 15", 2 Piece (Flat Upper/Convex Lower), Heated, Remote Upper Mirror Driver Side	Option		N/A		$ -	$ 44.70	$ 47.90
Body – Mirror, Exterior	13	Add LED Turn Signal to Side Mirror - Side Mount	Option		$ -		$ -	$ 328.15	$ 351.61
Body – Mirror, Exterior	14	Add LED Turn Signal to Side Mirror - Within Glass	Option		$ 29.63		$ -	$ 365.31	$ 391.43
		Other Option - Specify			N/A	N/A	N/A		$ -
Body - Mirror, Interior						$ -	$ -		$ -
Body – Mirror, Interior	1	Mirror - 8 1/2 " X 16"	Discontinued		$ 29.63	$ 33.12	$ 38.09	N/A	N/A
Body – Mirror, Interior	2	Mirror - 4.75" X 15"	Not Available		N/A	N/A	N/A	N/A	N/A
Body – Mirror, Interior	3	Mirror - Front Door 6" Round on Header Door	Option		$ 24.78	$ 27.70	$ 31.85	$ 31.85	$ 34.13
Body – Mirror, Interior	4	Mirror - Rear Exit Door/Step Well 12" Convex	Inc In Base		$ -	$ -	$ -	$ -	$ -
Body – Mirror, Interior	5	Mirror - 8 1/2 " X 1" center	Not Available		N/A	N/A	N/A	N/A	N/A
Body – Mirror, Interior	6	Mirror - 5" flat	Not Available		N/A	N/A	N/A	N/A	N/A
Body – Mirror, Interior	7	Mirror - 8 1/2 " X 15" Flat	Option		$ -		$ -	$ 31.26	$ 33.50
		Other Option - Specify				$ -	$ -		$ -
Body - Paint & Decal						$ -	$ -		$ -
Body – Paint & Decal	1	One Color w/Roof Numbers	Inc In Base		Standard	N/A	N/A	$ -	$ -
Body – Paint & Decal	2	(2) Colors, with and without Black Mask At Windows	Option		$ 1,290.00	$ 1,441.96	$ 1,658.26	Quote	Quote
Body – Paint & Decal	3	(3) Colors, with and without Black Mask At Windows	Option		$ 1,640.00	$ 1,833.19	$ 2,108.17	Quote	Quote
Body – Paint & Decal	4	Basic Decal Package (Up to Three Strips and Equivalent Design)	Option		QUOTE	N/A	N/A	Quote	Quote
Body – Paint & Decal	5	Custom Paint/Decal Design (Per Purchasers' Spec)	Option		QUOTE	N/A	N/A	Quote	Quote
Body – Paint & Decal	6	Clear Coat Complete Bus	Option		$ 1,290.00	$ 1,441.96	$ 1,658.26	Quote	Quote
Body – Paint & Decal	7	Remove Roof Numbers	Option		$ 175.00	$ 195.62	$ 224.96	Quote	Quote
		Other Option - Specify			N/A	N/A	N/A		$ -
Body - Passenger Signal						$ -	$ -		$ -
Body – Passenger Signal	1	Pullcords - Above Windows (Neutral Or Yellow) w/Touch Pad At W/C Positions (Pullcords in Base, option is for adding touch pads)	Option		$ 46.75	$ 52.26	$ 60.10	$ 172.03	$ 184.33
Body – Passenger Signal	2	Touch Tape (At Window Mullions)	Option		$ 1,051.35	$ 1,175.20	$ 1,351.48	$ 511.68	$ 548.27
Body – Passenger Signal	3	Button at Exit Door Vertical Stanchion	Inc In Base		$ -	$ -	$ -	$ -	$ -
Body – Passenger Signal	4	Additional Amber Stop Request Lamp Mounted on Driver's Dash	Option		$ 50.27	$ 56.19	$ 64.62	$ 85.25	$ 91.35
Body – Passenger Signal	5	Button in the Parcel Rack	Option		$ 15.79	$ 17.65	$ 20.30	$ 20.30	$ 21.75
		Other Option - Specify				$ -	$ -		$ -
Body - Rear Door						$ -	$ -		$ -
Body – Rear Door	1	34" Wide Rear Door w/Full Driver Control (Air Open/Spring Close)	Inc In Base		N/A	N/A	N/A	$ -	$ -
Body – Rear Door	2	48" Wide Rear Door w/Full Driver Control (Air Open/Spring Close)	Not Available		N/A	N/A	N/A	N/A	N/A
Body – Rear Door	3	56" Wide Rear Door w/Full Driver Control (Air Open/Air Close)	Not Available		N/A	N/A	N/A	N/A	N/A
Body – Rear Door	4	Electric Operated Front/Rear Door Motor and Control	Option		$ 4,628.84	$ 5,174.12	$ 5,950.23	Quote	Quote
Body – Rear Door	5	Passenger Open (Push Open/Spring Close)	Option		N/A	N/A	N/A	Quote	Quote
Body – Rear Door	6	Touch Bars (Air Open/Spring Close)	Option		$ 1,111.00	$ 1,241.88	$ 1,428.16	Quote	Quote
Body – Rear Door	7	Touch Bars w/Driver Override	Option		$ 227.66	$ 254.48	$ 292.65	Quote	Quote
Body – Rear Door	8	Touch Tape in Place of Touch Bars	Option		$ 364.08	$ 406.97	$ 468.01	Quote	Quote
Body – Rear Door	9	Vapor Class Acoustic (Photo Sensor)	Option		$ 2,414.00	$ 2,698.37	$ 3,103.12	Quote	Quote
Body – Rear Door	10	Vapor V Touch (Electronic Touch Bar)	Option		$ 344.81	$ 385.43	$ 443.24	Quote	Quote
Body – Rear Door	11	Vapor Electric Transit Operator	Option		N/A	N/A	N/A	Quote	Quote
Body – Rear Door	12	Vapor Electric Door Control / 1939 Interface	Option		N/A	N/A	N/A	Quote	Quote
Body – Rear Door	13	Vapor Optical Pressure Wave Switch	Option		$ 2,319.68	$ 2,592.94	$ 2,981.88	Quote	Quote
Body – Rear Door	14	Exterior Air Release (Front Door Control Valve)	Option		$ 101.32	$ 113.26	$ 130.24	Quote	Quote
Body – Rear Door	15	Driver Push Button Door Controls	Option		$ 91.88	$ 102.70	$ 118.11	Quote	Quote
Body – Rear Door	16	Bode CADS All electric doors	Not Available		N/A	N/A	N/A	N/A	N/A
Body – Rear Door	17	Remove Rear Door, Add Two Seats	Option		$ (2,700.00)	$ (3,018.06)	$ (3,470.77)	Quote	Quote
Body – Rear Door	18	Ventura electric rear door	Option		$ 16,442.00	$ 18,378.87	$ 21,135.70	Quote	Quote
Body – Rear Door	19	Add Center Door (Articulated bus only)	Not Available		N/A	N/A	N/A	N/A	N/A
		Other Option - Specify			N/A	N/A	N/A	N/A	N/A

Category	Item #	Description	Designation	Propulsion (if applicable)	Price	6/1/22 Price Change	4/1/23 Price Change	June 2023 Revised Price	7/19/24 Price
Body - Roof Hatch						$ -	$ -		$ -
Body – Roof Hatch	1	Manual Hatch At Front and Rear Positions	Option		$ -	$ -	$ -	$ 345.55	$ 370.26
Body – Roof Hatch	2	One (1) Roof Hatch Position - Rear	Inc In Base		$ (507.70)	$ (567.51)	$ (652.63)	$ -	$ -
Body – Roof Hatch	3	Change Manual Hatch to Electric Hatch with Driver Control (per Position)	Option		$ 349.00	$ 390.11	$ 448.63	$ 343.14	$ 367.67
Body – Roof Hatch	4	Change Manual Hatch to Glass Hatch in Lieu of Standard (per Position)	Option		$ 928.38	$ 1,037.74	$ 1,193.40	$ 147.59	$ 158.14
Body – Roof Hatch	5	Additional Roof Hatch Position	See Option 1		N/A	N/A	N/A	N/A	N/A
		Other Option - Specify			N/A	N/A	N/A	N/A	N/A
Body - Schedule Rack						$ -	$ -		$ -
Body – Schedule Rack	1	none	Inc In Base			$ -	$ -	$ -	$ -
Body – Schedule Rack	2	Innocom Schedule Racks 3.75" x 7" x 1.5"	Option		$ 21.43	$ 23.95	$ 27.55	$ 17.40	$ 18.64
Body – Schedule Rack	3	Innocom Schedule Racks 8.62" x 1 1" x 1"	Option		$ 27.69	$ 30.95	$ 35.59	$ 35.59	$ 38.13
Body – Schedule Rack	4	22" x 21" Black, RH Load Open Back	Option		$ 34.78	$ 38.88	$ 44.71	$ 202.78	$ 217.28
Body – Schedule Rack	5	Transit Information Products - 19" x 21" OBIC ~~19/21 4P 1LTRMC~~ 19/21 4P 2L	Option		$ 343.97	$ 384.49	$ 442.16	$ 420.48	$ 450.54
Body – Schedule Rack	6	Transit Information Products - 19" x 21" OBICT10P2LTRMC	Discontinued		$ 501.38	$ 560.44	$ 644.51	N/A	N/A
Body – Schedule Rack	7	Transit Information Products - OBIC 19/21 4P 1T	Option		Included in base		$ -	$ 414.43	$ 444.06
Body – Schedule Rack	8	Transit Information Products - OBIC 19/21 4PW 2L	Option		See Option 2		$ -	$ 420.48	$ 450.54
Body – Schedule Rack	9	Transit Information Products - OBIC 19/21 4PW 1T	Option		See Option 2		$ -	$ 414.43	$ 444.06
		Other Option - Specify			N/A	N/A	N/A		$ -
Body - Stanchions/Grab Rails						$ -	$ -		$ -
Body – Stanchions/Grab Rails	1	Stainless Steel Stanchions and Grab Rails and Modesty Panel Tubes	Mix of Stainless Steel and Powder Coated Stanchions in Base		$ -	$ -	$ -	$ -	$ -
Body – Stanchions/Grab Rails	2	Powder Coated Vertical Stanchions, Grab Rails and Modesty Panel Tubes	Mix of Stainless Steel and Powder Coated Stanchions in Base		$ -	$ -	$ -	$ -	$ -
Body – Stanchions/Grab Rails	3	Powder Coated Vertical Stanchions only	Option		$ (153.24)	$ (171.29)	$ (196.99)	$ -	$ -
Body – Stanchions/Grab Rails	4	Farebox Guard Rail	Option		$ 252.61	$ 282.37	$ 324.72	$ 290.62	$ 311.40
Body – Stanchions/Grab Rails	5	Grab Rail Forward Wheel Housing	Inc In Base		$ -	$ -	$ -	$ -	$ -
Body – Stanchions/Grab Rails	6	Luggage Rack 68", Two -Tier with Fixed Shelf's	Option		$ 3,739.33	$ 4,179.82	$ 4,806.80	$ 4,574.04	$ 4,901.08
Body – Stanchions/Grab Rails	7	Vinyl Coated Nylon Grab Straps (Cost per Handle)	Option		$ 50.01	$ 55.90	$ 64.29	$ 29.73	$ 31.86
Body – Stanchions/Grab Rails	8	SSTL Spring Loaded Grab Handle (Cost per Handle)	Option		$ 35.28	$ 39.43	$ 45.35	$ 72.90	$ 78.11
Body – Stanchions/Grab Rails	9	non-vinyl-coated nylon grab straps (per handle, color to be chosen by agency)	Option		$ 48.60	$ 54.32	$ 62.47	$ 17.24	$ 18.47
		Other Option - Specify			N/A	N/A	N/A		$ -
Cooling System						$ -	$ -		$ -
Cooling System	1	Modine Side By Side By Side Plate Fin Radiator	Not Available		N/A	N/A	N/A	N/A	N/A
Cooling System	2	Modine Electric Cooling Fan System (8 x 12" Fans)	Option	Diesel/CNG Hybrid	$ 350.00	$ 391.23	$ 449.91	$ -	$ -
Cooling System	2	Modine Electric Cooling Fan System (9 x 12" Fans)	Option		Included in base		$ -	$ -	$ -
Cooling System	3	EMP Electric Cooling Fan System	Inc In Base		Included in base	N/A	N/A	$ -	$ -
Cooling System	4	Electric Fan Cooling System (Non EMP - Specify OEM)	Not Available		See Option 2	N/A	N/A	N/A	N/A
Cooling System	5	Grayson Electric Cooling Fan System	Not Available		N/A	N/A	N/A	N/A	N/A
Cooling System	6	Hydraulic Cooling Fan	Not Available		N/A	N/A	N/A	N/A	N/A
Cooling System	7	L&M Radiator	Not Available		N/A	N/A	N/A	N/A	N/A
Cooling System	8	Masabi Radiator	Not Available		N/A	N/A	N/A	N/A	N/A
Cooling System	9	E - Coat Radiator, CAC & Hydraulic Cooler	Option	Diesel, CNG	$ 16.37	$ 18.30	$ 21.04	$ 908.78	$ 973.76
Cooling System	9	E - Coat Radiator, CAC & Hydraulic Cooler	Option	Diesel-Hybrid (Allison and BAE)			$ -	$ 1,074.85	$ 1,151.70
Cooling System	10	Radiator Tank Guard	Option	Diesel, Diesel-Hybrid, and CNG only	$ 130.25	$ 145.59	$ 167.43	$ 167.43	$ 179.40
Cooling System	11	Double Breeze Constant Tension Clamps	Not Available		N/A	N/A	N/A	N/A	N/A
Cooling System	12	Oetiker Constant Torque Clamps	Not Available		N/A	N/A	N/A	N/A	N/A
Cooling System	13	Gates - Greenstripe Hose	Inc In Base		N/A	N/A	N/A	$ -	$ -
Cooling System	14	Valeo ~~Webasto~~ Model Thermo 300 (104,000 btu) Coolant Heater	Inc In Base		N/A	N/A	N/A	N/A	N/A
Cooling System	15	Valeo ~~Webasto~~ Model Thermo 230 (80,000 btu) Coolant Heater	Inc In Base		N/A	N/A	N/A	N/A	N/A
Cooling System	16	Proheat Model X120 (120,000 btu) Coolant Heater	Not Available		N/A	N/A	N/A	N/A	N/A
Cooling System	17	Proheat Model X80 (80,000 btu) Coolant Heater	Not Available		N/A	N/A	N/A	N/A	N/A
Cooling System	18	Proheat Model X50 (50,000 btu) Coolant Heater	Discontinued		$ (300.00)	$ (335.34)	$ (385.64)	N/A	N/A
Cooling System	19	Proheat Model X45 (45,000 btu) Coolant Heater	Discontinued		$ (85.00)	$ (95.01)	$ (109.26)	N/A	N/A
Cooling System	20	Electric Coolant Auxiliary Heater (LV Half Kettle Heater)	Option	Diesel/CNG	$ (170.00)	$ (190.03)	$ (218.53)	$ (218.53)	$ (234.15)
Cooling System	21	Espar Model Hydronic #4	Not Available		N/A	N/A	N/A	N/A	N/A
Cooling System	22	Espar Model Hydronic #5	Not Available		N/A	N/A	N/A	N/A	N/A
Cooling System	23	Articulated Only?	Not Available		N/A	N/A	N/A	N/A	N/A
Cooling System	24	EMP Electric Cooling Fan System	Inc In Base		N/A	N/A	N/A	$ -	$ -
Cooling System	25	Electric Fan Cooling System (Non EMP - Specify OEM)	Not Available		N/A	N/A	N/A	N/A	N/A
Cooling System	26	Double Breeze Constant Tension Clamps	Not Available		N/A	N/A	N/A	N/A	N/A
Cooling System	27	Oetiker Constant Torque Clamps	Not Available		N/A	N/A	N/A	N/A	N/A
Cooling System	28	Grayson Electric Cooling Fan System	Not Available		N/A	N/A	N/A	N/A	N/A
		Other Option - Specify				$ -	$ -		
Electrical						$ -	$ -		
Electrical	1	Voltage Spike Arrestor, S.K.I. Products SKI241 -101445, or Approved Equal	Discontinued		N/A	N/A	N/A	N/A	N/A
Electrical	2	24 Volt to 13.6 Volt DC - DC Converter, 30 Ampere Output, Model 1645 - 24 - 12 - 30, Manufactured By Wilmore Electronics Co., Inc. or Equivalent	Option		$ 904.87	$ 1,011.46	$ 1,163.18	$ 533.53	$ 571.68
Electrical	3	Battery Voltage Equalizer	Inc In Base		$ -	$ -	$ -	$ -	$ -
Electrical	4	24V battery isolation system (keeps house batteries from being drained by cameras, recorders, etc.) (Vanner)	Option	Diesel, Diesel-Hybrid, and CNG	N/A	N/A	N/A	$ 317.61	$ 340.32
		Other Option - Specify				$ -	$ -		$ -
Electrical - Accessories						$ -	$ -		$ -
Electrical – Accessories	1	12 V Cigarette-Style Light Adaptor for PC Auxiliary Power - Drivers Area	Option		$ 6.71	$ 7.50	$ 8.63	$ 22.10	$ 23.68
Electrical – Accessories	2	12 V Cigarette-Style Light Adaptor for PC Auxiliary Power - Rear Air Return Grille Area	Discontinued		N/A	N/A	N/A	N/A	N/A
Electrical – Accessories	3	USB Power Source - Driver's Area	Option		$ -		$ -	$ 107.09	$ 114.75
		Other Option - Specify				$ -	$ -		$ -
Electrical - Alternator						$ -	$ -		$ -
		Not for Electric			N/A	N/A	N/A	N/A	N/A
Electrical – Alternator	1	Delco 50 DN (270 AMP)			N/A	N/A	N/A	N/A	N/A
Electrical – Alternator	3	Penntex Px833 Alternator			N/A	N/A	N/A	N/A	N/A
Electrical – Alternator	4	Neihoff C - 701 (300 AMP)			N/A	N/A	N/A	N/A	N/A
Electrical – Alternator	5	Neihoff C - 703 (330 AMP)			N/A	N/A	N/A	N/A	N/A
Electrical – Alternator	6	Neihoff C - 803 (500 AMP) Air Cooled		Diesel, CNG	N/A	N/A	N/A	$ 796.65	$ 853.61
Electrical – Alternator	7	EMP POWER 450 AMP Brushless Alternator			N/A	N/A	N/A	$ -	$ -
Electrical – Alternator	8	KA500 HIPRO (KHP 500-000) (475 AMP)			N/A	N/A	N/A	N/A	N/A
Electrical – Alternator	9	Marine Cabling for Charging System			N/A	N/A	N/A	N/A	N/A
		Other Option - Specify			N/A	N/A	N/A		$ -
Electrical - Automatic Passenger Counter						$ -	$ -		$ -
Electrical – Automatic Passenger Counter	1	none	Inc In Base			$ -	$ -	$ -	$ -
Electrical – Automatic Passenger Counter	2	UTA Automatic Passenger Counter System with GPS, WLAN Capabilities (Two-Door Configuration Only)	Option		$ 17,529.39	$ 19,594.35	$ 22,533.50	$ 5,207.13	$ 5,579.44
Electrical – Automatic Passenger Counter	2	UTA APC Per Order Application Approvals and Miscellaneous Fees, Required for UTA Automatic Passenger Counter System	Option		$ 2,830.99		$ -	Quote	Quote
Electrical – Automatic Passenger Counter	3	UTA APC Sensors, Cabling~~, CPU only~~	Option		$ 2,830.99	$ 3,164.48	$ 3,639.15	$ 345.97	$ 370.71
Electrical – Automatic Passenger Counter	4	Wiring provisions IAW APC manufacture (Fishwire and Conduit)	Option		$ 2,830.99	$ 3,164.48	$ 3,639.15	$ 142.95	$ 153.17
Electrical – Automatic Passenger Counter	5	Strategic Mapping APC system (Two-Door Configuration Only)	Option		$ 9,473.75	$ 10,589.76	$ 12,178.22	$ 8,937.50	$ 9,576.53
Electrical – Automatic Passenger Counter	5	Strategic Mapping APC Per Order Application Approvals and Miscellaneous Fees, Required for Strategic Mapping Automatic Passenger Counter System	Option				$ -	Quote	Quote
		Other Option - Specify			N/A	N/A	N/A		$ -

Category	Item #	Description	Designation	Propulsion (if applicable)	Price	6/1/22 Price Change	4/1/23 Price Change	June 2023 Revised Price	7/19/24 Price
Electrical - Auxiliary Lights						$ -	$ -		$ -
Electrical – Auxiliary Lights	1	Four (4) 4" Diameter LED Auxiliary Brake Lights	Option		$ -	$ -	$ -	$ -	$ -
Electrical – Auxiliary Lights	2	Two (2) 4" Diameter LED Auxiliary Brake Lights	Inc In Base		$ -	$ -	$ -	$ -	$ -
Electrical – Auxiliary Lights	3	Two (2) Dialight 7" Diameter LED Auxiliary Brake Lights	Option		$ 79.29	$ 88.63	$ 101.92	$ 41.14	$ 44.08
Electrical – Auxiliary Lights	4	4 LED Brake Strip Lamps	Discontinued		$ 115.50	$ 129.11	$ 148.47	N/A	N/A
Electrical – Auxiliary Lights	5	JKA Enterprises LED "Stop" Light	Discontinued		N/A	N/A	N/A	N/A	N/A
Electrical – Auxiliary Lights	5	Edison Displays LED "Stop" Light	Option				$ -	$ 450.77	$ 483.00
Electrical – Auxiliary Lights	6	Exterior Curb Lamps, Front & Rear - Dialight	Option		$ (79.52)	$ (88.89)	$ (102.22)	$ 448.40	$ 480.46
Electrical – Auxiliary Lights	7	Triangle Amber LED Yield Sign - Dialight	Discontinued		$ 314.73	$ 351.81	$ 404.58	N/A	N/A
Electrical – Auxiliary Lights	7	Triangle Amber LED Yield Sign - Dataled	Option				$ -	$ 811.27	$ 869.28
Electrical – Auxiliary Lights	8	Two (2) Red LED Brake Strip Lamps	Option		$ 57.46	$ 64.23	$ 73.86	$ 73.86	$ 79.14
Electrical – Auxiliary Lights	9	Remove LED Auxiliary Brake Lights (DEDUCT)	Option		$ (39.42)	$ (44.06)	$ (50.67)	$ (39.48)	$ (39.48)
Electrical – Auxiliary Lights	10	Overhead Farebox LED - Light W/Night - Day Switch (on Drivers Side Panel) - Light Illuminates W/Frt. Door Open and Switch in the Night Position	Inc In Base		$ -	$ -	$ -	$ -	$ -
Electrical – Auxiliary Lights	11	Service Compartment (SDS) Lights - LED	Inc In Base		$ -	$ -	$ -	$ -	$ -
Electrical – Auxiliary Lights	11	Side Console and Destination Sign Service Compartment Lights - LED	Option				$ -	$ 125.10	$ 134.04
Electrical – Auxiliary Lights	12	LED Beacon Light	Option		$ 251.35	$ 280.96	$ 323.10	$ 405.98	$ 435.01
Electrical – Auxiliary Lights	13	LED Decal Lights (2) - Non - Flashing only (Per NHTSA)	Not Available		N/A	N/A	N/A	N/A	N/A
Electrical – Auxiliary Lights	14	3 LED Brake Strip Lamps	Option				$ -	$ 120.04	$ 128.62
		Other Option - Specify			N/A	N/A	N/A		$ -
Electrical - Battery & Battery Chargers						$ -	$ -		$ -
Electrical - Battery & Battery Chargers	1	Polyethylene battery tray and enclosure	Inc In Base		Inc In Base	N/A	N/A	$ -	$ -
Electrical – Battery & Battery Chargers	2	(2) DEKA 8D Side and Top Post Connections (Standard for Diesel Bus)	Inc In Base		Inc In Base	N/A	N/A	$ -	$ -
Electrical – Battery & Battery Chargers	3	(4) DEKA Group 31 Top Post	Option		$ (73.68)	$ (82.36)	$ (94.71)	$ 126.87	$ 135.94
Electrical – Battery & Battery Chargers	4	DEKA AGM Type 8D/Group 31	Option		$ 296.59	$ 331.53	$ 381.26	$ 685.19	$ 734.18
Electrical – Battery & Battery Chargers	5	(4) Odyssey Group 31	Option		$ 98.05	$ 109.60	$ 126.04	$ 1,367.42	$ 1,465.19
Electrical – Battery & Battery Chargers	6	(4) Trojan Group 32	Discontinued		Discontinued	N/A	N/A	N/A	N/A
Electrical – Battery & Battery Chargers	7	Ultra Capacitors - KBI KAPower	Option		$ 3,598.59	$ 4,022.50	$ 4,625.88	$ 4,270.26	$ 4,575.58
Electrical – Battery & Battery Chargers	8	Anderson 350 Jump Start Connector (Each)	Inc In Base		Inc In Base	N/A	N/A	$ -	$ -
Electrical – Battery & Battery Chargers	9	Remove Anderson 350 Jump Start	Option		$ (94.06)	$ (105.14)	$ (120.91)	$ (71.00)	$ (71.00)
Electrical – Battery & Battery Chargers	10	En-route Battery Charging system (please specify)	See Below	(electric only)	See Below	N/A	N/A	See Below	See Below
Electrical – Battery & Battery Chargers	31	Add Charge rails for En-Route Charging - 300kW	Option	(electric only)			$ -	$ 36,251.85	#REF!
Electrical – Battery & Battery Chargers	31	Add Charge rails for En-Route Rapid Charging - 450kW (requires rapid charge batteries below)	Option	(electric only)			$ -	$ 39,421.48	#REF!
Electrical – Battery & Battery Chargers	10	ABB- HVC 150P UL – 150kW opportunity Charger	Not Available	(electric only)	$ 233,771.05	$ 261,309.28	$ 300,505.67	N/A	N/A
Electrical – Battery & Battery Chargers	10	ABB HVC-PD 150kW Overhead Charger with Mast-mounted or Structure-mounted Pantograph; Onsite Commissioning; Standard Warranty (2 years); Charger Wireless Connection - Year 1; Charger Monitoring Software (Operator Pro) - Year 1; Freight; Buy America Compliant	Option	(electric only)					$ 304,933.83
Electrical – Battery & Battery Chargers	10	ABB HVC-PD 300kW Overhead Charger with Mast-mounted or Structure-mounted Pantograph; Onsite Commissioning; Standard Warranty (2 years); Charger Wireless Connection - Year 1; Charger Monitoring Software (Operator Pro) - Year 1; Freight; Buy America Compliant	Option	(electric only)	$320,005.11	$ 357,701.71	$ 411,356.97	$ 356,257.12	$ 385,632.96
Electrical – Battery & Battery Chargers	10	ABB HVC-PD 450kW Overhead Charger with Mast-mounted or Structure-mounted Pantograph; Power cabinet metal frame; Onsite Commissioning; Standard Warranty (2 years); Charger Wireless Connection - Year 1; Charger Monitoring Software (Operator Pro) - Year 1; Freight; Buy America Compliant	Option	(electric only)	$385,638.25	$ 431,066.44	$ 495,726.40	$ 459,036.60	$ 473,686.24
Electrical – Battery & Battery Chargers	10	SIEMENS HPCC 300kW On-Route Charger	Not Available	(electric only)	$ 465,626.91	$ 520,477.76	$ 598,549.42	N/A	N/A
Electrical – Battery & Battery Chargers	11	Inductive charging system for depot charging	Not Available	(electric only)	N/A	N/A	N/A	N/A	N/A
Electrical – Battery & Battery Chargers	12	Cable "Pigtail" Chargers	Not Available	(electric only)	N/A	N/A	N/A	N/A	N/A
Electrical - Battery & Battery Chargers	38	Heliox Flex DC 180kW Depot Charger with Pantograph (250A) for Structure Mount; Dynamic Charging; Onsite Commissioning; Standard Warranty (2 years); Charger Wireless Connection - Year 1; Charger Monitoring Software - Year 1; Freight; Buy America Compliant	Option	(electric only)			$ -	$ 152,312.89	$ 153,809.41
Electrical - Battery & Battery Chargers	38	Heliox Flex DC 180kW Depot Charger with 2 Pantographs (250A) for Structure Mount; Dynamic Charging; Onsite Commissioning; Standard Warranty (2 years); Charger Wireless Connection - Year 1; Charger Monitoring Software - Year 1; Freight; Buy America Compliant	Option	(electric only)			$ -	$ 210,219.36	$ 218,018.37
Electrical - Battery & Battery Chargers	38	Heliox Flex DC 180kW Depot Charger with 3 Pantographs (250A) for Structure Mount; Dynamic Charging; Onsite Commissioning; Standard Warranty (2 years); Charger Wireless Connection - Year 1; Charger Monitoring Software - Year 1; Freight; Buy America Compliant	Option	(electric only)			$ -	$ 268,362.96	$ 282,158.47
Electrical - Battery & Battery Chargers	39	Heliox Ultra Fast 360kW Depot Charger with Pantograph (600A) for Structure Mount; Onsite Commissioning; Standard Warranty (2 years); Charger Wireless Connection - Year 1; Charger Monitoring Software - Year 1; Freight; Buy America Compliant	Option	(electric only)			$ -	$ 265,857.94	$ 280,234.73
Electrical - Battery & Battery Chargers	40	Heliox Ultra Fast 360kW Depot Charger with Mast and Pantograph (600A); Onsite Commissioning; Standard Warranty (2 years); Charger Wireless Connection - Year 1; Charger Monitoring Software - Year 1; Freight; Buy America Compliant	Option	(electric only)			$ -	$ 412,144.28	$ 421,902.38
Electrical - Battery & Battery Chargers	55	Heliox Ultra Fast 540kW Depot Charger with Pantograph (600A) for Structure Mount; Onsite Commissioning; Standard Warranty (2 years); Charger Wireless Connection - Year 1; Charger Monitoring Software - Year 1; Freight; Buy America Compliant	Option	(electric only)					$ 431,490.28
Electrical - Battery & Battery Chargers	56	Heliox Ultra Fast 540kW Depot Charger with Mast and Pantograph (600A); Onsite Commissioning; Standard Warranty (2 years); Charger Wireless Connection - Year 1; Charger Monitoring Software - Year 1; Freight; Buy America Compliant	Option	(electric only)					$ 573,157.93
Electrical – Battery & Battery Chargers	18	250 kW Inductive Charging In Route Pad	Not Available	(electric only)	N/A	N/A	N/A	N/A	N/A
Electrical – Battery & Battery Chargers	19	250 kW Inductive Charging On-Board Receiver	Not Available	(electric only)	N/A	N/A	N/A	N/A	N/A
Electrical – Battery & Battery Chargers	20	350 kW on-route Charger	Not Available	(electric only)	N/A	N/A	N/A	N/A	N/A
Electrical - Battery & Battery Chargers	21	Wave Wireless Inductive chargin Equipment In Route Pad	Not Available	(electric only)	N/A	N/A	N/A	N/A	N/A
Electrical - Battery & Battery Chargers	22	Wave Wireless Inductive Charging Equipment Depot Level Pad	Not Available	(electric only)	N/A	N/A	N/A	N/A	N/A
Electrical – Battery & Battery Chargers	23	Momentum Dynamics Wireless Inductive Charging Equipment In Route Pad	Not Available	(electric only)	N/A	N/A	N/A	N/A	N/A
Electrical – Battery & Battery Chargers	24	Momentum Dynamics Wireless Inductive Charging Equipment Depot Level Pad	Not Available	(electric only)	N/A	N/A	N/A	N/A	N/A
Electrical – Battery & Battery Chargers	25	Momentum Dynamics Wireless Inductive Charging Equipment On Bus Receiver	Not Available	(electric only)	N/A	N/A	N/A	N/A	N/A
Electrical – Battery & Battery Chargers	26	Momentum Dynamics/Princeton power Wayside Battery storage-one megawatt with optional 500 kW	Not Available	(electric only)	N/A	N/A	N/A	N/A	N/A
Electrical – Battery & Battery Chargers	13	Battery Chargers	See Below	(electric only)	See Below	N/A	N/A	See Below	See Below
Electrical – Battery & Battery Chargers	14	60 kW Charger and Dispenser	Not Available	(electric only)	$ 62,912.52	$ 70,323.61	$ 80,872.15	N/A	N/A
Electrical – Battery & Battery Chargers	15	80 kW Charger and Dispenser	Not Available	(electric only)	$ 119,920.09	$ 134,046.67	$ 154,153.67	N/A	N/A
Electrical – Battery & Battery Chargers	16	100 kW Charger and Dispenser	Not Available	(electric only)	$ 127,530.39	$ 142,553.47	$ 163,936.49	N/A	N/A
Electrical – Battery & Battery Chargers	17	125 kW Charger and Dispenser	Not Available	(electric only)	$ 93,753.82	$ 104,798.02	$ 120,517.72	N/A	N/A
Electrical – Battery & Battery Chargers	17	125 kW Charger and Dispenser	Not Available	(electric only)	$ 136,417.88	$ 152,487.91	$ 175,361.10	N/A	N/A
Electrical - Battery & Battery Chargers	41	ABB HVC-C150kW Depot Charger with 1 Dispenser/Charge Box with single 7m CCS1 cable; Sequential Charging; Onsite Commissioning; Standard Warranty (2 years); Charger Wireless Connection - Year 1; Charger Monitoring Software (Operator Pro) - Year 1; Freight; Buy America Compliant. See Miscellaneous Items below for accessories.	Option	(electric only)			$ -	$ 117,489.52	$ 119,671.23
Electrical - Battery & Battery Chargers	41	ABB HVC-C150kW Depot Charger with 2 Dispenser/Charge Box with single 7m CCS1 cable each; Sequential Charging; Onsite Commissioning; Standard Warranty (2 years); Charger Wireless Connection - Year 1; Charger Monitoring Software (Operator Pro) - Year 1; Freight; Buy America Compliant. See Miscellaneous Items below for accessories.	Option	(electric only)			$ -	$ 134,286.82	$ 137,219.02
Electrical - Battery & Battery Chargers	42	ABB HVC-C150kW Depot Charger with 3 Dispenser/Charge Box with single 7m CCS1 cable each; Sequential Charging; Onsite Commissioning; Standard Warranty (2 years); Charger Wireless Connection - Year 1; Charger Monitoring Software (Operator Pro) - Year 1; Freight; Buy America Compliant. See Miscellaneous Items below for accessories.	Option	(electric only)			$ -	$ 147,048.66	$ 150,315.71

Category	Item #	Description	Designation	Propulsion (if applicable)	Price	6/1/22 Price Change	4/1/23 Price Change	June 2023 Revised Price	7/19/24 Price
Electrical - Battery & Battery Chargers	43	Heliox Flex DC 180kW Depot Charger with 1 dispenser (Column) with single 7m CCS1 cable; Dynamic Charging; column pedestal; Onsite Commissioning; Standard Warranty (2 years); Charger Wireless Connection - Year 1;Charger Monitoring Software - Year 1 ; Freight; Buy America Compliant. See Miscellaneous items below for accessories.	Option	(electric only)			$ -	$ 112,094.58	$ 108,411.83
Electrical - Battery & Battery Chargers	44	Heliox Flex DC 180kW Depot Charger with 2 dispensers (Column) with single 7m CCS1 cable each; Dynamic Charging; column pedestal; Onsite Commissioning; Standard Warranty (2 years); Charger Wireless Connection - Year 1; Charger Monitoring Software - Year 1; Freight; Buy America Compliant. See Miscellaneous items below for accessories.	Option	(electric only)			$ -	$ 132,416.64	$ 131,542.49
Electrical - Battery & Battery Chargers	45	Heliox Flex DC 180kW Depot Charger with 3 dispensers (Column) with single 7m CCS1 cable each; Dynamic Charging; column pedestal; Onsite Commissioning; Standard Warranty (2 years); Charger Wireless Connection - Year 1; Charger Monitoring Software - Year 1; Freight; Buy America Compliant. See Miscellaneous items below for accessories.	Option	(electric only)			$ -	$ 152,965.95	$ 154,607.16
Electrical - Battery & Battery Chargers	47	Borg Warner (Rhombus) 60kW Unidirectional Smart Inverter, Unidirectional Inverter: 60kW; EV Charging Unidirectional Dispenser; Standard Warranty (2 years); Onsite Commissioning, Freight: Buy America Compliant	Option	(electric only)			$ -	$ 59,804.70	$ 62,674.32
Electrical - Battery & Battery Chargers	46	ABB Terra 124 CC UL with single 6m CCS1 cable each; Dynamic Charging; 7" high-brightness color touchscreen display; RFID; support for OCPP 1.6 integrations and cellular modem. Remote Commissioning; Standard Warranty (2 years); Charger Wireless Connection - Year 1; Charger Monitoring Software (Operator Pro) - Year 1; Freight	Option	(electric only)			$ -	$ 71,550.24	$ 77,265.89
Electrical - Battery & Battery Chargers	49	Borg Warner (Rhombus) 120kW Smart Inverter, EV Charging Unidirectional Dispenser;Dynamic Charging ; Standard Warranty (2 years); On-site Commissioning; Freight: Buy America Compliant	Option	(electric only)			$ -	$ 92,812.83	$ 94,123.60
Electrical - Battery & Battery Chargers	48	ABB Terra 184 CC UL with single 6m CCS1 cable each; Dynamic Charging; 7" high-brightness color touchscreen display; RFID; support for OCPP 1.6 integrations and cellular modem. Remote Commissioning; Standard Warranty (2 years); Charger Wireless Connection - Year 1; Charger Monitoring Software (Operator Pro) - Year 1; Freight	Option	(electric only)			$ -	$ 79,841.74	$ 85,993.49
Electrical - Battery & Battery Chargers	50	Borg Warner (Rhombus) 125kw Bidirectional - 125kW Smart Inverter; EV Charging Bidirectional Dispenser; Standard Warranty (2 years); On-Site Commissioning: Freight: Buy America Compliant	Option	(electric only)			$ -	$ 100,028.84	N/A
Electrical - Battery & Battery Chargers	51	Heliox Fast DC 50 kW Mobile Charger with single 3m CCS1 cable; Onsite Commissioning; Standard Warranty (1 year); Charger Wireless Connection - Year 1; Freight; Buy America Compliant	Option	(electric only)				$ 55,860.21	$ 51,689.51
Electrical - Battery & Battery Chargers	59	120kW Smart Inverter, EV Charging Unidirectional with 2 Dispensers;Dynamic Charging ; Standard Warranty (2 years); On-site Commissioning; Freight; Buy America Compliant	Option	(electric only)					$ 106,368.66
Electrical - Battery & Battery Chargers	60	125kW Smart Inverter, EV Charging Unidirectional with 1 Dispenser; Sequential Charging ; Standard Warranty (2 years); On-site Commissioning; Freight; Buy America Compliant	Option	(electric only)					$ 97,460.04
Electrical - Battery & Battery Chargers	61	125kW Smart Inverter, EV Charging Unidirectional with 2 Dispensers;Sequential Charging ; Standard Warranty (2 years); On-site Commissioning; Freight; Buy America Compliant	Option	(electric only)					$ 109,705.09
Electrical - Battery & Battery Chargers	62	Siemens Sicharge 150kW Depot Charger with 1 Dispenser/Charge Box with single 7m CCS1 cable; Sequential Charging; Onsite Commissioning; Standard Warranty (2 years); Charger Wireless Connection - Year 1; Charger Monitoring Software (- Year 1; Freight, Buy America Compliant. See Miscellaneous Items below for accessories.	Option	(electric only)					$ 113,307.46
Electrical - Battery & Battery Chargers	63	Siemens Sicharge 150kW Depot Charger with 2 Dispensers/Charge Box with single 7m CCS1 cable each; Sequential Charging; Onsite Commissioning; Standard Warranty (2 years); Charger Wireless Connection - Year 1; Charger Monitoring Software - Year 1; Freight; Buy America Compliant. See Miscellaneous Items below for accessories.	Option	(electric only)					$ 133,499.30
Electrical - Battery & Battery Chargers	64	Siemens Sicharge 150kW Depot Charger with 3 Dispensers/Charge Box with single 7m CCS1 cable each; Sequential Charging; Onsite Commissioning; Standard Warranty (2 years); Charger Wireless Connection - Year 1; Charger Monitoring Software - Year 1; Freight; Buy America Compliant. See Miscellaneous Items below for accessories.	Option	(electric only)					$ 153,619.40
Electrical - Battery & Battery Chargers		The Mobility House Charge Management System	See Below	(electric only)			$ -	See below	See below
Electrical - Battery & Battery Chargers	52	The Mobility House (TMH) - Base Equipment cost per site - ChargePilot Starter Kit ; Connectivity Router; ChargePilot Mobile Data - per site. Total cost is a combination of the three TMH line items.	Option	(electric only)			$ -	$ 13,272.00	$ 13,506.00
Electrical - Battery & Battery Chargers	53	The Mobility House (TMH) - Commissioning per dispenser - CMS Commissioning with all relevant parameters in the system - per dispenser. Total cost is a combination of the three TMH line items.	Option	(electric only)			$ -	$ 923.10	$ 979.20
Electrical - Battery & Battery Chargers	54	The Mobility House (TMH) - Annual licensing per dispenser - ChargePilot Fleet Charging and Energy Management License - annual per dispenser. Total cost is a combination of the three TMH line items.	Option	(electric only)			$ -	$ 1,611.60	$ 1,713.60
Electrical – Battery & Battery Chargers	27	Electrical Management Software from Viriciti	Not Available	(electric only)	N/A	N/A	N/A	N/A	N/A
Electrical – Battery & Battery Chargers		Charger Miscellaneous Items	See Below	(electric only)				See below	See below
Electrical – Battery & Battery Chargers	55	ABB Dispenser Option - Depot Charge box pedestal, Cable Management System	Option	(electric only)				$ 5,847.90	$ 5,900.00
Electrical – Battery & Battery Chargers	56	Heliox Dispenser Option - Cable Management Post	Option	(electric only)				$ 3,680.78	$ 3,668.40
Electrical – Battery & Battery Chargers	57	New Flyer Infrastructure Solutions staff - Engineering, project management, coordination and consulting services (Hourly Rate)	Option	(electric only)				$ 157.50	$ 157.50
Electrical – Battery & Battery Chargers	58	ABB Metal frame	Option	(electric only)					$ 2,959.18
Electrical – Battery & Battery Chargers	28	Energy Storage System = Battery Packs	See Below		See Below	N/A	N/A	See Below	See Below
Electrical – Battery & Battery Chargers	29	Change base 435 kWh to long range 440 ~~311~~KWh-~~35~~ 40FT	Not Available	(electric only)	$ -	$ -	$ -	N/A	N/A
Electrical – Battery & Battery Chargers	30	Change base 435 kWh to Rapid charge 267 KWh-40FT	Not Available	(electric only)	$ 9,174.21	$ 10,254.93	$ 11,793.17	N/A	N/A
Electrical – Battery & Battery Chargers	31	Change base 435 kWh to Rapid charge ~~267~~ 320 KWh-40FT	Not Available	(electric only)	$ 55,000.00	$ 61,479.00	$ 70,700.85	N/A	N/A
Electrical – Battery & Battery Chargers	32	Charge per kWh Increase from available packages (Depot Charge)	Option	(electric only)	$ 52,545.00	$ 58,734.80	$ 67,545.02	$ 67,545.02	$ 570.00
Electrical – Battery & Battery Chargers	33	540 - 700 kWh Long Range ESS	Option		N/A	N/A	N/A	Quote	Quote
Electrical – Battery & Battery Chargers	34	800 kWh Long Range ESS	Not Available		N/A	N/A	N/A	N/A	N/A
Electrical - Battery & Battery Chargers	52	Change from 435kWh Long Range to 335 kWh 5 String Rapid Charge (Must Select Charge Rails to be Eligible for this Option)	Option	(electric only)			$ -	$ 41,023.78	$ 43,956.98
Electrical - Battery & Battery Chargers	53	Change from Long Range ESS to Rapid Charge ESS (Must Select Charge Rails to be Eligible for this Option)	Option	(electric only)			$ -	Quote	Quote
Electrical - Battery & Battery Chargers	35	Electric Trolley Bus Package	Not Available		N/A	N/A	N/A	N/A	N/A
Electrical - Battery & Battery Chargers	54	Other Option - Specify			N/A	N/A	N/A		$ -
						$ -	$ -		$ -
Electrical - Communication/Radio					N/A	N/A	N/A		$ -
Electrical – Communication/Radio	1	Pre - Wire:12V/40A Direct Battery & 12V/10A Ignition (Route to RH Dash & Ele. Equip. Box) and Install Roof Mount RF/GPS/Cellular Antenna	Option		N/A	N/A	N/A	Quote	Quote
Electrical – Communication/Radio	2	Motorola XLT 2500, 10- 35 W, 800MHZ W/DEC Box and Silent Alarm Switch	Not Available		Obsolete	N/A	N/A	N/A	N/A
Electrical – Communication/Radio	3	Motorola XLT 5000	Not Available		Obsolete	N/A	N/A	N/A	N/A
Electrical – Communication/Radio	4	Motorola APX4500	Option		$ 9,017.26	$ 10,079.49	$ 11,591.42	Quote	Quote
Electrical – Communication/Radio	5	Motorola CM200 and CM300, 45W, 439 - 470- MHZ	Option		$ 3,328.93	$ 3,721.08	$ 4,279.24	Quote	Quote
Electrical – Communication/Radio	6	Motorola CDM 1250	Not Available		Obsolete	N/A	N/A	N/A	N/A
Electrical – Communication/Radio	7	Harris Radio	Option		$ 10,173.38	$ 11,371.80	$ 13,077.57	Quote	Quote
Electrical – Communication/Radio	8	DC Power Filter for Radio Wiring	Option		$ 465.55	$ 520.39	$ 598.45	$ 598.45	$ 641.24
Electrical – Communication/Radio	9	Hand - Held Microphone	Option		N/A	N/A	N/A	$ -	$ -
Electrical – Communication/Radio	10	Public Address System with Boom Mic	Option		$ -	$ -	$ -	$ -	$ -
Electrical – Communication/Radio	11	Additional Flush Mounted Speakers (per Pair)	Option		$ 55.41	$ 61.94	$ 71.23	$ 71.23	$ 76.32
Electrical – Communication/Radio	12	~~ASP930T~~ ASP931 Radio Antenna with RG58 Coax Cable and TNC Connector	Option		$ 77.77	$ 86.93	$ 99.97	$ 99.97	$ 107.12
Electrical – Communication/Radio	13	Antenna Specialist ASP- 572	Option		$ 87.03	$ 97.28	$ 111.87	$ 111.87	$ 119.87
Electrical – Communication/Radio	14	Customer Specified Two Way Radio and Installation	Option		$ 9,017.26	$ 10,079.49	$ 11,591.42	Quote	Quote
Electrical – Communication/Radio	15	GPS Antenna W/Gasket (Trimble 502 Model 18334 and Approved Equal) with RG58 Coax Cable and F Type Male Connector to the VLU	Option		N/A	N/A	N/A	$ 98.31	$ 105.34
Electrical – Communication/Radio	16	customer specific antenna, ground plane, and cable runs installation	Option		$ 22.72	$ 25.40	$ 29.21	$ 84.66	$ 90.71
		Other Option - Specify				$ -	$ -		$ -

Category	Item #	Description	Designation	Propulsion (if applicable)	Price	6/1/22 Price Change	4/1/23 Price Change	June 2023 Revised Price	7/19/24 Price
Electrical - Destination Sign						$ -	$ -		$ -
Electrical – Destination Sign	1	Twin Vision Silver Series Sign (16 X160) Route, Rear, Front & Side (SSIII White)	Option		$ 355.00	$ 396.82	$ 456.34	$ 3,282.02	$ 3,516.68
Electrical – Destination Sign	2	Twin Vision ~~Silver Series Sign~~ Titan (24 X 200) Route, Rear, Front & Side (Titan White)	Option		$ 2,888.77	$ 3,229.07	$ 3,713.43	$ 2,759.52	$ 2,956.83
Electrical – Destination Sign	3	Twin Vision Smart Series II (16 X160) Route, Rear, Front & Side (SSIII Amber)	Option		$ 127.83	$ 142.89	$ 164.33	$ 664.02	$ 711.50
Electrical – Destination Sign	4	Twin Vision ~~Smart Series II~~ Titan (24 X 200) Route, Rear, Front & Side (Titan Amber)	Option		$ 114.32	$ 127.79	$ 146.95	$ 1,946.89	$ 2,086.09
Electrical – Destination Sign	5	Twin Vision 100% Amber LED, Front, Curb Side, Route, Rear (SSIII Amber)	Option		$ (190.33)	$ (212.75)	$ (244.66)	$ 527.89	$ 565.63
Electrical – Destination Sign	6	Twin Vision 100% Amber LED, Rear (SSIII Amber), Rear Sign Change Only	Option		$ 141.79	$ 158.50	$ 182.27	$ 246.43	$ 264.05
Electrical – Destination Sign	7	Twin Vision Chroma I Color LED Front	Not Available		N/A	N/A	N/A	N/A	N/A
Electrical – Destination Sign	8	Twin Vision Chroma IV 100% Color LED	Not Available		N/A	N/A	N/A	N/A	N/A
Electrical – Destination Sign	9	Twin Vision 24 X 200 Front, Side, Route, & Rear Amber LED Sign	Option		$ 2,124.21	$ 2,374.44	$ 2,730.61	$ -	$ -
Electrical – Destination Sign	10	Luminator SMT Horizon 100% Amber LED Front, Curbside, Rear	Inc In Base		$ -	$ -	$ -	Inc In Base	Inc In Base
Electrical – Destination Sign	11	AXION with WI FI and Time and Date Time Stamp	Not Available		N/A	N/A	N/A	N/A	N/A
Electrical – Destination Sign	12	Luminator Spectrum 100% ~~Amber~~ Full Color LED Front ,Curbside, Rear & Route (Spectrum FF Sign)	Option		$ 12,004.58	$ 13,418.72	$ 15,431.53	$ 17,399.45	$ 18,643.51
Electrical – Destination Sign	13	Luminator White LED Front, Curb-side, Route, and Rear (GTI White Sign)	Option		$ 620.54	$ 693.64	$ 797.69	$ 2,587.95	$ 2,772.99
Electrical – Destination Sign	14	Add Twin Vision Smart Series II w/ rear camera, Rear Sign (Twin Vision SSIII Amber Front, Side, Route, and Rear Signs)	Option		$ 575.18	$ 642.94	$ 739.38	$ 1,081.92	$ 1,159.28
Electrical – Destination Sign	15	Add Street Side Sign (Twin Vision Amber LED) (SSIII Amber Sign)	Option		$ 1,198.69	$ 1,339.90	$ 1,540.88	$ 1,694.00	$ 1,815.12
Electrical – Destination Sign	16	Add Street Side Sign (Twin Silver Series LED) (SSIII White Sign)	Option		$ 1,812.50	$ 2,026.01	$ 2,329.91	$ 2,711.50	$ 2,905.37
Electrical – Destination Sign	17	Remove Rear Sign (DEDUCT)	Option		$ (600.57)	$ (671.32)	$ (772.02)	$ (604.77)	$ (604.77)
Electrical – Destination Sign	18	Program Software (Twin Vision): DS17 Programming Software MIE (SSIII/FF)	Option		N/A	N/A	N/A	$ -	$ -
Electrical – Destination Sign	18	Program Software (Twin Vision): DS18 Programming Software IPS (GTI)	Option				$ -	$ -	$ -
Electrical – Destination Sign	18	Program Software (Twin Vision): DS18A Wireless programming Software (Remote Access Software)	Option				$ -	$ 1,232.00	$ 1,320.09
Electrical – Destination Sign	18	Program Software (Twin Vision): Programming Software IPS (GTI)	Option				$ -	$ -	$ -
Electrical – Destination Sign	18	Program Software (Twin Vision): Programming Software MIE (SSIII/FF)	Option				$ -	$ -	$ -
Electrical – Destination Sign	19	Luminator Programming Software USB Wireless	Option		N/A	N/A	N/A	$ -	$ -
Electrical – Destination Sign	20	Transign Curtain Front and Side Sign	Option		N/A	N/A	N/A	$ 5,699.37	$ 6,106.87
Electrical – Destination Sign	21	Heated Front Sign Glazing	Option		$ 101.86	$ 113.86	$ 130.94	$ 130.94	$ 140.30
Electrical – Destination Sign	22	Transign, (4) Character, Metal Housing, D5591-LED	Option		N/A	N/A	N/A	$ 341.82	$ 366.26
Electrical – Destination Sign	23	Transign, (3) Character, Metal Housing (Front Route Sign Change)	Option		$ (35.38)	$ (39.55)	$ (45.48)	$ 222.88	$ 238.82
Electrical – Destination Sign	24	Transign, (2) Character, D - 1 853, Metal Housing (Front Route Sign Change)	Option		N/A	N/A	N/A	$ 26.53	$ 28.43
Electrical – Destination Sign	25	Twin Vision Electronic Front Dash Sign (Front Route Sign Change)	Option		$ (130.39)	$ (145.75)	$ (167.61)	$ (167.61)	$ (167.61)
Electrical – Destination Sign	26	Hanover Display LED Amber Destination Signs (model# OL028, OL054 & OL64J)	Option		$ (496.11)	$ (554.55)	$ (637.73)	$ 288.95	$ 309.61
Electrical – Destination Sign	27	Luminator Electronic Front Dash Sign	Option		$ -	$ -	$ -	$ 209.68	$ 224.67
Electrical – Destination Sign	28	I/O controls Destination sign all Models	Not Available		N/A	N/A	N/A	N/A	N/A
Electrical – Destination Sign	29	Add One Additional Full Color Spectrum FF Twin Vision Silver Series LED, Street Side Sign (Must Purchase Option 12 to be Eligible for this Option)	Option		$ -		$ -	$ 5,852.00	$ 6,270.42
Electrical – Destination Sign	30	Remove Front Route Sign (DEDUCT)	Option		N/A		$ -	$ (725.00)	$ (725.00)
		Other Option - Specify			N/A	N/A	N/A		$ -
Electrical - Destination Sign Programming									$ -
Electrical – Destination Sign Programming	1	Luminator USB & Integrated Programing Software	Option		$ 499.92	$ 558.81	$ 642.63	$ -	$ -
Electrical – Destination Sign Programming	2	Twin Vision ~~Elyse 2~~ USB	Option		$ 58.30	$ 65.17	$ 74.94	$ 74.25	$ 79.56
Electrical – Destination Sign Programming	3	Twin Vision Software Package	Option		$ 441.62	$ 493.64	$ 567.69	$ -	$ -
		Other Option - Specify			N/A	N/A	N/A		$ -
Electrical - Diagnostics									$ -
Electrical – Diagnostics	1	Set of Multiplexing Diagnostics (Includes the 7 Following Items)	Option		See Section 10 for bus model specific diagnostics	N/A	N/A	Quote	Quote
Electrical – Diagnostics	2	Incl w/set - Circuit Tester	Option		See Section 10 for bus model specific diagnostics	N/A	N/A	Quote	Quote
Electrical – Diagnostics	3	Incl w/set - Program Loader	Option		See Section 10 for bus model specific diagnostics	N/A	N/A	Quote	Quote
Electrical – Diagnostics	4	Incl w/set - Program	Option		See Section 10 for bus model specific diagnostics	N/A	N/A	Quote	Quote
Electrical – Diagnostics	5	Incl w/set - ID Writer/Verification	Option		See Section 10 for bus model specific diagnostics	N/A	N/A	Quote	Quote
Electrical – Diagnostics	6	Incl w/set - RS232/RS485 Converter	Option		See Section 10 for bus model specific diagnostics	N/A	N/A	Quote	Quote
Electrical – Diagnostics	7	Incl w/set - Software, Real Time Ladder Logic	Option		See Section 10 for bus model specific diagnostics	N/A	N/A	Quote	Quote
Electrical – Diagnostics	8	Incl w/set - Hand - Held Computer	Option		See Section 10 for bus model specific diagnostics	N/A	N/A	Quote	Quote
		Other Option - Specify			N/A	N/A	N/A		
Electrical - Equipment Storage Box						$ -	$ -		
Electrical – Equipment Storage Box	1	none			$ -	$ -	$ -	N/A	N/A
Electrical – Equipment Storage Box	2	UTA APC Sensors, Cabling- ~~CPU only~~			$ 15,728.63	$ 17,581.46	$ 20,218.68	$ 345.97	$ 370.71
Electrical – Equipment Storage Box	3	33"H X 20"D X 22.5"W, 13 - 42920F006	Inc In Base		$ -	$ -	$ -	$ -	$ -
Electrical – Equipment Storage Box	4	33"H X 20"D X 22.5"W, 13 - 42920F006, w/2 - Doors	Not Available		$ -	$ -	$ -	N/A	N/A
Electrical – Equipment Storage Box	5	33"H X 20"D X 22.5"W, 13 - 42920F014, w/Louvered Back Panel (Add Equipment Storage Box Ventilator)			$ -	$ -	$ -	402.94	$ 431.75
Electrical – Equipment Storage Box	6	Strategic Mapping sensors, cabling, CPU only			$ 9,473.75	$ 10,589.76	$ 12,178.22	Quote	Quote
		Other Option - Specify				$ -	$ -		$ -
Electrical - Lights, Exterior						$ -	$ -		$ -
Electrical – Lights, Exterior	1	All Exterior Lights LED - Type Lamps	Inc In Base		$ -	$ -	$ -	$ -	$ -
Electrical – Lights, Exterior	2	Headlight LED Dialight - Low Beam	Inc In Base		$ -	$ -	$ -	$ -	$ -
Electrical – Lights, Exterior	3	Headlight LED Dialight - High Beam	Inc In Base		$ -	$ -	$ -	$ -	$ -
Electrical – Lights, Exterior	4	Halogen Sealed Beam Headlights	Not Available		N/A	N/A	N/A	N/A	N/A
Electrical – Lights, Exterior	5	Tail Lights - Manufacturer Dialite LED, Fixture Size - 7" Diameter	Option		$ 167.00	$ 186.67	$ 214.67	$ 170.05	$ 182.21
Electrical – Lights, Exterior	6	Tail Lights - Manufacturer Dialite LED, Fixture Size - 4" Diameter	Inc In Base		$ -	$ -	$ -	$ -	$ -
		Other Option - Specify			N/A	N/A	N/A		$ -
Electrical - Intelligent Vehicle Network						$ -	$ -		$ -
Electrical – Intelligent Vehicle Network	1	none	Inc In Base			$ -	$ -	$ -	$ -
Electrical – Intelligent Vehicle Network	2	Clever Devices IVN III W/Voice Annunciation, APC, Wireless LAN	Option		$ 34,206.69	$ 38,236.24	$ 43,971.67	Quote	Quote
Electrical – Intelligent Vehicle Network	3	AVAIL IVN W/MDC, GPS, APC, WLAN	Option		$ 31,301.52	$ 34,988.84	$ 40,237.16	Quote	Quote
Electrical – Intelligent Vehicle Network	4	Init Voice Enunciator/AVL/GPS/APC/WLAN	Option		$ 46,285.83	$ 51,738.30	$ 59,499.05	Quote	Quote
Electrical – Intelligent Vehicle Network	5	Siemens Transit Master	Not Available		N/A	N/A	N/A	N/A	N/A
Electrical – Intelligent Vehicle Network	6	Transloc Transit Visualization System AVL	Not Available		N/A	N/A	N/A	N/A	N/A
Electrical – Intelligent Vehicle Network	7	Orbital TMS CAD/AVL System W/Voice Annunciation, APC	Not Available		N/A	N/A	N/A	N/A	N/A
Electrical – Intelligent Vehicle Network	8	Intelligent Vehicle System Prewire only	Option		N/A	N/A	N/A	Quote	Quote
Electrical – Intelligent Vehicle Network	9	Mapping and Database Setup for GPS per Customer Requirement	Not Available		N/A	N/A	N/A	N/A	N/A
Electrical – Intelligent Vehicle Network	10	Trimble "Button" Antenna	Not Available		N/A	N/A	N/A	N/A	N/A
Electrical – Intelligent Vehicle Network	11	Low Profile Blade Antenna	Option		N/A	N/A	N/A	Quote	Quote

Category	Item #	Description	Designation	Propulsion (if applicable)	Price	6/1/22 Price Change	4/1/23 Price Change	June 2023 Revised Price	7/19/24 Price
Electrical – Intelligent Vehicle Network	12	Strategic Mapping IVN	Not Available		N/A	N/A	N/A	N/A	N/A
Electrical – Intelligent Vehicle Network	13	Complete INIT on-board ITS system, CoPilot PC, APC, CAD/AVL, Visual/Voice Stop Enunciator, Emergency button	Option		N/A	N/A	N/A	Quote	Quote
		Other Option - Specify							
Electrical - Multiplexing									
Electrical – Multiplexing	1	Dinex, I/O Controls G3 System	Not Available		N/A	N/A	N/A	N/A	N/A
Electrical – Multiplexing	2	I/O Controls Wireless RF Module	Not Available		N/A	N/A	N/A	N/A	N/A
Electrical – Multiplexing	3	I/O Controls, Gateway Module (Included in the ITS Prewire Option)	Not Available		N/A	N/A	N/A	N/A	N/A
Electrical – Multiplexing	4	Vansco	Inc In Base		$ -	$ -	$ -	$ -	$ -
Electrical – Multiplexing	5	VDO	Not Available		N/A	N/A	N/A	N/A	N/A
		Other Option - Specify			N/A	N/A	N/A	$ -	$ -
Electrical - Pleasure						$ -	$ -		$ -
Electrical – Pleasure	1	none	Inc In Base		$ -	$ -	$ -	$ -	$ -
Electrical – Pleasure	2	Radio Tacho Link Event Data Recorder	Option		$ 5,352.35	$ 5,982.86	$ 6,880.29	Quote	Quote
Electrical – Pleasure	3	Radio	Not Available		N/A	N/A	N/A	N/A	N/A
Electrical – Pleasure	4	Radio Am/FM/CD	Option		$ 552.08	$ 617.12	$ 709.68	$ 657.74	$ 704.77
Electrical - Pleasure	5	On-Board entertainment system including 6 video screen DVD CD-ROM player (Luminator)	Option		N/A	N/A	N/A	$ 15,708.00	$ 16,831.12
Electrical - Pleasure	6	On-Board entertainment system including 6 video screen DVD CD-ROM player (Clever)	Option		N/A		$ -	$ 20,018.63	$ 21,449.96
Electrical - Pleasure	7	On-Board entertainment system including 6 video screen DVD CD-ROM player (Hanover)	Option		N/A		$ -	$ 11,602.94	$ 12,432.55
Electrical - Pleasure	8	Hanover Software Licensing (per Customer, may be required for Electrical - Pleasure Option 7)	Option - Required with Item 7		$ -		$ -	$ 6,750.00	$ 7,232.63
		Other Option - Specify			N/A	N/A	N/A		$ -
Electrical - Public Announcement						$ -	$ -		$ -
Electrical – Public Announcement	1	Drivers Speaker W/Separate Volume Control	Inc In Base		$ 22.23	$ 24.85	$ 28.58	$ -	$ -
Electrical – Public Announcement	2	REI Model 750040 PA W/Handheld Mic W/(6) Flush Mounted Speakers	Option		$ (1,004.85)	$ (1,123.22)	$ (1,291.70)	$ -	$ -
Electrical – Public Announcement	3	Luminator IVS W/GPS Capability, w/LED Sign, W/O Mapping	Option		$ 7,651.88	$ 8,553.27	$ 9,836.26	Quote	Quote
Electrical – Public Announcement	4	DR700 Vehicle Logic Unit W/GPS Capability, w/LED Sign, W/O Mapping	Option		$ 14,661.00	$ 16,388.07	$ 18,846.28	Quote	Quote
Electrical – Public Announcement	5	Clever Devises - Speakeasy II	Inc In Base		$ -	$ -	$ -	$ -	$ -
Electrical – Public Announcement	6	Rei Echo PA System	Option		$ (1,069.30)	$ (1,195.26)	$ (1,374.55)	$ -	$ -
Electrical – Public Announcement	7	Shure Brothers Lapel Microphone w/REI PA System	Option		$ 1,452.76	$ 1,623.90	$ 1,867.48	$ -	$ -
Electrical – Public Announcement	8	Midwest Lapel Microphone (Use w/Voice Annunciation System)	Option		$ 161.56	$ 180.59	$ 207.68	$ 207.68	$ 222.53
Electrical – Public Announcement	9	Interior LED Sign	Inc In Base		In Item #4	N/A	N/A	$ -	$ -
Electrical – Public Announcement	10	One Additional Pair of Interior Speakers	Option		$ 55.41	$ 61.94	$ 71.23	$ 71.23	$ 76.32
Electrical – Public Announcement	11	One Additional exterior Speaker ~~Each~~	Option		$ 28.45	$ 31.80	$ 36.57	$ 36.57	$ 39.18
Electrical – Public Announcement	12	REI w/switch mounted in Driver's Area	Option		$ 1,452.76	$ 1,623.90	$ 1,867.48	$ -	$ -
		Other Option - Specify			N/A	N/A	N/A		$ -
Electrical - Video Surveillance									$ -
Electrical – Video Surveillance	1	none	Inc In Base			$ -	$ -	$ -	$ -
Electrical – Video Surveillance	2	Apollo RoadRunner DVR 2TB 4 Camera System w/Audio	Option		$ 4,477.44	$ 5,004.88	$ 5,755.61	Quote	Quote
Electrical – Video Surveillance	3	Apollo RoadRunner DVR 2TB 8 Camera System w/Audio	Option		$ 7,388.07	$ 8,258.38	$ 9,497.14	Quote	Quote
Electrical – Video Surveillance	4	Apollo RoadRunner DVR 2TB 12 Camera System w/Audio	Option		$ 9,636.99	$ 10,772.23	$ 12,388.06	Quote	Quote
Electrical – Video Surveillance	5	Apollo RoadRunner DVR 2TB 16 Camera System w/Audio	Option		$ 12,315.88	$ 13,766.69	$ 15,831.69	Quote	Quote
Electrical – Video Surveillance	6	Apollo RoadRunner HDR DVR 2TB 4 Camera System & Audio	Option		$ 6,254.13	$ 6,990.87	$ 8,039.50	Quote	Quote
Electrical – Video Surveillance	7	Apollo RoadRunner HDR DVR 2TB 8 Camera System & Audio	Option		$ 9,572.86	$ 10,700.54	$ 12,305.62	Quote	Quote
Electrical – Video Surveillance	8	Apollo RoadRunner HDR DVR 2TB 12 Camera System & Audio	Option		$ 12,186.16	$ 13,621.69	$ 15,664.94	Quote	Quote
Electrical – Video Surveillance	9	Apollo RoadRunner HDR DVR 2TB 16 Camera System & Audio	Option		$ 15,354.76	$ 17,163.55	$ 19,738.08	Quote	Quote
Electrical – Video Surveillance	10	Apollo Wireless Data Download capable	Option		$ 463.49	$ 518.09	$ 595.80	Quote	Quote
Electrical – Video Surveillance	11	Apollo Cellular "Live Look Through" Capable	Option		$ 1,447.30	$ 1,617.79	$ 1,860.46	Quote	Quote
Electrical – Video Surveillance	12	Apollo Vehicle Information Management System (VIM)	Option		$ 6,120.04	$ 6,840.98	$ 7,867.13	Quote	Quote
Electrical – Video Surveillance	13	Apollo video 4K DVR w/9 camera system w/ Audio	Option		$ 10,905.02	$ 12,189.63	$ 14,018.08	Quote	Quote
Electrical – Video Surveillance	14	Cole Hersee 12063 Electrical Tow Connector	Inc In Base		$ -	$ -	$ -	$ -	$ -
Electrical – Video Surveillance	15	(4) Camera Pre Wire Package	Option		$ 145.75	$ 162.92	$ 187.36	Quote	Quote
Electrical – Video Surveillance	16	SEON TX8 8 channel w/1 TB hard drive	Not Available		Obsolete	N/A	N/A	N/A	N/A
Electrical – Video Surveillance	17	SEON DX-HD 13 channel w/1 TB hard drive	Not Available		Obsolete	N/A	N/A	N/A	N/A
Electrical – Video Surveillance	18	SEON 2 TB hard drive upgrade	Option		$ 3,881.25	$ 4,338.46	$ 4,989.23	Quote	Quote
Electrical – Video Surveillance	19	SEON WP00AG4 Explorer DX12 and DX-HD Smart-Link 12 VDC module to DVR cable, diagnostic indicator/alarm button & harness, GPS4 receiver mount.	Not Available		Obsolete	N/A	N/A	N/A	N/A
Electrical – Video Surveillance	20	SEON CQ903A integrated IR Dome day/Night 600TVL interior camera, audio, 2.9 mm lens.	Option		$ 253.80	$ 283.70	$ 326.25	Quote	Quote
Electrical – Video Surveillance	21	SEON CA904EI Day/Night 600TVL camera, exterior (w/infrared, no audio), 3.6 mm lens (Replaced with C3Q9PD04AF-BK)	Option		$ 371.25	$ 414.98	$ 477.23	Quote	Quote
Electrical – Video Surveillance	22	SEON CJ904A Dome Day/Night 600TVL camera, audio, 3.6mm lens w/mount (Replaced with C3Q9PD04AF-BK)	Option		$ 253.80	$ 283.70	$ 326.25	Quote	Quote
Electrical – Video Surveillance	23	SEON CHW702EJ HD progressive scan camera, 16mm lens, exterior (no audio) and APPINJ POE injector w/mount.	Not Available		Obsolete	N/A	N/A	N/A	N/A
Electrical – Video Surveillance	24	SEON SRLGA07 Smart-Reach Lite, 2.4GHz Wireless bridge w/antenna	Option		N/A	N/A	N/A	Quote	Quote
Electrical – Video Surveillance	25	SEON HDD-STB Vmax View software, docking station & handheld mouse.	Option		N/A	N/A	N/A	Quote	Quote
Electrical – Video Surveillance	26	SEON LMK LCD monitor, 5.6 inch, AC charger, battery pack	Option		$ 354.06	$ 395.77	$ 455.13	Quote	Quote
Electrical – Video Surveillance	27	Safety Vision RR6000 Pro w/(4) Digital Color Cameras, 120 GB DVR, w/Audio	Option		$ 11,812.94	$ 13,204.50	$ 15,185.18	Quote	Quote
Electrical – Video Surveillance	28	Angel Trax - 6 HD/IR Camera System - 500 G HD Storage with SD Card Backup and Wi-Fi ready	Option		N/A	N/A	N/A	Quote	Quote
Electrical – Video Surveillance	29	Angel Trax - 8 HD/IR Camera System - 500 G HD Storage with SD Card Backup and Wi-Fi ready	Option		N/A	N/A	N/A	Quote	Quote
Electrical – Video Surveillance	30	Angel Trax - 12 HD/IR Camera System - 750 G HD Storage with SD Card Backup and Wi-Fi ready	Option		N/A	N/A	N/A	Quote	Quote
Electrical – Video Surveillance	31	Angel Trax -16 HD/IR Camera System - 750 G HD Storage with SD Card Backup and Wi-F- ready	Option		N/A	N/A	N/A	Quote	Quote
Electrical – Video Surveillance	32	Angel Trax Upgrade to 1 Tb - Double Stacked 500 G HD	Option		N/A	N/A	N/A	Quote	Quote
Electrical – Video Surveillance	33	Angel Trax Live View, Live GPS, and System Health Notification option	Option		N/A	N/A	N/A	Quote	Quote
Electrical – Video Surveillance	34	March Network (8) Camera System	Option		$ 14,435.08	$ 16,135.53	$ 18,555.86	Quote	Quote
Electrical – Video Surveillance	35	REI Bus Watch Digital	Option		$ 6,705.24	$ 7,495.12	$ 8,619.38	Quote	Quote
Electrical – Video Surveillance	36	TVSS Claim Safe III w/4 Digital Cameras	Not Available		N/A	N/A	N/A	N/A	N/A
Electrical – Video Surveillance	37	Mobileview IV Digital, (5) Cameras, 250 GB DVR, w/Audio	Not Available		N/A	N/A	N/A	N/A	N/A
Electrical – Video Surveillance	38	Mobilview PENTA DVR	Not Available		N/A	N/A	N/A	N/A	N/A
Electrical – Video Surveillance	39	Mobileview MV3000 DVR	Not Available		N/A	N/A	N/A	N/A	N/A
Electrical – Video Surveillance	40	Rear View Camera System	Option		N/A	N/A	N/A	Quote	Quote

Category	Item #	Description	Designation	Propulsion (if applicable)	Price	6/1/22 Price Change	4/1/23 Price Change	June 2023 Revised Price	7/19/24 Price
Electrical – Video Surveillance	41	Add Additional Color Camera	Option		$ 274.01	$ 306.29	$ 352.23	Quote	Quote
Electrical – Video Surveillance	42	Central Station Mobileview (Kalatel)	Not Available		N/A	N/A	N/A	N/A	N/A
Electrical – Video Surveillance	43	Verint 4 Camera System	Not Available		N/A	N/A	N/A	N/A	N/A
Electrical – Video Surveillance	44	Verint 5 Camera System	Not Available		N/A	N/A	N/A	N/A	N/A
Electrical – Video Surveillance	45	Video Test Kit Mobileview IV - Kalatal	Not Available		N/A	N/A	N/A	N/A	N/A
Electrical – Video Surveillance	46	Desk Top Viewing Station (REI)	Option		N/A	N/A	N/A	Quote	Quote
Electrical – Video Surveillance	47	Velvac Hyperion Virtual DVR (up to 7 camera views through dash mounted tablet)	Not Available		N/A	N/A	N/A	N/A	N/A
		Other Option - Specify			N/A	N/A	N/A		
Engine - Accessories									
Engine – Accessories	1	Cummins Compucheck Fittings for (Air, Oil, Fuel & Coolant Testing)	Not Available	Diesel/CNG/Hybrid Only	N/A	N/A	N/A	N/A	N/A
Engine – Accessories	2	Williams Controls 41 Degree Throttle Pedal	Not Available	Diesel/CNG/Hybrid Only	N/A	N/A	N/A	N/A	N/A
Engine – Accessories	3	Williams Controls 45 Degree Throttle Pedal	Inc In Base	Diesel/CNG/Hybrid Only	N/A	N/A	N/A	$ -	$ -
Engine – Accessories	4	Teleflex Adjustable Throttle and Brake Pedal	Not Available	Diesel/CNG/Hybrid Only	N/A	N/A	N/A	N/A	N/A
Engine – Accessories	5	STD Donaldson (RBX00- 2277) - Air Intake Restriction	Discontinued	Diesel/CNG/Hybrid Only	$ 23.93	$ 26.75	$ 30.76	N/A	N/A
Engine – Accessories	6	Ashcraft (25-1490a02L) - Air Intake Restriction	Not Available	Diesel/CNG/Hybrid Only	N/A	N/A	N/A	N/A	N/A
Engine – Accessories	7	Filterminder # SP - 3832 - Air Intake Restriction	Not Available	Diesel/CNG/Hybrid Only	N/A	N/A	N/A	N/A	N/A
Engine – Accessories	8	Donaldson Informer - Air Intake Restriction	Not Available	Diesel/CNG/Hybrid Only	N/A	N/A	N/A	N/A	N/A
Engine – Accessories	9	Spin on Filters Supplied By Engine Manufacturer (Fleetguard), L9 Engines Only	Option	Diesel/CNG/Hybrid Only	$ 1,391.76	$ 1,555.71	$ 1,789.07	$ 246.56	$ 264.19
Engine – Accessories	10	By Pass Filter - Spinner - Bypass Model ~~976~~ 576 (976 is obsolete)	Option	Diesel/Hybrid	N/A	N/A	N/A	$ 1,615.21	$ 1,730.70
Engine – Accessories	10	By Pass Filter - Spinner - Bypass Model ~~976~~ 576 (976 is obsolete)	Option	CNG	N/A		$ -	$ 1,428.03	$ 1,530.13
Engine – Accessories	11	Sample Test Port - Titan Probalizer OD-1014 (Obsolete - added replacement in otion #26)	Discontinued	Diesel/CNG/Hybrid Only	$ (36.10)	$ (40.35)	$ (46.41)	N/A	N/A
Engine – Accessories	12	FEMCO Oil Drain Plug	Option	Diesel/CNG/Hybrid (L9) Only	$ 83.34	$ 93.16	$ 107.13	$ 107.13	$ 114.79
Engine – Accessories	13	Magnetic Drain Plug	Inc In Base	Diesel/CNG/Hybrid Only	N/A	N/A	N/A	$ -	$ -
Engine – Accessories	14	Test Ports Shall Be Provided for Commonly Checked Functions on the Bus (Transmission Drain Plugs)	Option	Diesel/CNG	N/A	N/A	N/A	$ 93.44	$ 100.12
Engine – Accessories	16	Rear Run Box Starter - Delco MT 42 - 24v Electric	Inc In Base	Diesel/CNG/Hybrid Only	$ -	$ -	$ -	$ -	$ -
Engine – Accessories	17	Rear Run Box	Inc In Base	Diesel/CNG/Hybrid Only	$ -	$ -	$ -	$ -	$ -
Engine – Accessories	18	Rear Run Box Rear Hand Throttle	Inc In Base	Diesel/CNG/Hybrid Only	$ 4.91	$ 5.49	$ 6.31	$ -	$ -
Engine – Accessories	19	Rear Run Box Engine Hour Meter	Inc In Base	Diesel/CNG/Hybrid Only	$ -	$ -	$ -	$ -	$ -
Engine – Accessories	20	Rear Run Box A/C Hour Meter	Inc In Base	Diesel/CNG/Hybrid Only	N/A	N/A	N/A	$ -	$ -
Engine – Accessories	21	Rear Run Box Voltmeter J1939	Inc In Base	Diesel/CNG/Hybrid Only	$ -	$ -	$ -	$ -	$ -
Engine – Accessories	22	Rear Run Box Oil Pressure Gauge J1939	Inc In Base	Diesel/CNG/Hybrid Only	$ -	$ -	$ -	$ -	$ -
Engine – Accessories	23	Rear Run Box Coolant Gauge J1939	Inc In Base	Diesel/CNG/Hybrid Only	$ -	$ -	$ -	$ -	$ -
Engine – Accessories	24	Mechanical Gauges - Murphy Oil Pressure and Coolant Temperature	Discontinued	Diesel/CNG/Hybrid Only	$ -	$ -	$ -	N/A	N/A
Engine - Accessories	25	Adjustable brake and accelerator pedals (minimum 3 in.)	Not Available	Diesel/CNG/Hybrid Only	N/A	N/A	N/A	N/A	N/A
Engine - Accessories	26	Sample Test Port - KST18N-VC	Option		N/A		$ -	$ 82.42	$ 88.31
Engine - Accessories	27	High Grade Motor	Option	Electric / Fuel Cell				$ 27,923.25	$ 29,919.77
		Other Option - Specify			N/A	N/A	N/A		$ -
Engine - Diagnostics						$ -	$ -		$ -
Engine – Diagnostics	1	Cummins Inline 6 Adapter Kit, Insite Basic	Option		See Section 10 for bus model specific diagnostics	N/A	N/A	Quote	Quote
Engine – Diagnostics	2	Cummins Quickserve Online 1 Year Subscription	Option		See Section 10 for bus model specific diagnostics	N/A	N/A	Quote	Quote
Engine – Diagnostics	3	Cummins Quickserve Online each Additional Year Subscription	Option		See Section 10 for bus model specific diagnostics	N/A	N/A	Quote	Quote
Engine – Diagnostics	4	Cummins INSITE Diagnostic Program 1 Year Subscription	Option		See Section 10 for bus model specific diagnostics	N/A	N/A	Quote	Quote
Engine – Diagnostics	5	Cummins INSITE Diagnostic Program each Additional Year Subscription	Option		See Section 10 for bus model specific diagnostics	N/A	N/A	Quote	Quote
Engine – Diagnostics	6	ISL G Fold Up Wiring Diagram	Option		See Section 10 for bus model specific diagnostics	N/A	N/A	Quote	Quote
		Other Option - Specify			See Section 10 for bus model specific diagnostics	N/A	N/A	Quote	Quote
Engine - Tune Up Kit						$ -	$ -		$ -
Engine – Tune Up Kit	1	Cummins Tune - Up Kit (Includes the Following)	Option		$ 7,675.22	$ 8,579.37	$ 9,866.27	$ 9,866.27	$ 10,571.71
Engine – Tune Up Kit	2	Includes - Pressure Gauge	Included in Line 1		Included in Line 1	N/A	N/A	Included in Line 1	Included in Line 1
Engine – Tune Up Kit	3	Includes - Torque Wrench	Included in Line 1		Included in Line 1	N/A	N/A	Included in Line 1	Included in Line 1
Engine – Tune Up Kit	4	Includes - Oil Filter Wrench	Included in Line 1		Included in Line 1	N/A	N/A	Included in Line 1	Included in Line 1
Engine – Tune Up Kit	5	Includes - Engine Coolant & Fuel Wrench	Included in Line 1		Included in Line 1	N/A	N/A	Included in Line 1	Included in Line 1
Engine – Tune Up Kit	6	Includes - Belt Tension Gauge	Included in Line 1		Included in Line 1	N/A	N/A	Included in Line 1	Included in Line 1
Engine – Tune Up Kit	7	Includes - Belt Tension Gauge	Included in Line 1		Included in Line 1	N/A	N/A	Included in Line 1	Included in Line 1
Engine – Tune Up Kit	8	Includes - Charge- A/C CAC Pressure Kit	Included in Line 1		Included in Line 1	N/A	N/A	Included in Line 1	Included in Line 1
Engine – Tune Up Kit	9	Includes - Engine Barring Gear	Included in Line 1		Included in Line 1	N/A	N/A	Included in Line 1	Included in Line 1
Engine – Tune Up Kit	10	Includes - Torque Wrench	Included in Line 1		Included in Line 1	N/A	N/A	Included in Line 1	Included in Line 1
Engine – Tune Up Kit	11	Includes - Roller Follower Rem. & Installation Tool	Included in Line 1		Included in Line 1	N/A	N/A	Included in Line 1	Included in Line 1
Engine – Tune Up Kit	12	Includes - Compucheck Fitting	Included in Line 1		Included in Line 1	N/A	N/A	Included in Line 1	Included in Line 1
		Other Option - Specify							$ -
Flare Box									$ -
Fare Box	1	No Fare box, Power Circuit and Ground strap only	Inc In Base		$ -	$ -	$ -	$ -	$ -
Fare Box	2	GFI 36" Fastfare	Option		$ 15,159.38	$ 16,945.15	$ 19,486.93	$ 28,811.75	$ 30,871.79
Fare Box	3	GFI 36" Odyssey	Discontinued		$ 15,159.38	$ 16,945.15	$ 19,486.93	N/A	N/A
Fare Box	4	GFI 41" Fast Fare	Option		$ 15,159.38	$ 16,945.15	$ 19,486.93	$ 28,811.75	$ 30,871.79
Fare Box	5	GFI 41" Odyssey	Discontinued		$ 15,159.38	$ 16,945.15	$ 19,486.93	N/A	N/A
Fare Box	6	Diamond Model H w/Two (2) Vaults	Not Available		N/A	N/A	N/A	N/A	N/A
Fare Box	7	Diamond Model 5V w/Two (2) Vaults	Option		$ 1,588.68	$ 1,775.83	$ 2,042.20	$ 2,640.00	$ 2,828.76
Fare Box	8	Main T1 Fare box w/Two V1 Vaults in Standard Paint Colors	Option		$ 1,195.15	$ 1,335.94	$ 1,536.33	$ 2,908.13	$ 3,116.06
Fare Box	9	Main M 4 Fare box w/Two V4 Vaults in Standard Paint Colors	Option		$ 991.10	$ 1,107.85	$ 1,274.03	$ 2,392.50	$ 2,563.56
Fare Box	10	Main SL 5 Fare box w/Two V5 Vaults in Standard Paint Colors	Discontinued		$ 3,033.06	$ 3,390.35	$ 3,898.91	N/A	N/A
Fare Box	11	Cubic Fare box	Not Available		N/A	N/A	N/A	N/A	N/A
Fare Box	12	Denominator Manual Passenger Counter	Not Available		N/A	N/A	N/A	N/A	N/A
Fare Box	14	Globe Transfer Cutter	Option		$ 61.12	$ 68.32	$ 78.57	$ 87.12	$ 93.35
		Other Option - Specify			N/A	N/A	N/A		$ -
HVAC						$ -	$ -		$ -
HVAC	1	Thermo King System (Per Technical Specification)	Inc In Base		$ -	$ -	$ -	$ -	$ -
HVAC	2	TK Intelligaire 3 W/X 616 Compressor, R134A, Reliance Brushless Cond. & Evap. Motors	Not Available		$ -	$ -	$ -	$ -	$ -
HVAC	3	TK System w/General Electric Field Wound Motors (Cond & Evap)	Not Available		N/A	N/A	N/A	N/A	N/A
HVAC	4	TK System w/General Electric P.M. Motors	Not Available		N/A	N/A	N/A	N/A	N/A
HVAC	5	TK System w/X430Compressor	Option	Diesel/CNG	$ (1,030.48)	$ (1,151.87)	$ (1,324.65)	$ (1,090.00)	$ (1,090.00)

Category	Item #	Description	Designation	Propulsion (if applicable)	Price	6/1/22 Price Change	4/1/23 Price Change	June 2023 Revised Price	7/19/24 Price
HVAC	6	TK System w/5391 Screw Compressor	Inc In Base		$ -	$ -	$ -	$ -	$ -
HVAC	7	TK System w/5616 Screw Compressor	Not Available		$ -	$ -	$ -	$ -	$ -
HVAC	8	TK Electric HVAC System	Option	Diesel/CNG	$ 20,875.00	$ 23,334.08	$ 26,834.19	Quote	Quote
HVAC	8	TK Electric HVAC System	Option	Hybrid	$ 1,675.35	$ 1,872.71	$ 2,153.61	Quote	Quote
HVAC	9	TK Pressure and Return Gauges Mounted to Unit	Option		$ 391.88	$ 438.04	$ 503.75	$ 503.75	$ 539.77
HVAC	10	R407c Refrigerant	Option			$ -	$ -	$ -	$ -
HVAC	11	MCC Drivers Heater W/Brushless Motors	Option		$ -	$ -	$ -	$ 440.98	$ 472.51
HVAC	12	MCC Drivers Heater W/Brush Motors	Discontinued		$ -	$ -	$ -	N/A	N/A
HVAC	13	MCC Front Stepwell/Threshold Heater W/Brushless Motor (Each)	Inc In Base		$ 359.98	$ 402.39	$ 462.74	$ -	$ -
HVAC	14	MCC Underseat/Rear Stepwell Heater W/Brushless Motor (Each)	Inc In Base		N/A	N/A	N/A	$ -	$ -
HVAC	15	MCC Underseat/Rear Stepwell Heater W/Brush Motor (Each)	Not Available		N/A	N/A	N/A	N/A	N/A
HVAC	16	Sutrak All Electric Air Conditioning - Roof Mount	Discontinued		$ 71,185.24	$ 79,570.86	$ 91,506.49	N/A	N/A
HVAC	17	Sutrak All Electric Air Conditioning - Rear Mount	Discontinued		$ 45,324.40	$ 50,663.61	$ 58,263.16	N/A	N/A
HVAC	18	Change Floor Heating to ACT Convection Heater	Option		$ 437.26	$ 488.77	$ 562.08	$ -	$ -
HVAC	19	ACT Espar Fuel-Fired Supplemental Coolant Heater	Not Available		N/A	N/A	N/A	N/A	N/A
HVAC	20	Warm Welcome Mat (Rear Door)	Not Available		N/A	N/A	N/A	N/A	N/A
HVAC	21	Warm Welcome Mat (Installed on W/C Ramp)	Not Available		N/A	N/A	N/A	N/A	N/A
HVAC	22	Eberspacher AC 136 G3 AE	Not Available		N/A	N/A	N/A	N/A	N/A
HVAC	23	Air Purification System (Thermo King)	Option		$ 7,520.29	$ 8,406.18	$ 9,667.11	$ 3,828.00	$ 4,101.70
HVAC	24	Other Option - Air Purification System (Puradigm FLOW100 12V)	Option		$ 2,849.00	$ 3,184.61	$ 3,662.30	$ 4,414.84	$ 4,730.50
HVAC	25	Sanuv Air Filter System	Option		$ 8,527.45	$ 9,531.98	$ 10,961.78	$ 4,903.28	$ 5,253.86
HVAC Special Purpose						$ -	$ -		$ -
HVAC Special Purpose	1	TK Intelligaire - Diagnostics	Option		$ 1,592.38	$ 1,779.96	$ 2,046.95	$ 2,046.95	$ 2,193.31
HVAC Special Purpose	2	Carrier Micromax ATE Diagnostics	Option		$ 619.76	$ 692.77	$ 796.69	$ 796.69	$ 853.65
HVAC Special Purpose	3	Webasto Diagnostic Tool	Option		$ 416.28	$ 465.32	$ 535.12	$ 535.12	$ 573.38
HVAC Special Purpose	4	Van Steenburgh Regional Recovery System (JV90- 1)	Option		$ 11,167.31	$ 12,482.82	$ 14,355.24	$ 14,355.24	$ 15,381.64
HVAC Special Purpose	5	Eberspacher diagnostics	Not Available		N/A	N/A	N/A	N/A	N/A
		Other Option - Specify	Not Available		N/A	N/A	N/A	N/A	N/A
Manuals						$ -	$ -		$ -
Manuals	1	Drivers Handbook (1 Manual/1 CD per Bus Order)	Option		$ 90.00	$ 100.60	$ 115.69	$ 115.69	$ 123.96
Manuals	2	Service Manual (1 Manual/1 CD per Bus Order	Option		$ 210.00	$ 234.74	$ 269.95	$ 269.95	$ 289.25
Manuals	3	Parts Manual (1 Manual/1CD per Bus Order)	Option		$ 240.00	$ 268.27	$ 308.51	$ 308.51	$ 330.57
Manuals	4	Electrical Schematics (1 Manual/1CD per Bus Order)	Option		$ 180.00	$ 201.20	$ 231.38	$ 231.38	$ 247.93
Manuals	5	Vendor Manuals (1 Manual/1 CD per Bus Order)	Option		$ 31.38	$ 35.08	$ 40.34	$ 40.34	$ 43.22
Manuals	6	Additional Driver's Handbook	Option		$ 90.00	$ 100.60	$ 115.69	$ 115.69	$ 123.96
Manuals	8	Additional Parts Manuals	Option		$ 90.00	$ 100.60	$ 115.69	$ 115.69	$ 123.96
Manuals	9	Additional Electrical Schematics	Option		$ 90.00	$ 100.60	$ 115.69	$ 115.69	$ 123.96
Manuals	10	Additional Electrical Multiplex	Option		$ 650.00	$ 726.57	$ 835.56	$ 835.56	$ 895.30
Manuals	11	Additional Cummins ISL Manuals (4 Books)	Option		$ 49.92	$ 55.80	$ 64.17	$ 64.17	$ 68.76
Manuals	12	Additional Allison B400 Manuals (6 Books)	Option		$ 59.04	$ 65.99	$ 75.89	$ 75.89	$ 81.32
Manuals	13	Additional ZF 6hp594 Manuals (5 Books)	Option		quote	N/A	N/A	Quote	Quote
Manuals	14	Additional Voith Manuals (7 Books)	Option		quote	N/A	N/A	Quote	Quote
Manuals	15	Additional Amerex Manuals	Option		$ 132.00	$ 147.55	$ 169.68	$ 169.68	$ 181.81
Manuals	16	Additional TRW Steering Gear Manuals	Option		quote	N/A	N/A	Quote	Quote
Manuals	17	Additional Thermo King Manual	Option		$ 180.00	$ 201.20	$ 231.38	$ 231.38	$ 247.93
Manuals	18	Additional Carrier HVAC Manuals (2 Books)	Option		quote	N/A	N/A	Quote	Quote
		Other Option - Specify			quote	N/A	N/A		
Safety						$ -	$ -		
Safety	2	Amerex V-25lb ABC System	Option	Electric	$ 2,519.10	$ 2,815.85	$ 3,238.23	Quote	Quote
Safety	3	Amerex VH-25lb ABC Cylinder	Option	Electric	$ 7,862.40	$ 8,788.59	$ 10,106.88	Quote	Quote
Safety	4	Amerex V-30lb ABC Cylinder	Option	CNG	$ (47.62)	$ (53.23)	$ (61.21)	Quote	Quote
Safety	5	Amerex Fire Suppression System w/Automatic Shutdown, Programmable Heat Detectors (PHDs) and Automatic Maintenance Testing (AMT)	Not Available		N/A	N/A	N/A	N/A	N/A
Safety	6	Amerex Safety Net 2-Zone Fire Detection/Suppression System	Option		$ 3,712.66	$ 4,150.01	$ 4,772.51	Quote	Quote
Safety	7	Jomar Firestick Liquid	Not Available		N/A	N/A	N/A	N/A	N/A
Safety	8	Kidde - Dual Spectrum	Option	Diesel/Hybrid	$ (840.97)	$ (940.04)	$ (1,081.04)	$ (446.74)	$ (446.74)
Safety	8	Kidde - Dual Spectrum	Option	CNG	N/A		$ -	$ 1,260.30	$ 1,350.41
Safety	8	Kidde - Dual Spectrum	Option	Battery-Electric	$ -		$ -	$ 5,565.69	$ 5,963.64
Safety	9	Kidde - Ltd Spectrum	Not Available		N/A	N/A	N/A	N/A	N/A
Safety	10	Kidde TLSE Spectrum	Discontinued		$ 5,040.43	$ 5,634.19	$ 6,479.32	N/A	N/A
Safety	11	Fogmaker Fire Suppression System (water mist)	Option	Diesel/CNG/Hybrid	$ 248.41	$ 277.67	$ 319.32	$ -	$ -
Safety	11	Fogmaker Fire Suppression System (water mist)	Option	Battery-Electric			$ -	$ 4,643.44	$ 4,975.45
Safety	14	Firetrace Automatic Fire Detection/Suppression System (gas detection base system)	Not Available		N/A	N/A	N/A	N/A	N/A
Safety	15	Remove Amerex	Option	CNG	$ (3,418.06)	$ (3,820.71)	$ (4,393.81)	$ (4,393.81)	$ (4,393.81)
Safety	15	Remove Amerex	Option	Diesel/Hybrid			$ -	$ (3,992.98)	$ (3,992.98)
Safety	16	Fire Extinguisher and Safety Triangle Kit	Inc In Base		$ -	$ -	$ -	$ -	$ -
Safety	17	Twenty - Four Unit First Aid Kit	Option		$ 73.56	$ 82.23	$ 94.56	$ 94.56	$ 101.32
Safety	18	Ten Unit First Aid Kit	Option		$ 73.56	$ 82.23	$ 94.56	$ 76.09	$ 81.53
Safety	19	Blood Borne Pathogens Kit	Option		$ 36.52	$ 40.82	$ 46.95	$ 55.58	$ 59.55
Safety	20	Bio - Hazard Disposal Kit	Option		$ 36.55	$ 40.86	$ 46.98	$ 46.98	$ 50.34
Safety	21	High Temperature Protective Sleeves for Component Lines	Option	Diesel/CNG	N/A	N/A	N/A	$ 194.55	$ 208.46
Safety	22	(3) 20 - Minute Road Flares	Discontinued		$ 52.54	$ 58.73	$ 67.54	N/A	N/A
Safety	23	Wheel Chocks (Per Set)	Option		$ 121.80	$ 136.15	$ 156.57	$ 156.57	$ 167.76
Safety	24	Electric - Standard no fire suppression	Inc In Base	Battery-Electric	$ -	$ -	$ -	$ -	$ -
		Other Option - Specify			N/A	N/A	N/A		$ -
Steering						$ -	$ -		$ -
Steering	1	Ross Model TS 65	Not Available		N/A	N/A	N/A	N/A	N/A
Steering	2	Sheppard Model M110	Inc In Base		$ -	$ -	$ -	$ -	$ -
Steering	3	ZF ReAX ~~TRW~~ Electric Assisted Steering with Tilt and Telescopic Features	Option		$ 2,225.83	$ 2,488.03	$ 2,861.24	$ 3,208.68	$ 3,438.10
Steering	4	TRW TAS6505	Not Available		N/A	N/A	N/A	N/A	N/A
Steering	5	Standard Size Padded Steering Wheel	Inc In Base		$ -	$ -	$ -	$ -	$ -
Steering	6	Douglas Autotech 'Double-Knuckle' Steering Column (PN 9003148-C) (Double Tilt)	Option		$ 354.64	$ 396.42	$ 455.88	$ 455.88	$ 488.48
		Other Option - Specify				$ -	$ -		$ -
Towing & Hoisting						$ -	$ -		$ -
Towing & Hoisting	1	Set Towing Adapters/Tow Bar	Option		$ 200.50	$ 224.12	$ 257.74	$ 801.25	$ 858.54
Towing & Hoisting	2	Set of Hoist Adapters (Includes the 4 Following Items)	Option		$ 260.66	$ 291.37	$ 335.07	$ 335.07	$ 359.03
Towing & Hoisting	3	Incl w/set - Front Saddle	Not Available		N/A	N/A	N/A	N/A	N/A
Towing & Hoisting	4	Incl w/set - Front Adapters	Not Available		N/A	N/A	N/A	N/A	N/A
Towing & Hoisting	5	Incl w/set - Rear Saddle	Not Available		N/A	N/A	N/A	N/A	N/A
Towing & Hoisting	6	Incl w/set - Rear Adapters	Not Available		N/A	N/A	N/A	N/A	N/A
Towing & Hoisting	7	Front towing point	Inc In Base		$ -	$ -	$ -	$ -	$ -
Towing & Hoisting	8	Rear towing point	Not Available		N/A	N/A	N/A	N/A	N/A
		Other Option - Specify				$ -	$ -		$ -
Training									$ -
Training	1	none	Inc In Base			$ -	$ -	$ -	$ -
Training	2	Operator Orientation - 4 Hours, (Procuring Agency)	Option		$ 877.20	$ 980.53	$ 1,127.61	$ 1,127.61	$ 1,208.24
Training	3	Operator Orientation - 8 Hours, (Procuring Agency)	Option		$ 1,754.40	$ 1,961.07	$ 2,255.23	$ 2,255.23	$ 2,416.48
Training	4	Operator Orientation - Additional hours of training, per hour	Option		$ 219.30	$ 245.13	$ 281.90	$ 281.90	$ 302.06
Training	5	Maintenance Orientation - 4 Hours, (Procuring Agency)	Option		$ 877.20	$ 980.53	$ 1,127.61	$ 1,127.61	$ 1,208.24
Training	6	Maintenance Orientation - 24 Hours, (Procuring Agency)	Option		$ 5,263.20	$ 5,883.20	$ 6,765.69	$ 6,765.69	$ 7,249.43
Training	7	Maintenance Orientation - 32 Hours, (Procuring Agency)	Option		$ 7,017.60	$ 7,844.27	$ 9,020.91	$ 9,020.91	$ 9,665.91
Training	8	Maintenance Orientation - Additional hours of training, per hour	Option		$ 219.30	$ 245.13	$ 281.90	$ 281.90	$ 302.06
Training	9	Technical Training - 96 Hours, (Procuring Agency) Price Proposal Form	Option		$ 29,220.00	$ 32,662.12	$ 37,561.43	$ 37,561.43	$ 40,247.08
Training	10	Technical Training - Additional hours of training, per hour	Option		$ 310.50	$ 347.08	$ 399.14	$ 399.14	$ 427.68
Training	11	OEM Training - Two Slots for "Train the Trainers" Technical Instruction	Option		$ 3,600.00	$ 4,024.08	$ 4,627.69	$ 4,627.69	$ 4,958.57
Training	12	OEM Training - Additional Slots for "Train the Trainers" Technical Instruction	Option		$ 1,800.00	$ 2,012.04	$ 2,313.85	$ 2,313.85	$ 2,479.29
Training	13	Body, Chassis, Suspension and Steering - (8 Hour Class), Procuring Agency	Option		$ 1,754.40	$ 1,961.07	$ 2,255.23	$ 2,255.23	$ 2,416.48
Training	14	Body, Chassis, Suspension and Steering - (24 Hour Class), Procuring Agency	Option		$ 5,263.20	$ 5,883.20	$ 6,765.69	$ 6,765.69	$ 7,249.43
Training	15	Body, Chassis, Suspension and Steering - Additional hours of training per hour, Procuring Agency	Option		$ 219.30	$ 245.13	$ 281.90	$ 281.90	$ 302.06
Training	16	Electrical and Electronics - (8 Hour Class), Procuring Agency	Option		$ 1,754.40	$ 1,961.07	$ 2,255.23	$ 2,255.23	$ 2,416.48
Training	17	Electrical and Electronics - (24 Hour Class), Procuring Agency	Option		$ 5,263.20	$ 5,883.20	$ 6,765.69	$ 6,765.69	$ 7,249.43
Training	18	Electrical and Electronics - Additional hours of training per hour, Procuring Agency	Option		$ 219.30	$ 245.13	$ 281.90	$ 281.90	$ 302.06
Training	19	Air and Brake Systems - (24 Hour Class), Procuring Agency	Option		$ 5,263.20	$ 5,883.20	$ 6,765.69	$ 6,765.69	$ 7,249.43
Training	20	Air and Brake Systems - (8 Hour Class), Procuring Agency	Option		$ 1,754.40	$ 1,961.07	$ 2,255.23	$ 2,255.23	$ 2,416.48
Training	21	Air and Brake Systems - Additional hours of training per hour, Procuring Agency	Option		$ 219.30	$ 245.13	$ 281.90	$ 281.90	$ 302.06
Training	22	HVAC and Climate Controls - (4 Hour Class), Procuring Agency	Option		$ 1,560.00	$ 1,743.77	$ 2,005.33	$ 2,005.33	$ 2,148.71
Training	23	HVAC and Climate Controls - (8 Hour Class), Procuring Agency	Option		$ 3,120.00	$ 3,487.54	$ 4,010.67	$ 4,010.67	$ 4,297.43
Training	24	HVAC and Climate Controls - Additional hours of training per hour, Procuring Agency	Option		$ 390.00	$ 435.94	$ 501.33	$ 501.33	$ 537.18
Training	25	Engine - (8 Hour Class), per Student at Procuring Agency	Option		$ 3,360.00	$ 3,755.81	$ 4,319.18	$ 4,319.18	$ 4,628.00
Training	26	Engine - (24 Hour Class), per Student at Procuring Agency	Option		$ 10,080.00	$ 11,267.42	$ 12,957.54	$ 12,957.54	$ 13,884.00
Training	27	Engine - additional hour of training per hour, per Student at Procuring Agency	Option		$ 420.00	$ 469.48	$ 539.90	$ 539.90	$ 578.50
Training	28	Transmission - (8 Hour Class), per Student, at Procuring Agency	Option		$ 4,080.00	$ 4,560.62	$ 5,244.72	$ 5,244.72	$ 5,619.71
Training	29	Transmission - (24 Hour Class), per Student, at Procuring Agency	Option		$ 12,240.00	$ 13,681.87	$ 15,734.15	$ 15,734.15	$ 16,859.14
Training	30	Transmission - Additional hour of training per hour, per Student, at Procuring Agency	Option		$ 510.00	$ 570.08	$ 655.59	$ 655.59	$ 702.46

Category	Item #	Description	Designation	Propulsion (if applicable)	Price	6/1/22 Price Change	4/1/23 Price Change	June 2023 Revised Price	7/19/24 Price
Training	31	Wheelchair Ramp - (2 Hour Class), at Procuring Agency	Option		$ 438.60	$ 490.27	$ 563.81	$ 563.81	$ 604.12
Training	32	Wheelchair Ramp - (4 Hour Class), at Procuring Agency	Option		$ 877.20	$ 980.53	$ 1,127.61	$ 1,127.61	$ 1,208.24
Training	33	Wheelchair Ramp - Additional hour of training per hour, at Procuring Agency	Option		$ 219.30	$ 245.13	$ 281.90	$ 281.90	$ 302.06
Training	34	Destination Sign - (4 Hour Class), at Procuring Agency	Option		$ 1,200.00	$ 1,341.36	$ 1,542.56	$ 1,542.56	$ 1,652.86
Training	35	Destination Sign - (8 Hour Class), at Procuring Agency	Option		$ 2,400.00	$ 2,682.72	$ 3,085.13	$ 3,085.13	$ 3,305.71
Training	36	Destination Sign - Additional hour of training per hour, at Procuring Agency	Option		$ 300.00	$ 335.34	$ 385.64	$ 385.64	$ 413.21
Training	38	Axles and Tires - Procuring Agency. Included in Body/Chassis	Not Available		N/A	N/A	N/A	N/A	N/A
Training	39	Fire Suppression - (4 Hour Class), at Procuring Agency	Option		$ 960.00	$ 1,073.09	$ 1,234.05	$ 1,234.05	$ 1,322.29
Training	40	Fire Suppression - (8 Hour Class), at Procuring Agency	Option		$ 1,920.00	$ 2,146.18	$ 2,468.10	$ 2,468.10	$ 2,644.57
Training	41	Fire Suppression - Additional hour of training per hour, at Procuring Agency	Option		$ 240.00	$ 268.27	$ 308.51	$ 308.51	$ 330.57
Training	42	Engine OEM Training (8 Hour Class, Per Person), at Local Dealer	Option		$ 720.00	$ 804.82	$ 925.54	$ 925.54	$ 991.71
Training	43	Engine OEM Training (24 Hour Class, Per Person), at Local Dealer	Option		$ 2,160.00	$ 2,414.45	$ 2,776.62	$ 2,776.62	$ 2,975.14
Training	44	Engine OEM Training (Additional hour of training per hour, Per Person), at Local Dealer	Option		$ 90.00	$ 100.60	$ 115.69	$ 115.69	$ 123.96
Training	45	Transmission Training (8 Hour Class, Per Person), at Local Dealer	Option		$ 720.00	$ 804.82	$ 925.54	$ 925.54	$ 991.71
Training	46	Transmission Training (24 Hour Class, Per Person), at Local Dealer	Option		$ 2,160.00	$ 2,414.45	$ 2,776.62	$ 2,776.62	$ 2,975.14
Training	47	Transmission Training (Additional hour of training per hour, Per Person), at Local Dealer	Option		$ 90.00	$ 100.60	$ 115.69	$ 115.69	$ 123.96
Training	48	Data Communications System OEM Training (4 Hour Class, Per Person), at Local Dealer	Option		$ 360.00	$ 402.41	$ 462.77	$ 462.77	$ 495.86
Training	49	Data Communications System OEM Training (8 Hour Class, Per Person), at Local Dealer	Option		$ 720.00	$ 804.82	$ 925.54	$ 925.54	$ 991.71
Training	50	Data Communications System OEM Training (Additional hour of training per hour, 2 Persons), at Local Dealer	Option		$ 90.00	$ 100.60	$ 115.69	$ 115.69	$ 123.96
Training	51	Hybrid Drive - (8 Hour Class), at Procuring Agency	Option		$ 4,080.00	$ 4,560.62	$ 5,244.72	$ 5,244.72	$ 5,619.71
Training	52	Hybrid Drive - (24 Hour Class), at Procuring Agency	Option		$ 12,240.00	$ 13,681.87	$ 15,734.15	$ 15,734.15	$ 16,859.14
Training	53	Hybrid Drive - (Additional hour of training per hour), at Procuring Agency	Option		$ 510.00	$ 570.08	$ 655.59	$ 655.59	$ 702.46
Training	54	Hybrid Drive OEM Training (8 Hour Class, Per Person), at Local Dealer	Option		$ 720.00	$ 804.82	$ 925.54	$ 925.54	$ 991.71
Training	55	Hybrid Drive OEM Training (24 Hour Class, Per Person), at Local Dealer	Option		$ 2,160.00	$ 2,414.45	$ 2,776.62	$ 2,776.62	$ 2,975.14
Training	56	Hybrid Drive OEM Training (Additional hour of training per hour, Per Person), at Local Dealer	Option		$ 90.00	$ 100.60	$ 115.69	$ 115.69	$ 123.96
Training	57	Hybrid Transmission Training - (8 Hour Class, Per Person), at Local Dealer	Option		$ 720.00	$ 804.82	$ 925.54	$ 925.54	$ 991.71
Training	58	Hybrid Transmission Training - (24 Hour Class, Per Person), at Local Dealer	Option		$ 2,160.00	$ 2,414.45	$ 2,776.62	$ 2,776.62	$ 2,975.14
Training	59	Hybrid Transmission Training - (Additional hour of training per hour, Per Person), at Local Dealer	Option		$ 90.00	$ 100.60	$ 115.69	$ 115.69	$ 123.96
Training	60	Additional training ...	Option		$ 220.00	$ 245.92	$ 282.80	$ 282.80	$ 303.02
		Other Option - Specify			N/A	N/A	N/A		$ -
Training Equipment Modules						$ -	$ -		$ -
Training Equipment Modules	1	Fare Collection OEM Training (2 Persons), At Local Dealer	Option		$ 2,880.00	$ 3,219.26	$ 3,702.15	$ 3,702.15	$ 3,966.86
Training Equipment Modules	2	ISL/Voith D864.5	Not Available		N/A	N/A	N/A	N/A	N/A
Training Equipment Modules	3	ISL/ZF 6AP1400B	Not Available		N/A	N/A	N/A	N/A	N/A
Training Equipment Modules	4	ISL/ZF HP594	Not Available		N/A	N/A	N/A	N/A	N/A
Training Equipment Modules	5	ISX 12 G	Not Available		N/A	N/A	N/A	N/A	N/A
Training Equipment Modules	6	ISL G	Not Available		N/A	N/A	N/A	N/A	N/A
Training Equipment Modules	7	HVAC Training Module	Option		$ 40,800.00	$ 45,606.24	$ 52,447.18	$ 52,447.18	$ 56,197.15
Training Equipment Modules	8	I/O Controls Multiplex Board	Option		$ 55,800.00	$ 62,373.24	$ 71,729.23	$ 71,729.23	$ 76,857.87
Training Equipment Modules	9	Air Brake Training Board	Option		$ 38,400.00	$ 42,923.52	$ 49,362.05	$ 49,362.05	$ 52,891.43
Training Equipment Modules	10	ISB 6.7	Option		Same as Option 11	N/A	N/A	Same as Option 11	Same as Option 11
Training Equipment Modules	11	ISL/B400R Power Plant	Option		$ 186,000.00	$ 207,910.80	$ 239,097.42	$ 239,097.42	$ 256,192.89
		Other Option - Specify			N/A	N/A	N/A		$ -
Transmission						$ -	$ -		$ -
Transmission	1	Allison B- 400R, GEN IV	Not Available		Inc In Base	N/A	N/A	$ -	$ -
Transmission	2	Allison B- 500R, GEN IV	Not Available		N/A	N/A	N/A	N/A	N/A
Transmission	3	Allison B- 400R, ~~GEN V~~	Inc In Base	Diesel/CNG	N/A	N/A	N/A	$ -	$ -
Transmission	4	Allison B- 500R, ~~GEN V~~	Not Available		N/A	N/A	N/A	N/A	N/A
Transmission	5	Voith D854.6	Option	Diesel/CNG	$ (1,830.00)	$ (2,045.57)	$ (2,352.41)	$ -	$ -
Transmission	6	ZF 6AP1400B	Discontinued	Diesel/CNG	$ (140.00)	$ (156.49)	$ (179.97)	N/A	N/A
Transmission	7	ZF 6HP594	Not Available		N/A	N/A	N/A	N/A	N/A
Transmission	8	"Transynd" Synthetic	Inc In Base		$ -	$ -	$ -	$ -	$ -
Transmission	9	Titan Probalizer OD- 1014 (Obsolete - Replaced by Option 15)	Discontinued	Diesel/CNG	$ (35.70)	$ (39.91)	$ (45.89)	N/A	N/A
Transmission	10	Davco Electronic Fluid Level Gauge	Not Available		N/A	N/A	N/A	N/A	N/A
Transmission	11	Keyed Transmission Lockout Switch on Dash	Option		$ 981.46	$ 1,097.08	$ 1,261.64	$ 1,261.64	$ 1,351.85
Transmission	12	Transmission Oil Temperature Gauge (Dash and Rear Run Box)	Inc In Base		Inc In Base	N/A	N/A	$ -	$ -
Transmission	13	Electric Transmission - 2 speed	Not Available		N/A	N/A	N/A	N/A	N/A
Transmission	14	Electric Transmission - 4 speed	Not Available		N/A	N/A	N/A	N/A	N/A
Transmission	15	Checkfluid KST18N-VC	Option	Diesel/CNG	Inc In Base	$ -	$ -	19.43	$ 20.82
		Other Option - Specify			N/A	N/A	N/A		$ -
Transmission Diagnostics						$ -	$ -		$ -
Transmission Diagnostics	1	Allison Cable & Software	Option		See Section 10 for bus model specific diagnostics	N/A	N/A	Quote	Quote
Transmission Diagnostics	2	Voith Cable & Software	Option		See Section 10 for bus model specific diagnostics	N/A	N/A	Quote	Quote
Transmission Diagnostics	3	Voith Service Tool Kit	Option		See Section 10 for bus model specific diagnostics	N/A	N/A	Quote	Quote
Transmission Diagnostics	4	Set of ZF Diagnostics (Includes the 3 Following Items)	Option		See Section 10 for bus model specific diagnostics	N/A	N/A	Quote	Quote
Transmission Diagnostics	5	Includes - Testman Diagnostic System	Option		See Section 10 for bus model specific diagnostics	N/A	N/A	Quote	Quote
Transmission Diagnostics	6	Includes - SAE Cable	Option		See Section 10 for bus model specific diagnostics	N/A	N/A	Quote	Quote
Transmission Diagnostics	7	Includes - Ecomat Testman Software	Option		See Section 10 for bus model specific diagnostics	N/A	N/A	Quote	Quote
		Other Option - Specify	Option		See Section 10 for bus model specific diagnostics	N/A	N/A	Quote	Quote
W/C Restraints						$ -	$ -		$ -
W/C Restraints	1	AMSECO - A.R.M.	Option		$ 576.13	$ 644.00	$ 740.60	740.60	$ 793.55
W/C Restraints	2	AMSECO Reliant Mobility Aid Securement System	Not Available		N/A	N/A	N/A	N/A	N/A
W/C Restraints	3	AMESCO Passive rear-facing restraints (rear facing barriers)	Option		$ 1,654.13	$ 1,848.99	$ 2,126.33	Quote	Quote
W/C Restraints	4	USSC - First	Not Available		N/A	N/A	N/A	N/A	N/A
W/C Restraints	5	Freedman - First	Not Available		Same as Option #4	N/A	N/A	N/A	N/A
W/C Restraints	6	AMSECO - Q'Straint - QRT	Option		$ 728.75	$ 814.60	$ 936.79	$ 936.79	$ 1,003.77
W/C Restraints	7	AMSECO - Q'Straint - QRT 360	Option		$ 1,042.25	$ 1,165.03	$ 1,339.78	$ 1,339.78	$ 1,435.57
W/C Restraints	8	Q'Straint - Q'UBE 3- Point Securement Station	Discontinued		$ 844.25	$ 943.70	$ 1,085.26	N/A	N/A
W/C Restraints	9	Q'Straint - Quantum Securement System (One Quantum)	Option		$ 25,864.78	$ 28,911.65	$ 33,248.40	$ 15,152.50	$ 16,235.90
W/C Restraints	10	AMSECO - Q'Straint/Sure-Lok - OMNI Floor Anchor System	Option		$ 125.13	$ 139.87	$ 160.85	$ 160.85	$ 172.35
W/C Restraints	11	AMSECO - Q'Straint Slide N Click floor mount restraint system	Option		$ 728.75	$ 814.60	$ 936.79	$ 936.79	$ 1,003.77
W/C Restraints	12	AMSECO - Q- Pod W/C Restraint System	Option		$ 4,915.63	$ 5,494.69	$ 6,318.89	$ 5,468.38	$ 5,859.37
W/C Restraints	13	USSC - Q- Pod W/C Restraint System	Option		$ 830.50	$ 928.33	$ 1,067.58	$ 4,873.00	$ 5,221.42
W/C Restraints	14	AMESCO Dual Auto Lock W/C Restraint System	Not Available		N/A	N/A	N/A	N/A	N/A
W/C Restraints	15	USSC - V- PRO	Inc In Base		$ 830.50	$ 928.33	$ 1,067.58	$ -	$ -
W/C Restraints	16	Sure LOK - RTT Electric (USSC)	Option		N/A	N/A	N/A	$ 1,067.58	$ 1,143.91
W/C Restraints	17	Additional L-track per/foot	Not Available		N/A	N/A	N/A	N/A	N/A
W/C Restraints	18	RESNA WC18 compliant restraint	Not Available		N/A	N/A	N/A	N/A	N/A
W/C Restraints	19	RESNA WC19 compliant restraint	Not Available		N/A	N/A	N/A	N/A	N/A
		Other Option - Specify			N/A	N/A	N/A		$ -
Wheel Chair Ramp (low-floor only) / Lift (high-floor only)						$ -	$ -		$ -
Wheel Chair Ramp (low-floor only) / Lift (high-floor only)	1	Lift- U Model LU11, 1:6 Ratio, Front Door only	Option		$ 900.00	$ 1,006.02	$ 1,156.92	$ -	$ -
Wheel Chair Ramp (low-floor only) / Lift (high-floor only)	2	LIFT- U Model LU18, Dual- Mode 1:6 (Street)/1:8 (Sidewalk)	Option		$ 2,500.00	$ 2,794.50	$ 3,213.68	$ 311.56	$ 333.84

Category	Item #	Description	Designation	Propulsion (if applicable)	Price	6/1/22 Price Change	4/1/23 Price Change	June 2023 Revised Price	7/19/24 Price
Wheel Chair Ramp (low-floor only) / Lift (high-floor only)	3	Ricon 6:1 SA Self-Leveling Ramp	Not Available		N/A	N/A	N/A	N/A	N/A
						$ -	$ -		
Wheel - Brakes						$ -	$ -		
Wheel – Brakes	1	S - Cam Drum w/Wabsco ABS System - (DEDUCT)	Not Available		N/A	N/A	N/A	N/A	N/A
Wheel – Brakes	2	Front Wheel Drum Brakes - (DEDUCT)	Not Available		N/A	N/A	N/A	N/A	N/A
Wheel – Brakes	3	Rear Wheel Drum Brakes - (DEDUCT)	Not Available		N/A	N/A	N/A	N/A	N/A
Wheel – Brakes		All Wheel Drum Brakes	Not Available		N/A	N/A	N/A	N/A	N/A
Wheel – Brakes	4	MGM "E-Stroke" Electronic Brake Monitoring System – Disc Brakes	Inc In Base		$ 3,244.17	$ 3,626.33	$ 4,170.28	$ -	$ -
Wheel – Brakes	5	MGM "E-Stroke" Electronic Brake monitoring System – Drum Brakes	Not Available		N/A	N/A	N/A	N/A	N/A
Wheel – Brakes	6	All Wheel Disc Brakes	Inc In Base		$ -	$ -	$ -	$ -	$ -
		Other Option - Specify			N/A	N/A	N/A	$	$ -
Wheel - Hubometer						$ -	$ -	$	$ -
Wheel Hubometer	1	none	Inc In Base			$	$ -	$ -	$ -
Wheel Hubometer	2	Veeder Root w/o Tenths w/o Guard	Option		$ 78.86	$ 88.15	$ 101.37	$ 101.37	$ 108.62
Wheel Hubometer	3	S&A Fleetwatch 392 Electronic	Option		$ 659.99	$ 737.74	$ 848.40	$ 705.75	$ 756.21
Wheel Hubometer	4	E J Ward Data System (Includes Receiver, Display Unit and Antenna)	Option		$ 1,247.76	$ 1,394.75	$ 1,603.96	$ 1,343.86	$ 1,439.95
Wheel Hubometer	5	Engler (Stemco) Mechanical W/o Tenths W/o Guard	Option		$ 57.91	$ 64.73	$ 74.44	$ 74.44	$ 79.76
Wheel Hubometer	6	Engler Hubometer W/Powder Coat Guard	Option		$ 91.55	$ 102.33	$ 117.68	$ 117.68	$ 126.09
		Other Option - Specify			N/A	N/A	N/A	$	$ -
Wheel - Hubs						$ -	$ -	$	$ -
Wheel Hubs	1	Hub Piloted Wheels and Axles W/Grease Seals	Not Available		$ -	$ -	$ -	N/A	N/A
Wheel Hubs	2	Hub Piloted w/Oil Seals (per Axle)	Not Available		N/A	N/A	N/A	N/A	N/A
Wheel Hubs	3	Stud Piloted Wheels and Axles w/Grease Seals	Not Available		N/A	N/A	N/A	N/A	N/A
Wheel Hubs	4	Stud Piloted Wheels and Axles w/Oil Seals	Not Available		N/A	N/A	N/A	N/A	N/A
Wheel Hubs	5	Wabco Traction Control	Inc In Base		$ -	$ -	$ -	$ -	$ -
Wheel Hubs	6	Hydraulic drop down snow chain system	Not Available		N/A	N/A	N/A	N/A	N/A
		Other Option - Specify			N/A	N/A	N/A		
Wheel - Tires						$ -	$ -		
Wheel – Tires	1	Customer Supplied	Inc In Base		N/A	N/A	N/A	$ -	$ -
Wheel – Tires	2	Michelin XZU2 (305/85R/22.5)	Not Available		N/A	N/A	N/A	N/A	N/A
Wheel – Tires	3	Michelin XZU2 (305/70R/22.5)	Not Available		$ 2,800.00	$ 3,129.84	$ 3,599.32	N/A	N/A
Wheel – Tires	4	Michelin X incity Z (305/70R/22.5) - NFI Supplied	Option		$ 2,800.00	$ 3,129.84	$ 3,599.32	$ 4,900.50	$ 5,250.89
Wheel – Tires	5	Michelin XZU3 (305/85/22.5)	Not Available		N/A	N/A	N/A	N/A	N/A
Wheel – Tires	6	Michelin XZU2 (275/70R/22.5)	Not Available		N/A	N/A	N/A	N/A	N/A
Wheel – Tires	7	Michelin XZE2+(H) (295/80/R22.5)	Not Available		N/A	N/A	N/A	N/A	N/A
Wheel – Tires	8	G152 (305/85R/22.5)	Not Available		N/A	N/A	N/A	N/A	N/A
Wheel – Tires	9	Goodyear G152 (305/70R/22.5)	Not Available		$ 2,800.00	$ 3,129.84	$ 3,599.32	N/A	N/A
Wheel – Tires	10	Goodyear G152 (275/70R/22.5)	Not Available		N/A	N/A	N/A	N/A	N/A
Wheel – Tires	11	Firestone 18J (315/80R/22.5)	Not Available		N/A	N/A	N/A	N/A	N/A
Wheel – Tires	12	Firestone 16H (305/70R/22.5)	Not Available		N/A	N/A	N/A	N/A	N/A
Wheel – Tires	13	Bridgestone 16H (275/70R/22.5)	Not Available		N/A	N/A	N/A	N/A	N/A
Wheel – Tires	14	Tire Pressure Monitoring System	Option		N/A	N/A	N/A	$ 1,332.38	$ 1,427.65
		Other Option - Specify			N/A	N/A	N/A	$	$ -
Wheels						$ -	$ -	$	$ -
Wheels	1	(7) Powder Coated Steel Wheels (~~White and~~ Black) - White included in Base	Option		$ -	$ -	$ -	$ 255.46	$ 273.73
Wheels	2	(7) Aluminum Alcoa - Full Polish (Wheels Only Change)	Option		$ 1,813.34	$ 2,026.95	$ 2,330.99	$ 1,733.33	$ 1,857.26
Wheels	3	(7) Aluminum Alcoa - Full Polish W/Dura Bright Finish (Wheels Only Change)	Option		$ 2,147.05	$ 2,399.97	$ 2,759.97	$ 2,232.45	$ 2,392.07
Wheels	4	(7) Aluminum Alcoa - Machine Finish (Wheels Only Change)	Option		$ 1,266.71	$ 1,415.93	$ 1,628.32	$ 1,402.09	$ 1,502.34
Wheels	5	(7) Aluminum Alcoa - Machine Finish W/Dura Bright Finish (Wheels Only Change)	Option		$ 1,634.37	$ 1,826.90	$ 2,100.93	$ 2,395.80	$ 2,567.10
Wheels	6	Remove Spare Wheel (One Spare), Steel	Option	Diesel / Hybrid	$ (817.97)	$ (914.33)	$ (1,051.48)	$ (108.32)	$ (108.32)
Wheels	7	Remove Spare Wheel (One Spare), Aluminum	Option	Electric / CNG / Fuel Cell	$ (817.97)		$ -	$ (242.00)	$ (242.00)
Wheels	7	Add Dura Flange to Alcoa (Per Wheel)	Option		$ 2,846.00	$ 3,181.26	$ 3,658.45	$ 282.84	$ 303.06
		Other Option - Specify			N/A	N/A	N/A	$	$ -
Windows						$ -	$ -	$	$ -
Windows	2	Laminated Safety Glass (1/4") - Framed Sliders	Option		N/A	N/A	N/A	Quote	Quote
Windows	3	Laminated Safety Glass (1/4") - Framed Fixed	Option		$ 217.81	$ 243.47	$ 279.99	Quote	Quote
Windows	4	Laminated Safety Glass (1/4") - Framed Transom - openable	Inc In Base		$ -	$ -	$ -	$ -	$ -
Windows	5	Hidden Framed Bonded - Fixed	Option		$ 4,741.59	$ 5,300.15	$ 6,095.17	Quote	Quote
Windows	6	Hidden Framed Bonded - Transom -openable	Option		$ 3,567.56	$ 3,987.82	$ 4,585.99	Quote	Quote
Windows	7	Add Window Guards (Acrylic Liner and Film)	Option		$ 2,853.13	$ 3,189.23	$ 3,667.61	Quote	Quote
Windows	8	anti-graffiti 3M film (per inside window)	Option		$ 3,987.50	$ 4,457.23	$ 5,125.81	Quote	Quote
Windows	9	Stormite flush-mount serviceable w/tip	Option		Quote	N/A	N/A	Quote	Quote
Windows	10	All windows equipped with liners attached	Option		$ 1,675.00	$ 1,872.32	$ 2,153.16	Quote	Quote
		Other Option - Specify			N/A	N/A	N/A	$	$ -
Other Items						$ -	$ -		$ -
Other Items	1	Brake System Diagnostics	Option		$ 1,562.44	$ 1,746.49	$ 2,008.46	$ 2,008.46	$ 2,152.06
Other Items	2	Meritor Software (Tool Box), Serial Link/Interface Kit	Not Available		N/A	N/A	N/A	N/A	N/A
Other Items	3	Engine Dolly	Option		$ 2,154.63	$ 2,408.44	$ 2,769.71	$ 2,769.71	$ 2,967.74
Other Items	4	Phillips Thermo Block Heater	Option		$ 1,042.99	$ 1,165.86	$ 1,340.74	$ 1,084.82	$ 1,162.38
Other Items	5	Engine Skid Protection (Add curb side skid rail)	Option		$ -	$ -	$ -	$ 66.22	$ 70.95
Other Items	6	Mobile Receiver for S&A 392 Hubometer	Option		$ 576.71	$ 644.64	$ 741.34	$ 741.34	$ 794.35
Other Items	7	Floor Mounted 4 -Way Flasher Switch	Included in base		$ -	$ -	$ -	$ -	$ -
Other Items	8	Cup Holder	Option		$ 28.44	$ 31.79	$ 36.56	$ 36.56	$ 39.17
Other Items	9	Auxiliary Drivers Fan	Option		$ -	$ -	$ -	$ 222.36	$ 238.26
Other Items	10	Stainless Steel Trash Bag Holder	Option		$ 75.44	$ 84.32	$ 96.97	$ 96.97	$ 103.90
Other Items	11	Transfer Cutter	Option		$ 53.41	$ 59.70	$ 68.65	$ 68.65	$ 73.56
Other Items	12	Keyed Ignition Switch	Not Available		$ 857.62	$ 958.65	$ 1,102.44	N/A	N/A
Other Items	13	Fiber Optic Backlighting on Drivers Dash	Option		N/A	N/A	N/A	$ 987.55	$ 1,058.16
Other Items	14	Exterior Ad Frame - Front 21" X 40"	Not Available		N/A	N/A	N/A	N/A	N/A
Other Items	15	Exterior Ad Frame - Curbside 30" X 88"	Option		$ 221.74	$ 247.86	$ 285.04	$ 285.04	$ 305.42
Other Items	16	Exterior Ad Frame -Streetside 30" X 144"	Option		$ 229.94	$ 257.03	$ 295.59	$ 567.34	$ 607.90
Other Items	17	Exterior Ad Frame Rear 21" X 72"	Not Available		$ 216.19	$ 241.66	$ 277.90	N/A	N/A
Other Items	18	I/O Controls LED Interior Lights	Not Available		N/A	N/A	N/A	N/A	N/A
Other Items	19	Pretoria LED Interior Lights	Option		$ 507.51	$ 567.30	$ 652.39	$ -	$ -
Other Items	20	See II Transit Airfoil	Not Available		N/A	N/A	N/A	N/A	N/A
Other Items	21	Open Bottom Racks	Option		$ 4,230.42	$ 4,728.76	$ 5,438.07	$ 5,549.78	$ 5,946.59
Other Items	22	Suburban Package Racks/Open Bottom	Option		$ 14,647.41	$ 16,372.88	$ 18,828.81	$ 19,109.97	$ 20,476.33
Other Items	23	Twin Automatic Greasing System	Not Available		N/A	N/A	N/A	N/A	N/A
Other Items	24	EMCO -Wheaton Posi -Lock Nozzle	Option		$ -	$ -	$ -	$ -	$ -
Other Items	25	Hybrid Drive Tools	Option		See Section 10 for bus model specific diagnostics	N/A	N/A	Quote	Quote
Other Items	26	Special Purpose Hybrid Drive Tool Kit	Option		See Section 10 for bus model specific diagnostics	N/A	N/A	Quote	Quote
Other Items	27	BAE (APS2) beltless power pack	Not Available		See Section 10 for bus model specific diagnostics	N/A	N/A	N/A	N/A
Other Items	28	WABCO E-COMP	Not Available		N/A	N/A	N/A	N/A	N/A
Other Items	29	ISB 6.7 Fold Up Wiring Diagram (hybrid option)	Option		Quote	N/A	N/A	Quote	Quote
Other Items	30	Allison Hybrid Manuals	Option		N/A	N/A	N/A	Quote	Quote
Other Items	31	BAE Hybrid Manuals	Option		$ -	$ -	$ -	Quote	Quote
Other Items	32	Allison Mid-Life Overhaul Parts List and Cost	Option		Quote	N/A	N/A	Quote	Quote
Other Items	33	BAE Mid-Life Overhaul Part List and Cost	Option		Quote	N/A	N/A	Quote	Quote
Other Items	34	winter weather package (heated front entrance)	Option		$ 198.94	$ 222.37	$ 255.73	$ 974.02	$ 1,043.66
Other Items	35	First Aid kit for 24 people option	Option		$ 64.38	$ 71.96	$ 82.75	$ 94.56	$ 101.32
Other Items	36	2 front dash-mounted fans to defrost front door	Option		$ 332.01	$ 371.12	$ 426.79	$ 537.33	$ 575.75
Other Items	37	driver's LED reading light	Inc In Base		$ -	$ -	$ -	$ -	$ -
Other Items	38	driver's sun visors	Option		$ 184.37	$ 206.09	$ 237.00	$ 347.77	$ 372.64
Other Items	39	driver's foot controls- adjustable Kongsberg system	Not Available		$ 34.22	$ 38.25	$ 43.99	N/A	N/A
Other Items	40	Stainless Steel molding to cover edges on entrance and rear rise on passenger assist	Not Available		Quote	N/A	N/A	N/A	N/A
Other Items	41	Separate control for non-synchronized wipers	Option		$ (8.31)	$ (9.29)	$ (10.68)	$ 357.98	$ 383.58
Other Items	42	Curb Side Skid Rail	Option				$ -	$ 66.22	$ 70.95
Other Items	43	Exterior Ad Frame - Front 15" X 66"	Option		$ -	$ -	$ -	$ 264.87	$ 283.81
Other Items	44	Exterior Ad Frame - Rear 24" X 65"	Option		$ -	$ -	$ -	$ 223.02	$ 238.97

SFMTA-2025-22-FTA

Agreement

Appendix A, Item A4

Amendment 1

State of Washington
Contracts & Procurement Division
Department of Enterprise Services
P.O. Box 41411
Olympia, WA 98504-1411

New Flyer of America, Inc.
6200 Glenn Carlson Dr.
St. Cloud, MN 56301

FIRST AMENDMENT
TO
CONTRACT NO. 06719-01
TRANSIT BUSES

This First Amendment ("Amendment") to Contract No. 06719-01 is made and entered into by and between the State of Washington acting by and through the Department of Enterprise Services, a Washington State governmental agency ("State") and New Flyer of America, Inc., a North Dakota corporation ("Contractor") and is dated as of June 1, 2022.

RECITALS

A. State and Contractor (collectively the "Parties") entered into that certain Contract No. 06719-01 for Transit Buses dated effective as of April 1, 2021 ("Contract").

B. The amendment set forth herein is within the scope of the Contract.

C. The Parties now desire to amend the Contract as set forth herein.

AGREEMENT

NOW THEREFORE, in consideration of the mutual covenants and agreements set forth herein, the Parties hereby agree to amend the Contract, as previously amended, as follows:

1. ECONOMIC PRICE ADJUSTMENT. Pursuant to Section 3.4 of the Master Contract Economic Price Adjustment using the Bureau of Labor Statistics Index for Truck and Bus Bodies, Series No. WPU 1413 to determine a price change, the prices set forth in the Exhibit B – Prices are increased by 11.78%.

2. NO CHANGE OTHER THAN AMENDMENT. Except as amended herein, the Contract is unaffected and remains in full force and effect.

3. INTEGRATED AGREEMENT; MODIFICATION. This Amendment constitutes the entire agreement and understanding of the Parties with respect to the subject matter and supersedes all prior negotiations and representations. In the event of any conflict between this Amendment and the Contract or any earlier amendment, this Amendment shall control and govern. This Amendment may not be modified except in writing signed by the Parties.

4. AUTHORITY. Each party to this Amendment, and each individual signing on behalf of each party, hereby represents and warrants to the other that it has full power and authority to enter into this Amendment and that its execution, delivery, and performance of this Amendment has been fully

authorized and approved, and that no further approvals or consents are required to bind such party.

5. ELECTRONIC SIGNATURES. A signed copy of this Amendment or any other ancillary agreement transmitted by facsimile, email, or other means of electronic transmission shall be deemed to have the same legal effect as delivery of an original executed copy of this Amendment or such other ancillary agreement for all purposes.

6. COUNTERPARTS. This Amendment may be executed in one or more counterparts, each of which shall be deemed an original, and all of which counterparts together shall constitute the same instrument which may be sufficiently evidenced by one counterpart. Execution of this Amendment at different times and places by the parties shall not affect the validity thereof so long as all the parties hereto execute a counterpart of this Amendment.

EXECUTED AND EFFECTIVE as of the day and date first above written.

NEW FLYER OF AMERICA, INC **A NORTH DAKOTA CORPORATION**	**STATE OF WASHINGTON** **DEPARTMENT OF ENTERPRISE SERVICES**
By: Jennifer McNeill	By:
Name: Jennifer McNeill	Name: David Mgebroff
Title: Vice President, Sales & Marketing	Title: Strategy Supervisor
Date: August 22, 2022	Date: August 24, 2022

SFMTA-2025-22-FTA

Agreement

Appendix A, Item A5

Amendment 2

State of Washington Contracts & Procurement Division Department of Enterprise Services P.O. Box 41411 Olympia, WA 98504-1411	**CONTRACT AMENDMENT**	
	Contract No.:	06719-01
New Flyer of America, Inc. 6200 Glenn Carlson Dr. St. Cloud, MN 56301	Amendment No.:	2
	Effective Date:	April 1, 2023

SECOND AMENDMENT
TO
STATEWIDE CONTRACT NO. 06719-01
TRANSIT BUSES

This Second Amendment ("Amendment") to Contract No. 06719-01 is made and entered into by and between the State of Washington acting by and through the Department of Enterprise Services, a Washington State governmental agency ("State") and New Flyer of America, Inc., a North Dakota corporation ("Contractor") and is dated as of April 1, 2023.

R E C I T A L S

A. State and Contractor (collectively the "Parties") entered into that certain Contract No. 06719-01 for Transit Buses dated effective as of April 1, 2021 ("Contract").

B. The Parties previously amended the Contract June 1, 2022 for an economic adjustment of 11.78%.

C. The amendment set forth herein is within the scope of the Contract.

D. The Parties now desire to amend the Contract as set forth herein.

A G R E E M E N T

NOW THEREFORE, in consideration of the mutual covenants and agreements set forth herein, the Parties hereby agree to amend the Contract, as previously amended, as follows:

1. CONTRACT TERM. Pursuant to Section 1 Term of the Contract, this Contract has been extended for an addition twelve (12) months, this extension term is until March 31, 2024.

2. ECONOMIC PRICE ADJUSTMENT. Section 3.4 of the contract is deleted in its entirety and replaced with the following:

   ECONOMIC ADJUSTMENT. Beginning twelve (12) months after the effective date of this Master Contract and for every annual anniversary thereafter, the prices set forth in Exhibit B shall be adjusted, based upon the percent changes (whether up or down) in the United States Department of Labor, Bureau of Labor and Statistics (BLS) indices described below, for the most recent year. The Index is the Producer Price Index for Truck and Bus Bodies, Series No. WPU 1413, published by the United States Department of Labor, Bureau of Labor Statistics, or if such Index is no longer in use, then such replacement that is most comparable to the

Index as may be designated by the Bureau of Labor Statistics, or as agreed by the parties. Economic adjustment will lag one (1) calendar quarter past the Master Contract commencement date to allow for publication of BLS data. All calculations for the index shall be based upon the latest version of data published as of February each year. Prices shall be adjusted on April 1st. If an index is recoded, that is the replacement is a direct substitute according to the BLS, this Master Contract will instead use the recode. If an index becomes unavailable, Enterprise Services shall substitute a proxy index. If there is not a direct substitute, the next higher aggregate index available will be used. The economic adjustment shall be calculated as follows:
New Price = Old Price x (Current Period Index/Base Period Index).

3. ECONOMIC PRICE ADJUSTMENT. Pursuant to Section 3.4 of the Master Contract Economic Price Adjustment using the Bureau of Labor Statistics Index for Truck and Bus Bodies, Series No. WPU 1413 to determine a price change, the prices set forth in the Exhibit B – Prices are increased by 15.00%.

4. NO CHANGE OTHER THAN AMENDMENT. Except as amended herein, the Contract is unaffected and remains in full force and effect.

5. INTEGRATED AGREEMENT; MODIFICATION. This Amendment constitutes the entire agreement and understanding of the Parties with respect to the subject matter and supersedes all prior negotiations and representations. In the event of any conflict between this Amendment and the Contract or any earlier amendment, this Amendment shall control and govern. This Amendment may not be modified except in writing signed by the Parties.

6. AUTHORITY. Each party to this Amendment, and each individual signing on behalf of each party, hereby represents and warrants to the other that it has full power and authority to enter into this Amendment and that its execution, delivery, and performance of this Amendment has been fully authorized and approved, and that no further approvals or consents are required to bind such party.

7. ELECTRONIC SIGNATURES. An electronic signature or electronic record of this Amendment or any other ancillary agreement shall be deemed to have the same legal effect as delivery of an original executed copy of this Amendment or such other ancillary agreement for all purposes.

8. COUNTERPARTS. This Amendment may be executed in one or more counterparts, each of which shall be deemed an original, and all of which counterparts together shall constitute the same instrument which may be sufficiently evidenced by one counterpart. Execution of this Amendment at different times and places by the parties shall not affect the validity thereof so long as all the parties hereto execute a counterpart of this Amendment.

EXECUTED AND EFFECTIVE as of the day and date first above written.

NEW FLYER OF AMERICA, INC.,
A NORTH DAKOTA CORPORATION

By: _____

Name: Jennifer McNeill

Title: Vice President, Sales & Marketing

Date: 3/31/2023

STATE OF WASHINGTON
DEPARTMENT OF ENTERPRISE SERVICES

By: _____

Name: Alexander Kenesson

Title: Procurement Supervisor

Date: 3/31/2023

SFMTA-2025-22-FTA

Agreement

Appendix A, Item A6

Amendment 3

State of Washington Contracts & Procurement Division Department of Enterprise Services P.O. Box 41411 Olympia, WA 98504-1411	**CONTRACT AMENDMENT**	
	Contract No.:	06719-01
New Flyer of America, Inc 6200 Glenn Carlson Dr. St. Cloud, MN 56301	Amendment No.:	3
	Effective Date:	April 25, 2024

THIRD AMENDMENT

TO

CONTRACT NO. 06719-01

TRANSIT BUSES

This third Amendment ("Amendment") to Contract No. 06719-01 is made and entered into by and between the State of Washington acting by and through the Department of Enterprise Services, a Washington State governmental agency ("Enterprise Services") and New Flyer of America, Inc., A North Dakota corporation ("Contractor") and is dated as of April 1, 2024.

RECITALS

A. Enterprise Services and Contractor (collectively the "Parties") entered into that certain Contract No. 06719-01 for Transit Buses dated effective as of April 1, 2021 ("Contract").

B. The Parties previously amended the Contract 06719-01 as followed:

   a. First Amendment: to make an Economic Price Adjustment of 11.78% dated on June 1, 2022.

   b. Second Amendment: to extend contract for an additional twelve (12) months, and to make an economic price adjustment of 15% on April 1, 2023.

C. The amendment set forth herein is within the scope of the Contract.

D. The Parties now desire to amend the Contract as set forth herein.

AGREEMENT

NOW THEREFORE, in consideration of the mutual covenants and agreements set forth herein, the Parties hereby agree to amend the Contract, as previously amended, as follows:

1. CONTRACT TERM. Pursuant to Section 1 Term of the Contract, this Contract has been extended for an addition twelve (12) months, this extension term is until March 31, 2025.

2. NONDISCRIMINATION. The following provision is added as a new subsection at the end of Section 18 of the Contract (General Provision):

   18.24. NONDISCRIMINATION.

(a) Nondiscrimination Requirement. During the term of this Contract, Contractor, including any subcontractor, shall not discriminate on the bases enumerated at RCW 49.60.530(3). In addition, Contractor, including any subcontractor, shall give written notice of this nondiscrimination requirement to any labor organizations with which Contractor, or subcontractor, has a collective bargaining or other agreement.

(b) Obligation to Cooperate. Contractor, including any subcontractor, shall cooperate and comply with any Washington state agency investigation regarding any allegation that Contractor, including any subcontractor, has engaged in discrimination prohibited by this Contract pursuant to RCW 49.60.530(3).

(c) Default. Notwithstanding any provision to the contrary, Enterprise Services may suspend Contractor, including any subcontractor, upon notice of a failure to participate and cooperate with any state agency investigation into alleged discrimination prohibited by this Contract, pursuant to RCW 49.60.530(3). Any such suspension will remain in place until Enterprise Services receives notification that Contractor, including any subcontractor, is cooperating with the investigating state agency. In the event Contractor, or subcontractor, is determined to have engaged in discrimination identified at RCW 49.60.530(3), Enterprise Services may terminate this Contract in whole or in part, and Contractor, subcontractor, or both, may be referred for debarment as provided in RCW 39.26.200. Contractor or subcontractor may be given a reasonable time in which to cure this noncompliance, including implementing conditions consistent with any court-ordered injunctive relief or settlement agreement.

(d) Remedies for Breach. Notwithstanding any provision to the contrary, in the event of Contract termination or suspension for engaging in discrimination, Contractor, subcontractor, or both, shall be liable for contract damages as authorized by law including, but not limited to, any cost difference between the original Contract and the replacement or cover contract and all administrative costs directly related to the replacement contract, which damages are distinct from any penalties imposed under Chapter 49.60, RCW. Enterprise Services and/or Purchasers shall have the right to deduct from any monies due to Contractor or subcontractor, or that thereafter become due, an amount for damages Contractor or subcontractor will owe Enterprise Services and/or Purchasers for default under this provision.

3. NO CHANGE OTHER THAN AMENDMENT. Except as amended herein, the Contract is unaffected and remains in full force and effect.

4. INTEGRATED AGREEMENT; MODIFICATION. This Amendment constitutes the entire agreement and understanding of the Parties with respect to the subject matter and supersedes all prior negotiations and representations. In the event of any conflict between this Amendment and the

Contract or any earlier amendment, this Amendment shall control and govern. This Amendment may not be modified except in writing signed by the Parties.

5. AUTHORITY. Each party to this Amendment, and each individual signing on behalf of each party, hereby represents and warrants to the other that it has full power and authority to enter into this Amendment and that its execution, delivery, and performance of this Amendment has been fully authorized and approved, and that no further approvals or consents are required to bind such party.

6. ELECTRONIC SIGNATURES. An electronic signature or electronic record of this Amendment or any other ancillary agreement shall be deemed to have the same legal effect as delivery of an original executed copy of this Amendment or such other ancillary agreement for all purposes.

7. COUNTERPARTS. This Amendment may be executed in one or more counterparts, each of which shall be deemed an original, and all of which counterparts together shall constitute the same instrument which may be sufficiently evidenced by one counterpart. Execution of this Amendment at different times and places by the parties shall not affect the validity thereof so long as all the parties hereto execute a counterpart of this Amendment.

EXECUTED AND EFFECTIVE as of the day and date first above written.

NEW FLYER OF AMERICA, INC.,
A NORTH DAKOTA CORPORATION

By: Jennifer McNeill
Name: Jennifer McNeill
Title: Vice President, Sales & Marketing
Date: April 22, 2024

STATE OF WASHINGTON
DEPARTMENT OF ENTERPRISE SERVICES

By: Kelli Carmony
Name: Kelli Carmony
Title: Procurement Supervisor
Date: 4/24/24

NewFlyer 06719 Amd3 updated 4-21

Final Audit Report 2024-04-22

Created:	2024-04-22
By:	Cindy Campbell (cindy.campbell@mcicoach.com)
Status:	Signed
Transaction ID:	CBJCHBCAABAAWH-zi0q9K7O1bvYy-EU-bR4VFfmx1Dg4

"NewFlyer 06719 Amd3 updated 4-21" History

Document created by Cindy Campbell (cindy.campbell@mcicoach.com)
2024-04-22 - 7:43:22 PM GMT

Document emailed to Jennifer McNeill (jennifer_mcneill@newflyer.com) for signature
2024-04-22 - 7:43:40 PM GMT

Email viewed by Jennifer McNeill (jennifer_mcneill@newflyer.com)
2024-04-22 - 8:06:20 PM GMT

Document e-signed by Jennifer McNeill (jennifer_mcneill@newflyer.com)
Signature Date: 2024-04-22 - 8:06:48 PM GMT - Time Source: server

Agreement completed.
2024-04-22 - 8:06:48 PM GMT

State of Washington Contracts & Procurement Division Department of Enterprise Services P.O. Box 41411 Olympia, WA 98504-1411	**CONTRACT AMENDMENT**	
	Contract No.:	06719-01
New Flyer of America, Inc 6200 Glenn Carlson Dr. St. Cloud, MN 56301	Amendment No.:	4
	Effective Date:	July 19, 2024

FOURTH AMENDMENT

TO

CONTRACT NO. 06719-01

TRANSIT BUSES

This fourth Amendment ("Amendment") to Contract No. 06719-01 is made and entered into by and between the State of Washington acting by and through the Department of Enterprise Services, a Washington State governmental agency ("Enterprise Services") and New Flyer of America, Inc., a North Dakota corporation ("Contractor") and is dated and effective as of July 19, 2024.

R E C I T A L S

A. Enterprise Services and Contractor (collectively the "Parties") entered into that certain Contract No. 06719-01 for Transit Buses dated effective as of April 1, 2021 ("Contract").

B. The Parties previously amended the Contract 06719-01 as followed:

   a. By instrument titled First Amendment to Contract (dated June 1, 2022) to make an Economic Price Adjustment of 11.78%.

   b. By instrument titled Second Amendment to Contract (dated April 1, 2023) to extend the term of contract twelve (12) months ending March 31, 2024, and to make an economic price adjustment of 15%.

   c. By instrument titled Third Amendment to Contract (dated April 25, 2024) to extend contract twelve (12) months, ending March 31, 2025.

C. The Parties now desire to amend the Contract to make an economic price adjustment, add goods, and modify of the Contact.

D. The amendment set forth herein is within the scope of the Contract.

A G R E E M E N T

NOW THEREFORE, in consideration of the mutual covenants and agreements set forth herein, the Parties hereby agree to amend the Contract, as previously amended, as follows:

1. ADVANCE PAYMENTS. Section 6.5 of the Contract (No Advanced Payment) is hereby amended by deleting the existing Section 6.5 in its entirety and inserting the following in lieu thereof:

6.5 ADVANCE PAYMENTS. Participant and Contractor may agree to advance payments, provided that adequate security is made for the payments. Unless otherwise agreed between Participant and Contractor, security shall be in the form of a performance bond or letter of credit in the amount of the payment.

2. EXHIBIT B – PRICE SHEET

    a. ECONOMIC PRICE ADJUSTMENT. Pursuant to section 3.4 of the Contract, using the Bureau of Labor Statistics Index for Truck and Bus Bodies, Series No. WPU 1413 to determine a price change, the price set forth in *Exhibit B – Price Sheet (Amd. 4)* are increased by 7.15%.

    b. GOODS AND SERVICE ADDITION. Pursuant to section 3.6 of the Contract, the Parties agree to add Battery charging infrastructure solutions. *Exhibit B – Price Sheet (Amd. 4)* is modified to include plug-in chargers, overhead chargers, mobile chargers, and charge management systems.

    Attached *Exhibit B – Price Sheet (Amd. 4)* supersedes all previous versions. As of the effective date of this Amendment, any reference to *Exhibit B* in the Contract is deemed to be a reference to *Exhibit B – Price Sheet (Amd. 4)*.

3. NO CHANGE OTHER THAN AMENDMENT. Except as amended herein, the Contract is unaffected and remains in full force and effect.

4. INTEGRATED AGREEMENT; MODIFICATION. This Amendment constitutes the entire agreement and understanding of the Parties with respect to the subject matter and supersedes all prior negotiations and representations. In the event of any conflict between this Amendment and the Contract or any earlier amendment, this Amendment shall control and govern. This Amendment may not be modified except in writing signed by the Parties.

5. AUTHORITY. Each party to this Amendment, and each individual signing on behalf of each party, hereby represents and warrants to the other that it has full power and authority to enter into this Amendment and that its execution, delivery, and performance of this Amendment has been fully authorized and approved, and that no further approvals or consents are required to bind such party.

6. ELECTRONIC SIGNATURES. An electronic signature or electronic record of this Amendment or any other ancillary agreement shall be deemed to have the same legal effect as delivery of an original executed copy of this Amendment or such other ancillary agreement for all purposes.

7. COUNTERPARTS. This Amendment may be executed in one or more counterparts, each of which shall be deemed an original, and all of which counterparts together shall constitute the same instrument which may be sufficiently evidenced by one counterpart. Execution of this Amendment at different times and places by the parties shall not affect the validity thereof so long as all the parties hereto execute a counterpart of this Amendment.

EXECUTED AND EFFECTIVE as of the day and date first above written.

NEW FLYER OF AMERICA, INC., A NORTH DAKOTA COMPANY		**STATE OF WASHINGTON DEPARTMENT OF ENTERPRISE SERVICES**	
By:	_____	By:	_____
Name:	Jennifer McNeill	Name:	Michellee Jemmott
Title:	Vice President, Sales & Marketing	Title:	Procurement Supervisor
Date:	12/07/24	Date:	_____

BID 20-046 SoW NewFlyer 06719 Amd 4

Final Audit Report 2024-07-12

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By:	Luciana Marques (luciana_marques@newflyer.com)
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