CONTRACT INDEX
CONTRACT BDS56____
Central Florida Commuter Rail Transit
Bi-Level Coaches and Cab Cars
ITN-DOT-08/09-5003-CCC
Financial Project No. 412994-6-53-01

STATE OF FLORIDA DEPARTMENT OF TRANSPORTATION

STANDARD WRITTEN AGREEMENT

Agreement No.: BDS56

Financial Project I.D.: **412994-6-53-01, & 412994-6-53-03**

F.E.I.D. No: F 061508773-001

Procurement No. ITN-DOT-08-09-5003-CCC

D.M.S. Catalog Class No.: 737-100

By This Agreement, made and entered into this 10th day of June, 2011, by and between the STATE OF FLORIDA DEPARTMENT OF TRANSPORTATION, hereinafter called the "Department" and Bombardier Transit Corporation of 101 Gibraltar Road, Suite 112, Horsham, PA 19044 duly authorized to conduct business in the State of Florida, hereinafter called "Vendor," hereby agree as follows:

1. SERVICES AND PERFORMANCE

A. In connection with the Central Florida Commuter Rail Transit Bi-Level Coaches and Cab Cars, the Department does hereby retain the Vendor to furnish certain services, information, and items as described in Exhibit "A," attached hereto and made a part hereof.

B. Before making any additions or deletions to the work described in this Agreement, and before undertaking any changes or revisions to such work, the parties shall negotiate any necessary changes and shall undertake reasonable efforts to come to /enter into an Amendment covering such work and compensation. Reference herein to this Agreement shall include any amendment(s).

C. All tracings, plans, specifications, maps, computer files, and reports prepared or obtained under this Agreement exclusively at the cost of and exclusively for the benefit of the Department, as well as all data collected, together with summaries and charts derived there from exclusively at the cost of and exclusively for the benefit of the Department, shall be the exclusive property of the Department without restriction or limitation on their use and shall be made available, upon request, to the Department at any time during the performance of such services and/or upon completion or termination of this Agreement. Upon delivery to the Department of said document(s), the Department shall become the custodian thereof in accordance with Chapter 119, Florida Statutes. Tracings, plans, specifications, maps, computer files, and reports that contain or are based on intellectual property that is owned by entities other than the Vendor or Department or that contain or are based on intellectual property that was created by Vendor prior to this Agreement shall not be deemed to be prepared or obtained under this Agreement exclusively at the cost of and exclusively for the benefit of the Department, regardless of whether the final product is prepared for the Department only, and shall be used by the Department only pursuant to the license granted below. The Vendor shall not copyright any material and products or patent any invention developed under this Agreement. The Department shall have the right to visit the site for inspection of the work and the products of the Vendor at any time exclusively at the cost of and exclusively for the benefit of the Department. As to all other intellectual property prepared, used or otherwise connected in any way with this Agreement, the Department shall have a perpetual, irrevocable, royalty free, non-exclusive license for the use thereof in connection with the commodities and services procured pursuant to this Agreement in order to repair, operate and maintain, which license shall be deemed assigned to any other entity to whom the commodities may hereafter be conveyed.

D. All final plans, documents, reports, studies, and other data prepared by the Vendor shall bear the professional's seal/signature, in accordance with the applicable Florida Statutes, Administrative Rules promulgated by the Department of Business and Professional Regulation, and guidelines published by the Department, in effect at the time of execution of this Agreement. In the event that changes in the statutes or rules create a conflict with the requirements of published guidelines, requirements of the statutes and rules shall take precedence.

E. The Vendor agrees to provide project schedule progress reports in a format acceptable to the Department and at intervals established by the Department. The Department shall be entitled at all times to be advised, at its request, as to the status of work being done by the Vendor and of the details thereof. Coordination shall be maintained by the Vendor with representatives of the Department, or of other agencies interested in the project on behalf of the Department. Either party to this Agreement may request and be granted a conference.

2. TERM

A. Initial Term. This Agreement shall begin on date of execution and shall remain in full force and effect through completion of all services required or _____, whichever occurs first. Subsequent to the execution of this Agreement by both parties, the services to be rendered by the Vendor shall commence and be completed in accordance with the option selected below. (Select box and indicate date(s) as appropriate):

○ Services shall commence _____ and shall be completed by _____or date of termination, whichever occurs first.

○ Services shall commence upon written notice from the Department's Contract Manager and shall be completed by _____or date of termination, whichever occurs first.

☒ Other: See Exhibit "A" and Exhibit "B"

B. RENEWALS (Select appropriate box):

● This Agreement may not be renewed.

o This Agreement may be renewed for a period that may not exceed three (3) years or the term of the original contract, whichever period is longer. Renewals shall be contingent upon satisfactory performance evaluations by the Department and subject to the availability of funds. Any renewal or extension shall be in writing and shall be subject to the same terms and conditions set forth in this Agreement.

C. EXTENSIONS. In the event that circumstances arise which make performance by the Vendor impracticable or impossible within the time allowed or which prevent a new contract from being executed, the Department, in its discretion, may grant an extension of this Agreement. Extension of this Agreement shall be in writing for a period not to exceed six (6) months and shall be subject to the same terms and conditions set forth in this Agreement; provided the Department may, in its discretion, grant a proportional increase in the total dollar amount based on the method and rate established herein. There shall be only one extension of this Agreement unless the failure to meet the criteria set forth in this Agreement for completion of this Agreement is due to events beyond the control of the Vendor.

It shall be the responsibility of the Vendor to ensure at all times that sufficient time remains in the Project Schedule within which to complete services on the project. In the event there have been delays which would affect the project completion date, the Vendor shall submit a written request to the Department which identifies the reason(s) for the delay and the amount of time related to each reason. The Department shall review the request and make a determination as to granting all or part of the requested extension.

3. COMPENSATION AND PAYMENT

A. Payment shall be made only after receipt and approval of goods and services unless advance payments are authorized by the Chief Financial Officer of the State of Florida under Section 215.422(14), Florida Statutes.

B. If this Agreement involves units of deliverables, then such units must be received and accepted in writing by the Contract Manager prior to payments.

C. Bills for fees or other compensation for services or expenses shall be submitted in detail sufficient for a proper preaudit and post audit thereof.

D. The bills for any travel expenses, when authorized by terms of this Agreement and by the Department's Project Manager, shall be submitted in accordance with Section 112.061, Florida Statutes, and Chapter 3 -Travel, Department's Disbursement Operations Manual, 350-030-400.

E Vendors providing goods and services to the Department should be aware of the following time frames. Upon receipt of the invoice, the Department has thirty (30) Calendar days to inspect and approve the goods and services, Subsequently the Department has twenty (20) days to deliver a request for payment (voucher) to the Department of Financial Services. The twenty (20) days are measured from the latter of the date the invoice is received or the goods or services are received, inspected and approved.

F. If a payment is not available within forty (40) days from the date the goods and services are received, inspected and approved, a separate interest penalty as established pursuant to Section 215.422, Florida Statutes, shall be due and payable, in addition to the invoice amount, to the Vendor. Interest penalties of less than one (1) dollar shall not be enforced unless the Vendor requests payment. Invoices which have to be returned to a Vendor because of Vendor preparation errors shall result in a delay in the payment. The invoice payment requirements do not start until a properly completed invoice is provided to the Department

G. The State of Florida, through the Department of Management Services, has instituted MyFloridaMarketPlace, a statewide eProcurement system. Pursuant to Section 287.057(22), Florida Statutes, all payments shall be assessed a

transaction fee of one percent (1%), which the Vendor shall pay to the State. For payments within the State accounting system (FLAIR or its successor), the transaction fee shall, when possible, be automatically deducted from payments to the Vendor. If automatic deduction is not possible, the Vendor shall pay the transaction fee pursuant to Rule 60A-1.031(2), Florida Administrative Code. By submission of these reports and corresponding payments, Vendor certifies their correctness. All such reports and payments shall be subject to audit by the State or its designee. The Vendor shall receive a credit for any transaction fee paid by the Vendor for the purchase of any item(s) if such item(s) are returned to the Vendor through no fault, act, or omission of the Vendor. Notwithstanding the foregoing, a transaction fee is non-refundable when an item is rejected or returned, or declined, due to the Vendor's failure to perform or comply with specifications or requirements of the Agreement. Failure to comply with these requirements shall constitute grounds for declaring the Vendor in default and recovering re-procurement costs from the Vendor in addition to all outstanding fees. VENDORS DELINQUENT IN PAYING TRANSACTION FEES MAY BE EXCLUDED FROM CONDUCTING FUTURE BUSINESS WITH THE STATE.

H. A vendor ombudsman has been established within the Department of Financial Services. The duties of this individual include acting as an advocate for vendors who may be experiencing problems in obtaining timely payment(s) from a state agency. The Vendor Ombudsman may be contacted at (850) 413-5516.

I. Records of costs incurred under terms of this Agreement shall be maintained and made available upon request to the Department at all times during the period of this Agreement and for three (3) years after final payment for the work pursuant to this Agreement is made. Copies of these documents and records shall be furnished to the Department upon request. Records of costs incurred shall include the Vendor's general accounting records and the project records, together with supporting documents and records of the Vendor and all sub-vendors performing work on the project, and all other records of the Vendor and sub-vendors considered necessary by the Department for a proper audit of project costs.

J. The Department, during any fiscal year, shall not expend money, incur any liability, or enter into any contract which, by its terms, involves the expenditure of money in excess of the amounts budgeted as available for expenditure during such fiscal year. Any contract, verbal or written, made in violation of this subsection is null and void, and no money may be paid on such contract. The Department shall require a statement from the comptroller of the Department that funds are available prior to entering into any such contract or other binding commitment of funds. Nothing herein contained shall prevent the making of contracts for periods exceeding one (1) year, but any contract so made shall be executory only for the value of the services to be rendered or agreed to be paid for in succeeding fiscal years. Accordingly, the Department's performance and obligation to pay under this Agreement is contingent upon an annual appropriation by the Legislature.

4. INDEMNITY AND PAYMENT FOR CLAIMS

A. INDEMNITY: To the extent permitted by Florida Law, the Vendor shall indemnify and hold harmless the Department, its officers and employees from liabilities, damages, losses, and costs, including, but not limited to, reasonable Attorney's fees, to the extent caused by negligence, recklessness, or intentional wrongful misconduct of the Vendor and persons employed or utilized by the Vendor in the performance of this Agreement.

It is specifically agreed between the parties executing this Agreement that it is not intended by any of the provisions of any part of the Agreement to create in the public or any member thereof, a third party beneficiary here under, or to authorize anyone not a party to this Agreement to maintain a suit for personal injuries or property damage pursuant to the terms or provisions of this Agreement.

Vendor's cumulative liability to the Department under this paragraph 4.A. shall be limited to 100% of the purchase price paid to the Vendor by the Department under this Agreement. The purchase price shall include any optional purchases if the Department elects to exercise the option.

Unless otherwise specifically enumerated in the Contract or in the purchase order, no party shall be liable to another for special, indirect, punitive, or consequential damages, including lost data or records (unless the contract or purchase order requires the Vendor to back-up data or records), even if the party has been advised that such damages are possible. No party shall be liable for lost profits, lost revenue, or lost institutional operating savings. The State may, in addition to other remedies available to them at law or equity and upon notice to the Vendor, retain such monies from amounts due Vendor as may be necessary to satisfy any claim for damages, penalties, costs and the like asserted by or against them. The State may set off any liability or other obligation of the Vendor or its affiliates to the State against any payments due the Vendor under any contract with the State.

PAYMENT FOR CLAIMS: The Vendor guaranties the payment of all just claims for materials, supplies, tools, or labor and other just claims against the Vendor or any sub-vendor, in connection with the Agreement. The Department's final acceptance and payment does not release the Vendor's bond until all such claims are paid or released.

B. LIABILITY INSURANCE. (Select and complete as appropriate):

O No general liability insurance is required.

● Prior to Notice to Proceed the vendor shall submit to the Department the proof that following insurance policies are in place. Failure to provide the necessary Insurance will be considered a material default under this contract. The Vendor shall carry and keep in force during the term of this Agreement, a general liability insurance policy or policies with a company or companies authorized to do business in Florida, affording public liability insurance with a combined bodily injury limits of at least $500,000.00 per person and $ 1,000,000.00 each occurrence, and property damage insurance of at least $500,000.00 each occurrence for the services to be rendered in accordance with this Agreement.

O The Vendor shall have and maintain during the term of this Agreement, a professional liability insurance policy or policies or an irrevocable letter of credit established pursuant to Chapter 675 Section 337.106, Florida Statutes, with a company or companies authorized to do business in the State of Florida, affording liability coverage for the professional services to be rendered in with this Agreement in the amount of $ _____ .

C. WORKERS' COMPENSATION. The Vendor shall also carry and keep in force Workers' Compensation insurance as required for the State of Florida under the Workers' Compensation Law.

D. PERFORMANCE BOND.

The Vendor shall supply to the Department the following bonds for the base procurement:

(a) Within ten (10) calendar days of the issuance of the Notice to Proceed for this Agreement, a performance bond in the amount of $9,000,000.00 ("Performance Bond"), provided by a surety authorized to do business in the State of Florida, using the form attached to this Agreement in a form acceptable to the Department, which shall guarantee the prompt, faithful and efficient performance of the base procurement under this Agreement, except for the warranty obligations. This Performance Bond shall expire upon final acceptance of the last vehicle of the base procurement. Failure to provide a properly executed performance bond within the time provided shall be a material default under this Agreement, time being of the essence in the delivery thereof.

(b) Within ten (10) calendar days of the delivery of the first vehicle of the base procurement, a warranty bond in the amount of 10% of the Compensation of the base procurement ("Warranty Bond"), provided by a surety authorized to do business in the State of Florida, using the form attached to this Agreement, which shall guarantee the Vendor's warranty obligations of the base procurement under this Agreement. Such Warranty Bond shall expire at the end of the two (2) -year warranty or the proper and final completion of all repairs, replacements, or payments under the two (2) -year warranty, whichever is later. Failure to provide a properly executed warranty bond within the time provided shall be a material default under this Agreement, time being of the essence in the delivery thereof. Withholding of payments under this provision shall not relieve Vendor from continuing to perform under this Agreement.

The Vendor shall supply the Department the following bonds for each of the additional procurements for Optional Vehicles:

(c) Within ten (10) calendar days of the issuance of a purchase order for additional order of Optional Vehicles under this Agreement, a performance bond in an amount equal to 22.20% of the total Optional procurement value shall be provided to the Department ("Option Performance Bond") by a surety authorized to do business in the State of Florida, using the form attached to this Agreement in a form acceptable to the Department, which shall guarantee the prompt, faithful and efficient performance of this additional procurement under this Agreement, except for the warranty obligations.. This Option Performance Bond shall expire upon final acceptance of the last vehicle of this additional procurement. The notice to proceed for the additional order will not be issued until the properly executed performance bond is received by the Department. Failure to provide a properly executed performance bond within the time provided shall be a material default under this Agreement, time being of the essence in the delivery thereof.

(d) Within ten (10) calendar days of the delivery of the first vehicle of the additional procurement, a warranty bond in the amount of 10% of the Compensation of the additional procurement of Optional Vehicles ("Option Warranty Bond"), provided by a surety authorized to do business in the State of Florida, using the form attached to this Agreement, which shall guarantee the Vendor's warranty obligations of the additional procurement under this Agreement. Such Option Warranty Bond shall expire at the end of the two (2)-year warranty or the proper and final completion of all repairs,

replacements, or payments under the two (2) -year warranty, whichever is later. Failure to provide a properly executed warranty bond within the time provided shall be a material default under this Agreement, time being of the essence in the delivery thereof Withholding of payments under this provision shall not relieve Vendor from continuing to perform under this Agreement.

E. CERTIFICATION. With respect to any insurance policy required pursuant to this Agreement, all such policies shall be issued by companies licensed to do business in the State of Florida. The Vendor shall provide to the Department certificates showing the required coverage to be in effect and showing the Department to be an additional certificate holder. Such policies shall provide that the insurance is not cancelable except upon thirty (30) days prior written notice to the Department.

5. COMPLIANCE WITH LAWS

A. The Vendor shall allow public access to all documents, papers, letters, or other material subject to the provisions of Chapter 119, Florida Statutes, and made or received by the Vendor in conjunction with this Agreement. Failure by the Vendor to grant such public access shall be grounds for immediate unilateral cancellation of this Agreement by the Department.

B. The Vendor agrees that it shall make no statements, press releases or publicity releases concerning this Agreement or its subject matter or otherwise disclose or permit to be disclosed any of the data or other information obtained or furnished in compliance with this Agreement, or any particulars thereof, during the period of the Agreement, without first notifying the Department's Contract Manager and securing prior written consent.

C. The Vendor shall comply with all federal, state, and local laws and ordinances applicable to the work or payment for work thereof, and will not discriminate on the grounds of race, color, religion, sex, national origin, age, or disability in the performance of work under this Agreement.

D. If the Vendor is licensed by the Department of Business and Professional Regulation to perform the services herein contracted, then Section 337.162, Florida Statutes, applies as follows:

(1) If the Department has knowledge or reason to believe that any person has violated the provisions of state professional licensing laws or rules, it shall submit a complaint regarding the violations to the Department of Business and Professional Regulation. The complaint shall be confidential.

(2) Any person who is employed by the Department and who is licensed by the Department of Business and Professional Regulation and who, through the course of the person's employment, has knowledge to believe that any person has violated the provisions of state professional licensing laws or rules shall submit a complaint regarding the violations to the Department of Business and Professional Regulation. Failure to submit a complaint about the violations may be grounds for disciplinary action pursuant to Chapter 455, Florida Statutes, and the state licensing law applicable to that licensee. The complaint shall be confidential.

(3) Any complaints submitted to the Department of Business and Professional Regulation are confidential and exempt from Section 119.07(1), Florida Statutes, pursuant to Chapter 455, Florida Statutes, and applicable state law.

E. The Vendor covenants and agrees that it and its employees and agents shall be bound by the standards of conduct provided in applicable law and applicable rules of the Board of Business and Professional Regulation as they relate to work performed under this Agreement. The Vendor further covenants and agrees that when a former state employee is employed by the Vendor, the Vendor shall require that strict adherence by the former state employee to Sections 112.313 and 112.3185, Florida Statutes, is a condition of employment for said former state employee. These statutes will by reference be made a part of this Agreement as though set forth in full. The Vendor agrees to incorporate the provisions of this paragraph in any subcontract into which it might enter with reference to the work performed pursuant to this Agreement.

F. A person or affiliate who has been placed on the convicted vendor list following a conviction for a public entity crime may not submit a bid, proposal, or reply on a contract to provide any goods or services to a public entity, may not submit a bid, proposal, or reply on a contract with a public entity for the construction or repair of a public building or public work, may not submit bids, proposals, or replies on leases of real property to a public entity, may not be awarded or perform work as a vendor, contractor, supplier, subcontractor, sub-vendor, or consultant under a contract with any public entity, and may not transact business with any public entity in excess of the threshold amount provided in Section 287.017, Florida Statutes, for CATEGORY TWO for a period of thirty-six (36) months following the date of being placed on the convicted vendor list.

G. An entity or affiliate who has been placed on the discriminatory vendor list may not submit a bid, proposal, or reply on a contract to provide any goods or services to a public entity, may not submit a bid, proposal, or reply on a contract with a

public entity for the construction or repair of a public building or public work, may not submit bids, proposals, or replies on leases of real property to a public entity, may not be awarded or perform work as a vendor, contractor, supplier, sub-vendor, subcontractor, or consultant under a contract with a public entity, and may not transact business with any public entity.

H. The Department shall consider the employment by any vendor of unauthorized aliens a violation of Section 274 A (e) of the Immigration and Nationality Act. If the Vendor knowingly employs unauthorized aliens, such violation shall be cause for unilateral cancellation of this agreement.

I. Pursuant to Section 216.347, Florida Statutes, the vendor may not expend any State funds for the purpose of lobbying the Legislature, the judicial branch, or a state agency.

6. TERMINATION AND DEFAULT

(A.) The Department may terminate performance of work under this contract in whole or, from time to time, in part if the Department determines that a termination is in the Department's interest (convenience), in the event that matters beyond the control of the Department require the termination (necessity), or in the event that Vendor makes an assignment for the benefit of creditors (insolvency). The Department shall terminate by delivering to the Contractor a Notice of Termination specifying the reason for the termination, the extent of termination and the effective date.

The Department is purchasing a platform product which is not a new design. If the Department exercises its right to terminate for necessity, the parties will meet promptly to discuss opportunities to minimize the impacts to both parties resulting therefrom; provided, however, that under no circumstances shall the Department be obligated to expend additional funds to minimize any impacts. The Departments right to terminate for necessity shall expire upon final acceptance of the last vehicle delivered under the initial base vehicle order; provided, that it is understood and agreed that in the event that the Department decides not to exercise its option to purchase additional vehicles, the Department may, in its discretion, elect to pursue a new procurement for the vehicles that might have been purchased under the option without any liability or obligation to Contractor whatsoever regardless of the terms and conditions of such new procurement.

(1) After receipt of a Notice of Termination, and except as directed by the Department, the Vendor shall immediately proceed with the following obligations, regardless of any delay in determining or adjusting any amounts due under this clause:

(a) Stop work as specified in the notice.
(b) Place no further subcontracts or orders for materials, services, or facilities which exist exclusively for this Agreement, except as necessary to complete the continued portion of the contract. As to subcontracts or orders for materials, services, or facilities which do not exist exclusively for this Agreement, place nothing further for the vehicles which are the subject matter of this Agreement, except as necessary to complete the continued portion of this Agreement.
(c) Complete the delivery, testing and inspection of vehicles in transit or ready for transit.
(d) Complete performance of the work not terminated in accordance with the terms of this Agreement.
(e) Use its best efforts to sell any partially constructed vehicles or materials procured exclusively for this Agreement. The proceeds of any such sale shall be applied to reduce any payments to be made by the Department under this Agreement.

(2) As a sole remedy, within 6 months of receipt of the Notice of Termination for convenience (but not for termination for necessity or insolvency), Vendor may submit to the Department for payment an invoice for costs related to vehicles which have been ordered but will not be delivered as a result of the termination. Other than payment for vehicles to be delivered, there shall be no payments, remedies or damages for a termination for necessity or insolvency. In determining the costs to be invoiced, the provisions of Part 31.2 of the Federal Acquisition Regulations in effect on the date of this Agreement shall apply. Credit against such costs shall be given for any milestone payments made for vehicles not delivered and for any sales proceeds as provided in section (1)(e) above. The invoice shall be accompanied by copies of all documents under which the costs are incurred. The audit provisions and all invoicing provisions of this Agreement apply to any such invoice and invoices not submitted within said 6 month period shall not be paid. Notwithstanding the foregoing, the following limits shall apply to the invoice for such costs:

(a) No payment shall be made for any lost profits of Vendor.

(b) The maximum amount paid shall be $500,000.00 for a termination up to the delivery of the first vehicle under the initial order and $2,700,000.00 for a termination taking place from delivery of the first vehicle to final acceptance of the last vehicle under the initial order. In the event that the Department exercises the option to order additional vehicles, the maximum amounts for the optional order shall be a proportion of these maximum amounts based on the total of the total dollar figure for the optional order as compared to the total dollar figure for the initial order.

(c) No amounts for indirect overhead will be paid.

(d) No amounts will be paid for termination of labor contracts, material contracts, or subcontracts that were not entered into exclusively for producing the vehicles which are the subject of this Agreement.

(e) No costs will be paid in connection with employees for whom other positions with Vendor are available.

(f) No payments will be made in connection with the termination of labor contracts, material contracts, or subcontracts where the payment is not mandatory under the provisions of the applicable terminated contract.

(B) If the Department determines that the performance of the Vendor is not satisfactory, the Department shall have the option of (a) immediately terminating the Agreement, or (b) notifying the Vendor of the deficiency with a requirement that the deficiency be corrected within a specified time, otherwise the Agreement will be terminated at the end of such time, or (c) taking whatever action is deemed appropriate by the Department. Notwithstanding the foregoing, the Department will provide the Vendor with an opportunity to cure before terminating for unsatisfactory performance as provided in Rule 60A-1.006(3), F.A.C.

7. ASSIGNMENT AND SUBCONTRACTS

A. The Vendor shall maintain an adequate and competent staff so as to enable the Vendor to timely perform under this Agreement and may associate with it such sub-vendors, for the purpose of its services hereunder, without additional cost to the Department, other than those costs within the limits and terms of this Agreement. The Vendor is fully responsible for satisfactory completion of all subcontracted work. The Vendor, however, shall not sublet, assign, or transfer any work under this Agreement to other than sub-vendors specified in the proposal, bid, and/or Agreement without the written consent of the Department.

B. Select the appropriate box:

● The following provision is not applicable to this Agreement:

○ The following provision is hereby incorporated in and made a part of this Agreement:

It is expressly understood and agreed that any articles that are the subject of, or required to carry out this Agreement shall be purchased from a nonprofit agency for the blind or for the severely handicapped that is qualified pursuant to Chapter 413, Florida Statutes, in the same manner and under the same procedures set forth in Section 413.036(1) and (2), Florida Statutes; and for purposes of this Agreement the person, firm, or other business entity (Vendor) carrying out the provisions of this Agreement shall be deemed to be substituted for the state agency (Department)insofar as dealings with such qualified nonprofit agency are concerned.

○ The following provision is hereby incorporated in and made a part of this Agreement:

It is expressly understood and agreed that any articles which are the subject of, or required to carry out this Agreement shall be purchased from the corporation identified under Chapter 946, Florida Statutes, in the same manner and under the procedures set forth in Sections 946.515(2) and (4),Florida Statutes; and for purposes of this Agreement the person, firm, or other business entity(Vendor) carrying out the provisions of this Agreement shall be deemed to be substituted for this agency (Department) insofar as dealings with such corporation are concerned.

The "corporation identified" is Prison Rehabilitative Industries and Diversified Enterprises, Inc.(PRIDE). Available pricing, products, and delivery schedules may be obtained by contacting:

PRIDE Enterprises
12425 - 28th Street, North
St. Petersburg, FL 33716-1826
(800)643-8459

○ This Agreement involves the expenditure of federal funds and Section 946.515, Florida Statutes, as noted above, does not apply. However, Appendix I is applicable to all parties and is hereof made a part of this Agreement.

8. MISCELLANEOUS

A. The Vendor and its employees, agents, representatives, sub-vendors or subcontractors are not employees of the Department and are not entitled to the benefits of State of Florida employees. Except to the extent expressly authorized herein, Vendor and its employees, agents, representatives, sub-vendors or subcontractors are not agents of the Department or the State for any purpose or authority such as to bind or represent the interests thereof, and shall not represent that it is an agent or that it is acting on the behalf of the Department or the State. The Department shall not be bound by any unauthorized acts or conduct of
the Vendor or its employees, agents, representatives, sub-vendors or subcontractors. Vendor agrees to include this provision in all its subcontracts under this Agreement.

B. All words used herein in the singular form shall extend to and include the plural. All words used in the plural form shall extend to and include the singular. All words used in any gender shall extend to and include all genders.

C. This Agreement embodies the whole agreement of the parties. There are no promises, terms, conditions, or obligations other than those contained herein, and this Agreement shall supersede all previous communications, representations, or agreements, either verbal or written, between the parties hereto. The State of Florida terms and conditions, whether general or specific, shall take precedence over and supersede any inconsistent or conflicting provision in any attached terms and conditions of the Vendor.

D. It is understood and agreed by the parties hereto that if any part, term or provision of this Agreement is by the courts held to be illegal or in conflict with any law of the State of Florida, the validity of the remaining portions or provisions shall not be affected, and the rights and obligations of the parties shall be construed and enforced as if the Agreement did not contain the particular part, term, or provision held to be invalid.

E. This Agreement shall be governed by and construed in accordance with the laws of the State of Florida.

F. In any legal action related to this Agreement, instituted by either party, the Vendor hereby waives any and all privileges and rights it may have under Chapter 47 and Section 337.19, Florida Statutes, relating to venue, as it now exists or may hereafter be amended, and any and all such privileges and rights it may have under any other statute, rule, or case law, including, but not limited to those grounded on convenience. Any such legal action may be brought in the appropriate Court in the county chosen by the Department and in the event that any such legal action is filed by the Vendor, the Vendor hereby consents to the transfer of venue to the county chosen by the Department upon the Department filing a motion requesting the same.

G. If this Agreement involves the purchase or maintenance of information technology as defined in Section282.0041, Florida Statutes, the selected provisions of the attached Appendix II are made a part of this Agreement.

H. If this Agreement is the result of a formal solicitation (Invitation to Bid, Request for Proposal or Invitation to Negotiate), the Department of Management Services Forms PUR1000 and PUR1001, included in the solicitation, are incorporated herein by reference and made a part of this Agreement.

I. Time is of the essence as to each and every obligation under this Agreement.

J. E- VERIFY

Vendor/Contractor shall utilize the U.S. Department of Homeland Security's E-Verify system, in accordance with the terms governing use of the system, to confirm the employment eligibility of:

1. All persons employed by the Vendor/Contractor during the term of the Contract to perform employment duties within Florida; and

2. All persons, including subcontractors, assigned by the Vendor/Contractor to perform work pursuant to the contract with the Department.

K. The following attachments are incorporated and made a part of this agreement:

Exhibit "A", Scope of Services, Pages A-1 through A-4
Exhibit "B" Method of Compensation, Pages B-1 through B-16
Exhibit "D" Vehicle Technical Specification, Pages D-i through D 17-154
Exhibit "E" Federal Transportation Administration (FTA) Terms and Conditions, Pages E-1 through E-16
Exhibit "F" Software Code Deposit Agreement Pages F-1 through F-8
Exhibit "G" General Contract Conditions (PUR 1000), Pages G-1 through G-11
Exhibit "H" General Instructions to Respondents (PUR 1001) Pages H-1 through H-6
Exhibit "I" Train Color Scheme, Page 1
Appendix "A" IOS 2010 Scenario Preliminary Train Schedules Page 1
Appendix "B" LPA 2013 Scenario Preliminary Train Schedules, Page 1
Appendix "C" Full Build 2016 Scenario Preliminary Train Schedules, Page 1

Table 8, Full Build Estimated Station to Station Run Times, Page 1
Table 9, Operating Requirements for Commuter Rail Scenarios, Page 1
Insurance Certificate, Pages 1 through 2

L. Other Provisions:

In case of conflict the contract documents shall have the following order of precedence:

- Exhibit "E" FTA Terms and Conditions
- Exhibit "D", Vehicle Technical Specification
- Exhibit "A", Scope of Services
- Exhibit "B", Method of Compensation
- Standard Written Agreement
- Invitation to Negotiate ITN-DOT-08/09-5003-CCC and Addendums 1 and 2 and Questions and Answers
- General Contract Conditions (PUR 1000)
- General Instructions to Respondents (PUR 1001)
- Exhibit "F" Software Code Deposit Agreement

IN WITNESS WHEREOF, the parties have executed this Agreement by their duly authorized officers on the day, month and year set forth above.

Bombardier Transit Corporation
Name of Vendor

BY: _____
Authorized Signature

Robert E. Furniss
(Print/Type)
Title: Vice President

STATE OF FLORIDA
DEPARTMENT OF TRANSPORTATION

BY: Noranne Downs
Authorized Signature

Noranne Downs
~~Alan E. Hyman~~, P.E.
(Print/Type)
Title: ~~Director of Transportation Operations~~ District Secretary, D5

FOR DEPARTMENT USE ONLY

Approved: _____
Procurement

LEGAL REVIEW: _____

Bombardier Transit Corporation
Name of Vendor

BY: _____

Raymond Bachant

Exhibit A
Scope of Services
Central Florida Commuter Rail Transit
BI-LEVEL COACHES AND CAB CARS
Financial Project Number 412994-6-53-01

I. Introduction

This Exhibit "A" describes the performance required of the Vendor under this Agreement.

II. Description of Goods and Services

The goods and services to be provided are described as follows:

a. Cab Cars and Coaches

Vendor shall design, produce, test, deliver and warrant up to Twenty Two (22) Cab Cars and or Thirty Eight (38) Coaches. The contract for the production of the initial Five (5) Bi-Level Coaches and Nine (9) Bi-Level Cab Cars will be the base procurement. Two types of vehicles shall be supplied under this procurement. The services to be performed under this contract involve the design, production, testing and warranty of low-floor bi-level Cab Cars and Coaches. Each Cab Car shall be single ended, four-axle units, capable of bi-directional operation as married-pair or longer consist with a Diesel Electric Passenger Locomotive and other Coaches. All Cab Cars shall be able to operate and be fully functional in a consist (Train Set) of up to six (6) cars and Passenger Locomotives made up in push-pull trainsets. One end of the Cab Car shall have a fully-equipped operating cab. Operating controls and performance shall be equal in both directions.

Walk-through provision between two coupled cars shall be provided. The cars must be designed for boarding from low-level floor 25 inches above the top of rail. Each vehicle shall be equipped with four sets of bi-parting doors. The Cab Cars and Coaches shall comply with the Design Criteria contained in Exhibit "D".

b. Spare Parts

The Department may purchase spare parts during the term of this Agreement from Table 2 attached to Exhibit B at the prices specified therein. There is no minimum or maximum on the number of orders or on the quantity of spare parts that may be purchased. Spare parts shall be purchased through the issuance of a Department standard purchase order issued within 120 days of Notice to Proceed.

c. Training and Manuals

Vendor will provide, as part of the purchase price for the Cab Cars and Coaches, training for the train crews sufficient to allow the crews to safely and completely operate the Cab Cars and Coaches during the testing. The training will be provided at the site of the testing at a time selected by The Department. Department shall provide reasonable advance notice to the Vendor of the time for training. Vendor shall deliver manuals that fully describe all operation and maintenance procedures and contain "As-Built" drawings and specifications with each Cab Cars and Coaches in accordance with Exhibit "D".

d. Testing

The vendor shall be responsible for all costs associated with on-site testing. The Vendor will provide the train crews, fuel and necessary supplies for testing of the Cab Cars and Coaches. The vendor

shall prepare a Master Test and Inspection Plan (MTIP) for review and approval of the Department. The MTIP shall show all Tests and Inspections; it shall be broken down into Type (one time Qualification Tests) and Routine (Production Tests on every subsystem/component and car). The Vendor shall prepare Test Procedures and Record Sheets for the review and approval of the Department. The Vendor shall submit test procedures and inspection procedures 30 days in advance of any scheduled tests.

e. Delivery

The Cab Cars and Coaches shall be delivered to the Vehicle Storage and Maintenance Facility in accordance with Florida Statute. Spare parts shall be delivered to the location and within the time specified on the purchase order. The first Nine (9) Cab Cars and five (5) Coaches shall be delivered, tested, and accepted in accordance with the Vehicle Delivery Schedule below. The Department has until five (5) years from the date of the execution of this Agreement to order up to an additional thirteen (13) Cab Cars and thirty-three (33) Coaches in one or more orders. Orders shall be placed using the Department's standard purchase order form. For each such order of additional Cab Cars and Coaches, Vendor shall have no less than12 months to deliver the first Cab Car or Coach under the additional order. The remaining Cab Cars and Coaches under the additional order shall be delivered as specified in the purchase order and in compliance with all of the terms and conditions of the original contract. Vendor shall coordinate with the Department's Design/Build Firm, who is responsible for building the Vehicle Storage and Maintenance Facility for storage and security of the Cab Cars and Coaches, regarding schedule and method of delivery for the Cab Cars and Coaches. The Department's Chief Operating Officer (COO) will assist in the coordination between the Vendor and the Design/Build Firm. Vendor shall also coordinate with the Department's Operations and Maintenance Contractor and the Chief Operating Officer regarding testing and acceptance of all Cab Cars and Coaches. Testing and acceptance is specified in Exhibit "D".

Vendor shall not commence work under this Agreement prior to the Department's issuance of a Notice to Proceed. The Department will issue a Notice to Proceed for the initial purchase. Additional purchases shall be authorized by purchase order as set forth herein. It is currently anticipated that the Notice to Proceed for the initial purchase will be issued on or about June 1, 2011. In the event the Department actually issues such Notice to Proceed for the initial purchase subsequent to June 1, 2011, the Vendor's remedy, in addition to the provisions provided in Exhibit B, Section 2.0, will be an adjustment of the delivery schedule based on the actual date of issuance as provided in the chart below. Under no circumstances shall the Department have any liability, nor shall Vendor have any claim, or cause of action whatsoever for any monetary compensation, damages, or other relief of any nature or kind if a Notice to Proceed for the initial purchase is never issued by the Department.

Delivery Schedule		
Central Florida Commuter Rail Transit		
Bi-Level Coaches and Cab Cars		
Vehicle	Delivery Date	Final Acceptance Date
Cab Car #1	Thursday, May 30, 2013	Monday, June 10, 2013
Cab Car #2	Thursday, June 06, 2013	Monday, June 17, 2013
Cab Car #3	Thursday, June 13, 2013	Monday, June 24, 2013
Cab Car #4	Thursday, June 20, 2013	Monday, July 01, 2013
Cab Car #5	Thursday, June 27, 2013	Monday, July 08, 2013
Cab Car #6	Wednesday, July 03, 2013	Monday, July 15, 2013
Cab Car #7	Wednesday, July 10, 2013	Monday, July 22, 2013

Cab Car #8	Wednesday, July 17, 2013	Monday, July 29, 2013
Cab Car #9	Tuesday, July 23, 2013	Friday, August 02, 2013
Coach #1	Thursday, August 01, 2013	Sunday, August 11, 2013
Coach #2	Thursday, August 08, 2013	Monday, August 19, 2013
Coach #3	Thursday, August 15, 2013	Monday, August 26, 2013
Coach #4	Thursday, August 22, 2013	Tuesday, September 03, 2013
Coach #5	Thursday, August 29, 2013	Monday, September 09, 2013
Final Acceptance and all outstanding items complete		Tuesday, October 1, 2013

III Risk of Loss

Risk of loss for the commodities delivered to the Vehicle Storage and Maintenance Facility under this Agreement shall pass to the Department at the time that title to the commodities transfers to the Department. When the Department rejects a commodity, the Vendor shall remove it within ten days after rejection. After rejection, the risk of loss of the rejected commodity shall revert to the Vendor. The rejected commodity not removed by the Vendor within ten days shall be deemed abandoned by the Vendor, and the Department shall have the right to dispose of it as its own property. The Vendor shall reimburse the Department for costs and expenses incurred in storing or effecting removal or disposition of the rejected commodity.

IV. Liquidated Damages

The Vendor acknowledges that failure to timely perform in accordance with the vehicle delivery schedule may cause the Department to incur damages that, at present are, and upon the occurrence of the failure to so timely perform may be, difficult to determine. Therefore, in the event the Vendor fails to timely perform in accordance with the vehicle delivery schedule, and the Department does not terminate this Agreement, the Department may exercise the remedy of liquidated damages against the Vendor, in the amount of $350.00 per day for each calendar day after the applicable performance date that the Vendor fails to provide each vehicle (includes delivery, testing and final acceptance). The Parties agree that if the Department allows the Vendor to continue to perform after the expiration of the time allowed, that the Department's action shall in no way act as a waiver on the part of the Department of the liquidated damages due under this contract. The Vendor shall pay said sum to the Department not as a penalty, but as liquidated damages. The Department has the right to apply, as payment on such liquidated damages, any money the Department owes the Vendor. Vendor's cumulative liability to the Department for liquidated damages under this paragraph shall be limited to 10% of the purchase price paid to the Vendor by the Department under this Agreement. The purchase price shall include any optional purchases if the Department elects to exercise the option. Collection of liquidated damages payable under this paragraph shall be the Department's sole and exclusive remedy for events of delay covered by this paragraph.

V. Additional Terms and Conditions

The Department of Management Services form PUR 1000, General Contract Conditions, is attached hereto and by this reference made a part hereof; provided, however, that the following paragraphs do not apply: 4, 5, 11, 12, 13, 15, 19, 20, 21, 22, 23, 25, 26, 27, 29, 31, 35, 40, 41, and 42. Deletion of these paragraphs shall not be deemed to be deletion of content contained elsewhere and the substance of these excepted paragraphs may be addressed in other locations in this Agreement. That substance located elsewhere continues to apply regardless of this exception paragraph.

Provided further, in paragraph 14 of PUR 1000, the reference to section 287.057(23), Florida Statutes (2002) is replaced by section 287.057(22), Florida Statutes.

The Department of Management Services form PUR 1001, General Instructions to Respondents, is attached hereto and by this reference made a part hereof; provided, however, that the following paragraphs do not apply: 3, 4, 5, 12, 13, 14, 19, 20 and 21. Deletion of these paragraphs shall not be deemed to be deletion of content contained elsewhere and the substance of these excepted paragraphs may be addressed in other locations in this Agreement. That substance located elsewhere continues to apply regardless of this exception paragraph.

Exhibit B
Method of Compensation
Contract BDS56
Central Florida Commuter Rail Transit Bi-Level Coaches and Cab Cars
Financial Project ID No. 412994-6-53-01

1.0 PURPOSE

This exhibit defines the method and limits of compensation to be made to the Vendor for the commodities described in Exhibit "A" Scope of Services and Exhibit "D" Central Florida Commuter Rail Transit Bi-Level Coach and Cab Car Vehicle Design Criteria and the method by which payments will be made.

2.0 COMPENSATION

For the delivery of the Initial Procurement of commodities described in Exhibit "A" – Scope of Services and defined Exhibit "D" Central Florida Commuter Rail Transit Bi-Level Coach and Cab Car Vehicle Design Criteria and authorized under this Agreement, the Department will pay the Vendor $ 40,633,428.00 Currently only $30,566,348.00 of the Total Amount is available, the remaining $10,067,080.00 will be made available before Notice to Proceed is issued. This is a Term Contract for a defined product whereby the Vendor agrees to furnish the commodity by the prescribed period of time. Subsequent to contract execution the Department will issue Notice to Proceed for the commencement of production and delivery of this commodity in accordance with Exhibit "A", Scope of Services. Execution of this Agreement does not guarantee that the work will be authorized. If Notice to Proceed for the Initial Procurement is not issued by July 31, 2011, the Vendor reserves the right to hold the prices or terminate the agreement. The Vendor must exercise the right to terminate prior to the Department's issuance of a Notice to Proceed.

The Department, based on need and availability of budget, may increase the Contract amount by amendment. At the Department's option additional commodities may be added to the contract through one or more supplemental amendments, contingent upon legislative appropriation and budget approval. Changes to the commodities described in Exhibit "A" – Scope of Services and Exhibit "D" Central Florida Commuter Rail Transit Bi-Level Coach and Cab Car Vehicle Design Criteria will be made by amendment to this Agreement.

The Initial Procurement is for nine (9) Bi-Level Cab Cars and five (5) Bi-Level Coaches.

2.1 Details of Compensation

Each vehicle shall be delivered inclusive of all inspections, testing, manuals, training, shipping and handling, insurance, software and drawings FOB to the VSMF, Rand Yard, Sanford, FL as required by Exhibit "A" Scope of Services and Exhibit "D", Central Florida Commuter Rail Transit Bi-Level Coach and Cab Car Vehicle Design Criteria.

Based on the Notice to Proceed date vehicles will be priced as follows.

2.1.1Base Vehicles

For the Initial Procurement, the Base Vehicle prices are as follows

The Base price for each Bi-Level Coach is $2,729,161.50

The Base price for each Bi-Level Cab car is $2,998,624.50

For Option I and Option II the Base Vehicle Prices are as follows

The Base price for each Bi-Level Coach is $2,398,958.00.

The Base price for each Bi-Level Cab car is $2,711,433.00

2.1.2 Optional Vehicles:

The Pricing below for Options 1 and 2 are based on the vehicles being produced in production continuity with this contract or another of similar Bi-Level type. Should the manufacturing plant in the regular course of business be inactive and options are exercised a one-time fee of $1,250,000.00 would be applicable and payable within 90 days of Notice to Proceed for the Optional purchase.

At the Department's option up to an additional Thirty three (33) Bi-Level Coaches and thirteen (13) Bi-Level Cab cars may be ordered as optional vehicles under this section.

2.1.2.1Option 1 Vehicles:

Provided Notice to Proceed is issued on or before February 15, 2012

Vehicles procured under this Option shall be subject to a currency adjustment according to the date of Notice to Proceed based on the following formula:

1) Adjustment for Currency Variation:

FSP = P * [1 + [(Ro - Rn) / Ro) * C]]

Where:

FSP: Final Selling Price **P:** Option 1 Price in Exhibit C

Ro: Base CAD/USD Exchange Rate reflecting $1.00 USD = 0.9954 CAD

Rn: Current USD/CAD Exchange Rate. The noon rate published by the Bank of Canada on the day prior to the NTP of the option $1.00 USD = Rn CAD).

C: Canadian Content = 40%

2.1.2.2 Option II Vehicles:

Provided Notice to Proceed is issued after February 15, 2012

Vehicles procured under this option will be subject to a currency, labor and material adjustment according to the date of Notice to Proceed based on the following formula:

Escalation and Currency adjustment clauses for the Option 2 order

The following escalation and foreign exchange formulas shall be used to adjust the price of the option 2 cars and calculate the Final Selling Price when the options are exercised.

1) Adjustment for Escalation:

EP = PFP * [1 + [(40% * LIA) + (60% * MIA)]]

Where:

EP: Escalated Price

PFP: Price Form Price: (Coach option price x Coach quantity + Cab option price x Cab quantity)

LIA: Labor Indices Adjustment

LIA = [(Weighted average of Current Month Labor Indices – Weighted average of Base Labor Indices) / Weighted average of Base Labor Indices]

Where Labor Indices are weighted as follows:

- 35% NAICS Code 336 (Transportation Equipment, CEU 3133600008)
- 65% Canada Consumer Price Index, All Items, not seasonally adjusted (CANSIM vector number v41713403).

MIA: Material Indices Adjustment

MIA= [(Weighted average of Current Month Material Indices – Weighted average of Base Material Indices) / Weighted average of Base Material Indices]

Where Material Indices are weighted as follows:

- 15% Metals and Metal Products, Aluminum Mill Shapes (PPI, Metals and Metal Products, Aluminum Mill Shapes, Series ID WPU102501)
- 15% Metals and Metal Products, Iron and Steel (PPI, Metals and Metal Products, Iron and Steel, Series ID WPU101)
- 70% Materials for Durable Manufacturing (PPI, by Stage of Processing,

Intermediate Materials, Supplies and Components, Series ID WPUSOP2130)

Current month indices: most recent available indices on the date of NTP of each option exercised.
Base indices: most recent available indices as of June 1st 2011.

2) Adjustment for Currency Variation:

FSP = EP * [1 + [((Ro - Rn) / Ro) * C]]

Where:

FSP: Final Selling Price

EP: Escalated Price
Ro: CAD/USD Exchange Rate reflecting $1.00 USD = 0.9954 CAD

Rn: Current USD/CAD Exchange Rate. The noon rate published by the Bank of Canada on the day prior to the NTP of the option $1.00 USD = Rn CAD).

C: Canadian Content = 40%

The Adjustment for Escalation and Foreign Exchange variation shall be capped within the boundaries stated below. Any fluctuation beyond these parameters will not be reflected in the Final Selling Price of the option 2.

- LIA not to exceed a compounded variation of 3 % per year from the NTP of the base to the NTP of each option exercised.

- MIA not to exceed a compounded variation of 4 % per year from the NTP of the base to the NTP of each option exercised.

- (Ro – Rn) not to exceed $0.20 CAD.

The maximum adjustment for Escalation (for a period of 5 years) and maximum adjustment for Currency Variation, the maximum Final Selling Price for option 2 cars would be as follows:

Cab Cars: 3,496,769 USD / car
Coach Cars: 3,093,789 USD / car

Spare Parts:

Purchase order(s) shall be issued by the Department within 120 days of the Notice to Proceed for spare parts required by the Department at the rates shown in Table 2, Spare Parts Price List. The Quantity and delivery location and date of delivery for each spare part shall be at the sole discretion of the Department.

2.2 General Compensation Provisions

2.2.1BI-LEVEL COACHES AND CAB CARS

The Vendor will receive progress payments for services and expenses based on the services that have been completed and accepted by the Department in accordance with the Schedule of Payment Values shown in Table 1, the sum of which shall not exceed the lump sum unit price for each vehicle. Final payment shall be made at such time as the Department accepts the commodities as being in complete compliance with all terms and conditions of the Agreement.

2.2.2 SPARE PARTS and WARRANTY SPARE PARTS

The Vendor will receive payment for spare parts based on quantities delivered and accepted by the Department. Delivery of the spare parts shall take place at the time and place specified by the Department in the Purchase Order. Payment for spare parts shall be made at the unit rates shown in Table 2, Pages B-8 through B-18. At the discretion of the Department any spare parts owned by the Vendor and on location for use as warranty spares may be purchased by the Department at the end of the warranty period at the rates provided in Table 2, Spare Parts Price list.

3.0 INVOICING PROCEDURE

The Vendor will be eligible for progress payments under this Agreement at intervals not less than monthly or when individual tasks or milestones defined in the Schedule of Payment Values are completed or reached.

The Vendor shall provide a certificate at the time of each milestone as indicated in the Schedule of Payment Values, certifying the amount of work completed by the Vendor. For payment

approval by the Department, all invoices must be in compliance with all requirements of the Contract Documents and Vehicle Design Criteria.

Payments shall be achieved and become eligible for payment in accordance with Schedule Payment Values (Table 1). The Vendor shall submit with each invoice certification that all requirements of each milestone have been completed and approved by the Department. Milestone requirements are detailed in Exhibit "B-1" pages B-1, 1 through B-1, 12. The Department shall verify that all deliverables meet the requirements of Exhibit "A", Scope of Services and Exhibit "D" Vehicle Design Criteria. Milestone payments detailed in Table 1, section 5 shall be the basis for Milestone payments on Optional Vehicles.

Documentation must be on file with the Vendor and forwarded to the Department to support the invoiced costs. The Vendor shall maintain books and records as related to this Agreement in such a manner that supports each invoice.

4.0 PROJECT CLOSEOUT

4.1 Final Audit

If requested, the Vendor will permit the Department to perform or have performed, an audit of the records of the Vendor and any or all sub-vendors to support the compensation paid the Vendor. The audit will be performed as soon as practical after completion and acceptance of the contracted services. In the event funds paid to the Vendor under this agreement are subsequently properly disallowed by the Department because of accounting errors or changes not in conformity with this Agreement, the Vendor agrees that such disallowed costs are due to the Department on demand. Further, the Department will have the right to deduct from any payment due the Vendor under any other Agreement any amount due the Department.

5.0 PAYMENT SCHEDULES

The Schedule of Payment Values is shown in Table 1, and Table 2 below. Spare Parts Price List pages B-6 through B-16 provides the prices for the spare parts. Detail for Table 1, is attached as Exhibit B-1, pages B.1.1 through B.1.12. Each Item listed in Exhibit B-1 for each milestone must be complete and accepted by the Department prior to submitting an invoice for payment.

Central Florida Commuter Rail Coaches and Cab Cars		
Schedule of Payment Values – REV 3		
FM No. 412994-6-53-01		
	Table 1	Task %
1	Delivery and Acceptance of the Approved Master Program Schedule including engineering and production schedules, Project Management Plan, and Quality Assurance Plan. Acceptance of delivery plan for 1st vehicle, Customer Decision Requirement Matrix	5%
2	Submit Proof of Execution of Purchase Orders for major components to FDOT	7.5
3	Delivery of Draft user education plan; Acceptance of Warranty program, Final Delivery Schedule and delivery of Draft Vehicle Hazard Analysis Report, Draft Engineering Drawings & Schematics for existing systems.	5%
4	Delivery of approved Carshell Stress analysis reports	7.5
5	Submission of proof of successful completion of First Article Inspections on all major subsystems, (FAI = First Article Inspection)	15%

6	Arrival of the 1st rail worthy vehicle at the contractor's final assembly plant, ready for final assembly.	10%
7	Arrival of rail worthy vehicles 2 through 14 to Contractors final assembly plant, ready for final assembly. Paid on a per vehicle basis.	10%
8	Delivery of 1st vehicle, delivery of Draft Integrated Schematics, delivery of Draft Operations and Maintenance Manuals, delivery of Final Vehicle Hazard Analysis and delivery of Warranty Bond	10%
9	Delivery and successful completion of commissioning of Each vehicle for revenue service paid on a per vehicle basis.	15%
	Vehicle #1 Cab Car, Commissioning	
	Vehicle #2 Cab Car	
	Vehicle #3 Cab Car	
	Vehicle #4 Cab Car	
	Vehicle #5 Cab Car	
	Vehicle #6 Cab Car	
	Vehicle #7 Cab Car	
	Vehicle #8 Cab Car	
	Vehicle #9 Cab Car	
	Vehicle #10 Coach	
	Vehicle #11 Coach	
	Vehicle #12 Coach	
	Vehicle #13 Coach	
	Vehicle #14 Coach	
10	Successful completion of heavy maintenance training and heavy maintenance manuals. Successful Completion of Light Maintenance and Operators Training Program, (includes running maintenance and repair training and acceptance of Final Running Maintenance Manual, Parts Catalogs, Maintenance and Operations Manual, and Integrated Schematics)	5%
11	Completion of Final acceptance of vehicles, paid on a per vehicle basis.	5%
12	Successful completion of contract including delivery of "As-Built" drawings and contractor specifications as well as completion of all administrative and technical deliverables with the exception of warranty items outstanding. Source Code has been escrowed, Vehicle History Books have been delivered	5%
		100%

TABLE 2, CENTRAL Florida Commuter Rail Transit, Bi-Level Coaches and Cab Cars
SPARE PARTS PRICE LIST

ITEM	DESCRIPTION	VENDOR	Currency	Unit Price
	TRUCK			
1	TRUCK COMPLETE - COMMON	BOMBARDIER	USD	$201,285.00
2	CHEVRON SPRING	Bradken	USD	$442.26
3	AIR SPRING ASSY	Bradken	USD	$2,012.85
4	SIDE BEARER	Bradken	USD	$296.61
5	TRACTION PAD	Bradken	USD	$304.90
6	LATERAL DAMPER	Bradken	USD	$737.81
7	VERTICAL DAMPER	Bradken	USD	$737.10
8	HYDRAULIC (YAW) DAMPERS	Bradken	USD	$1,137.54
9	LEVELLING VALVE	WESTCODE	USD	$503.21
10	LEVELLING VALVE STRAINER CARTRIDGE	NORGREN	USD	$100.02

11	WHEEL & AXLE ASSY	ORX	USD	$17,900.19
12	WHEEL - PLAIN	ORX	USD	$2,523.15
13	WHEEL - DISC SIDE	ORX	USD	$2,615.29
14	AXLE - ROUGH MACHINED	ORX	USD	$2,679.08
15	BEARING ASSY CLASS F	TIMKEN	USD	$681.82
16	ODOR TYPE HEAT INDICATOR	ROBINETTE	USD	$22.65
17	MAGNETIC PICK-UP SPLIT GEAR OUTLINE	Wabtec	USD	$399.74
18	ARMORED PICK-UP ASSEMBLY	Wabtec	USD	$171.26
	BRAKE SYSTEM			
19	E-3 Brake Valve	Wabtec	USD	$821.34
20	COMPOSITION BRAKE SHOE	Wabtec	USD	$12.20
21	26-B-1 BRAKE VALVE	Wabtec	USD	$9,283.66
22	NOT USED	N/A		$0.00
23	HB-5 RELAY AIR VALVE	Wabtec	USD	$1,312.79
24	GM 5-1/2 TREAD BRAKE UNIT LH NON H/BRAKE	Wabtec	USD	$3,364.00
25	GM 5-1/2 TREAD BRAKE UNIT LH HANDBRAKE	Wabtec	USD	$3,682.47
26	GM 5-1/2 TREAD BRAKE UNIT RH NON H/BRAKE	Wabtec	USD	$3,364.00
27	GM 5-1/2 TREAD BRAKE UNIT RH HANDBRAKE	Wabtec	USD	$3,682.47
28	DISC BRAKE PADS	Wabtec	USD	$19.48
29	D-7 OPERATING UNIT	Wabtec	USD	$16,226.85
30	(26C) SERVICE PORTION	Wabtec	USD	$4,833.68
31	(J12.1) RELAY VALVE BRAKE CONTROL	Wabtec	USD	$1,679.74
32	26-B-1 BRAKE VALVE	Wabtec	USD	$9,283.66
33	(H5) BRAKE CONTROL VALVE	Wabtec	USD	$701.66
34	BRAKE CONTROL VALVE (LOAD)	Wabtec	USD	$1,406.42
35	HP-1-C DISC BRAKE UNIT	Wabtec	USD	$6,167.17
36	DISC BRAKE HUB 24" DIA	Wabtec	USD	$941.15
37	E-7 DECELOSTAT CONTROLLER	Wabtec	USD	$15,805.13
38	D-1 DECELOSTAT VALVE	Wabtec	USD	$2,469.41
39	SPEED SENSOR CABLE ASSEMBY	BOMBARDIER	USD	$232.47
40	FILTER-"H"	Wabtec	USD	$1,792.22
41	EMERGENCY BRAKE HANDLE	STARTING	USD	$1.39
42	EMERGENCY BRAKE CAP	STARTING	USD	$2.47
43	HAND BRAKE	ELLCON	USD	$1,913.63
	AIR CONDITIONING			
44	HVAC UNIT	WESTCODE	USD	$77,267.93
45	COMPRESSOR ASSEMBLY	WESTCODE	USD	$6,406.96
46	CONDENSER MOTOR	WESTCODE	USD	$2,029.15
47	CONDENSER FAN	WESTCODE	USD	$530.71
48	CONDENSER COIL	WESTCODE	USD	$8,658.09
49	EVAPORATOR MOTOR	WESTCODE	USD	$1,382.69
50	EVAPORATOR COIL	WESTCODE	USD	$9,145.71
51	NOT USED	N/A		$0.00
52	HVAC STATUS PANEL	WESTCODE	USD	$9,899.82
53	ZONE SENSORS C/W PROTECTIVE METAL COVER AND MOUNTING PLATE	WESTCODE	USD	$756.63

54	DUCT SENSORS	WESTCODE	USD	$568.53
55	BLOWER, FRESH AIR FAN ASSEMBLY	AIRDEX	USD	$122.33
56	MOTOR, FRESH AIR FAN ASSEMBLY	AIRDEX	USD	$73.00
	HEATING			
57	DOOR POCKET DUCT HEATER 480 VAC 1.8KW COMPLETE WITH OVERHEAT PROTECTION	CCI THERMAL TECHNOLOGIES INC	USD	$365.01
58	HEAT LIMITER BASE BOARD (190F)	TBD	USD	$40.89
59	FORCED-FLOW UNDERSEAT HEATERS RH 0.5kw COMPLETE WITH OVERHEAT	CCI THERMAL TECHNOLOGIES INC	USD	$876.02
60	FORCED-FLOW UNDERSEAT HEATERS LH 0.5kw COMPLETE WITH OVERHEAT	CCI THERMAL TECHNOLOGIES INC	USD	$876.02
61	SIDE DOOR THRESHOLD HEATER 500W/480 VOLTS	TRIVOLT	USD	$389.81
62	HEATER ELEMENT 120V 250W 42.50"	TRIVOLT	USD	$86.40
63	HEATER ELEMENT 120V 242W 42.50"	TRIVOLT	USD	$86.40
64	HEATER ELEMENT 240V 366W 53.88"	TRIVOLT	USD	$99.15
65	HEATER ELEMENT 120V 242W 53.88"	TRIVOLT	USD	$99.15
66	HEATER ELEMENT 60V 242W 53.88"	TRIVOLT	USD	$99.15
67	HEATER ELEMENT 120V 367W 53.88"	TRIVOLT	USD	$99.15
68	HEATER ELEMENT 60V 250W 42.50"	TRIVOLT	USD	$99.15
69	HEATER ELEMENT 60V 240W 42.50"	TRIVOLT	USD	$86.40
70	HEATER ELEMENT 240V 330W 48.75"	TRIVOLT	USD	$86.40
71	HEATER ELEMENT 240V 160W 25.84"	TRIVOLT	USD	$86.40
72	HEATER ELEMENT KIT	TRIVOLT	USD	$26.93
	LAVATORY			
73	NOT USED	N/A		$0.00
74	NOT USED	N/A		$0.00
75	NOT USED	N/A		$0.00
76	FRAMED MIRROR	FLOYD'S	USD	$191.36
77	FAUCET-HANDICAPPED 2 GPM@20 Psig STATIC	MICROPHOR	USD	$150.26
78	TOILET TISSUE HOLDER	FRANKLIN	USD	$25.52
79	WASHROOM DOOR ASSY	BOMBARDIER	USD	$1,924.97
80	WASHROOM DOOR ASSY	BOMBARDIER	USD	$2,781.14
81	WASHROOM DOOR TRACK & HANGER ASSY	ELLCON	USD	$425.25
82	WASHROOM DOOR TRACK & HANGER ASSY	ELLCON	USD	$425.25
83	AUTO DRAIN VALVE 3/4"	OGONTZ	USD	$266.49
84	WASHROOM EXHAUST FAN	AIRDEX	USD	$52.09
85	CABINET-MULTI PURPOSE UNIT MPU-5 MODIFIED	GENERAL ACCES MFG CO.	USD	$375.27
86	SINK-OVAL C/W WALTEC DRAIN	WALTECH	USD	$55.28
87	SINK DRAIN COVER .050 SST TYPE 304 #4	NORTHLAND	USD	$52.45
88	FAUCET-HANDICAPPED 2 GPM@20 psig STATIC	MICROPH.	USD	$154.51
89	SINK-OVAL C/W DRAIN COLLAR	KINDRED	USD	$103.39
90	SEAT COVER DISPENSER 2-3/8X11-1/2"X15"W	BRADLEY	USD	$193.87

91	LIQUID SOAP DISPENSER	BOBRICK	USD	$38.27
92	TOILET TISSUE HLDR 6-1/4"X 6-1/4" X 3"D	FRANKLIN	USD	$25.52
93	PAPER TOWEL DISPENSER SURFACE MOUNTED	BOBRICK	USD	$59.75
94	TEMPERED SAFETY GLASS MIRROR	TBD	USD	$118.55
95	TOILET COVER ASSEMBLY MODEL #92	OLSONITE	USD	$19.85
	EMERGENCY EQUIPMENT			
96	FIRE EXTINGUISHER 5 LB PRESSURIZED	AMEREX	USD	$63.32
97	AXE - PROPERTY OF CFCRT	TBD	USD	$36.50
98	HAND SAW -PROPERTY OF CFCRT	TBD	USD	$30.29
99	PRY BAR - PROPERTY OF CFCRT	TBD	USD	$40.94
100	SLEDGE HAMMER - PROPERTY OF CFCRT	TBD	USD	$42.51
101	SPLITTER - PROPERTY OF CFCRT	TBD	USD	$106.17
102	FIRST AID KIT	ZEE	USD	$92.14
	ELECTRICAL			
103	RECEPTACLE 480V WITH HOUSING ASSY	CLEMENTS	USD	$533.55
104	DUMMY PLUG	CLEMENTS	USD	$141.75
105	RECEPTACLE-27 PIN LOCO CONTROL	CLEMENTS	USD	$143.17
106	RECEPTACLE-27 PIN CAR CONTROL	CLEMENTS	USD	143.17
107	RECEPTACLE-27 PIN LOCO CONTROL	CLEMENTS	USD	389.46
108	27 PIN CAR CONTROL TRANSITION ASSY	CLEMENTS	USD	375.64
109	27 PIN CAR CONTROL JUMPER ASSY	CLEMENTS	USD	382.94
110	RECEPTACLE-27 PIN LOCO CONTROL 27	CLEMENTS	USD	156.28
111	PIN LOCO CONTROL JUMPER ASSY	CLEMENTS	USD	425.75
112	TRANSFORMER - 15 KVA 120 VOLTS/240 VAC	HAMMOND	USD	2,825.08
113	LVPS - BATTERY CHARGER(CAB)	TECHNOLOGIES LANKA	USD	13,820.63
114	LVPS - BATTERY CHARGER(COACH)	TECHNOLOGIES LANKA	USD	13,111.88
115	BATTERY(COACH) 6 CELL	HOPPECKE	USD	1,502.15
116	BATTERY(CAB) 6 CELL	HOPPECKE	USD	2,155.27
117	JUMPER CABLE -INTER TRAY 30" LG-CABLE	HOPPECKE	USD	47.02
118	JUMPER CABLE -INTER TRAY 26" LG-CABLE	HOPPECKE	USD	40.48
119	ELECTROLYTIC TOPPING UP APPARATUS	HOPPECKE	USD	318.94
120	REMOTE BATTERY STATUS DISPLAY UNIT	TECHNOLOGIES LANKA	USD	992.25
121	TEMPERATURE SENSOR	TECHNOLOGIES LANKA	USD	375.64
122	FLANGE MOUNTED CABLE GRIP	CLEMENTS	USD	80.80
123	TRANSFORMER- CONTROL 3KVA 480/120	TRANSFAB	USD	701.66
124	TRANSFORMER 15KVA	MARCUS	USD	2,825.08
125	AC-DC POWER CONVERTOR AC120 - DC 72	POWER-ON	USD	2,268.00
126	MDT DIGITAL TERMINAL DISPLAY	CONT COR	USD	2,060.27
127	POWER SUPPLY-100W,120VACIMPUT,12VDC/8A	ABSOPULS	USD	211.21
128	POWER SUPPLY 72VDC TO 13.8VDC	CONT COR	USD	1,794.80
129	LOADMETER	TRAINLINE	USD	921.38
130	CIRCUIT BREAKER 250 VOLT	HEINEMAN	USD	18.71
131	CIRCUIT BREAKER 250 VOLT	HEINEMAN	USD	18.71

132	CIRCUIT BREAKER 250 VAC	HEINEMAN	USD	18.71
133	CIRCUIT BREAKER 250 VAC	HEINEMAN	USD	18.71
134	CIRCUIT BREAKER 250 VOLT	HEINEMAN	USD	19.96
135	CIRCUIT BREAKER 600V 60HZ 15 AMPS 3 POLE	HEINEMAN	USD	267.30
136	CIRCUIT BREAKER 600V 60HZ 20 AMPS 3 POLE	HEINEMAN	USD	250.02
137	CIRCUIT BREAKER 600V 60HZ 35 AMP 2 POLE	HEINEMAN	USD	237.86
138	CIRCUIT BREAKER 600V 60HZ 35AMPS 3 POLE	HEINEMAN	USD	263.17
139	CIRCUIT BREAKER 600V 60HZ 10 AMPS 3 POLE	HEINEMAN	USD	267.30
140	CIRCUIT BREAKER 80 VDC 1 AMPS, 2 POLES	HEINEMAN	USD	47.17
141	CIRCUIT BREAKER 80 VDC 5 AMPS, 2 POLES	HEINEMAN	USD	47.17
142	CIRCUIT BREAKER 80 VDC 10 AMPS, 1 POLES	HEINEMAN	USD	19.14
143	CIRCUIT BREAKER 80 VDC 10 AMPS, 2 POLES	HEINEMAN	USD	47.17
144	CIRCUIT BREAKER 80 VDC 20 AMPS, 2 POLES	HEINEMAN	USD	47.17
145	CIRCUIT BREAKER 80 VDC 30 AMPS, 2 POLES	HEINEMAN	USD	47.17
146	CIRCUIT BREAKER 80 VDC 50 AMPS, 2 POLES	HEINEMAN	USD	47.17
147	CIRCUIT BREAKER 80 VDC 15 AMPS, 2 POLES	HEINEMAN	USD	47.17
148	CIRCUIT BREAKER 600V 60HZ 40 AMPS 3 POLE	HEINEMAN	USD	285.48
149	CIRCUIT BREAKER 480 VAC 125A,60Hz	ABB	USD	546.83
150	EXTERIOR LIGHTING CONTROL UNIT	TRANSTEC	USD	3,851.35
151	CIRCUIT BREAKER 80 VDC 3 AMP, 2 POLES	HEINEMAN	USD	59.49
152	CIRCUIT BREAKER 250 VAC 5 AMP	HEINEMAN	USD	18.71
	DOORS			
153	R.H. SIDE DOOR LESS TRACK AND HANGER	BOMBARDIER	USD	4,394.25
154	L.H. SIDE DOOR LESS TRACK AND HANGER	BOMBARDIER	USD	4,394.25
155	SLIDING END DOOR	BOMBARDIER	USD	5,498.48
156	DOOR OPERATOR, EMERGENCY LEFT HAND	VAPOR	USD	2,890.67
157	DOOR OPERATOR, EMERGENCY RIGHT HAND	VAPOR	USD	2,890.67
158	DOOR EDGE - GROOVE 80"	VAPOR	USD	155.90
159	DOOR EDGE - TONGUE 80"	VAPOR	USD	155.90
160	DOOR INTERLOCK SWITCH LH	VAPOR	USD	187.93
161	DOOR INTERLOCK SWITCH RH	VAPOR	USD	187.93
162	STAFF SWITCH EXTERIOR	VAPOR	USD	883.00
163	END DOOR OPERATOR ASSY	Semec	USD	2,660.00
164	END DOOR LOCK (KEEPER)	JAMES	USD	39.79
165	END DOOR LATCH	JAMES	USD	589.91
166	PUSHBUTTON SWITCH PANEL LOWER LEVEL RH	VAPOR	USD	4,846.43

167	PUSHBUTTON SWITCH PANEL LOWER LEVEL LH	VAPOR	USD	4,846.43
168	DOOR CONTROL MODULE	VAPOR	USD	11,423.36
171	EMERGENCY BOX ASS'Y- EXTERIOR	VAPOR	USD	714.08
172	EMERGENCY BOX ASS'Y- INTERIOR LH	VAPOR	USD	498.69
173	EMERGENCY BOX ASS'Y- INTERIOR RH	VAPOR	USD	498.69
174	PASSENGER CONTROL SWITCH INTERIOR	VAPOR	USD	236.65
175	PASSENGER CONTROL SWITCH EXTERIOR	LANKA	USD	215.46
176	LOCAL DOOR SWITCH	VAPOR	USD	792.28
177	DOOR CLOSURE SERIES 7700ST	YALE	USD	348.59
178	DOOR LOCK KEEPER	JAMES	USD	41.46
179	DOOR LOCK - CAB CREW LOCKER	JAMES	USD	579.16
180	EMERGENCY RELEASE MECHANISM	JAMES	USD	191.08
181	DOOR LOCK ASSEMBLY WITH SAFETY RELEASE	JAMES	USD	991.75
182	KEEPER	JAMES	USD	61.31
183	CLAMP - HINGE TYPE	BASSICK	USD	5.56
184	DOOR LOCK-TOILET	JAMES	USD	681.96
185	ROLLER GUIDE CHANNEL	VAPOR	USD	18.38
186	END DOOR LOCK (KEEPER)	JAMES	USD	36.78
187	DOOR LOCK - SLIDING TOILET DOOR LOCK-LEFT	JAMES	USD	681.82
188	END DOOR LOCK	JAMES	USD	751.28
189	DOOR LOCK ASSY - CAB ENDL.H. DOOR LOCK	JAMES	USD	1,008.00
190	DOOR LOCK - CAB CREW LOCKER	JAMES	USD	546.38
191	CAB DOOR LOCK WITH FULL WIDTH PUSH BAR	JAMES	USD	1,054.00
192	CAB DOOR LOCK 5/16" SQ	JAMES	USD	1,054.00
193	DOOR LOCK #46 UNIV TOOL BOX TYPE STEEL	HANSEN	USD	1.91
194	LOCK & CAM ASSEMBLY	COMPX	USD	11.69
195	END DOOR LATCH	JAMES	USD	589.91
196	EXT TOUCH PLATE ASSY W/GASKET	TECH. LA	USD	215.46
	WHEELCHAIR LIFT AND RAMP			
197	WHEELCHAIR LIFT ASSEMBLY	RICON	USD	36,004.50
198	MAGNETIC SENSORS -STOWED	RICON	USD	43.86
199	ELECTRIC PUMP ASSEMBLY	RICON	USD	1,403.33
200	WHEELCHAIR RAMP	BOMBARDIER	USD	3,023.53
200A	STOW LATCH BLOCK	RICON	USD	447.63
200B	MAGNETIC SENSORS - PLATFORM	RICON	USD	24.31
200C	MANUAL PUMP HANDLE	RICON	USD	16.87
200D	ELECTRIC PUSH BUTTONS - LIFT CONTROL	RICON	USD	113.57
200E	LED DEPLOYMENT LIGHT	RICON	USD	8.77
200 F	PLATFORM GAS STRUTS	RICON	USD	272.81
	WINDOWS			
201	GLASS-SIDE WINDOW LARGE	PRELCO	USD	316.53
202	GLASS-SIDE WINDOW SMALL	PRELCO	USD	231.85
203	END DOOR WINDOW	PRELCO	USD	83.80
204	FILLER STRIP EMERGENCY EXIT	ELLCON	USD	24.10

	WINDOW			
205	CAB END DOOR WINDOW	DYNAMIC	USD	1,783.41
206	RETAINING "H" TIRE 148.32"	ELLCON	USD	163.01
207	SIDE DOOR WINDOW	PRELCO	USD	83.80
208	POCKET SLIDING SASH	DYNAMIC METALS	USD	4,501.53
209	ELECTRICALLY HEATED WINDSHIELD	DYNAMIC METALS	USD	3,130.46
210	EMERGENCY EXIT WINDOW	ELLCON	USD	1,145.34
211	EMERGENCY WINDOW INSTRUCTIONAL DECAL	ELLCON	USD	19.14
212	VANDAL RESISTANT FILM- CAB END DOOR WINDOW	GRAFFITI REMOVAL INC	USD	8.53
213	VANDAL RESISTANT FILM- SIDE WINDOW GLASS-SMALL	GRAFFITI REMOVAL INC	USD	66.00
214	VANDAL RESISTANT FILM- SIDE WINDOW GLASS-LARGE	GRAFFITI REMOVAL INC	USD	325.00
215	VANDAL RESIST. FILM-END/SIDE DOOR WINDOW	GRAFFITI REMOVAL INC	USD	38.78
216	VANDAL RESISTANT FILM - EMERG EXIT WINDOW	GRAFFITI REMOVAL INC	USD	228.27
217	VANDAL RESISTANT FILM - CAB DOOR WINDOW	GRAFFITI REMOVAL INC	USD	9.70
218	VANDAL RESISTANT FILM - CAB PARTITION GLASS	GRAFFITI REMOVAL INC	USD	9.20
219	VANDAL RESISTANT FILM - L/L PARTITION GLASS	GRAFFITI REMOVAL INC	USD	7.57
220	VANDAL RESISTANT FILM - I/L PARTITION GLASS	GRAFFITI REMOVAL INC	USD	21.01
221	INSTALLATION KIT-WINDOW FILM	GRAFFITI REMOVAL INC	USD	417.03
222	GLASS-CAB PARTITION 0.25"X25.875X28.875	TBD	USD	27.30
223	GLASS - CAB DOOR 0.25 X 13.375 X 31.375	TBD	USD	15.72
224	GLASS-PARTITION 0.375"X 25.625 X 32.000	TBD	USD	126.57
225	END PANEL 0.375" X 9.884" X18.094"	TBD	USD	175.77
226	GLASS-PARTITION 0.375"X 19 X 16.5	TBD	USD	46.04
227	DOOR WINDOW SEAL-RUBBER 83.0" LG	SAS	USD	36.86
228	NEOPRENE RUBBER EXTRN U CHANNEL 102" LG	TBD	USD	49.61
229	LARGE WINDOW SEAL-RUBBER147.875" LG	SAS	USD	68.04
230	SMALL WINDOW SEAL 115.125" LG	SAS	USD	56.70
	LIGHTING			
231	INTERIOR LIGHT - 48" LAMP C/W 120 VAC BALLAST 2 LAMP OPERATION	TDG	USD	332.87
232	INTERIOR LIGHT - 48" LAMP C/W 72VDC INVERTER BALLAST 1 OR 2 LAMP OPERATION	TDG	USD	442.00
233	INTERIOR LIGHT - 48" LAMP NO BALLAST	TDG	USD	305.57
234	INTERIOR LIGHT - 36" LAMP NO BALLAST	TDG	USD	272.85
235	END FILLER 60"	TDG	USD	499.43
236	VESTIBULE FIXTURE 72 VDC C/W BALLAST	TDG	USD	439.27

237	VESTIBULE FIXTURE 120VAC C/W BALLAST	TDG	USD	331.55
238	EXTERIOR SIDE INDICATOR LIGHT	TDG	USD	671.12
239	TOILET - OCCUPIED SIGN (LED)	TDG	USD	156.89
240	END DOOR LIGHT FIXTURE LED	TDG	USD	190.99
241	DOOR CLOSE WARNING LIGHT - LED	TDG	USD	143.55
242	STAIRWELL LIGHT FIXTURE - LED	TDG	USD	226.90
243	INTERIOR LIGHT - 36" LAMP C/W 120VAC BALLAST 1 LAMP OPERATION	TDG	USD	319.60
244	INTERIOR LIGHT - 48" LAMP C/W 120VAC BALLAST 1 LAMP OPERATION	TDG	USD	332.87
245	INTERIOR LIGHT - 36" LAMP C/W 72VDC BALLAST 1 OR 2 LAMP OPERATION	TDG	USD	428.50
246	CAB CEILING LIGHT FIXTURE-LED	TDG	USD	253.17
247	LED MARKER LIGHT RED	TDG	USD	284.55
248	CAR RUN NUMBER SIGN	TDG	USD	671.97
249	LAMP, 120V 40W	GE	USD	1.42
250	LAMP, 200W PAR 56	GE	USD	40.40
	SEATING			
251	SEAT SHELL ASSY - BACK TO BACK	TBD	USD	240.27
252	SEAT SHELL ASSY - SINGLE- LOW BACK	TBD	USD	75.72
253	SEAT SHELL ASSY - SINGLE- LOW BACK	TBD	USD	75.72
254	SEAT SHELL ASSY - SINGLE- LOW BACK	TBD	USD	72.83
255	SEAT SHELL ASSY - SINGLE- LOW BACK	TBD	USD	85.53
256	SEAT SHELL ASSY - SINGLE- HIGH BACK	TBD	USD	88.93
257	SEAT SHELL ASSY - SINGLE- HIGH BACK	TBD	USD	85.11
258	SEAT SHELL ASSY - SINGLE LOW BACK	TBD	USD	86.55
259	ARMREST - MOULDED FIBERGLASS	TBD	USD	23.71
260	SEAT ASSY-FOLDING 3 PASSENGER	TBD	USD	3,917.06
261	SEAT ASSY-FOLDING 1 PASSENGER	TBD	USD	1,852.20
262	SEAT FILLER	TBD	USD	14.22
263	HEADREST CUSHION SINGLE	TBD	USD	38.06
264	SEAT CUSHION BACK ASSY	TBD	USD	117.65
265	HEADREST CUSHION BK/BK	TBD	USD	72.97
266	COVER - SEAT BASE	ALGRA PLASTICS	USD	18.78
267	COVER - SEAT BACK	ALGRA PLASTICS	USD	21.46
268	COVER - SEAT BASE	ALGRA PLASTICS	USD	21.46
269	SEAT CUSHION BOTTOM	TBD	USD	134.66
	FLOORING			
270	RUBBER FLOORING (39.37 x 39.37 x .14 tiles)	NORA	USD	876.09
271	RUBBER FLOORING	TBD	USD	88.64
272	STAIR NOSING-TREAD RISER	NORA	USD	117.47
273	FLOORING TRIM (500 ft)	TBD	USD	1.60
	INTERIOR			
274	WINDSCREEN GLASS	TBD	USD	116.65
275	GLASS-CAB PARTITION	TBD	USD	27.30
276	WINDOW FRIEZE	TBD	USD	42.11
277	WINDOW FRIEZE	TBD	USD	47.42

278	WINDOW FRIEZE	TBD	USD	51.21
279	WINDOW FRIEZE	TBD	USD	53.43
	EVENT RECORDER			
280	TRAIN MONITORING SYSTEM AUDIO ALARM PANEL	BACH-SIMPSON	USD	1,124.08
281	SPEED SENSOR	BACH-SIMPSON	USD	242.39
282	PRESSURE SWITCH	BACH-SIMPSON	USD	70.73
283	SPEEDOMETER DISPLAY C/W INTEGRAL BOX RECPTACLE AND WARNING LIGHT	BACH-SIMPSON	USD	1,729.66
284	SPEED INDICATOR CONTROL MODULE	BACH-SIMPSON	USD	2,603.56
285	ISOLATION AMPLIFIER	BACH-SIMPSON	USD	1,720.24
286	TRANSDUCER - PRESSURE	BACH-SIMPSON	USD	701.66
287	EVENT RECORDER	BACH-SIMPSON	USD	12,187.67
	DESTINATION SIGN			
288	OPERATOR DISPLAY KEYBOARD	AXION	USD	2,567.09
289	SIDE DESTINATION SIGN	AXION	USD	8,463.89
290	CABLE UPLOAD INTERFACE	AXION	USD	252.32
	PA & INTERCOM\ COMMUNICATION			
291	INTERIOR SPEAKER	AXION	USD	158.76
292	EXTERIOR SPEAKER	AXION	USD	199.87
293	PAA MOUNTING BASE	AXION	USD	1,540.82
294	CONDUCTOR'S HANDSET C/W 8 PIN CONNECTOR	AXION	USD	758.36
295	RADIO ANTENNA LOW PROFILE	CONT COR	USD	70.69
296	GPS ANTENNA 1575 MHZ	CONT COR	USD	161.54
297	WLAN ANTENNA CABLE 30FT	CONT COR	USD	206.13
298	RADIO ANTENNA CABLE 30FT	CONT COR	USD	354.91
299	ANTENNA, WLAN	CONT COR	USD	122.03
300	WIPORT WLAN BOX ASSY	CONT COR	USD	735.17
301	REMOTE CONTROL CABLE (20 FEET LONG)	MOTOROLA	USD	704.06
302	HANDSET - C/W 10' CORD &6-PIN CONNECTOR	GETS	USD	158.76
303	HANDSET HANGER	WEGU	USD	58.83
304	HANDSET HOLDERS	MOTOROLA	USD	435.88
305	RADIO-CLEANCAB, REMOTE MODEL 12RII-SR	GETS	USD	3,969.00
306	HANDSET CRADLE SWITCH	GETS	USD	134.66
307	MA-COMM 7100 RADIO	CONT COR	USD	10,521.39
308	SONALERT-AUDIBLE SIGNAL MALLORY#SC616-N	SAFETRAN	USD	26.86
309	RADIO REMOTE CONTROL HEAD	GETS	USD	1,204.88
310	AAR RADIO TRAY	GETS	USD	104.90
311	CABLE W2, EEPROM	CONT COR	USD	385.72
312	MALE TO MALE MDT DIGITALCABLE	CONT COR	USD	$233.31
313	GPS CABLE, 35FT	CONT COR	USD	$75.37
314	W1 CABLE HARNESS POWER	CONT COR	USD	$474.61
315	W4 CABLE HARNESS	CONT COR	USD	$572.23
316	PREAMP/INTERFACE UNIT	SAFETRAN	USD	$5,772.06
317	DRIVER SPEAKER, LARGE	CONT COR	USD	$100.19
	MISCELLANEOUS			

318	STAFF KEY	JAMES L. HOWARD	USD	$31.81
319	MAINTENANCE KEY	JAMES L. HOWARD	USD	$76.53
320	DECAL INSTALLATION CAB AND COACH EXTERIOR	BOMBARDIER	USD	$2,246.74
321	DECAL INSTALLATION COACH INTERIOR	BOMBARDIER	USD	$1,124.08
322	DECAL INSTALLATION CAB INTERIOR	BOMBARDIER	USD	$1,124.08
323	DIAPHRAGM ASSY(COACH & B-END CAB)	SMR	USD	$8,163.38
324	MODULAR DIAPHRAGM ASSY "CAB ONLY"	SMR	USD	$8,245.60
325	WORKTABLE ASSEMBLY	BOMBARDIER	USD	$715.84
326	VESTIBULE CURTAIN ASSEMBLY GRAY	ADAMS & WESTLAKE	USD	$231.28
327	ROUTE MAP FRAME 0.750 X 12.71 X 36.71	INPS	USD	$86.47
328	LITERATURE RACK 18.250" X 23.00"	TBD	USD	$267.69
329	TRASH CAN NOTCHED INT. LEVEL	TBD	USD	$722.93
330	WASTE RECEPTACLE ASSY .037X9.000X20.375	TBD	USD	$219.71
331	WASTE RECEPTACLE ASSY .037X 9.00X 17.50	TBD	USD	$262.24
332	WASTE RECEPTACLE ASS'Y	TBD	USD	$635.04
333	GRAB BAR - 18 GA SST TYPE 304 #4 FINISH	BRADLEY	USD	$111.84
334	GRAB BAR	TBD	USD	$97.78
335	MOLDING - STAIRWAY VACUUM FORMED	TBD	USD	$42.13
336	COVER .094" X 13.530" X 65.25"	TBD	USD	$119.16
337	MOULDING-LOWER STAIRWAY*L/H	TBD	USD	$35.85
338	MOULDING-CORNER STAIR WAY	TBD	USD	$32.26
339	MOULDING-SIDE STAIRWAY *	TBD	USD	$21.11
340	MOULDING - DOOR POCKET *	TBD	USD	$35.31
341	MOULDING - DOOR POCKET *	TBD	USD	$35.31
342	MOULDING - DOOR POCKET *	TBD	USD	$35.31
343	MOULDING - DOOR POCKET *	TBD	USD	$35.31
344	MOULDING - DOOR POCKET *	TBD	USD	$35.31
345	MOULDING - CEILING TRANSITION	TBD	USD	$27.49
346	MOULDING - CENTRE STWY *R/H	TBD	USD	$49.54
347	MOULDING - CENTRE STWY *L/H	TBD	USD	$45.01
348	MOLDING - TOP STAIRWAY *CEILING	TBD	USD	$45.01
349	MOLDING - CB LOCKER	TBD	USD	$27.32
	CAB CAR SPECIFIC			
350	OPERATOR'S SEAT	NATIONAL SEATING CO.	USD	$912.02
351	20" FLEXIBLE BLADE	TRANS TECH	USD	$28.07
352	WINDSHIELD WIPER MOTOR 24V & BKT ASSY	TRANS TECH	USD	$302.59
353	20" DRY ARM PANTOGRAPH	TRANS TECH	USD	$122.64
354	PIVOT MOUNTING PLATE ASSY	SPRAGUE	USD	$5.90
355	HEX NUT	SPRAGUE	USD	$1.89
356	WEATHER SEAL	SPRAGUE	USD	$0.47
357	GM CONTROLLER	TBD	USD	$14,788.78

358	END DOOR LOCK	JAMES L. HOWARD	USD	$751.40
359	WEDGE LOCK ASSEMBLY	JAMES L. HOWARD	USD	$389.17
360	HORN	WINDHAM	USD	$1,185.03
361	STROBE MARKER LIGHT 72 VDC RED	STAR	USD	$219.71
362	DITCHLIGHT ASSY SEMI-FLUSH SEALED BEAM	TRANSLITE INC.	USD	$170.10
363	HEADLIGHT ASSY SEMI-FLUSH DUAL SEALED BEAM	TRANSLITE INC.	USD	$354.38
364	LAMP 350 WATTS #350 PAR 56 SP	GENERAL ELECTRIC	USD	$63.79
365	COMPLETE PILOT	BOMBARDIER	USD	$11,232.27
366	REMOTE CONTROL HEAD (ONE HEAD OPERATION)	MOTOROLA	USD	$2,004.61
367	ANTENNA VHF	SINCLAIR	USD	$392.79
368	BELL - ELECTRONIC	TRANSTRONIC	USD	$1,240.31
369	BELL - TYPE DC VIBR	JENKINS	USD	$270.19
370	SUN VISOR	PRIME	USD	$36.12
371	CAB HEATER	CCI THERMAL TECHNOLOGIES	USD	$1,502.55
372	MIRROR - HEATED	GROTE	USD	$74.67
373	CURTAIN CAB DOOR	ADAMS & WESTLAKE	USD	$219.71
374	SONALERT-AUDIBLE SIGNAL MALLORY#SC616-N	SAFETRAN	USD	$21.46
375	WET KIT	TRANSTEC	USD	$39.75
376	PANTOGRAPH ADAPTOR KIT	TRANSTEC	USD	$70.88
377	HOSE FITTING CONNECTOR	TRANSTEC	USD	$28.49
378	WASH TANK SUB-ASSY	HEPWORTH	USD	$595.35
379	LOADMETER	TRAINL.	USD	$921.38
380	CONTROL VALVE	SPRAGUE	USD	$20.02
381	DUPLEX AIR GAUGE	GRAHAM	USD	$2,574.66
382	CAB HEATER GRILL 4.750" X 7.750"	EH PRICE	USD	$616.71
383	COAT HOOK	ADAMS R.	USD	$75.45
384	TRAIN ORDER CLIP	LOWERY	USD	$0.82
385	BRACKET-CURTAIN ROLLER SLOTTED	A & W	USD	$7.02
386	BRACKET-CURTAIN ROLLER PIVOT	A & W	USD	$7.02
387	STUD-RETAINER BRASS NICKEL PLATED	SPAE	USD	$2.91
388	CARD HOLDER 2 SLOT 1.00 X 10.13 X 12.38	POWER	USD	$75.68
389	FLASHLIGHT & BRACKET	DME	USD	$153.63
390	WINDSHIELD WIPER POWER UNIT	TRANSTEC	USD	$3,614.63
391	WINDSHIELD WIPER CONTROLSWITCH	TRANSTEC	USD	$216.54
392	WINDSHIELD WIPER CONTROLSWITCH W/O WASHER LOGO	TRANSTEC	USD	$231.69
393	Trainline Test Box	Bombardier	USD	$27,783.00
394	PTE INTERFACE CABLE	Wabtec	USD	$70.88

Central Florida Commuter Rail Transit
Bi-Level Coaches and Cab Cars
Exhibit B-1, Milestone Payment Detail

Milestone #1,		
Delivery and Acceptance of the Approved Master Program Schedule including engineering and production schedules, Project Management Plan, and Quality Assurance Plan. Acceptance of delivery plan for 1st vehicle, Customer Decision Requirement Matrix	Item Approved By:	
As identified below and in accordance with Exhibit "D" Technical Specification	BTNA	FDOT
1. Delivery and Acceptance of the Master Program Schedule.		
2. Delivery and Acceptance of Engineering Schedule		
3. Delivery and Acceptance of Production Schedule		
4. Delivery and Acceptance of Project Management Plan		
5. Delivery and Acceptance of Quality Assurance plan and Test Program Plan		
6. Delivery and Acceptance of the Quality Assurance Plan		
7. Acceptance of Delivery plan for 1st vehicle		
8. Delivery of Customer Decision Requirement Matrix		

Pay Item Approved By: Date: _____
Florida Department of Transportation

Pay Item Approved By: Date: _____
Bombardier Transit Corporation

Central Florida Commuter Rail Transit
Bi-Level Coaches and Cab Cars
Exhibit B-1, Milestone Payment Detail

Milestone #2,		
Submit Proof of Execution of Purchase Orders for major components to FDOT	Item Approved By:	
As identified below and in accordance with Exhibit "D" Technical Specification	BTNA	FDOT
1. Purchase Order for Trucks		
2. Purchase Order for Brakes		
3. Purchase Order for Lighting		
4. Purchase Order for Door Controls		
5. Purchase Order for Cab Controls		
6. Purchase Order for HVAC units and controls		
7. Purchase Order for Communications Systems (excluding PTC and ATAS)		
8. Purchase Order for steel side sills and aluminum panels for carshells		
9. Purchase Order for seats and seat shells		
10. Purchase Orders for,wheels, axles, couplers, yokes		

Pay Item Approved By: Date: _____
Florida Department of Transportation

Pay Item Approved By: Date: _____
Bombardier Transit Corporation

Central Florida Commuter Rail Transit
Bi-Level Coaches and Cab Cars
Exhibit B-1, Milestone Payment Detail

Milestone #3,		
Delivery of Draft user education plan; Acceptance of Warranty program, Final Delivery Schedule and delivery of Draft Vehicle Hazard Analysis Report, Draft Engineering Drawings & Schematics for existing systems.	Item Approved By:	
As identified below and in accordance with Exhibit "D" Technical Specification	BTNA	FDOT
1. Delivery of Draft User education plan.		
2. Acceptance of Warranty program		
3. Acceptance of Delivery schedule		
4. Draft Vehicle Hazard Analysis Report due.		
5. Draft Engineering Drawings and Schematics for existing systems		

Pay Item Approved By: Date: _____
Florida Department of Transportation

Pay Item Approved By: Date: _____
Bombardier Transit Corporation

Central Florida Commuter Rail Transit
Bi-Level Coaches and Cab Cars
Exhibit B-1, Milestone Payment Detail

Milestone #4,		
Delivery of approved Carshell Stress analysis reports	Item Approved By:	
As identified below and in accordance with Exhibit "D" Technical Specification	BTNA	FDOT
Delivery and approval of Carshell Stress analysis reports		

Pay Item Approved By: Date: _____
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Bombardier Transit Corporation

Central Florida Commuter Rail Transit
Bi-Level Coaches and Cab Cars
Exhibit B-1, Milestone Payment Detail

Milestone #5,		
Submission of proof of successful completion of First Article Inspections on all major subsystems, (FAI = First Article Inspection)	Item Aproved By:	
As identified below and in accordance with Exhibit "D" Technical Specification	BTNA	FDOT
Major subsystems requiring submittal of FAI documentation.		
1. Air conditioning HVAC & Controls.		
2. Floor Heaters.		
3. Door Controls.		
4. Lighting, operational.		
5. Brake Systems.		
6. Batteries.		
7. LVPS.		
8. Event recorders.		
9. Wheelchair Lift and Bridge plate.		
10. PA/Communication System.		
11. Truck Frame and Bolster.		
12. Assembled Trucks.		

Pay Item Approved BY: Date: _____
Florida Department of Transportation

Pay Item Approved By: Date: _____
Bombardier Transit Corporation

Central Florida Commuter Rail Transit
Bi-Level Coaches and Cab Cars
Exhibit B-1, Milestone Payment Detail

Milestone # 6		
Arrival of the 1st rail worthy vehicle at the contractors final assembly plant, ready for final assembly.	Item Approved By:	
As identified below and in accordance with Exhibit "D" Technical Specification	BTNA	FDOT
1. Completion of customer FAI at the contractors carshell plant and approval for shipment of the first vehicle to the final assembly plant including agreed Open Items list.		
2. Completion of arrival inspection at the contractors final assembly plant .		
3. Action plan for closure of Open item list submitted and accepted.		

Pay Item Approved By: Date: _____
Florida Department of Transportation

Pay Item Approved By: Date: _____
Bombardier Transit Corporation

Central Florida Commuter Rail Transit
Bi-Level Coaches and Cab Cars
Exhibit B-1, Milestone Payment Detail

Milestone #7			
	Arrival of rail worthy vehicles 2 through 14 to conractors final assembly plant, ready for final assembly. Paid on a per vehicle basis	Item Appr oved	By.
	As identified below and in accordance with Exhibit "D" Technical Specification	BTNA	FDOT
	Vehicle #2 Cab Car		
	Vehicle #3 Cab Car		
	Vehicle #4 Cab Car		
	Vehicle #5 Cab Car		
	Vehicle #6 Cab Car		
	Vehicle #7 Cab Car		
	Vehicle #8 Cab Car		
	Vehicle #9 Cab Car		
	Vehicle #10 Coach Car		
	Vehicle #11 Coach Car		
	Vehicle #12 Coach Car		
	Vehicle #13 Coach Car		
	Vehicle #14 Coach Car		

Pay Item Approved By: Date: _____
Florida Department of Transportation
Pay Item Approved By: Date: _____
Bombardier Transit Corporation

Central Florida Commuter Rail Transit
Bi-Level Coaches and Cab Cars
Exhibit B-1, Milestone Payment Detail

Milestone #8		
Delivery of 1st vehicle, delivery of Draft Integrated Schematics, delivery of Draft Operations and Maintenance Manuals, delivery of Final Vehicle Hazard Analysis and delivery of Warranty Bond	Item Approved By:	
As identified below and in accordance with Exhibit "D" Technical Specification	BTNA	FDOT
1. Vehicle delivered to specified location.		
2. Draft integrated schematics delivered.		
3. Draft Operations and Maintenance Manuals delivered, for approval.		
4. Vehicle inspected for damage resulting from transport		
5. Transport damage documented and corrective action plan submitted		
6. Delivery of Final Vehicle Hazard Analysis		
7. Delivery of Warranty Bond		

Pay Item Approved By: Date: _____

Florida Department of Transportation

Pay Item Approved By: Date: _____

Central Florida Commuter Rail Transit
Bi-Level Coaches and Cab Cars
Exhibit B-1, Milestone Payment Detail

Bombardier Transit Corporation

Milestone #9		
Delivery and successful completion of commissioning of Each vehicle for revenue service paid on a per vehicle basis.	Item Aproved By:	
As identified below and in accordance with Exhibit "D" Technical Specification	BTNA	FDOT
Major subsystems requiring inspection and approval		
1. Air conditioning HVAC & Controls tested and fully functional		
2. Floor Heaters tested and fully functional		
3. Door Controls tested and fully functional		
4. Lighting tested and fully functional		
5. Seats, Arrangement, Style and Colors as required		
5a. Flip up seats installed as required, tested and functional		
6. Brake Systems tested and fully functional		
7. Batteries tested and fully functional		
8. LVPS tested and fully functional		
9. Event recorders tested and fully functional		
10. Wheelchair Lift tested and fully functional.		
11. Bridge plate fits as required and size is as per specification, storage acceptable		
12. Radio tested and fully functional		
13. PA/Communication System, tested and fully functional.		
14. Wheels and Axles, inspected and approved		
15. Truck Frame and Bolster, inspected and approved		
16. Assembled Trucks, tested and fully functional		
17. Provisions for Positive Train Control, wiring tested for continuity and capacity		
18. Video Surveillance system tested and fully functional.		
19. Vehicle ready for revenue service		
20. Vehicle Testing complete as per section 14 of Exhibit "D" Vehicle Design Criteria		

Pay Item Approved By: Date: _____
Florida Department of Transportation

Pay Item Approved By: Date: _____
Bombardier Transit Corporation

Central Florida Commuter Rail Transit
Bi-Level Coaches and Cab Cars
Exhibit B-1, Milestone Payment Detail

Milestone #10		
Successful completion of heavy maintenance training and heavy maintenance manuals. Successful Completion of Light Maintenance and Operators Training Program, (includes running maintenance and repair training and acceptance of Final Running Maintenance Manual, Parts Catalogs, Maintenance and Operations Manual, and Integrated Schematics)	Item Approved By:	
As identified below and in accordance with Exhibit "D" Technical Specification	BTNA	FDOT
1. Heavy Maintenance Training complete as specified and approved		
2. Heavy Maintenance manuals updated, delivered and approved		
3. Training material updated, delivered and approved (Materials for future training by Central Florida Rail Corridor (CFRC))		
4. Running maintenance and repair training completed as required		
5. Final Running Maintenance Manual delivered as required and accepted		
6. Parts catalogs updated, delivered and accepted		
7. Operations manuals updated, delivered and accepted		
8. Maintenance and Operations Manuals updated, delivered and accepted		
9. Integrated Schematics, updated, verified and delivered as required		
10. Completion of training program		
11. Training materials delivered and accepted		

Pay item Approved By: Date: _____

Florida Department of Transportation

Pay Item Approved By: Date: _____

Bombardier Transit Corporation

Central Florida Commuter Rail Transit
Bi-Level Coaches and Cab Cars
Exhibit B-1, Milestone Payment Detail

Milestone #11		
Completion of Final acceptance of vehicles, paid on a per vehicle basis.	Item Approved By:	
As identified below and in accordance with Exhibit "D" Technical Specification	BTNA	FDOT
1. Each vehicle tested, inspected, and approved, as per the conditions of the contract.		
Completion of open items list and accepted for each vehicle:		
Vehicle #1 Cab Car		
Vehicle #2 Cab Car		
Vehicle #3 Cab Car		
Vehicle #4 Cab Car		
Vehicle #5 Cab Car		
Vehicle #6 Cab Car		
Vehicle #7 Cab Car		
Vehicle #8 Cab Car		
Vehicle #9 Cab Car		
Vehicle #10 Coach Car		
Vehicle #11 Coach Car		
Vehicle #12 Coach Car		
Vehicle #13 Coach Car		
Vehicle #14 Coach Car		

Pay Item Approved By: Date: _____
Florida Department of Transportation

Pay Item Approved By: Date: _____
Bombardier Transit Corporation

Central Florida Commuter Rail Transit
Bi-Level Coaches and Cab Cars
Exhibit B-1, Milestone Payment Detail

Milestone #12		
Successful completion of contract including delivery of "As-Built" drawings and contractor specifications as well as completion of all administrative and technical deliverables with the exception of warranty items outstanding. Source Code has been escrowed, Vehicle History Books have been delivered	Item Approved By:	
As identified below and in accordance with Exhibit "D" Technical Specification	BTNA	FDOT
1. Delivery and acceptance of contractor specification and "As Built Drawings"		
2. Completion of all other open items and deliverables		
3. Source code deposited as per the escrow agreement and approved by the Department		
List of Items to be deposited:		
3a. HVAC Source Code		
3b. Event Recorder software and/or Source Code		
3c. Station Announcement System Software and/or Source Code		
3d. Friction Brake and Wheelslide control		
3e. LPVS/BC		
3f. Doors and Door Controls		
3g. Software for the Video Surveillance System		
4. Vehicle History Books have been delivered and accepted		

Pay Item Approved By: Date: _____
Florida Department of Transportation

Pay Item Approved By: Date: _____
Bombardier Transit Corporation

Exhibit C

STATE OF FLORIDA DEPARTMENT OF TRANSPORATION

VEHICLE PRICING

CONTRACT NO: BDS56
ITN-DOT-08-09-5003-CCC

Date: June 2, 2011

PROJECT DESCRIPTION:
Central Florida Commuter Rail Transit (CFCRT) Bi-Level Coaches and Cab Car Vehicles

The Vendor is required to state the proposed per vehicle rate and submit to Roger Masten Procurement Supervisor Florida Department of Transportation, 719 South Woodland Boulevard, DeLand, Florida 32720 as part of their Technical Proposal. The lump Sum price shall be for the vehicles as specified in Exhibit's "A" Scope of Services and Exhibit "D" Vehicle Technical Specifications and in compliance with all terms and conditions contained within the contract document.

Item Description	Lump Sum Price Per Unit	
INITIAL PROCUREMENT		
Bi-Level Cab Car (Each)	$ 2,998,624.50	for Cab Cars 1 through 9
Bi-Level Coach (Each)	$ 2,729,161.50	for Coaches 1 through 5
OPTIONAL VEHICLES		
Option 1:		
Bi-Level Cab Car (Each)	$ 2,711,433.00	for Cab Cars 10 through 12
Bi-Level Coach (Each)	$ 2,398,958.00	for Coaches 6 through 8
Option 2:		
Bi-Level Cab Car (Each)	$ 2,711,433.00	for Cab Cars 13 through 22
Bi-Level Coach (Each)	$ 2,398,958.00	for Coaches 9 through 38

Cameras and digital video recorder (CCTV & DVR) full integration Included in Prices above as defined in Exhibit "D" Vehicle Design Criteria, Section 3.24

CONTRACT NO:
ITN-DOT-08-09-5003-CCC

PROJECT DESCRIPTION: Central Florida Commuter Rail Transit (CFCRT) Bi-Level Coaches and Cab Car Vehicles

Potential Schedule of Values

Please Refer to Exhibit B & B-1 Payout schedule REV 0 for detailed milestones and payment schedule description.

Exhibit "D"

CENTRAL FLORIDA COMMUTER RAIL TRANSIT

BI-LEVEL COACHES AND CABS
VEHICLE DESIGN CRITERIA

Revision June 3, 2011

Table of Contents

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SECTION 1

1 GENERAL REQUIREMENTS

1.1 Scope

This Technical Specification establishes and controls both the specific and general design parameters for the procurement of locomotive hauled, "push-pull", BOMBARDIER BiLevel™ commuter rail cars by the State of Florida Department of Transportation (the "Department"). The cars supplied shall be configured as cab cars with toilet and trailer cars without toilet. For all parts and components, designs which have a documented satisfactory operating history, as defined in Section 2 shall be provided. The Vendor shall provide equipment which is proven in equivalent or more severe climatic and operating environments. Systems and equipment with limited rail transit service experience will be given consideration by the Department at the Department's discretion, only if accompanied by timely presentations containing sufficient information for the Department to weigh the merits of the design.

The requirements and conditions in the Technical Specification for the Department's vehicles are intended to represent the "minimum acceptable" conditions for the design, manufacture, test and operation of the vehicles and its systems. The Department will entertain the use of other proven designs, methods and standards to be used to meet the intent and spirit of the Specification provided the alternative that is proposed can be shown to have successful, documentable, service proven history. The Department is under no obligation to accept any of these alternative designs and shall not be responsible for any expenses incurred as a result of the Vendor's efforts to gain approval of an alternative design.

The vehicles specified herein will be required to be safe, reliable, maintainable and available, as defined in Section 2. As indicated above, it is preferential that service-proven hardware be incorporated into vehicle design.

The Vendor shall ensure that each manufacturer of major items of equipment; for example: brakes, air conditioning, heating and cooling controls, door operators and controls, trucks, lighting, has a complete copy of the Technical Specification. Cross-referencing between sections of this Specification is provided for convenience only and may not be all inclusive. The Vendor is responsible for meeting all of the requirements of the Specification whether or not provided by a cross-reference.

The Vendor shall strive to design and construct the vehicles to accommodate passengers and Operators that range in size from the 5th percentile female to the 95th percentile male, where possible.

1.2 Definitions

When the following terms are used in these Specifications, the intent and meaning shall be interpreted as follows:

A-End of Car: Defined as the end of the car opposite from the B-end of the car, also designated as F-end of cab car.

AAR Standards: Means the latest issue, as of the times prescribed in Section 1.4. , of the Association of American Railroads *"Manuals of Standards and Recommended Practices"*.

Addendum, Addenda: Written interpretation(s) of, or revision(s) to, any of the Contract Documents issued by the Department before proposal opening.

Adhesion, Coefficient of: During rolling contact, the ratio between the longitudinal tangential force at the wheel-rail interface and normal force.

AMTRAK: Refers to the National Railroad Passenger Corporation.

Analysis: Written report of the systematic examination of parts, components, and systems against Contract and Technical Specification requirements.

Approval: Review and acceptance, in writing, by the Department. (Department approval in no way relieves the Vendor of meeting all requirements of the Specification).

Approved or Approved Type: Design, type of material, procedure, report or method given approval by CFCRT.

Approved Drawings: Shall mean those final (as built) drawings issued by the Vendor, executed in accordance with the requirements of these Specifications, and showing the Work as actually constructed. (The review and concurrence granted by the Department does not relieve the Vendor from any and all contractual obligations and responsibilities under this Contract).

APTA: The latest issue as of the times prescribed in Section 1.4. of the APTA Standards and Recommended Practices as provided in the APTA PRESS Manual of Standards and Recommended Practices for Rail Passenger Equipment.

Availability: The percentage of the car fleet usable for revenue service at the beginning of each day's schedule. Also on per car basis, the percentage of time a car is usable for service (MTBF)/ (MTBF+MTTR).

Baseline Design: The design of the BiLevel Platform vehicle(s) or any of its components, apparatus, systems, subsystems, or materials which has received both design approval and first article approval by CFCRT.

B-End of Car: The end of the car where the hand brake is located, the end opposite the A-end or F-end.

Buff: Compression, as occurs through the coupler and draft gear.

Burn-In: The operational test of an item by the Department, after all routine and commissioning testing requirements have been conducted, to confirm trouble-free operation.

Cab Car: (or Vehicle) refers to a BiLevel car that contains an operator's control cab.

Calculations: Numerical computations performed to demonstrate compliance with the Specifications.

Calibration: Comparing a response of a measuring device of unknown accuracy against one of known. It is performed to detect and eliminate, by adjustment, any variation in accuracy of the unknown measuring device.

Car: (or Vehicle) refers to a single 4-axle BiLevel Platform Cab or Coach car

Carbuilder: see Vendor.

Car History Book: A document specific to an individual car containing records of technical and parts data pertinent to that individual car.

CDRL - Contract Data Requirements List: Contract deliverables to be submitted by the Vendor to the Department as defined in this Technical Specification.

CFCRT: Central Florida Commuter Rail Transit

Characteristics: Any distinct property, or attribute, of the material, or services, that can be described, and measured, to determine conformance, or non-conformance, to Contract requirements.

Coach Car: (or Vehicle) refers to a BiLevel car that does not contain an operator's control cab.

Commissioning: Vendor post-delivery activities involved in delivering, adjusting, and testing the cars in accordance with the Test Program Plan.

Conformed Specification: These Specifications as revised to include and reflect all changes approved by the Department during design or construction.

Contract Data Requirements List (CDRL): Contract deliverables to be submitted by the Vendor to the Department as defined in this Technical Specification.

Contract Drawings: An initial set of drawings showing the general Base Consist layout and arrangement provided by the Department as part of the Contract Documents, as submitted during the Proposal stage.

Contracting Officer's Technical Representative: A designated representative of the Department, responsible for technical issues on behalf of the Department.

Vendor's Drawings: Items such as general arrangement drawings, detail drawings, graphs, diagrams, schematics and sketches which are prepared by the Vendor to detail its work.

Days: Unless otherwise designated, days as used in the Contract Documents will be understood to mean calendar days.

Days, Working: Days during which regular business is conducted, excluding Saturdays, Sundays, Statutory holidays, as well as all CFCRT-observed Federal, State, and municipal holidays.

Delivery, Delivered: The transfer of the completed vehicle (with all in-plant testing completed and results accepted by the Department) to Department property, ready for commissioning and acceptance testing.

Dependent Failure: The failure of a component, subsystem, or system induced by the failure of another component, subsystem, or system.

Derating: Using an item in such a way that the required performance is below the manufacturer's rated value.

Equal: Whenever the words "equal" or "approved equal" are used in connection with make or quality of material or equipment in these Contract Documents, the Department's decision as to whether any material or equipment proposed is equal to that specified shall be binding and final on both the Vendor and CFCRT.

Equipment: Refers to the rolling stock to be provided by the Vendor in accordance with the Contract documents.

Evaluation: An appraisal to determine whether or not production and quality control systems are capable of producing a quality product or service, and generating evidence that support decisions of acceptability.

Fail-Safe: A characteristic of a system which insures that any malfunction affecting safety will cause the system to revert to a state that is known to be safe.

Failure: An improper condition which requires unscheduled equipment maintenance or replacement to restore affected equipment to its normal operating condition.

Failure Rate: The frequency of failure, expressed as failures per hour or failures per mile. Failure rate is the mathematical reciprocal of MTBF or MDBF.

F-End: The end of the cab car where the control cab is located. Also known as front end of the cab car or the A-end.

First Article: A production component of the Base Vehicle that is produced for review. The First Article shall have been made to approved drawings.

First Article Approval: The examination of and approval by the Department of an initial production part, major assembly, subassembly, system, subsystem, apparatus, or material, manufactured or assembled by either the Vendor or subVendors.

First Article Inspection (FAI): An extraordinary inspection of a First Article, which accomplishes two purposes:

- First, it permits the Department to see, in three dimensions, what could be seen only on two-dimensional drawings up to that point. The Department may review the component that is demonstrated at the First Article Inspection, to validate that the component meets the requirements of the Contract.
- Second, it is used to establish the quality level of workmanship that will be maintained for the balance of the components. The level is established jointly by the Vendor, Department, and the Inspector.

Independent Failure: A failure which is not the result of another failure, either directly or indirectly.

Indicated: As used in these Contract Documents, "Indicated" shall be understood to mean, "as shown on the Contract Drawings", or "as described in the Contract Documents".

Inherent: Fundamentally present in the design.

Inspection: The careful examination, measurement, and testing of the characteristics of materials and services to ensure conformance with contract requirements.

Inspection Equipment: Any tool, gauge, fixture, apparatus, or other device used for inspection purposes.

Inspector: The person(s) or firm designated by the Department as its quality assurance representative.

Interface: The points where two or more systems, subsystems or structures meet, transfer energy, or transfer formation.

Jerk Rate: Time rate of change of acceleration and deceleration, equal to the second time derivative of velocity.

Jumper: A short piece of wire or cable with appropriate terminations on each end to permit connection to terminals within a terminal board or to an adjacent terminal strip. Also, a single or multi-conductor cable used to carry current or trainline signals between coupled cars and/or locomotives.

Left Hand Side: The side of the car on the left, when standing inside the car at the A-end facing the B-ends. Also the side of the car with the toilet room.

Lowest Level Replaceable Unit (LLRU): Unit (component) or subsystem which is normally replaced at the Service and Inspection Facility (S&I).

Load Weighing: A function incorporated in the traction system which measures changes of gross vehicle weight. Its purpose is to permit control of tractive effort or braking effort in order to achieve a constant effort-to-weight ratio.

Maintainability: A measure of a car's ability to be properly maintained taking into account the ease and frequency of maintenance tasks, ability to efficiently use applied labor, and accessibility of equipment to be maintained by CFCRT maintenance staff.

Manufacturer: The original builder or producer supplying materials, equipment, or apparatus for installation on the vehicle.

Material: An all inclusive term used to denote raw materials, parts, components, assemblies, and equipment used in the finished product.

Mean Distance Between Failures (MDBF): The mean operating mileage between independent failures.

Mean Time Between Failures (MTBF): The mean operating time between independent failures.

Mileage, Operating: The total distance traveled by the car during scheduled and un-scheduled movements over established routes as recorded by the Department.

No-Motion (Zero Speed): A referenced state of vehicle velocity of 3 mph or less.

Objective Evidence: Any recorded results of measurements, tests, or observations which provide facts pertaining to the quality of the work which, can be verified.

Population: The number of similar things forming a specified group as a sub-set of a sample used for statistical purposes.

Procurement (Work): The furnishing of all equipment, items, materials, parts, systems, data, design, services, incidentals, labor and management and performance of the contractual requirements defined in the Contract Documents, including changes thereto, in order to produce and deliver the specified Vehicles, Spare Parts, software goods, and services.

Project Manager: Person designated by CFCRT to be its liaison with the Contractor on all matters pertaining to the work. The Project Manager is empowered to act on behalf of CFCRT in such matters as

approval of Contractor's designs, test procedures, First Article approvals, and vehicle acceptance and contractual issues.

Proof (used as a suffix): Apparatus is designated as splash-proof, dustproof, etc., when so constructed, protected, or treated that its successful operation is not interfered with when subjected to the specified material or condition.

Redundancy: The existence of more than one means for accomplishing a given function; such means are not necessarily identical.

Reliability: The probability of performing a specified function without failure and within design parameters for the period of time specified under actual operating conditions.

Repair: Implies that the nonconforming product will meet the Contract requirements once repaired by means of a repair procedure once approved.

Rework: Restoring nonconforming material to meet Contract requirements.

Right Hand Side: The side of the car on the right, when standing inside the car at the A-end facing the B-end. Also the side of the car without the toilet room.

Safe: The condition in which passengers, crew, or repair personnel are secure from threat or danger, harm, or loss arising from improper design, manufacture, assembly, malfunction, failure of the vehicles or any of its components or systems.

Service, as in Service Use, Service Braking: The operation of the vehicles under normal conditions with passengers.

Services: Work and incidental material specified in a contract such as inspection, nondestructive examination, calibration, testing, welding, analysis, etc.

Shop Drawings: Drawings or sketches prepared by the Vendor for use in its manufacturing facility, assembly facility, or shop, to fabricate, assemble, and/or install parts of the vehicles, whether manufactured by it from raw materials or purchased from others in a ready-to-use condition.

Shipment: The physical departure of the car from the Vendor's facility to the Department's.

Slide, Wheel: During braking, the condition existing when the rotational speed of the wheel is less than that for pure rolling contact between tread and rail.

Special Tools: Tools which are not commonly available for purchase "off-the-shelf". A common, off-the-shelf tool becomes a special tool when it is altered in any way to make it more suitable for any specific use.

Speed, Balancing: The steady-state speed attained by a vehicle or train when resisting forces exactly equal the maximum available tractive forces on level tangent track.

Speed, Design: The anticipated maximum possible operating speed of the car.

Speed, Schedule: The average speed of a vehicle or train from terminal to terminal obtained by dividing the distance between these points by the time taken to make the trip, including time for intermediate station stops.

Spin, Wheel: During acceleration, the condition existing when the rotational speed of the wheel is greater than that for pure rolling contact between tread and rail.

Standards and Specifications: When industry, government, association, or society standards, or specifications are referred to, the applicable issue at the times prescribed in Section 1.4. shall be used.

Stop, Emergency: The stopping of a vehicle or train by an irretrievable emergency brake application.

Stop, Service: The stopping of a vehicle or train by application of service braking. Brake application can be released and reapplied.

SubVendor: An individual, firm, partnership, corporation, or joint venture to whom the Vendor sublets any part, subsystem, component or hardware services and other work for the Contract.

Subsystem: Generally a defined portion of car equipment e.g. "*Specification Section 9 - Brake Equipment*".

Supplier: Person, firm, partnership, corporation of combination thereof who builds, produces or supplies materials equipment or apparatus for installation on the vehicles.

Tamperproof: Fasteners are designated as tamperproof when they are selected so that they can not be easily loosened with common tools such as a flat blade screwdriver or pliers.

Technical Specifications, Specifications or specifications: Portion of the Contract Documents that detail the technical requirements for the supply of rail vehicles and associated equipment, including any changes or addenda made.

Tight (used as a suffix): Apparatus is designated as watertight, dust-tight, etc., when so constructed that the enclosing case will exclude the specified material.

Time, Build-up: Time interval from the beginning of change of a controlled variable (defined as being at 10% of the new steady state value) in response to a step-forcing function to the attainment of 90% of the new steady state value of the controlled variable.

Time Constant: Time interval from the beginning of change of a controlled variable in response to a step-forcing function to the attainment of a stated value.

Time, Dead (also, Time, Reaction): Time from the occurrence of a step change of the control signal to the beginning of a change of the controlled variable defined as being to the attainment of 10% of the new steady-state value of the controlled variable.

Time, Down: The elapsed time during which equipment is not capable of doing useful work because of maladjustment, malfunction, or maintenance in progress.

Time, Response: Time interval from the occurrence of a step change of control signal to the attainment of 90% of the new steady-state value of the controlled variable, equal to the sum of dead time and build-up time.

Time, Warm-up: The elapsed time from application of power to an operable device until it is capable of performing all of its intended functions.

Tram: A condition of ideal truck geometry in which the axles are perfectly parallel and the wheels longitudinally in perfect alignment. The centers of the journal bearings represent the corners of a perfect rectangle. Tram is checked by measuring the diagonal and longitudinal distances between reference points on the axle bearing housing.

U.S. Department of Transportation: U.S. Department of Transportation ("USDOT") means the Secretary of the USDOT and other persons who may at the time be acting in the capacity of the Secretary, or authorized representative or any person otherwise authorized to perform the functions to be performed hereunder, including representatives of the Federal Transit Administration ("FTA") and Federal Railroad Administration ("FRA").

Verification: Examination and testing by the QA Representative to confirm decisions made by those performing the work concerning conformance of material to Contract requirements.

Whenever in the Specifications or on the Plans the words "required", "determined", "directed", "specified", authorized", "ordered", "given", "designated", "indicated", "considered necessary", "deemed necessary", "permitted", "reserved", "suspended", "established", "approval", "approved", "disapproved", "acceptable", "unacceptable", "suitable", "accepted", "satisfactory", "unsatisfactory", "sufficient", "insufficient", "rejected", "condemned", or words of like importance are used, it is understood as if such words were followed by the words, in writing, "by the Department, unless otherwise specifically stated.

Vehicle: Same as Car.

Vital Circuit: Any circuit and its elements, the function of which affects the safety of train operations.

Warp, Track: The vertical distance between the plane of any three of four railhead contact points (two on each rail) forming a plane and the remaining point.

Weight, Actual: The measured weight of a finished empty vehicle, ready for passenger carrying service, and with all fluid levels filled to the top.

Weights, Assigned: The loaded vehicle categories assigned by the Department as the basis for structural design, traction system design, and for subsystem and vehicle testing as indicated.

Four weight categories are assigned:

AW0 Empty vehicle ready to run

AW1 Vehicle with full seated load of 150 passengers

AW2 Vehicle with full seated load of 150 and an additional standee load of 68 passengers

AW3 Vehicle with full seated load of 150 and an additional standees load of 211 passengers

Wherever the words "provided", "supplied" or "installed" are used in the Specifications in reference to work to be performed by the Vendor, it is understood to mean "furnished and delivered completed".

Work (Procurement): Where the context will allow, the term "work" means the production of goods and services furnished in accordance with the Contract.

1.3 Abbreviations

The following is a list of abbreviations used in the Specification. The list is not intended to be all inclusive.

A	Amperes
AAR	Association of American Railroads
AATCC	American Association of Textile Chemists and Colorists
ac	Alternating Current
ADA	Americans with Disabilities Act of 1990
AFBMA	Anti-Friction Bearing Manufacturer's Association
AFI	Air Filter Institute
AISC	American Institute of Steel Construction
AISI	American Iron and Steel Institute
AMCA	Air Moving & Conditioning Association
ANSI	American National Standards Institute
APA	American Plywood Association
API	American Petroleum Institute
APS	Auxiliary ac Power Supply
APTA	American Public Transportation Association
AREMA	American Railway Engineering and Maintenance of Way Association
ARI	Air Conditioning and Refrigeration Institute
ASHRAE	American Society of Heating, Refrigeration and Air Conditioning Engineers
ASC	Air Spring Cutout
ASCII	American Standard Code for Information Interchange
ASIC	Application Specific Integrated Circuit
ASM	American Society for Metals
ASME	American Society of Mechanical Engineers

ASTM	American Society for Testing and Materials
ATA	Air Transport Association of America
ATS	Automatic Train Stop
AVI	Automatic Vehicle Identification
AWG	American Wire Gauge
AWS	American Welding Society
AW0	Empty Vehicle Ready-to-Run Weight
AW1	Vehicle with Full Seated Load
AW2	Vehicle with Full Seated Load and Nominal Standee Load
AW3	Vehicle with Full Seated Load and Crush Standee Load
BTL	Battery Trainline
Btu	British Thermal Unit
°C	Degrees Centigrade
C	Capacitance
CAD	Computer Aided Design
CBM	Certified Ballast Manufacturer's Association
CGHAZ	Coarse Grain Heat Affected Zone
CDA	Copper Development Association
CDR	Critical Design Review
CDRL	Contract Data Requirement List (item). See Definition.
CFC	Chlorofluorocarbon
CFCRT	Central Florida Commuter Rail Transit
CFRC	Central Florida Rail Corridor
cfm	Cubic Feet per Minute
CFR	Code of Federal Regulations
COTS	Commercial Off the Shelf
COT&S	Clean, Oil, Test & Stencil

CPM	Critical Path Method
CRF	Critical Radiant Flux
CSA	Canadian Standards Association
dB	Decibel
dBA	Decibel, A Scale Reading
DB	Dry Bulb
DBU	Disc Brake Unit
dc	Direct Current
Ds	Specific Optical Density
DTE	Diagnostic Test Equipment
DTMF	Dual-Tone Multi-Frequency
E	Modulus of Elasticity
ECR	Engineering Change Request
ECU	Electronic Control Unit
EER	Energy Efficiency Ratio
EIA	Electronic Industries Association
EMI	Electromagnetic Interference
EMC	Electromagnetic Control, also Electromagnetic Compatibility
EMCP	Electromagnetic Compatibility Plan
EPA	The Environmental Protection Agency of the U.S. Government
ESNA	Elastic Stop Nut Division
ETFE	Ethylenetetrafluoroethylene
ETP	Electrolytic Tough Pitch
°F	Degrees Fahrenheit
°FDB	Degrees Fahrenheit Dry Bulb
°FWB	Degrees Fahrenheit Wet Bulb
FAA	Federal Aviation Administration

FAI	First Article Inspection
FCC	Federal Communications Commission
FDA	Food and Drug Administration
FDOT	Florida Department of Transportation
FEA	Finite Element Analysis
FH1	Floor Heat 1
FH2	Floor Heat 2
FMEA	Failure Mode and Effects Analysis
FMVSS	Federal Motor Vehicle Safety Standards
fpm	Feet Per Minute
FRA	Federal Railroad Administration
FRP	Fiberglass Reinforced Plastic
FTA	Federal Transit Administration
ft-lbs.	Foot-Pounds
g	Gravity Acceleration
GP	General Purpose
GPS	Global Positioning System
GTO	Gate Turn-Off
HAZ	Heat Affected Zone
HCFC	Hydrochlorofluorocarbon
HEP	Head End Power
HFC	Hydrofluorocarbon
HP	Horsepower
HPPL	High Performance Photoluminescent Material as defined in APTA Standard SS-PS-004-99
HSCB	High Speed Circuit Breaker
HVAC	Heating, Ventilation, and Air Conditioning

Hz	Hertz
I/O	Input/Output
IACS	International Annealed Copper Standard
IC	Integrated Circuit, also Inter-Communication System
ICCU	Intercommunications Control Unit
ICEA	Insulated Cable Engineers Association
IEC	International Electrotechnical Committee
IEEE	Institute of Electrical and Electronic Engineers
IES	Illuminating Engineering Society
IFD	Indentation Force Deflection
IPC	Institute of Printed Circuits
IPS	Iron Pipe Size
ISO	International Standards Organization
Is	Flame Spread Index
J	Joules
JEDEC	Joint Electronic Device Engineering Council
JIC	Joint Industrial Council
kHz	Kilohertz
km/h	Kilometers per Hour
kN	Kilo-Newton
LAHT	Low Alloy High Tensile Strength (Steel)
lbs.	Pounds
lbf	Pounds Force
LCD	Liquid Crystal Display
LED	Light Emitting Diode
L/s	Liters per Second
LLRU	Lowest Level Replaceable Unit

LVDN	Low Voltage Distribution Network
LVPS	Low Voltage dc Power Supply
MC	Master Controller
MDBF	Mean Distance Between Failures
MDS	Monitoring and Diagnostic System
MDU	Maintenance Display Unit
MHz	Megahertz
m	Meter
MIL	Military Specification
mm	Millimeter
mph	Miles per Hour
mphps	Miles per Hour per Second
mphpsps	Miles per Hour per Second per Second
ms	Millisecond
MTBF	Mean Time between Failure
MTTR	Mean Time to Repair
MU	Multiple-Unit
µA	Micro Ampere
NBS	National Bureau of Standards
NCA	Noise Criterion, Alternate
NEC	National Electrical Code
NEMA	National Electrical Manufacturers' Association
NFL	No Field Lubrication
NFPA	National Fire Protection Association
NIST	National Institute of Standards and Technology
NTP	Notice-to-Proceed
NTSB	National Transportation Safety Board

OD	Outside Diameter
ODK	Operator's Display Keyboard
OEM	Original Equipment Manufacturer
OFE	Oxygen Free Electronic
OHDS	Overhead Heat Duct Sensor
OH1	Overhead Heat 1
OH2	Overhead Heat 2
OSHA	Occupational Safety and Health Administration
PA	Public Address
PC	Printed Circuit
PCB	Printed Circuit Board
PCBs	Polychlorinated biphenyls
PCMCIA	Personal Computer Memory Card International Association
PCU	Pneumatic Control Unit
PDR	Preliminary Design Review
PEI	Passenger Emergency Intercom
PFC	Pulling Face of Coupler
PIV	Peak Inverse Voltage
ppm	Parts Per Million
PROMS	Programmable Read-Only Memories
PS	Pressure Switch
psi	Pounds Per Square Inch
psia	Pounds per Square Inch, Absolute
psig	Pounds per Square Inch, Gauge
PTE	Portable Test Equipment
PTFE	Polytetrafluoroethylene
PTU	Portable Test Unit

PWM	Pulse Width Modulation
QA	Quality Assurance
R-C	Resistive-Capacitive
RAM	Random Access Memory
RFI	Radio Frequency Interference
RH	Relative Humidity
rms	Root Mean Square
ROM	Read-Only Memory
rpm	Revolutions Per Minute
R-410A	Refrigerant 410A
s	Second
S	Flexural Strength
SAE	Society of Automotive Engineers
scfm	Standard Cubic Feet Per Minute
SCR	Silicone Controlled Rectifier
SDD	Software Design Description
SIC	Standard Industrial Code (U.S. Department of Labor)
SPL	Sound Pressure Level
SSP	System Safety Program
S&I	Service and Inspection Facility
S/N	Signal To Noise
STB	Surface Transportation Board
T_a	Ambient Temperature
T_i	Interior Temperature
TBU	Tread Brake Unit
TFE	Tetrafluoroethylene
TIG	Tungsten Inert Gas

TIR	Total Indicated Runout
TSDL	Technical Specification Deliverable List
TOR	Top-of-Rail
TXV	Thermal Expansion Valve
UA-Factor	Carbody Heat Transmission Factor
US, U.S.	United States
UL	Underwriters Laboratories Inc.
UNC	Unified National Course
UNF	Unified National Fine
USASI	United States of America Standards Institute
USDOT	United States Department of Transportation
USPHS	United States Public Health Services
UV	Ultraviolet
Vac	Volts, Alternating Current
Vdc	Volts, Direct Current
VHS	Very High Frequency
VOM	Volt-Ohm Meter
VPI	Vacuum Pressure Impregnation
VSWR	Voltage Standing Wave Ratio
W	Watt
WB	Wet Bulb
WPS	Weld Procedure Specifications

1.4 Compliance

Unless stated or agreed to with the Department, the cars shall comply in all respects with any and all applicable regulations and rules of the Federal Railroad Administration ("FRA"), Federal, State and Local laws, rules, regulations and orders that are in effect as of June 3, 2011. The cars shall also comply with the applicable standards of the Association of American Railroads ("AAR") and of the American Public Transportation Association ("APTA") that are in effect at the time of the proposal due date of April 2010.

Any conflicts between the various requirements, including the APTA regulations, shall be identified to the Department and approved by the Department within ten (10) working days of being identified. Any non-compliance to the APTA requirements shall be identified to the Department and approved by the Department **[CDRL].**

Confirmed exceptions:

1) Exceptions listed in Bombardier document 299-BRA-0076 BiLevel Platform Car Regulatory Compliance Matrix Rev. 2

2) Seats, seat arrangements and installations shall comply with requirements of the applicable FRA Regulations. As the BiLevel car requested by the Department will use a cluster back-to-back seating arrangement, APTA SS-C&S-016-99 Rev. 1 and Rev. 2 does not apply as this safety standard provides "design guidelines, recommendations and requirements for row-to-row passenger seating equipment installed in passenger rail cars that are part of the general railroad system of transportation."

   and

3) CFCRT elected not to apply APTA SS-M-18-10 Standard for Powered Exterior Side Door System Design for New Passenger Cars approved [by APTA] February 11, 2011.

It shall be the responsibility of the Vendor to determine the applicable laws, rules, and regulations as they apply to the design and construction of the equipment and, where required, obtain the necessary approvals and/or certificates.

The Department's approval of a particular system or feature in no way relieves the responsibility of the Vendor with respect to design, performance, safety, compliance with the laws, or suitability of the system or feature for the service intended.

1.5 Delivery and Commissioning

Each car shall be delivered to the Vehicle Storage and Maintenance Facility ("VSMF") completely assembled, in running condition, with all adjustments made. A qualified service representative provided by the Vendor shall be required to supervise the commissioning of the cars and the making of necessary adjustments to all pieces of equipment. The Vendor shall provide this service irrespective of an individual's vacations and/or sickness. In the event that more than one person is used to fulfill the various functions of service representative, the Vendor shall advise the Department of the identity and clearly define the responsibilities of each appointee.

Post delivery vehicle routine tests as detailed in Section 14 are to be performed and documented in a manner and form acceptable to the Department.

Delivery, commissioning and final acceptance of vehicles will take place in accordance with Paragraph II.f of Exhibit "A" attached to the Standard Written Agreement.

Delivery, commissioning and final acceptance of vehicles will take place in accordance with Paragraph II.f of Exhibit "A" attached to the Standard Written Agreement.

1.6 Owner Facility

The Department will provide, for the Vendor, during the period required to discharge the responsibilities outlined in Section 14.6:

1. Reasonable shop space for the storage of small tools and test equipment.

2. Permission to park a mobile trailer, if required, at a mutually agreed location for the storage of materials or for use as a work area. The costs for such a trailer and any services needed (electrical power connections, heating, etc.) shall be at the responsibility of the Vendor.

1.7 System Design Responsibility

The Vendor shall assume complete responsibility for design, implementation of design, construction and satisfactory operation of all subsystems and the total vehicle system.

Where specifications for materials, tests, etc. are referred to, this shall mean the latest revisions thereto in effect at the times prescribed in Section 1.4. . The Vendor shall be responsible for maintaining all documentation in a current state and to obtain and maintain all required Certificates of Compliance.

Safety of passengers shall be enhanced by providing components and assemblies with gentle shapes and surfaces and, wherever possible, energy absorbing characteristics.

Sharp corners and edges shall be minimized.

Maintainability shall be enhanced through the incorporation of the following features and procedures:

1. Provision of adequate access and working clearance.

2. The use of modular designs.

3. Interchangeability of components performing similar functions.

4. Accessibility of components and fasteners.

5. Adequate provisions for lifting.

6. Permanent identification of components.

7. Reparability including the provision of applicable data.

8. Minimization of required personnel skill levels and special training.

9. Appropriate self-test features.

10. Built in, quick-disconnect test points for air and electrical systems.

11. Design of simplified test equipment for use as trouble finding aids.

12. Where applicable, provide equipment covers and access panels incorporating simple, rugged, quick-removal fasteners, e.g., square key latches, toggle type and quarter-turn fasteners.

13. Tapping plates or nuts used with threaded fasteners where possible. (The use of self tapping screws or tapped holes in aluminum as a fastening medium for covers or equipment should be avoided.).

1.8 Appendices

Appended to, and forming a part of these Specifications, are the following:

Appendix	Description
A	List of CDRLs
B	List of Samples
C	List of Client Submissions
D	General Car Arrangement Layout (Cab and Coach)
E	Locomotive MU Control Trainline Assignments
F	Communication Control Trainline Assignments

SECTION 2

2 DESIGN PARAMETERS

2.1 General

This Section establishes system performance, environmental and general design criteria for the Sunrail BiLevel commuter rail vehicles. Included are configuration, capacity, dimensional, performance, environmental, noise and vibration, ride quality, weight, and other requirements that impact vehicle system and subsystem design. These requirements apply to all aspects of vehicle and equipment design.

The vehicles shall be designed and manufactured to operate successfully within the CFRC environment and in particular, the CFRC system. All requirements identified herein shall be met. If questions or conflicts arise within these Specifications, the Department shall be notified so that the subject questions or conflicts can be resolved without impact to design and manufacturing schedules.

The vehicles shall be designed, manufactured, inspected and delivered to be in compliance with all applicable FRA rules and regulations as of June 3, 2010 for a train of more than 600,000 pounds empty weight. The vehicles shall also comply with most APTA Standards that are in effect at time of proposal due date of April 2010 for a train of more than 600,000 pounds empty weight . A compliance matrix shall be submitted for review and concurrence by the Department **[CDRL].**

Normal operating speed shall be up to 79 mph. Subject to the maintenance intervals specified in Section 2, and also to the Vendor's recommended maintenance practices, the vehicles shall be designed for a minimum service life of 30 years in the CFCRT environment, based on an average annual operating distance of 70,000 miles per vehicle.

Weights and dimensions shall be as shown in Section 2 and in Section 3.1.1. The Vendor shall submit static and dynamic clearance and contour diagrams of the cars for review and concurrence by the Department **[CDRL]**.

2.2 Ambient Conditions

The vehicles shall be capable of being operated, stored and maintained at the specified performance levels, without impairment resulting from the natural or induced environmental conditions within the Department's coverage area. The following climatic factors shall be used as design guidelines and shall be considered as operational requirements. Actual localized temperatures and conditions within and under the carbody may be more severe than the ambient climatic conditions and the Vendor shall be responsible for evaluating these during its design effort. Additionally, the Vendor shall be responsible for advising the Department if there are any special environmental factors to which its equipment may be sensitive that are not listed below.

Temperature & Solar Load:

- Minimum ambient air temperature — 21° FDB
- Heating Design Temperature — 37°FDB
- Cooling Design Temperature — 94°FDB, 76°FWB
- Maximum ambient air temperature — 100° FDB, 78° FWB

Precipitation:

- Maximum rainfall rate: — 8" per day

Wind:

- Maximum sustained: 20 mph
- Maximum gusting: 60 mph

The vehicles shall operate under the atmosphere, track bed and wayside contamination and debris-conditions, experienced on rights-of-way in the CFCRT service area.

2.3 General Parameters

1. Maximum number of cars in train: 10.
2. Maximum design speed of train: 103 mph.
3. Maximum operating speed of train: up to 95 mph.
4. Average annual distance operated/car: 70,000 miles.
5. Number of passenger seats: 132 Cab/150 Trailer.
6. Maximum number of standing passengers: 211 (@ 1 passenger / 1.8 sq. ft).

For performance purposes, the weight of each vehicle shall be per the following table:

Symbol	Condition	Maximum Weight Trailer	Cab
AW0	Ready to run tare weight (No passengers)	122,000 lbs. Estimate to be adjusted upon seat selection and general arrangement	124,000 lbs. Estimate to be adjusted upon seat selection and general arrangement
AW1	With maximum of 150/132 seated passengers	AW0+(23250 lbs).	AW0+(22010 lbs).
AW2	With nominal capacity of 218/215 passengers total (maximum of 150 seated/minimum of 68 standing, but total AW2 load to be 218)	AW0+(33790 lbs).	AW0+(33325 lbs).
AW3	Rated performance load with 361/353 passengers	AW0+(55955 lbs).	AW0+(54715 lbs).

Average weight of passenger: 155 pounds

2.4 Car Dimensions

1. Length of car over coupler faces: 85'-0"
2. Width of car (excluding steps and mirrors): 9'-10"
3. Height of car: 15'-11"

4.	Wheel diameter, new:	33"
5.	Radial wheel wear:	1-1/2"
6.	Number of door openings per side:	2
7.	Width of side door opening:	52"
8.	Width of end door opening	
	a. Trailer car minimum:	28"
	b. Cab car minimum:	22.5"
9.	Minimum height of ceiling from floor at car center line:	6'-7"
10.	Height from top of rail to top of station platform:	15"
11.	Height from top of rail to top of side door step (if applicable):	18"
12.	Height from top of rail to top of lower level finished floor:	25"
13.	Height from top of rail to car end floor at intercar passageway with new wheels and empty car:	51"
14.	Truck spacing:	64'-0"
15.	Truck wheel base:	8'-6"
16.	Height of coupler from top of rail to center line of coupler, empty car, with new wheels:	34-1/2"
17.	Minimum vertical clearance above top of rail on 2000 ft vertical curve, (crest) with the maximum permissible amount of uncompensated wheel wear of 1/2 inch	2-3/4"

2.5 High Voltage System

2.5.1 Carborne and Trainline

The head end trainline power shall be at a nominal 480 Vac, 3 phase, 60 Hz. Carborne equipment shall function at its rated performance level between 430 and 530 Vac, and between 57 and 63 Hz. The quality of the head end power will be maintained within the above limits and no carborne devices shall be provided to protect against an out of tolerance power supply.

2.5.2 Wayside Power Supply

The vehicle shall be configured to be connected to wayside power, through the end car receptacles, supplied to the vehicles for layover by a 480 Vac, 3 phase, 60 Hz wayside power source.

2.6 Auxiliary Power Systems

The nominal voltage of the dc low voltage system and the dc low voltage trainline system shall be a nominal 72 Vdc.

The nominal voltage of the ac low voltage supply shall be a nominal 120 Vac, single phase, 60 Hz.

2.7 Operating Environment

2.7.1 Platform Interface

Accessibility to persons with disabilities shall be in compliance with 49 CFR part 38, ("ADA"). The cars shall be provided with both passenger boarding steps (at 18" ATR), and wheelchair lifts that can extend the full 25" from the lower level boarding finished floor height. The cars shall also be equipped with a portable bridge plate to negotiate passage from the car floor to the mini station platform (set at 22" ATR), or vice versa, when mini-high platforms are employed. A safe, secure and rattle-free stowing area shall be provided in each car for both the wheelchair lifts and the portable bridge plate. The portable bridge plate shall be readily deployed and stowed by one employee and its weight shall not exceed 30 lbs.

2.7.2 Track Limitations

The physical constraints of the track, yard and wayside include the items below:

- Rail Types: 112 RE, 115 RE, 119 RE, 132 RE, 136 RE, 132 HF
- Minimum horizontal curve radius: 250'
- Minimum vertical curve radius, crest: 4,000
- Minimum vertical curve radius, sag: 2,000'
- Nominal track gauge: straight and curve 4'-8.5"
- Maximum track superelevation: 6"
- Maximum gradient: 5%

Minimum undercar running clearance, including vertical curves after all wear and deflection under AW3 condition, to TOR:

- Under truck 2-3/4"
- Between trucks, between rails 6"

Track Class: The vehicles shall be capable of operating safely on trackage maintained in accordance with FRA requirements for Track Classes 1 through 4 inclusive at the maximum passenger train speed authorized for each track class.

2.7.3 ADA Boarding

Accessibility to persons with disabilities shall be in compliance with 49 CFR Part 38, ("ADA") Each BiLevel car will be equipped with one mechanical lift on each side, for a total of 2 lifts per both cab and coach cars as shown on C478-899-01-1 Rev. 7 and C478-899-02-1 Rev. 4 respectively. The lifts will be ADA compliant units intended to provide the primary wheelchair access to the train; mini-high platforms (set at 22" ATR) are proposed as a secondary boarding option portable bridge plates shall be available to board wheelchairs to both car types. One bridge plate per vehicle will be provided and

stored in a bridge plate holder. The design of the lifts shall be submitted for review and approval of the Department.

The door thresholds shall be provided at all four locations with bridgeplate supports to prevent the bridgeplate from "folding up" if a load is applied on the hinge along the longitudinal centerline of the plate. There will be a CDRL to verify the length of plate and interface with station mini-high ADA platforms.

Seating on the lower level of cab cars will be flip seats fitted with wheelchair restraints as described on drawing C478-899-01-1 Rev. 7. At two wheelchair/seating locations, there will be only one flip seat. The seat shall be mounted longitudinally, to the car side wall. It will be a three passenger flip seat. At this location, there will be additional bicycle storage for two bicycles. On the opposite side of the aisle, there will be one similar wheelchair/seating location. These two locations, located across the aisles, shall be joint use for either wheelchairs or bicycle storage. This applies to cab car lower level floor plan only. The Contractor shall submit a CDRL for lower level seating plan, describing operation of wheelchair lifts, function of flip seats and bicycle storage.

2.8 Electromagnetic Interference and Compatibility

The vehicles shall be electrically compatible within themselves and with the Department supplied locomotive.

As a general requirement, Bombardier requires its Vendors to be responsible to deliver a system that will be immune to the electromagnetic environment associated to the intended service conditions, while not contributing to interference conditions that could affect neighboring subsystems.

The information below enumerates emissions and immunity standards to be considered on a "Design to meet" basis.

Should the system or a part of it be involved in an EMI/EMC problem, the Vendor, together with Bombardier, shall work to correct the problem.

Compliance	**Ref. Standard**
Emission Limits	
Radiated Emissions: 30 to 960 MHz	FCC Part 15 Class A
Conducted Emissions: 0.45 to 30 MHz	FCC Part 15 Class A
Immunity Requirements	
Radiated RF Susceptibility: 26 to 1000 MHz	IEC 61000-4-3 Level 3
Electrostatic Discharge	IEC 61000-4-2 Level 2
Conducted Disturbances: 0.15 to 80 MHz	IEC 61000-4-6 Level 2
Fast Transient Burst:	IEC 61000-4-4 Level 2 kV on All lines

Surge Voltage Immunity	IEC 61000-4-5 Level 3

2.9 Service-Proven Design

Vehicle system and subsystem designs shall be service-proven. The Department will evaluate the applicability of "service-proven" according to the risk associated with each particular design. In general, a service-proven design will meet all the following criteria:

- Used successfully in a fleet of vehicles in revenue rail operation.
- Has a vehicle availability of 95% minimum,
- Has achieved a MTBF consistent with Department requirements.

To establish a design's service-proven history, the Vendor, as required, shall submit details of the application history. The Vendor may offer, for approval, a design which is basically unchanged from a service-proven design, but which must be varied slightly in design or manufacture to meet Department requirements. As applicable, the Vendor shall show, in detail, what has been changed in the equipment and why such changes will not adversely affect operation and performance.

As applicable, evidence documenting service proven design shall be furnished for the following systems and components:

- Carbody structure
- Coupler and draft gear
- Friction brakes and control
- Door operators
- Air comfort system
- Trucks
- Wheels
- Low voltage power supply
- Event recorder
- Batteries

The Department may waive design review and design conformance testing when service-proven equipment is provided. In general, the decision to waive design review and test requirements will be based on the Department's understanding of the historical success of the equipment.

2.10 Design Presentation and Information

Within ninety (90) days from the execution of the Contract, Vendor will provide the Department with a matrix of items for design presentation which will include designs or systems of substantial change from those previously supplied on the Vendor BiLevel Program. With "substantial change" meaning new functionality or features, new input/outputs, and new controls, and/or new BiLevel platform vehicle sub-systems that are different than those on equipment previously supplied;

New systems contemplated under the Contract, where "new system" means a system never previously developed for the Vendor BiLevel vehicles for any previous client; "new system" does not include variant design development from an established Vendor BiLevel vehicle system;

New designs contemplated under the Contract, where "new design" means a design never previously developed for the Vendor BiLevel vehicles for any previous customer; "new design" does not include variant design development from an established Vendor BiLevel vehicle design.

Vendor shall provide, design and other information related to the differences and similarities with respect to any existing BiLevel vehicles manufactured by Vendor.

Vendor shall at no charge to the Department, submit to the Department design information and drawings in respect of the agreed upon items:

Vendor shall conduct design presentations to demonstrate that the matrix items meet the requirements of the Contract. Vendor may propose the combining of design presentations, and the Department will agree where reasonable.

Not less than five (5) Calendar Days in advance of each design presentation, Vendor shall provide to the Department the documentation, design, and data package. The Department and any third parties acting on behalf of the Department shall attend the presentations. Vendor shall prepare detailed minutes of the design presentations, and identify and report progress against any actions which may be required to confirm design compliance with the requirements of the Contract. Both Parties shall act promptly in fulfilling their obligations under this Section.

Upon the Department's determination that a design and, if applicable, the test procedures are acceptable based on the requirements of the Contract, which shall occur within ten (10) Calendar Days following the design presentation for each matrix item, it shall so notify Vendor, in writing, of acceptance of the design. Should the Department find a design does not meet the requirements of the Contract, the Department will notify Vendor and Vendor shall promptly remedy the design so all requirements of the Contract are met. Vendor shall remain solely responsible for compliance in full with the requirements of the Contract.

Changes in the design of the Vehicles resulting from design presentation discussions and which require a Change to the Technical Specification shall require a Change Order and/or Project Change Request approval prior to incorporating such Changes into the design of the Vehicles.

SECTION 3

3 CAR BODY

3.1 Physical Requirements

The car body shall be designed and constructed in full compliance with any and all applicable regulations of the FRA, standards of the AAR and of APTA, including but not limited to: 49 CFR 38, ADA Accessibility Specification for Transportation Vehicles; 49 CFR 238, Passenger Equipment Safety Standards; APTA SS-C&S-034-99, Standard for the Design and Construction of Passenger Railroad Rolling Stock (except for Section 6 of this Standard which is a recommended practice concerning crash energy management); 49 CFR 223, Safety Glazing Standards – Locomotives, Passenger Cars and Cabooses; 49 CFR 239, Passenger Train Emergency Preparedness; 49 CFR 229, Railroad Locomotive Safety Standards.

All specified equipment on the car shall be arranged so that the proportion of the vehicle tare weight carried by each truck of the car shall be within 5 percent of each other. Similarly, the weight distribution from side to side of the car shall be within 5 percent.

The car body structure shall permit lifting or jacking of a car, with or without trucks attached, without damage to or deformation of the structure or equipment. Lugs for lifting of the car shall be provided at the top of the end door collision posts at each end of the car. The lifting area shall have a suitable removable cover sealed to prevent ingress of water or snow. Each end of the car shall have two jacking pads along the side sill at each corner; one near the sloping side sill and the other beside the truck, approximately 5 feet from the end of the car. Jacking pads shall be of an appropriate size with a suitable surface to avoid slippage. It shall be possible to jack up a complete car, or symmetrically jack up either end of a car utilizing portable jacking devices and to subsequently support the car with portable stands with the trucks remaining on the rails and remove the portable jacks. It shall be possible to manually roll the trucks from under the end of the car.

The car body structure shall provide for the mounting of all ancillary equipment; the applicable mounts and the applicable equipment shall be designed and constructed in accordance with requirements of the FRA regulations and rules, and the APTA standards (ref. Section 5.7 of APTA SS-C&S-034-99) that require equipment to withstand the forces caused by the accelerations shown below:

1. Vertical: ±4g
2. Longitudinal: ±8g
3. Lateral: ±4g

Housings for externally mounted equipment shall be completely weatherproof when covers are in place, excluding battery boxes, which are ventilated.

All trim and metal parts exposed to passengers, maintainers and crew shall have sharp edges removed. Drain holes shall be provided in structural shear plates.

All carbon steel surfaces of the underframe structure shall be thoroughly cleaned before priming, painting, and undercoating.

The vehicle shall be designed for at least, but not necessarily limited to, the worst loading case arising out of the possible simultaneous combinations of the following loads acting on the vehicle:

1. Car tare weight.
2. Crush passenger load (AW3).
3. Vertical dynamic load due to wheel/rail interaction.
4. Loads due to vehicle pitching caused by braking.
5. Snow or ice loads
6. Aerodynamic load.
7. Side wind loads.
8. Buff load. Compressive and lateral loads caused by another train passing in the opposite direction on an adjacent track with relative speeds of 185 mph.
9. Standing on maximum superelevation curve with full standing and seated load upstairs and other reasonable conditions from above to give the worst combination. (See Section 2.7)

3.1.1 Industrial Design Requirements

The vehicle design shall be based on the BiLevel car design that is service proven for more than 25 years in the United States and Canada.

3.2 Framing Structure

The framing and sheathing of the car body shall form an integrated structure capable of resisting, without permanent or destructive deformation, buff loads possible in normal commuter service operation. The car body structure shall be designed and constructed in accordance with the requirements of the applicable FRA regulations and APTA standards, including but not limited to 49 CFR 238 and APTA Standard SS-C&S-034-99 except for Section 6 of this Standard which is a recommended practice concerning crash energy management.

The car end structures shall be provided with vertical collision posts and corner posts designed and constructed to comply with applicable FRA rules regulations and APTA Standards

3.2.1 Collision Post Loads

The collision posts of the B-end of the cab car and each end of a trailer car shall resist the loads defined by APTA Standard SS-C&S-034-99, Section 5.3.1.4 and 49 CFR 238.211. Each collision post, supporting car body structure, and intervening connections shall resist each one of the following horizontal inward loads individually applied at any angle within 15 degrees of the longitudinal axis:

a) Minimum 300,000 pounds (1334 kN) applied at a point even with the top of the underframe, without exceeding the ultimate shear strength of the post.
b) Minimum 300,000 pounds (1334 kN) applied at a point 18 inches (457 mm) above the top of the underframe, without exceeding the ultimate strength.

c) Minimum 50,000 pounds (222 kN) applied anywhere along the post, including the top connection, above the top of the underframe, without permanent deformation.

The collision posts of the A-end (also called F-end) of the cab car shall resist the loads defined by APTA Standard SS-C&S-034-99, Section 5.3.1.3.1 and 49 CFR 238.211. Each collision post, supporting car body structure, and intervening connections shall resist each one of the following horizontal inward loads individually applied at any angle within 15 degrees of the longitudinal axis:

a) Minimum 500,000 pounds (2224 kN) applied at a point even with the top of the underframe, without exceeding the ultimate shear strength of the post.
b) Minimum 200,000 pounds (890 kN) applied at a point 30 inches (762 mm) above the top of the underframe, without exceeding the ultimate strength.
c) Minimum 60,000 pounds (267 kN) applied at any height along the post, including the top connection, above the top of the underframe, without permanent deformation.

The collision posts shall be LAHT steel, located one on each side of the end door opening and shall be welded to the sill and extended to a suitable attachment to the roof structure, and shall be welded to the top and bottom plates of the end sill with the equivalent of AWS pre-qualified weld joint as per APTA Standard SS-C&S-034-99, Section 5.3.1.3.1. The welded joint of the collision posts to the end sills shall carry the end reaction developed by the collision post. The torsional strains developed in the collision posts shall be resisted by the end sill and transverse beams above the end sill. The upper attachment shall be as an integral part of an anti-telescoping roof structure and shall be designed to develop plastic deformation of the roof and not fail by shear or rupture.

3.2.2 Corner Post Loads

The corner posts of the B-end of the cab car and each end of a trailer car shall resist the loads defined by APTA Standard SS-C&S-034-99, Section 5.3.2.4 and 49 CFR 238.213. Each corner post, supporting car body structure, and intervening connections shall resist each one of the following horizontal loads individually applied toward the inside of the vehicle in any direction from longitudinal to transverse:

a) Minimum 150,000 pounds (667 kN) applied at a point even with the top of the underframe, without exceeding the ultimate shear strength of the post.
b) Minimum 30,000 pounds (133 kN) applied at a point 18 inches (457 mm) above the top of the underframe, without permanent deformation.
c) Minimum 30,000 pounds (133 kN) applied at point of attachment to the roof structure, without permanent deformation.
d) Minimum 20,000 pounds (89 kN) applied anywhere between the top of the post at its connection to the roof structure, and the top of the underframe, without permanent deformation.

The corner posts of the A-end (also called F-end) of the cab car shall resist the loads defined by APTA Standard SS-C&S-034-99, Section 5.3.2.3.1 and 49 CFR 238.213. Each corner post, supporting car body structure, and intervening connections shall resist each of the following horizontal loads individually applied toward the inside of the vehicle in any direction from longitudinal to transverse:

a) Minimum 300,000 pounds (1334 kN) applied at a point even with the top of the underframe, without exceeding the ultimate shear strength of the post.
b) Minimum 100,000 pounds (445 kN) applied at a point 18 inches (457 mm) above the top of the underframe, without permanent deformation.

c) Minimum 45,000 pounds (200 kN) applied anywhere between the top of the post at its connection to the roof structure, and the top of the underframe, without permanent deformation.

3.2.3 Roof, Underframe and Body Structure Loads

The aperture in the end frame that contains the coupler shank shall resist an upward or downward load by the coupler as per 49 CFR 238.205(b). The aperture in the end frame that contains the coupler shank of both ends of a cab car and both ends of a coach car shall resist upward or downward loads by the coupler shank of 100,000 pound yield as required by the APTA standards. The structure shall be assembled by welding and mechanical fasteners in accordance with accepted industry practices.

Each passenger car shall be designed to accommodate the rollover strength requirements as per 49 CFR 238.215 and APTA SS-C&S-034-99, and the side structure requirements as per 49 CFR 238.217 and APTA SS-C&S-034-99.

The roof, underframe and body structure shall be manufactured from materials which meet the requirements of Section 11.2. Welded, mechanically fastened or bonded sub-floor metal sheets shall be applied to the underframe. They shall be flanged and supported at all edges. The corners shall be welded. The sub-floor sheets shall be 100 percent sealed against ingress of moisture or drafts. The intermediate end sub-floor sheets shall be resistant to flying stones. This installation shall be a high grade tolerance quality with any necessary cutouts designed for and consistent from car to car. When assembled to the car floor with required insulation, the interior sound pressure levels shall comply with Section 12.2.

The center sill and end floor substructure shall enclose the power train line (480 Vac) cables.

The body and roof sheeting shall be manufactured from aluminum alloy.

3.3 Attachment to Trucks

Longitudinal service loads of the truck to the car body connection shall be transmitted by radius rods. The bonded rubber elements in the ends of the rods shall not be prone to loss of preload. One lateral radius rod between the car body draft sill and the truck bolster with similar rubber-bonded elements shall transmit lateral dynamic loads.

The trucks shall be attached to the car body in such a manner as to prevent the car body from parting from the truck unintentionally, in accordance with the applicable FRA regulations and APTA Standards. The connection of the truck to the car body shall resist without failure, when applied separately, a 2g vertical force and provide for an ultimate horizontal shear strength of 250,000 lbs. in any direction as required by 49 CFR 238.219 and APTA SS-C&S-034-99 (refer to Section 5.6). The body attachment shall be of an appropriate design and of sufficient strength that the trucks may be safely suspended from the car body.

3.4 Air Conditioning Ducting

Air conditioning ducting shall be designed to permit access for cleaning. The ducts shall be free from rattles, squeaks, whistles, and air leaks with suitable means to prevent ingress of the climatic elements into the car body. The supply air duct work of the A-end HVAC unit distributes conditioned air to the A-end intermediate level and the right side of the upper and lower levels and to the cab area of the cab car; the supply air duct work of the B-end HVAC unit distributes conditioned air to the B-end intermediate level and the left side of the upper and lower levels. The air ducts that supply air to the lower level as they pass over the passenger doorways are exposed and located on the upper level floor between the floor

and the side wall. All exposed ducts shall be insulated. The outer shell of the exposed ducts shall be stainless steel with an embossed pattern.

3.5 Roof

The car roof framing shall be designed and constructed to maintain adequate strength and rigidity in accordance with FRA regulations (Reference 49 CFR 238.215) and APTA standards (reference APTA SS-C&S-034-99).

The roof design shall incorporate a rain water control system at the roof ends where collection pockets and drain piping shall be installed. Drain piping shall prevent water from striking wheels, electrical cables, or batteries.

The design shall also facilitate the fastening of stanchions and ceiling lining, and installation of roof wiring, lighting fixtures, and other required equipment in a secure, convenient manner. A non-skid surface shall be provided in the area of the two roof mounted air conditioning units.

Roof sheets shall be of sufficient strength as to not be permanently deformed when:

a) Supporting roof mounted equipment.
b) The vehicle passes through a mechanical car washer.
c) Supporting three concentrated loads of 250 pounds at 30 inch intervals in any direction to simulate workers on the roof.

3.6 Interior Finish and Furniture

Interior fittings and surfaces shall comply with 49 CFR 238.233 and APTA SS-C&S-006, Standard for Attachment Strength of Interior Fittings for Passenger Rail Equipment. Interior component materials shall meet the flammability and smoke emissions requirements of 49 CFR 238.103.

The ceiling, side and end walls, and bulkhead walls shall be finished with integrally colored panels, laminate plastic, molded reinforced plastic or similar material and color, applied and fastened in a manner to permit removal for maintenance as required. The BiLevel Platform offers set color schemes packages, which shall be submitted to the Department for approval **[CDRL]**.

Materials finished in melamine shall have a low glare finish with balance sheets to minimize warpage. End walls, bulkheads, windscreens, and other partitions shall be solid core laminated melamine. Side wall window masks shall be vacuum formed thermoplastic sheets or fiber reinforced composites, in compliance with the flammability and smoke emissions requirements. The masks shall be retained by elastomeric glazing strips around the windows.

Joints between window panels shall be concealed by trim strips. Edge radii design of the window masks, as well as the installation procedures, shall prevent stress cracking.

The ceilings shall be lined with balanced melamine panels. Hinged access panels with limit chains and maintainer's key locks shall be provided for access to equipment mounted overhead, including air conditioning units, battery charger/LVPS, air tanks, and electrical junction boxes.

All joints shall be properly supported to prevent sagging and drumming. Anti-squeak protection shall be provided at areas having potential for noise generation. The interior finish at the windows, armrests, and handholds shall be designed to minimize dirt collection.

Materials used shall minimize build up of static charge. The side lining below the windows shall be of sufficient strength and adequately supported to resist damage by kicking. Covers for door pockets shall be suitably framed for rigidity and hinged for access to equipment in the door pockets, using the maintainer's key lock. The covers shall be interchangeable by size and/or location.

At certain locations in the car, stainless steel trim shall be provided where vertical surfaces adjoin the floor.

The use of integrally colored panels and liners shall be maximized to not require additional painting. If and where painting is required, a synthetic enamel or urethane shall be applied.

Carbon steel parts in electric lockers shall be painted prior to installation. Areas inside the electrical locker where terminations are made shall be finished with a white paint.

Car number and car end designations (*"A"* or *"B"*) shall be applied over both end doors, in the lower vestibule, and in the upper passenger compartment at each end.

Identification of switches, circuit breakers, and fuses shall be provided in each electrical locker.

A single digit number identifying each side door leaf shall be applied to the interior surface of each door leaf.

The Vendor's name plate shall be mounted in the car.

On the interior of one of the electrical locker doors, a metal plate shall be mounted that identifies the manufacturing date, model and serial number. Record and log book holders shall be mounted inside the door used for destination sign controller access.

An APTA wheel unloading certification plate shall be mounted in the car inside the B-end equipment door looker.

The cover of the emergency tool kit and fire extinguisher cases shall be labeled with suitable access instructions.

The following, but not limited to, items shall be labeled:

1. Overhead heaters.
2. Emergency brake valves (red lettering).
3. DANGER DO NOT TOUCH (as appropriate - red lettering).
4. DANGER 480 VOLTS (as appropriate - red lettering).
5. HVAC temperature sensors.

3.7 Floors

3.7.1 Floor Panels

Floors at the lower and intermediate levels shall consist of plymetal panels with stainless steel cladding on both sides (See Section 11.12.1) applied on top of the transverse floor members. Floors at the upper

level shall be plywood faced with phenolic resin on both sides (See Section 11.12.2). All edges, holes and cutouts shall be sealed.

The floor panels shall be transversely installed panels, 0.750-inch thick. The panels shall be separated from the support structure by curing elastomeric sealant, and together will form a monolithic, waterproof deck. All edges of the floor panels, including openings, shall be waterproofed and sealed. Floor panels located in the vestibule areas of the lower level shall be fully encapsulated.

The floor shall be suitably supported by the car framing to provide a structurally sound, and sealed installation which shall not deform permanently under passenger loads up to AW3.

The installed floor deck with respect to leveling shall be divided into two zones: Zone #1 shall be anywhere within 3 feet of any transition between levels and/or walls of each seating level; Zone #2 shall be all other areas of each seating level. The installed floor deck with leveling compound in Zone #1 shall be flat and level within 0.188-inches over 3 feet in any direction. The installed floor deck with leveling compound in Zone #2 shall be flat and level within 0.094-inches over 3 feet in any direction. Floor joints shall not be visible or discernible under the floor covering. The floor structure shall be resistant to the effects of water, road salt, and cleaning fluids.

3.7.2 Floor Covering

For all cars, the floors shall be covered as follows:

- Rubber floor in all areas.

The colors, patterns and materials shall be developed by the Vendor and submitted to the Department for approval **[CDRL]**. Samples of each material with supporting data sheets shall be submitted to the Department for approval **[CDRL]**. The interior arrangement of the floor covering shall be submitted to the Department for approval **[CDRL]**.

3.8 Windows

Window glazing materials shall conform to the requirements of Section 11.5 and shall comply with the requirements of 49 CFR 223 and 238. Car side windows shall meet the requirements of FRA Type II material. The cab car windshield and cab end door window shall be FRA Type I material.

3.8.1 Passenger Side Windows

Fixed passenger side windows shall be provided as shown on the general arrangement drawings. Passenger side windows shall be of an integral design and are coordinated with the seating and interior layout to provide as much passenger viewing as is practically possible. The windows shall comply with the applicable FRA regulations and APTA Standards.

The window assembly shall be capable of withstanding (with a safety factor of 2.5) the pressure caused by the combination of maximum wind speeds and train speed considering their relative direction created by trains passing in the opposite direction on adjacent tracks at a relative speed of 185 mph.

All glazing shall be installed using extruded seals. Clearances between edge of glazing and extrusion, and between extrusion and side skin or door skin shall be sufficient to prevent damage to glazing due to car body deflections. Proper tools shall be used when installing glazing to prevent damage to the window or

seal. Exterior paint shall extend under the window seal extrusions to prevent unpainted metal from becoming visible due to the shifting of rubber during service or maintenance.

A total of twelve (12) windows on each car shall be emergency exit windows and shall be identified and marked accordingly. The emergency exit window system shall use pull handle(s) colored red and suitably designed for either one hand or two hand pull action to release the window assembly from its installation. All emergency windows shall also have the locking lace on the outside to permit removal from the outside. Each emergency exit window assembly shall incorporate two (2) handles appropriately sized and located to permit easy removal of the window assembly from its installation. When the window assembly is removed from its installation, these handles shall be suitable to lift and move the window glazing to provide an unobstructed exit route. The emergency exit windows shall be located as follows: two (2) on each side of the upper level, two (2) on each side of the lower level, and one on each side of each intermediate level. All emergency exit windows on the lower level shall function as emergency access windows and shall be identified and marked accordingly. The design shall prevent the emergency exit window assembly and its lace and associated installation parts from becoming loose through normal operation, action of the car washing system or similar functions. Design and window removal functions shall be in accordance with relevant sections of the applicable FRA regulations and APTA standards including, but not limited to the requirements of 49 CFR 223, 238 and 239. The design of the emergency window assembly and installation **[CDRL]**, and removal procedure decals shall be submitted to the Department for review and approval **[CDRL]**.

The Vendor shall ensure positive sealing of the windows against environmental conditions as well as machine car washing. Corners shall be rounded to facilitate cleaning. Ready repair and ease of replacement from inside the car are mandatory.

3.8.2 Sliding Side Door and End Door Windows

Glazing materials shall conform to the requirements of Section 11.5.

3.8.3 Cab Car Control Station Sliding Window

Glazing materials shall conform to the requirements of Section 11.5.

The side window on the control console side of the cab shall be a horizontal pocket sliding sash-type with the sash sliding within a frame that is embedded in the sidewall. The sliding action shall be a manual operation. The sliding portion shall be lockable in the closed position and will hold, but not necessarily latch, the sash in any position from closed to fully open.

Under normal operating conditions in either direction of car travel, the sliding window shall be weatherproof when in the closed position. The sliding window shall be retained in an aluminum sash frame. The frame material shall be extruded aluminum with a brush finish and shall be black anodized to withstand the mechanical and weather elements as well as cleaning chemicals. The frame shall confine the passage of water to the outermost portion of the car, collect it, and drain it overboard. In order to keep water from running down over operating personnel, sloping gutter shall be installed over the sliding window to redirect water.

3.8.4 Cab Car Windshield

Glazing materials shall conform to the requirements of Section 11.5

The cab windshields shall meet FRA Type I requirements. The size and location of the Operator's side windshield, in conjunction with the location of the Operator's seat, shall ensure that acceptable lines of sight will exist. Both windshields shall be electrically heated to prevent the formation of frost or moisture on the inside surface under all specified operating conditions. Windshield shall have a spall shield on the interior side of the cab.

3.9 Seats

The seats, seat arrangements and installations shall comply with requirements of the applicable FRA Regulations.

Details of the seats, seat arrangements and installation shall be submitted to the Department for review and approval **[CDRL]**. There shall be two basic types of seat assemblies; those with a fixed back and bottom; and those with a moveable bottom. The fixed back seat shall consist of an aluminum mounting frame and a fiberglass seat shell to which a bottom cushion, a back cushion and a headrest cushion can be attached. The cushion material for the bottom seat cushion shall be Chestnut Ridge Safeguard XL. The cushion material for the back and headrest cushions shall be Chestnut Ridge Safeguard. As required by the elements of the approved interior arrangement, the fixed bottom seats shall be assembled in high back and low back configurations and arranged for lateral and longitudinal mounting; the moveable bottom seat types shall be configured as flip-up seat assemblies without supporting legs arranged for lateral mounting to remain in last commanded position.

A triple fold-up seat shall be provided on the lower level A end vestibule area. When the seat is folded, the area shall be used as a storage location for bicycles, refer to section 3.20.

Seat bottom and back cushions shall be covered with transportation grade woven fabric as defined in Section 11.15 Upholstery and Covering Materials. Headrests cushions shall be covered with transportation grade woven fabric as defined in Section 11.15 Upholstery and Covering Materials. Color and pattern shall be approved by the Engineer **[CDRL]**. Samples of each material with supporting data sheets shall be submitted to the Department for approval **[CDRL]**.

Seat Strength – For all seat types and their installations, the seat shells, seat base assemblies and all respective attachments to the carbody or floor, shall be designed and constructed to comply with the requirements of 49 CFR 238.233.

3.10 Side Sliding Doors and Operating Mechanisms

The exterior side doors and associated mechanism shall comply with 49 CFR 37, 38, 223, 238 and 239.

3.10.1 Side Sliding Pocket Doors

Side sliding pocket doors, as described below, shall be supplied at two locations on each side of the car, at the lower level. The doors shall be double sheathed of aluminum alloy construction, with glass windows set in rubber glazing strips. The space between the aluminum sheets shall be filled with thermal and acoustic insulation sufficient to provide noise and vibration damping. The windows shall be as described in Sections 3.8 and 11.5. The threshold shall be of aluminum construction with integral grooves and guides providing for door seal and drainage. Color contrasting, anti-skid safety strips shall be installed.

The doors shall be designed to provide sufficient strength and rigidity to withstand a force of 200 pounds applied on an area 24 inches x 12 inches, with a maximum deflection of 0.5 inches with the long axis parallel to that of the door, 2 inches from the door edge and centered within the height of the door.

To avoid "oil canning" and warpage, the door design and construction shall take into account the differential expansion of the inner and outer skins of the doors under the extremes of the ambient and car internal temperatures.

All doors and edges shall be sealed against environmental conditions when in the fully closed position.

Each side door opening shall contain two sliding panels which, when opened, shall withdraw into door pockets without scuffing against seals, insulation, or the door engine mechanism.

Each door shall be equipped with interlocking rubber bumpers on the leading edge, extending the full height of the door. When doors are closed, the two interlocking bumpers shall mate and form a weathertight joint. Seals shall be provided in the door opening to completely seal the door trailing edges. The doors shall be supported at the top by a roller slide arrangement, which shall offer minimum friction to the sliding motion of the doors. The doors shall be guided at the bottom in a manner that provides freedom from rattles and squeaks. Any wearing part of the door guide arrangement, including the interlocking rubber bumpers, shall be easily replaceable without removing the door.

In order to keep water from running down over passengers, gutters shall be installed over the side door openings to direct water away from the door areas.

3.10.2 Door Operators

Door operating mechanisms shall be provided to open and close the side doors and shall include positive over-center locking of the doors when they are in the closed position. In the event of a single control system failure, the doors shall not inadvertently open while the train is in motion.

An arrangement shall be provided in the drive engine to each door which shall permit the door to travel in the closing direction without injury to a passenger caught between a pair of doors. The drive arm shall be equipped with a spring mechanism and arranged to ensure that the closing force shall not exceed 30 pounds as per APTA SS-C&S-012-02 in mid-travel. The spring mechanism shall allow the door leaf to be pushed back not less than 3.5-inches in case of entrapment between the edges of a closing door. The operating mechanism shall contain obstruction-sensing feature(s). During the door closing cycle, the recycle circuit shall be effective when the door leaf is approximately 3.25 inches or less from the fully closed position. In this region, whenever a door leaf is being pushed back by ¼ inch or more, both door leaves shall immediately retract to a fully open position. An adjustable time delay feature shall be provided to hold the doors open. The adjustable range shall be between 0 and 5 seconds. If the obstruction is not removed, the doors shall continue to cycle open and close until the obstruction is removed or the time delay circuit is superseded by removal of the door close command. The force required to move the door leaf back towards its door pocket shall be 20 ± 5 pounds.

A pneumatic piston-type air motor door operator, or equal, shall operate each door leaf. The operating compressed air from the main reservoir system shall have the necessary pressure regulator valve and a shut off valve readily accessible inside the car body in one of the door pockets. Moisture traps and/or filters shall be provided as required in the door operator compressed air system to prevent ingress of dirt or moisture in door engines. Materials used in the door operators or air system shall not be affected by either moisture or methyl hydrate which may be present in the air system.

Each operator shall also be fitted with a manual door open device, accessible when the adjacent access door panel is opened, that, when activated, shall open the corresponding door leaf and once released shall allow the door to reclose and restore the door operator to normal operating conditions. The device must be stand alone and operate using the air supply only.

The motion of the doors shall approximate simple, harmonic motion and shall, thereby, provide cushioning in both opening and closing. The speed of door movement shall be such that from the beginning until the end of door movement on receipt of an "OPEN" or "CLOSE" command signal, including cushioning, the following times shall be obtained:

Opening: 1.6 to 2.0 seconds

Closing: 2.0 to 2.6 seconds

Adjustment shall be provided to enable these times to be maintained throughout the door operator life.

Adjustments shall be provided on door engine mounts and mechanisms to eliminate scuffing of either face of the door panels. Items, such as wiring, that are located in the door pockets shall be installed to prevent fouling of the door mechanisms. The door controls shall be trainlined to permit remote operation from control stations in each car. Door control stations shall be located on the lower level, each side of each car type.

3.10.3 Passenger Emergency Release

Passenger emergency operating devices shall be provided for each doorway, inside and outside of the car, in accordance with the applicable FRA regulations and APTA standards. When the device is actuated, the corresponding exterior side door leaves shall open under power if the compressed air and car electrical systems are functioning. If the systems are not functioning, continued pulling on the emergency cable shall unlock both door leaves and move each sufficiently so that the door leaves can be pushed open manually. When actuated, there shall be a minimum clear opening 30 inches wide by 74 inches high. The emergency operating devices shall be covered by a transparent, frangible cover. The inside devices shall be mounted at the appropriate heights above the handholds adjacent to the side door openings to be reached by passengers, operating crew or emergency responders (approximately 54-inches – activation height - above the top of finished floor). The exterior devices shall be mounted approximately 71-inches above top of rail.

3.10.4 Employee Access

Employees shall be able to open the B-end side doors from the inside or outside of the car by means of switches located on the exterior of the car adjacent to the door and in the interior of the car at the door pockets. The switches shall be actuated by the staff key when the low voltage dc system is active.

Panels that can be opened with a maintainer's key shall be provided in the door pockets and above the doors to permit access for maintenance and adjustment of the operating parts.

3.10.5 Audible Door Alarm and Warning Light

Audible and visual warnings that comply with the requirements of 49 CFR 37 and 38 shall be provided at each doorway and shall be activated prior to door closing. Activation of the warnings shall precede the initiation of door closing by approximately 4-seconds. The warnings shall alert passengers inside and

outside the car on the side of the car where the doors are open. The audible warning shall be adjustable within a minimum range of 68 to 80 dBA. The initial output setting shall be 80 dBA.

The visual warning shall be in conjunction with the audible warning. The visual warnings are located adjacent to each door leaf.

3.10.6 Door Position Indicating Lights

An exterior door status indicator shall be provided on each side of each car. The indicator shall be visible both forward and rearward in daylight and nighttime conditions and shall be illuminated with a red aspect under all conditions except when the door is fully closed. See Section 7.4.

3.11 End Doors and Diaphragms

3.11.1 End Doors

Manually opening and closing sliding end doors shall be provided except for the A-end of the Cab Car, which shall have a hinged door. End doors shall meet the construction and strength requirements of the side doors described in Section 3.10.1. The sliding end doors shall be supported by roller in track hangers with bottom guiding as specified for the side sliding doors or approved equal. The doors shall be double sheathed, of aluminum alloy construction, fitted with windows. The doors shall be sealed against weather and noise. Due consideration shall be given to minimizing warpage similar to the side doors. The sliding end doors shall be provided with components to meet the following requirements:

1. The door shall automatically close. The closing device shall be concealed, adjustable and readily accessible for maintenance. The door is to be opened manually requiring a force no greater than 20 pounds to unlatch and move the door panel to the full open position.

   The mechanism shall contain provisions to adjust the force required to open the door. The opening force and closing speed shall be reasonably consistent through the full range of ambient temperatures given in Section 2.2.

2. A latch shall be provided to hold the door in the closed position. This latch shall be operable from either side of the door. Safety locks, operable by an approved crew key, shall be provided to preclude inadvertent opening of the end door by passengers when the car is located at the end of a train. A safety lock override located in the interior of the car is required for use in the event of an emergency.

3. A release lever shall be provided on each end door to permit opening of the door from inside the car.

4. A safety bar shall be provided at each non-cab end between the collision posts and approximately 40-inches above top of floor. When not in use, the bar shall swing downward and be secured by a spring clip on the web of the collision post.

3.11.2 Diaphragms

A non-metallic, modular, maintainable diaphragm shall be provided at each end of each car. The construction shall be such as to provide a safe, stable, weatherproof passageway between two coupled BiLevel cars, and shall include diaphragm curtains with an automatic release type handle.

To prevent undesirable noise, there shall be non-metallic wear plates on the rubbing surfaces.

The threshold plates shall be non-corrosive and have an anti-skid surface. The diaphragm shall be in full compliance with flammability and smoke emission requirements. Interface between diaphragm and diaphragm, at coupled connections, and between the diaphragm and the end wall of the car body, shall exclude water and air drafts.

3.11.3 Vestibule Curtains

A vertical curtain as supplied complete with an automatic-release handle. The curtain shall be mounted at the left side of each end door opening with a matching hook on the right side as seen looking at the end door opening from outside the car.

3.12 Stanchions and Windscreen

The stanchions shall be in accordance with 49 CFR 37, 38 and 238 and APTA Standards SS-C&S-006-98 and SS-C&S-016-99. Stainless steel stanchions, including tubing, fasteners, and fittings shall be provided in the areas of the car where passengers are likely to accumulate. Stanchions, of suitable strength, shall have an outside diameter of 1.25 inches.

There shall be no center stanchion at the side doors. Provision shall be made for future installation of these stanchions.

Handrails that comply with applicable ADA and FRA requirements and APTA standards shall be provided on each side of the stairway from the intermediate level to the upper level, and from the intermediate level to the lower level.

Suitable handholds shall be installed on either side of each side door opening to assist passengers when boarding or alighting from the car. In cars with toilet rooms, a separate handrail shall be mounted in the B end vestibule area located to provide passengers with a handhold on the transverse wall of the toilet room.

Windscreens – intentionally left blank.

All installations shall be free of rattles, squeaks, sharp edges, burrs, scratches, pitting, and discoloration.

3.13 Thermal and Acoustical Insulation

Thermal and acoustical insulation shall be provided in order to comply with Sections 8.1 and 12 conditions. All precautions consistent with accepted industry practice shall be taken to keep carbody heating and cooling losses to a minimum and minimize transmission of noise into the car.

To reduce structurally borne sound, the floors, walls, doors, ceilings, ducts, and other sheets shall include fire retardant acoustic and thermal insulation. The exposed side of the insulating material shall be covered with a durable, waterproof, smooth-finished, and thermally stable material to prevent dirt from adhering or moisture from being absorbed.

The thermal and acoustic insulation shall be as follows:

Floor pans:	0.75 pound density, unfaced fiberglass approximately 2 inches thick. The interior face of the sub-floor steel sheet shall be treated with anti-drumming material.

Sides, roof, ends: 2 or 3 inch thick, 0.75 pound density, reinforced kraft, foil l faced fiberglass bat. The perimeters of all fiberglass panels shall be sealed with pressure sensitive aluminum foil tape. The finished fiberglass installation shall thus have a complete vapor barrier facing the car interior. Dirt shall not adhere to the vapor barrier. Ends shall have the same materials and installation, but thickness can be reduced to 1 inch.

The insulation in use on hatch cover for air conditioning unit shall be primarily of high acoustical absorption design, 0.6-pound density, flexible, lightweight, open cell foam.
Bulkhead and Fresh air duct assembly shall be insulated with a 0.256-pound density, highly acoustical absorbent, resistant to mold and mildew, closed cell, flexible elastomeric insulation
Door cavities shall be insulated with one inch thick closed cell foam or equivalent to provide the required thermal and acoustical insulation requirements.

3.14 Exterior Finish

The Vendor shall work with the Department to finalize the exterior paint scheme and logos of the BiLevel cars. Details of the paint system shall be presented to the Department. Drawings and samples of the color scheme, lettering, signage and all graphics, tags and other lettering shall be compiled by the Vendor and submitted to the Department for approval **[CDRL]**.

The exterior front end of the cab car shall be legibly identified with the letter "F" on each side. The car number shall be legibly displayed on each side of each car.

3.15 Stairs and Steps

Steps shall be designed to achieve low level loading at the platforms. The distance from the top of the rail to the top of the side door step shall be 18 inches. Exterior side steps shall be of expanded metal treads with steel framework and assembly shall be of sufficient strength to withstand heavy passenger loads over the life expectancy of the car. The design shall minimize the retention of water on the side door steps.

All interior steps shall have non-skid treads.

Contrasting ADA-compliant strips shall be used.

The stairs shall be designed to meet all structural strength and safety requirements.

Sharp corners shall be avoided to minimize dirt entrapment and facilitate cleaning.

3.16 Toilet Room

The Contract shall consist of cab cars with toilet rooms, and coach cars without toilet rooms. When toilet rooms are required, the required accessibility and accommodation provisions of the toilet room shall comply with Section 3.19. The dimensional layout and arrangement of the toilet room shall be accessible or approved for equivalent facilitation. As a minimum, the following equipment shall be included in each toilet room:

1. Stainless steel hopper with seat and cover.

2. Vanity assembly which shall include:

    a. a stainless steel wash basin.

b. provisions shall be included for the Department to install a dispenser for liquid soap. As a minimum, these provisions shall include a properly sized and located mounting hole.

c. a tilted tempered glass mirror for wheelchair passengers.

d. a stainless steel paper towel dispenser.

e. a spring loaded faucet with a palm operated stem valve.

3. Waste container.

4. Disposable seat cover dispenser.

5. Two roll type toilet paper holder

6. Sanitary napkin waste container.

7. Flush-mounted retractable coat hook.

8. Tempered glass mirror for standing passengers

9. Exhaust fan and grille.

10. Fluorescent ceiling light powered by the low voltage dc lighting circuit.

11 Emergency LED lighting

12. Stainless steel wall mounted handholds around the toilet seat.

13. Illuminated toilet occupied status sign on the toilet room exterior wall.

14. PA speaker mounted behind a grille in the ceiling.

15. Green toilet flush push button.

16. HVAC system outlet.

Signage associated with the toilet room shall be submitted to the Department for approval **[CDRL]**.

3.17 Low Location Exit Path Marking

3.17.1 Exit Path Marking Standards

Low Location Exit Path Marking (LLEPM) shall be provided to give guidance to passengers and crew to exit the car by the primary exit paths when normal and emergency lighting sources are not available, in accordance with APTA Standard SS-PS-004-99, subject to review and approval of the Department **[CDRL]**.

3.17.2 Exit Path and Associated Signage

The exit path marking and signage shall be provided by high performance photo luminescent (HPPL) marking material. The material shall be as defined in APTA Standard SS-PS-004-99.

3.17.3 Exit Doors

The primary exit path doors shall be the car end doors.

3.17.4 Door Handles and Emergency Door Releases

Each door handle, latch or operating mechanism shall be identified by appropriate signage and instructions for use, where applicable.

3.17.5 Exit Door Sign

The primary exit doors shall be clearly marked with an HPPL "Exit" sign. The text and color requirements shall be in compliance with APTA Standard SS-PS-002-98 relative to exit door markings.

3.18 Miscellaneous

Car numbers, logos, signboards, signage and other graphics shall be applied to the interior and exterior of the car. Car end designations ("A" and "B") shall be included near the car numbers. The car number sequence shall begin with Cab Car 2000 and Coach Car 3000 **[Client Submission]**. Drawings and samples and/or camera ready drawings with supporting data sheets for the car numbers, logos, signboards, signage and other graphics shall be submitted to the Department for approval **[CDRL]**.

On-board emergency equipment shall be provided in accordance with 49 CFR 239.

Four 5-pound dry chemical fire extinguishers, (2A-10BC) or equivalent, shall be furnished. Two shall be flush-mounted on the lower level and two shall be flush-mounted on the upper level. The extinguishers shall be securely mounted on suitable brackets in a manner that will prevent vibration and rattling. Access to fire extinguishers shall be provided with maintainer's key latches for maintenance. Frangible covers shall be provided for in-service access. Dry charge shall be as approved by the fire marshal in the area of intended use.

Each car shall be provided with a set of railway standard emergency tools permanently marked "SunRail." These tools shall be: 1 auxiliary portable light (with charge indicator), 1 handsaw, metal cutting, 1 axe, 1 crowbar, and 1 sledge hammer. The flush-mounted access door shall be fitted with a removable cover. Each car shall be provided with a first aid kit which shall comply with 49 CFR 239.101. The first aid kit shall be contained in a recessed cabinet with a removable cover. First aid kit shall be one per car. Access to emergency tools and first aid kit cabinets shall be provided with maintainer's key latches or under emergency conditions by a pull ring attached to a zip strip and removing the cover.

Safety appliances will be in accordance with current requirements of the Code of Federal Regulations, Title 49, Chapter II, FRA.

Skirt panels for access to the trucks, shall be fitted with stainless steel cables and *"S"* hook holders to hold skirts in the open position and stainless steel hinges with a latch to secure the skirts in the closed position for the normal operation.

Removable panels shall be secured with standardized quarter turn fasteners.

Vendor shall apply all required interior decals and wording. A plate to identify the vehicle weight shall be posted inside A-end intermediate level electrical locker door.

A literature rack shall be provided per car.

3.19 Americans with Disabilities Act (ADA)

Accessibility to persons with disabilities shall be in compliance with 49 CFR 37, and 38 (ADA).

There shall be space for two wheelchairs on each coach and eight on cab cars.

The cars shall be equipped with two wheelchair lifts to negotiate passage from the car floor to the station platform or vice versa.

In addition a portable bridge plate will be provided to negotiate passage from the car floor to the mini-high (22" ATR) station platform, or vice versa. A safe, secure and rattle-free stowing area shall be provided in each car. The portable bridge plate shall be readily deployed and stowed by one employee. Weight of portable bridge plate shall not exceed 30 lbs.

3.20 Bicycle Storage

Storage for two bicycles shall be provided on the lower level A-end vestibule area on all car types. On cab cars at two flip seat locations there will be additional storage for two bicycles at each position, for a total of 6 bicycle storage locations on the lower level of all cab cars. See section 2.7.3.

Bicycle storage for coach cars will be for two bicycles only.

3.21 Keying

The Vendor will supply standard keys as used on other BiLevel cars. As a minimum the keys shall consist of 50 staff keys and 20 maintainer's keys (total for this contract). The Vendor shall provide drawings identifying each key type and location of its proposed use. A set of keys shall be provided by the Vendor for each car.

3.22 Emergency Signage

The interior and exterior emergency signage shall be in accordance with the applicable FRA regulations and APTA Standards. Emergency signage shall be submitted to the Department for review and approval **[CDRL]**.

3.23 Work Tables

Twelve (12) work tables shall be provided at facing seat locations. Work tables shall be designed to meet the strength requirements of 49 CFR 238. The table profile shall allow for easy entrance and exit to the window seats. The edges of the table top shall be chamfered and all corners shall have a radius. The location of the work tables shall be submitted to the Department for approval **[CDRL]**. A 120 VAC power outlet shall be provided at each work table location.

3.24 Video Surveillance System

a) A digital video surveillance system shall be installed in each cab. The following section describes the functionality of the system. Details of the entire system including engineering, drawings, software function, performance, all the components and the installation shall be reviewed and approved by the Department. (CDRL)

b) The system shall consist of a Digital Video Recorder ("DVR"), up to twelve inputs

(either cameras or audio), a removable media hard disk, camera weather proof enclosures, a GPS antenna, connections and power cables, an enclosure for the DVR, and two microphones, one exterior and one interior.

c) Any additional equipment such as computer interface cables, and software required for interfacing with the video surveillance system shall be furnished.

d) The system shall be powered from the car's low voltage 72 VDC system through a circuit breaker located in the electric locker. The system on all cars shall be activated (start and stop recording) by a local means approved by the Department.

e) The DVR system shall operate within one minute of being turned on when operating in a 20°F to 120°F temperature range and continue operating continuously until turned off or if battery power supply runs off.

f) Cameras

1. There shall be two forward facing color cameras to provide the forward view from the operator's position. And one camera to observe the operator. The cameras shall use the NTSC color system.

2. The selected cameras shall provide capture quality that permits the signal aspect colors to be seen and discerned for all weather conditions. Video samples showing camera performance will be submitted for approval by the Department.

3. The performance characteristics of the cameras including their resolution, adjustments, color saturation (dawn and dusk), temperature tolerance, and size shall be presented for approval by the Department.

4. The cameras shall be positioned on either the interior or exterior of the cab car so as to show station platforms, signals and track close to the front end of the train, without blind spots. A camera locations and coverage plan shall be submitted to the Authority for approval.

5. Each camera shall be pre-configured for its particular location. The settings for the cameras shall be determined by installation in the first cab.

6. There shall be covers over the cameras to protect them from vandalism including spray paint and hammer impacts.

7. The cameras shall be powered by the DVR unit and they shall be plug connected to permit quick changing of units. The connections shall be secured to prevent loosening by vibration.

8. The camera mounting, adjustment and wiring shall be

inaccessible when the camera is installed. All fastenings used in the camera installation, which are accessible from the interior of the cab, shall be tamperproof type reviewed by the Department.

9. There shall be a minimum of four (4) cameras in the passenger cabin in the cab cars. Two located on the lower level, one in the center of the car facing to the front, or No. 1 end, and one facing to the rear, or No. 2 end of the car. Two located on the upper level, one in the center of the car facing to the front, or No. 1 end, and one facing to the rear, or No. 2 end of the car.

10. There shall be a minimum of four (4) cameras on coaches. Two located on the lower level, one in the center of the car facing to the front, or No. 1 end, and one facing to the rear, or No. 2 end of the car. Two located on the upper level, one in the center of the car facing to the front, or No. 1 end, and one facing to the rear, or No. 2 end of the car.

g) Digital Video Recorder ("DVR")

1. The digital video recorder shall be a separate unit and it shall be key-locked, inside a key-locked steel enclosure. All of the DVR locks shall use the same key. The DVR shall be shock-mounted and shall be located inside the electrical locker. The recorder shall be shock mounted to be able to withstand and continue recording when subjected to at least 5g shocks on any axis.

2. The DVR shall be able to power twelve audio or video inputs, and shall be equipped with a minimum of eight camera video connections. The DVR shall have four additional camera-independent inputs for audio inputs. The DVR shall have a connection to permit external monitor connection for real time video playback.

3. The DVR shall have a network connection means to an external computer. The network connection shall allow the DVR to directly communicate with a Windows- based computer, through supplied software, for either face-to-face or through a network for remote communications. The computer connection cable shall be stored in the DVR enclosure.

4. The DVR shall be capable of recording up to eight camera inputs at 15 frames per second, with each input at 720 x 480 resolution. The DVR shall be capable of running for 24 hours a day/7 days a week without stopping.

5. The recording shall be done on a removable media hard disk drive that will be used for video storage only. The media hard disk shall have sufficient capacity to store a minimum of one week of continuous recording from two cameras on a car, recorded at a resolution of 720 x 480, at a minimum frame rate of 15 frames per second per camera, before overwriting occurs. The DVR shall be capable of holding larger hard disks to permit future upgrades of the system capacity.

6. The hard disk drive shall be held inside a ruggedized enclosure designed to protect the hard disk drive from the shock and vibration of a rail car without damage or loss of

image. The enclosure shall be directly inserted into the DVR. The hard disk drive assembly shall be fully interchangeable with all other hard disk drive/enclosure assemblies used on either the Coach or Cab Car system.

7. The hard disk drive shall be able to be read at a remote location, without a DVR, via provided software and a converter cable that converts the hard disk signal to a standard input signal. The required converter cables will be supplied.

8. The recording shall be date and time stamped along with the camera number and car number. Date and time stamp shall be coordinated with GPS data supplied as part of the DVR system.

9. The DVR shall record external audio of the two forward facing cab mounted cameras.

10. The DVR shall be able to scan through all cameras mounted on a particular rail car.

11. On cab cars only, GPS, Event Recorder and DVR shall be integrated. They should share time stamp and integrate data such as recordable events from the Event Recorder, and position and speed from the GPS onto the DVR display. The amalgamated data should then be stored on the DVR.

h) Microphones

1. An exterior microphone shall be located under the cab floor. It shall be installed in a weatherproof enclosure and be able to record exterior sounds such as bell, horn and other sounds in front of the cab.

2. An interior microphone shall be supplied in the cab area to record communications from the cab. The interior microphone can be integrated to one of the cab cameras.

i) Software

1. The Video Surveillance System shall come with two types of software for external computer interface. One type of software shall be used for administration of the DVR and the other for reviewing or downloading video from the hard disk drives. At a minimum, the two types of software shall allow the following features to be available. The Vendor shall submit a detailed description of each type of software, showing complete capabilities, for review and approval by the Department.

a. Administrative Software

(i) The administrative software shall allow a user to administer settings, view recorded video, or watch live video with a computer connected to the DVR. The software shall allow for a username and password set-up of each DVR. The software shall

allow for upgrading of the DVR firmware.

(ii) The software shall allow for image adjustment options, such as brightness and contrast, when watching either live or recorded video.

(iii) The software shall permit the user to play, pause, fast- forward, rewind, view frame-by-frame in forward/backward directions, and stop the video.

(iv) The software shall be flexible so as to permit updating as patches or newer versions become available.

(v) The Department shall be free to install the software on as many computers as it sees necessary.

b. Review/Download Software

(i) The review/download software shall be provided with a hard disk drive to USB adapter (computer connection) to view and download video from the hard disk drive at a remote location. The software shall allow either full or partial downloads of the hard disk drive. Downloading will be done through cable only.

(ii) The software shall permit the user to play, pause, fast- forward, rewind, view frame-by-frame in forward/backward directions, and stop the video. The software shall also allow adjustment of image quality.

(iii) The software shall be flexible so as to permit updating as patches or newer versions become available.

3.25 Passenger Compartment Interior Cameras

a) The Vendor shall provide all equipment necessary installed and functional for closed circuit monitoring of Passenger cabins.

b) The Vendor will provide Interior cameras (similar to the exterior cameras), two on the lower level and two on the upper level. The four cameras on the lower level will each focus on the field of vision to include two door locations in a configuration to be confirmed with the Department.

c) A plan of the field of vision of each of the four interior cameras shall be submitted to the Department for Review and approval. (CDRL)

d) These four additional passenger compartment cameras are in addition to the three cameras in the cabs.

e) Data storage from these cameras will be on the DVR required under section 3.24 above

SECTION 4

4 TRUCKS

4.1 General

Each car shall be equipped with two four-wheel, inboard, roller-bearing trucks suitable for normal operation at speeds up to 95 mph. Trucks shall enable the cars to meet the ride comfort requirements of Section 12.3.

The truck and its attachment to the car body shall comply with the applicable FRA regulations and rules, and applicable APTA Standards, including, but not limited to 49 CFR 238.111(a), 49 CFR 238.219, 49 CFR 238.227, and APTA Standard SS-C&S-008-98.

The truck frame and all truck parts, including brake gear, shall be capable of withstanding the maximum stress imposed by the forces acting on the frame, including, but not limited to, dynamic interaction between vehicle and track, braking, equipment operation, and any combination of these conditions.

A mechanical safety connection shall be provided between car body and truck to meet designed load transfer requirements. A positive mechanism shall also be provided such that the truck shall be raised with the car body when the body is lifted. The truck assembly shall be free from rattles and noise in service.

All truck components, with the exception of wheels, brake equipment, and brake shoes shall serve for a period of five years or 300,000 miles (whichever comes first) prior to need for replacement.

Castings for each truck shall be magnetic particle inspected per ASTM E709-80 in accordance with the manufacturer's plan. Radiographic and ultrasonic inspection may be used to supplement magnetic particle method for frame casting qualification. All casting inspections, dimensional/layout, MT, RT and UT, shall be documented, available for review upon request and retained in accordance with Contract requirements.

Welding done on truck and truck components can only be performed by certified welders. Welder certification is covered in Section 11.8. Welding in critical areas shall be magnetic particle inspected.

Wheel pairs shall be matched, not to exceed one-half tape size per axle set. Mounted wheels shall be concentric with respect to bearing centers and tread at plane of taping line within 0.015-inches T.I.R. and not to exceed 0.015-T.I.R., inches out of parallel to each other, per AAR requirements.

All equipment shall be secured to truck structure using appropriate torque values and locking methods as necessary on all attachment hardware. Fasteners used for truck mounted components shall be Grade 5 or greater as required, to meet design strength requirements for each application.

4.2 Weights and Dimensions

Trucks shall be designed to obtain the minimum weight, consistent with adequate strength, durability, reliability, performance, and low maintenance.

1. Truck wheelbase: 8'-6".

2. Wheel diameter (new): 33".

3. Track gauge (nominal): 4'-8.5".

The completely assembled truck shall not exceed the clearance limits, required between truck and car body for all operating conditions with new or worn wheels, secondary spring deflection, deflation and maintenance.

4.3 Truck Frame

The truck frame shall be of cast steel construction. Peak forces resulting from acceleration and braking must be transmitted through the frame in such a way as to produce approximately equal loading on wheels.

4.4 Wheels

Wheels shall be 33 inch diameter, multiple-wear type, AAR Class *"A"*, cast or wrought in conformance to the requirements of Section 11.3.2. Wheels shall be fully machined with hub diameter and rim inside diameter held to within a 0.030-inch total indicator reading. Each wheel shall have a visual wear indicator as per AAR Recommended Practice P619-83.

Wheel profile shall be 5-1/2 inches wide and in conformance with AAR Standard No. S-621-79 "Tread and Flange Contour for Narrow Flange Steel Wheels on Passenger Cars, Diesel and Electric Locomotives, Trailer and Engine Truck Wheels" with 1 in 20 tread taper. The wheels shall be machined all over with 250 micro-inch finish. If the proposed design, as required in Section 9.5, includes one brake disc per axle, then one wheel per axle shall be a standard wheel and the other wheel shall be machined to accept a WABCO (or equal) 24-inch brake rotor. Particular care shall be taken with the mounting holes drilled and tapped in all wheels for brake disc attachment. These holes shall be of sufficient depth, bottom tapped, and completely free of drill cuttings or other debris to allow proper torquing of the required disc attaching bolts.

Wheels shall be dynamically balanced to provide the ride comfort requirements of Section 12.3 over the intended operating speeds of Sections 2.3 and 4.1.

4.5 Axles

The axles shall be solid and of forged steel in conformance to the specification detailed in Section 11.3.1. As a minimum the wheels, axles and journal bearings shall be mounted using the practices specified in the AAR Wheel And Axle Manual. Pressure graphs and inspection data sheets shall be provided to the Department for all wheel and axle assemblies. **[CDRL)**

4.6 Journal Bearings (See also Section 11.11)

The journal bearings shall be fully enclosed, No Field Lubrication (NFL) roller bearings, Timken Part No. HM 133444-90382 or equal including the HDL seal shown in Timken drawing E43798, 6 ½ inches x 12 inches, Type AP, Class F.

Journal bearings shall be thoroughly packed with the recommended amount of AAR approved grease, in accordance with AAR specification M-942.

Grease fittings shall not be provided.

The journal-bearing housing shall accept a heat sensor or "stink-bomb". Sensors or "stink-bomb" shall be supplied and installed by the Vendor.

4.7 Suspension

The truck-suspension system shall be designed to minimize the transmission of axle lateral, longitudinal, and vertical accelerations to the extent possible without compromising wheel load equalization or roll stability. See Sections 2.3, 2.7 and 3.1.1. Contact with lateral stops are minimized when traversing switches and rounding curves.

Adjustment shall be provided at the primary suspension to compensate for radial wheel wear specified in Section 2.4.

The secondary-suspension springs shall be Firestone Model 222 or approved equal. Primary rubber springs (chevrons) shall be permanently identified into two categories of spring rate tolerances. All chevron springs on an axle shall be of the same tolerance category. Vertical dampers shall be of the telescopic type. Viscous yaw dampers of proven design shall be provided. Anti-seize compound is to be used on mounting bolts of dampers to facilitate replacement.

Elastomeric, laminated lateral suspension and longitudinal traction pads shall be provided between the truck frame and bolster to minimize the number of possible paths to attenuate noise and vibration from the wheels to the carbody through the truck frame so that the requirements of Section 12.2.2 and 12.3 can be met. The suspension system shall demonstrate compliance to 49 CFR 238.227 during dynamic testing and 49 CFR 213.57 during static testing.

4.8 Leveling Valve System

The air suspension leveling system shall:

1. Provide for a 3-point, 3-valve system.

2. Permit consistent practical static height leveling at each leveling valve, to within ± 0.250 inches measured across the air spring seats on rising air pressure using a standard shop procedure.

3. Maintain the leveled height for a passenger load variation from AW0 to AW3 weight condition.

4. Inflate and deflate the springs at a rate not less than maximum practical passenger loading and unloading rates (4 passengers per second).

5. Provide for maximum possible car body roll stiffness.

6. Provide a load weight air pressure that is proportional to the load carried by the air springs.

7. Provide for installation of the leveling valves on the car body, close to the sidesills, for ready adjustment access on floor level track.

SECTION 5

5 COUPLERS AND DRAFT GEAR

5.1 Coupler

The coupler shall be APTA RP-M-003 (latest revision) compliant, short shank Type H Tightlock coupler rotary operated, bottom operated with double rotary locklift operating mechanism for passenger cars. The coupler assembly shall be arranged for bottom operation by means of operating rods located on one side of each end of the car, the observer's left hand side when facing the coupler.

5.2 Yoke

The yoke shall be quadruple shear yoke No. 46637 as supplied by National Casting or approved equal to match the type MS-489-6A draft gear.

5.3 Draft Gear

Single cushion National Castings Type MS-489-6A draft gear or approved equivalent, shall be provided.

5.4 Coupler Carrier

The coupler carrier shall be designed in accordance with 49 CFR 238.207.

The coupler shall be supported by a spring-loaded carrier fitted with an abrasion-resistant, replaceable, manganese-steel wear plate.

SECTION 6

6 CAB CAR

6.1 General

The Cab Cars shall be identical in all respects to the Trailer cars, except as specified in this Section.

A full width cab shall be located at the F-end (front) of the cab car in accordance with 49 CFR 229.11. The cab shall be separated from the passenger compartment by a wall with a lockable, hinged door. The cab door shall be hinged to permit closing off cab compartment and the cab area. When not in use as a train control unit, the doors shall enclose the control area and free the seat on the opposite side of the control unit for passenger use. An equipment locker behind the cab shall house intercar jumper cables, dummy receptacle plugs, the radio and radio power supply, an event recorder, and any other apparatus that should be logically located there. There shall also be space in the locker for a stretcher and the Operator's personal effects.

6.2 Air Brake Equipment

Cab car mounted air brake equipment shall be Wabco schedule 26-C or equal.

A type Wabco 26B-1 brake control valve or equivalent, shall be mounted on the control panel, be within easy reach of a seated Operator, and incorporate a means to cut out the valve so that train braking can be controlled from the locomotive. The valve shall contain a handle which operates through the following positions:

1. Release
2. Minimum reduction
3. Full service
4. Suppression
5. Off
6. Emergency

Exhaust air from the brake valve shall be piped to the atmosphere through the floor. The brake handle shall be removable and when not in use, be stored in a secure place on the console.

Two duplex air gauges shall be located on the console, directly in front of the Operator within the Operator's normal line-of-sight when seated. One gauge shall show the air pressures in the main reservoir (red needle) and in the equalizing reservoir (white needle). The other shall show the brake cylinder pressure (red needle) and the brake pipe pressure (white needle). Both gauges shall be internally illuminated.

An emergency brake valve, Wabco B-3B or equivalent, shall be located in the cab area and accessible for operation from outside the cab wall when the full width cab is not in use. It shall be arranged so when activated, it will cause an emergency brake application in either the cut-out or cut-in positions of the brake valve.

6.3 Control Equipment

The cab area shall contain an upper control console, side control console, lower side control console and a console located directly in front of the Operator. The arrangement of the operating controls shall be of a

design agreed to by the Department and the Vendor **[CDRL]**. The following is a list of the operating controls to be installed in the cab:

1. Locomotive throttle controller with dynamic brake control
2. Reverser handle for direction control
3. Intentionally left blank
4. Horn control
5. One electric warning bell control switch
6. Sanding control pushbutton switch with indicator light (loco sanding only)
7. Headlight / auxiliary light switch (off; dim; bright; bright + aux) with indicator lights
8. Windshield heater control switch with indicator light
9. Two-windshield wiper control knobs
10. Console illumination dimming control
11. Overhead ceiling light switch
12. Integrated communications control unit (ICCU) to select VHF radio, intercom or public address functions for the handset
13. Communication handset and holder
14. Cab heater control switch
15. One alertness control system acknowledge switch and one alertness control system acknowledge foot pedal switch.
16. Air brake gauges
17. Speed indicator
18. Locomotive attendant call bell and pushbutton control switch
19. Locomotive fuel pump control switch
20. Locomotive generator field switch
21. Thumb lever actuated control switch (Cab Setup Switch) for enabling or locking out all locomotive controls
22. Remote locomotive load meter
23. Car number board light switch
24. Dynamic brake warning indicator
25. One green train "Doors Closed" indicator
26. Locomotive wheel slip indicator
27. Locomotive main engine fault indicator
28. Car battery charger normal indicator
29. Brake applied indicator
30. Zero speed indicator
31. Locomotive Positive Control Setup (PCS) indicator light
32. Right marker light control switch with indicator
33. Left marker light control switch with indicator
34. Door interlock override sealed switch with indicator light
35. Zero speed override sealed switch with indicator light
36. TMS audio/visual alarm panel
37. Non-Operator's side of cab light switch
38. Headlight failure indicator lights
39. Auxiliary failure indicator lights
40. Locomotive engine run switch
41. HEP alarm cutout sealed switch
42. Door buzzer
43. Door buzzer pushbutton
44. Auxiliary light flash enable

45. Auxiliary light flash disable
46. Auxiliary light flash indicator

A panel containing all the circuit breakers for the equipment particular to the cab shall be located on the rear cab wall and shall be accessible to the Operator. The panel shall include circuit breakers for the radio communication and public address systems and for other cab control equipment. This panel shall be covered by a hinged panel with a lock. On the main circuit breaker panel at the B-end of the car, a main low voltage dc cab services circuit breaker shall be provided as the feeder breaker for this panel.

Where appropriate, pilot lights shall be incorporated into the switch controlling the device. For example, the marker light switch or the loco sanding switch.

Traction Interlock

1) The Cab Cars shall be equipped with a traction interlock that must be energized for the locomotive to take power

2) The Vendor shall provide circuits through the trainline that will provide traction interlocking to prevent the locomotive from moving under power, if the car doors are not closed. The circuits shall be provided with sealed toggle switches with indicator light, on the operator's console that will allow the circuits to be bypassed.

3) A door override trainlined circuit shall be provided by connecting pins TBD of the trainline through a design to be coordinated with the locomotive supplier under a separate contract. The function is a traction interlock to inhibit taking power if doors are not closed and locked. The override will allow cutout switch to be operated, so that the train can be moved until the end of the shift. The Vendor shall submit the design for review and approval of the Department (CDRL).

6.4 Miscellaneous Cab Equipment

Each cab shall be equipped with the following accessories:

1. Windshield Wipers (both sides)
2. Communication handset and holder
3. Lighting

All brake gauges shall be illuminated by dimmable lights. An overhead cab light fixture shall be provided that has an independent control switch. All above lighting shall be protected by a circuit breaker.

- Operator's Seat

  A floor mounted, high-backed Operator's seat, National Seating Company Model 0849 or approved equal, shall be provided in the cab.

- Foot Rest

  A foot rest shall be provided.

- Sun Visor

  Two (2) sun visors shall be installed within the cab area. One sun visor shall be usable at the Operator windshield area. The other sun visor shall be useable at the side sliding sash window area. The sun visors shall be padded, fully adjustable in all directions, and shall store unobtrusively and securely when not in use. They shall not interfere with access to the controls or viewing of the gauges or indicators.

- Coat Hooks

  A folding coat hook shall be mounted inside of the cab on the rear wall. Two coat hooks shall be installed in the locker behind the cab.

- Form Holder

  Two (2) standard cab form holders and a log book holder shall be mounted inside of the cab on the rear wall.

- Train Order Clip

  A train order clip shall be mounted within reach of the Operator.

- Cup holder (cab only)

6.5 Additional Cab Car Equipment

6.5.1 Speed Indicator

A speed indicator system shall be installed in a position that shall be easily visible by the Operator. Speed indicator range shall be 0 – 120 mph. A speed sensing gear and magnetic pickup shall be mounted on the number three axle as seen from the B-end. The magnetic pickup and mounting shall be fully adjustable for proper operation and shall be securely lockable in any adjusted position.

6.5.2 Cab Communications

The cab cars shall be equipped with communications equipment from which the Operator may select a voice communication link with the railroad operating authorities through the VHF radio, private conversation with a train conductor through Intercom (IC) system, private conversation with a passenger call through the Intercom (IC) system, or an announcement over the train Public Address (PA) system. As a minimum, the cab communications system shall include a VHF radio and radio base, an Integrated Communications Control Unit (ICCU), a VHF antenna, handset and cradle and radio PA/IC Interface unit.

6.5.2.1 VHF Radio

The VHF radio shall be a General Electric - 12R Series II Radio, or approved equal. The radio shall be designed with state-of-the-art technology to provide onboard voice and data communications for transit rail operation. The radio shall be fully compliant with the FCC mandate for narrow band operation. The radio unit shall be mounted on an AAR-approved mounting base in the equipment locker adjacent to the cab and be accessible for maintenance. The radio unit shall be designed to operate from the car 72 Vdc low voltage power supply.

6.5.2.2 Integrated Communications Control Unit (ICCU)

There shall be one ICCU control head located on the cab side console of the cab area. The control head shall be used by the Operator to provide a radio communications link with the railroad operation authority. The control head shall contain four backlighted pushbuttons "RAD", "PA", "IC" and "CALL". The "RAD" and "PA" pushbuttons shall permit selection of radio and public address. Both the "IC" and "CALL" pushbuttons shall initiate an intercom call signal that will be heard in all control cabs and at all activated door control stations. The ICCU shall be operated by either the Push-To-Talk (PTT) button and the panel's internal microphone or by the handset located adjacent to the unit. The ICCU shall be capable of programming up to 90 channels as home channels. The unit shall be complete with a display to provide the standard FAP display used by railroads. The display shall provide the ability to program unique alpha home channel names and special messages to provide easy identification. The display shall provide LED indication showing the system activated and the mode in use.

6.5.2.3 VHF Radio Antenna

The VHF radio antenna shall be omnidirectional, low profile, hard-covered style and is to be designed for transit vehicle application. The unit shall be located on the cab car roof at the F-end of the car.

6.5.2.4 Handset and Holder

Handsets shall be equipped with a normally closed push-to-talk switch. The handset cord shall be equipped with an adequate strain relief fitting where it is attached to the handset. A handset holder shall be provided with each handset.

6.5.2.5 Radio PA/IC Interface Unit

A radio PA/IC interface unit shall be provided to work in conjunction with the VHF radio and the PA amplifier. The unit shall provide the Operator the ability to make public address (PA), Intercom (IC) or radio calls from the cab using the ICCU and handset.

6.5.2.6 Head End Controller

Cab cars shall be equipped with a Head End Controller (HEC) and a handset complete with holder, located on the cab rear wall, from which the operator may receive or transmit messages over the Public Address (PA) system, Intercom (IC) system, Passenger Emergency Communication (PEC) system and the display signs. The HEC is the Operator interface to the Automatic Train Announcement System (refer to Section 7.8).

The HEC shall be complete with;

1. An internal speaker which monitors all PA, IC and PEC communications while the handset is cradled and the audio line enable button is selected. A speaker level potentiometer shall also be provided for control of the sound.

2. Three green pushbuttons for control of the PA, IC and PEC modes of operation. The Public Address (PA) button shall allow the operator to monitor or initiate activity on the Public Address system. The Intercom (IC) button shall allow the operator to communicate with the crew at the door control and communication stations via the intercom system. The Passenger Emergency Communication (PEC) button shall allow the Operator at the HEC to communicate with passengers at other PEC panels in the cars.

3. An ATAS disable button. When activated, this button shall disable the Automatic Train Announcements.

4. A RS-232 connection to allow system status retrieval, diagnostics, firmware upgrades and control of the equipment in the ATAS system.

5. A PCMCIA memory card which stores automatic announcement messages as well as route configuration information.

6. Four buttons numbered 1 to 4 which shall be used to configure and monitor the status of the entire ATAS system.

The HEC shall also control the playback device, through trainline communications used to play pre-recorded audio messages over the car speakers and pre-recorded visual text messages to remote display units within the car.

6.5.3 Train Monitoring System

The cab car equipment shall include an Event Recorder (ER) which will record train operating parameters continuously, and a Train Monitoring System (TMS) which shall monitor the Operator's vigilance. Train operating parameters, with real time date stamping, received from trainline signals or pressure transducers on the brake system shall be continuously recorded in digital form by the ER. For analysis of train operation or in the event of an accident, it shall be possible to download the recorded data to a portable computer. The ER shall be initially set and maintained at Greenwich Mean Time Standard, but it shall be possible to be reset to local time standards through the use of download software.

The TMS shall detect the actions of the Operator. If the TMS does not receive, within a period of time determined by the Department as per 49 CFR 238.237(b), confirmation of Operator train control activities (movement of the propulsion or brake lever, etc.), an audio and visual alarm shall be activated. The activation of the alarm shall mark the beginning of the alarm cycle. The alarm cycle shall continue until the Operator performs a system reset activity or until a penalty brake application is initiated. If the Operator does not acknowledge the alarm prior to completion of the alarm cycle, the power down sequence shall be initiated, which activates the TMS magnet valve resulting in a penalty brake application. Valid Operator activities shall be the use of the throttle, brake, horn, bell, sander, headlight, or the manual reset switch. The visual alarm of an impending penalty brake application shall be given by a train monitoring system (TMS) audio/visual alarm panel. The audio/visual alarm panel shall be mounted above the cab windshield.

The ER and TMS systems shall be microprocessor based with sufficient memory capacity to record at least 48 hours of data. The memory shall be non-volatile, crash and fire protected, and vandal resistant. Communication with the download computer will be via an industry standard RS-232 port. The audio/visual alarm panel shall show a red indication for a system fault and a green indication for an operable system and shall have a self-test push-button switch.

The event recorder shall store data from all channels at four minute intervals. Recording of a particular channel shall also be initiated with the occurrence of the following:

1. A speed change of 1 mph or greater
2. A brake pipe pressure change of 2 psi or greater
3. Any digital input change of state

All events, along with Greenwich Mean Time to an accuracy of ± 0.5 seconds, shall be recorded. As a minimum, the following inputs for the following events shall be recorded:

1. Hand or foot reset switch
2. Self test internal
3. Intentionally left blank
4. Penalty (TMS) brake solenoid valve energized
5. Equalizing reservoir pressure switch
6. Bell activation switch
7. Horn pressure switch
8. TMS override switch (internal)
9. Auxiliary light, right side
10. Auxiliary light, left side
11. Marker lights
12. Headlight dim Input A
13. Headlight bright Input B
14. HEP on/off
15. Emergency brake pressure switch
16. Throttle position trainlines energized AV, BV, CV, DV
17. Reverser-Forward
18. Reverser-Reverse
19. Sanding trainline
20. Generator field
21. Doors closed indication
22. Dynamic brake setup
23. Wheel slip/slide indication
24. Radio handset Push to Talk
25. Intentionally left blank
26. Speed
27. Brake pipe pressure
28. Brake Cylinder pressure
29. HEP Sealed Cut-Out Switch
30. Door Open Override
31. Door Status
32. Zero Speed Bypassed

6.5.4 Horn

A Nathan three chime horn shall be provided at the front end of each cab car at a location accepted by the Department, below the floor. The horn shall be capable of producing 98 db ± 4db. The horn shall be similar to Nathan Model PC- 12345.

The horn system shall include a manually adjustable pressure reducing valve. The manual pressure reducing
valve shall be capable of setting the horn sound pressure output in 1 db increments (as measured 100 feet in front of the horn). The valve shall include a tamperproof locking mechanism to maintain a

constant sound pressure level setting after the original adjustment. The horn will have a sound insulated baffle or shroud to maintain the focus the horn sound down the right of way, similar to the UTA Cab Cars.

The horn shall be sounded by one of two buttons. One button will activate the horn sequencer. The other button shall activate the horn and deactivate the horn as released. The horn control will not be provided with an "emergency horn" function.

The horn shall be set to 96 db + 2db, - 0db before shipment to SunRail. A test record of the horn setting will be included in the car history book.

The horn shall include a conical debris deflector for each chime and debris shield over the entire horn assembly.

The sound intensity of the horn shall be in full accordance to FRA requirements.

6.5.5 Windshield Wiper

Pneumatically operated windshield wipers, with a pantograph style operating arm, shall be located above each windshield. The center of the sweeping area on a vertical plane shall be located at the center of the Operator's viewing area. They shall have their park position located toward the center of the car. The drive mechanism shall be accessible from inside the car.

6.5.6 Exterior Bell

An electronic, horn-type speaker bell, Transtonic Inc. Model Number 020-0082-00 or equivalent, shall be located on the roof. The bell shall be controlled electrically by a switch complete with integral ON/OFF pushbuttons. The bell shall also function when the horn is sounded. Even after the horn has ceased to sound, the bell shall continue to function until shut off by an adjustable time delay relay (default setting at 10-seconds).

6.5.7 Sanding Equipment

Cab cars shall have no sanding equipment installed.

6.5.8 Rear View Mirror

A horizontally adjustable rear view mirror shall be installed at the leading edge of the sliding cab side window. The location and fixed adjustment shall permit its use by a seated Operator. A similar rear view mirror shall be similarly installed on the opposite side of the cab.

6.5.9 Pilot

A one-piece pilot shall be installed in front of the Cab Car. The configuration of the pilot shall be within the clearance diagram and shall be submitted to the Department for concurrence **[CDRL]**. The height of the bottom of the pilot above TOR shall be in accordance with 49 CFR 229.123. The height shall not be less than 3 inches with maximum uncompensated wheel wear of 0.5 inch and deflated air springs. The pilot shall provide the necessary clearances to couple the F-end of the cab car to all other ends of equipment to be supplied under this contract. Clearances to couple two cab ends facing each other is required. The structural integrity of the entire assembly and its attachments to the carbody structure shall be consistent with the functional requirements.

6.5.10 Cab Heating and Air Conditioning

The cab area shall contain suitable ducting for heating and air conditioning supplied by the main system in the car. Cab air conditioning and overhead heating from the main system shall be provided by the ventilation air with the air temperature controlled by the A-end temperature control system.

Ventilation of the cab shall be provided by a duct take-off from the intermediate-level, ceiling diffuser duct. A minimum airflow of 150 cfm shall be available when the evaporator fan in the F-end overhead air-conditioning unit is operational. A louvered grille shall be installed in the cab door to exhaust the supply air. The air-flow rate and direction from the discharge outlet shall be adjustable by the Operator by means of a friction controlled damper.

The control cab compartment heating shall be supplemented by a separate cab heating system. This heating system shall be provided by:

1. Baseboard convection heating located adjacent to the Operator's seat. It shall be controlled by the F-end intermediate level floor heater thermostat.
2. A forced air heater having a nominal heating capacity of 2 kW located behind the cab rear wall inside the crew locker. The lower section of the cab rear wall shall have the inlet and outlet grilles. The heater element shall be arranged in three circuits; one 0.5 kW and two 0.75 kW. All circuits shall be powered from 120 Vac. The 0.5 kW circuit shall be controlled by the "F" end floor zone thermostat and the two 0.75 kW heaters shall be controlled by a three position switch provided in the cab labeled: "OFF", "Low" and "High". The forced air heater control switch shall only be enabled when the Operator's console key switch is in the "ON" position. The blower shall be "Activated" whenever any of the heater circuits are energized. Thermal protection shall be provided for all circuits by a solid state, thermal switch with a manual reset, which shall open on excessive temperature rise. In addition, a thermal fuse shall be provided for each circuit for ultimate backup protection.

6.5.11 Cab Insulation & Sealing

The cab area shall be thermally insulated. Drafts in the cab shall be minimized by sealing all gaps, e.g., around air piping.

6.6 Positive Train Control

A. Provisions shall be provided in the cab cars for the future installation of a Positive Train Control System to be defined by the Department and its railroad operator. It is understood that the Department will select the ETMS – Electronic Train Management System or the CBTM - Communications Based Train Management System by WABCO.

Provisions shall include the following hardware and space allocation:

- Space allocation for a circuit breaker on the DC voltage distribution system;
- Space allocation for the installation of equipment in the equipment rack of the crew locker;
- Space allocations for the wiring of positive train control

- The Vendor shall provide provisions for installation of a Positive Train Control System. Provisions shall include at least two circuit breakers, (one for radio(s)/WiFi/GPS, one for logic rack), wiring, racks and brackets. The provisions should also include wiring. The cab cars should include pulling four pair #12 stranded wire from CB Panel to the future location in electric locker. Four pair of #12 stranded wire from future location to cab throttle stand. Two pair #12 stranded wire from the PTC logic box rack to the brake controller. One coax cable from future location in electric locker to a good interior location for future exterior location of an antenna. One CAT 5 or four conductor shielded cable to be run from the future location in electric locker to the cab. Please leave three feet of wire looped at the end of the cables to be terminated with shrink wrap or other semi-permanent insulator.

- Two capped fittings on air lines in cab area to allow for future connection of ETMS to air brake system.

Required Submittals

The Contactor shall submit a document describing the PTC provisions. It will show locations for installation of radio, black boxes, ADU, conduits, wire running list, pneumatic interfaces, circuit breakers, antenna locations and generally describe how one would install the PTC system. Captioned photos of the provisions to aid in location and description will be provided.

SECTION 7

7 ELECTRICAL POWER, TRAIN LINES, DOOR CONTROLS, LIGHTING AND COMMUNICATIONS

7.1 General

The electrical power, lighting and communications systems shall be in accordance with the applicable FRA regulations and APTA standards in effect at the times prescribed in Section 1.4.

Power to the cars shall be by trainline cables from a 480 Vac, 3-phase, 60 Hz source. The design and configuration shall enable power to be supplied from the locomotive head end power (HEP) apparatus or from a wayside power source.

The cars shall be equipped with both locomotive and car control 27-wire trainlines. All trainline wires shall run the entire length of the car, with termination points as required, and be connected from end-to-end. Spare trainline wires shall be identified in the end-of-car junction boxes. The Vendor shall provide all car control trainline design data, including wire and pin assignments, to the Department **[CDRL]**. The Vendor shall submit a complete design review package for all trainlines and connections to the Department for approval **[CDRL]**.

The wire used in the electrical trainlines shall be of sufficient size to permit satisfactory operation of consist of up to 10 cars.

Input to the HVAC systems, the low voltage dc auxiliary power supplies, and the 120 Vac, 60 Hz transformers for each car shall be supplied from the HEP trainline.

The low voltage dc power supply shall power communications, and the other low voltage circuit loads. (See Section 7.8)

Adequate provisions for radio interference suppression shall be incorporated in all electrical equipment. (See Section 7.8.4). All low level signal circuits (less than 5V,rms), including trainlines of the communications system, shall use shielded cable.

Electrical equipment shall be installed in suitable enclosed compartments to prevent hazard to passengers and the spread of fire. Equipment shall be segregated by voltage and otherwise logically located to simplify wiring and to facilitate in maintenance and testing procedures.

The circuit breaker panel door shall lock in the open position for safety during normal maintenance and servicing on rear of panel. The fastening method for holding the circuit breaker panel in the closed position shall be square key locks. Except in lockers, all high voltage (480 Vac) terminal boards shall be covered with protective covers where possible.

Safety covers for the electrical lockers shall be permanently installed with one side hinged. The opposite side shall have square key locks to provide safety protection for crew members from the high voltage power. Warning decals (DANGER 480 VOLTS) shall be installed on front face of panel covers. Cut outs in these covers shall be provided for quick access to temperature adjustments, relay resets, overloads, and door cutout switches.

7.2 Head End Power Distribution

7.2.1 Intercar Connections

Provisions shall be made to distribute the head end power through all cars by means of connections between cars which permit easy coupling and uncoupling of the cars.

7.3 Intercar Jumper Receptacles

Trainline receptacles shall be mounted at both ends of the car in such a manner and location which will permit, by means of intercar jumper cables, one end of one car to be connected to either end of another car or a locomotive. Trains will normally be made up with all the same ends, A or B, facing in same direction.

Each car shall be provided with one car control trainline jumper cable and one locomotive control trainline jumper cable.

Suitable instruction diagrams, showing the correct interconnection of all trainline jumpers, shall be provided on each end of the car.

7.3.1 HEP Trainline

The power trainlines shall run inside the two I beams forming the car center sill and shall be supported by suitable cleats. In the truck area, the cables shall run inside a stainless steel cable duct inside the end sill weldment and be supported by suitable cleats. The cables shall emerge from the duct and enter junction boxes on either side of the draft sill. At these junction boxes, the cables to the end-of-car trainline receptacles shall be terminated on suitable power distribution bus bars.

Two parallel runs of three 646 MCM cables shall form the three phase power trainlines in order to allow power to be supplied from two independent, non-parallel generating systems. Three # 10 AWG conductors shall be terminated to the three control pins at each of the eight 480 Volt connectors on the car. One # 10 AWG conductor shall be terminated in one control pin of the 480 Volt fixed jumper cables and four 480 Volt receptacles on each car. The conductor shall run the length of the car from each 480 Volt jumper and receptacle to form the continuity interlock circuit (loop circuit) which provides the trainline complete signal to locomotive and wayside station. Two # 10 AWG conductors shall be terminated in two control pins of the four 480 Volt fixed jumper cables and four 480 Volt receptacles on each car. The conductors shall be connected to car body ground to form a car-to-car carbody ground bond.

Where individual conductors enter the trainline junction boxes at each end of the car, weatherproof, strain relief fittings shall be used for each conductor. To prevent inductive heating, the junction boxes shall be made of aluminum.

Power connectors shall be Amtrak compatible Pyle National "Trans Power" series (or approved equivalent) with two receptacles per car end. Each receptacle shall use 4/0 AWG conductors to connect to the trainline junction box distribution bus.

The receptacles mounted on each car shall satisfy the following criteria:

1. Quantity: Two sets per each end of the car (four receptacles total per car) symmetrically spaced for ease of installation and removal.

2. Type of Receptacles: Approved, identical, outdoor, manual, male portion with minimum of three main and three control pins each per receptacle rated at adequate voltage and current carrying capacity to provide for a ten car train.

The physical location of the receptacles for HEP and locomotive control trainlines shall be compatible with the Department's locomotives. Details of the HEP and Control trainline pin configurations of all the possible Department locomotives that could be used to pull the BiLevel products shall be provided to the Vendor at the beginning of the Project **[Client Submission]**. Receptacle and jumper orientation and pin numbers of HEP and locomotive control trainlines shall be compatible with BiLevel cars and Department wayside power equipment. If any differences are determined, the Vendor shall describe the differences and the reasons for the differences. The control pins on each receptacle shall be utilized by the continuity interlocking circuits (looping) to ensure safe power hookup or either head end power sources or wayside power sources to the car by shop personnel. Connection to wayside power shall be made through the use of standard end of car HEP receptacles. The train control loops shall remain disabled when wayside power is connected.

7.3.2 Induced Voltages

The Vendor shall minimize induced ac voltages in the low voltage wiring.

7.4 Auxiliary Power

The auxiliary power shall comply with the applicable parts of 49 CFR 238 and 49 CFR 239.

Low voltage dc and ac power systems shall be provided. Suitable system protection shall be included on the main circuit breaker panel for individual circuits on each system as well as input and output power protection of the low voltage power supply and battery charger. Input power to the low voltage power supply and battery charger, as well as the power transformers of the 120 Vac power system shall be supplied by the car's main power service.

The auxiliary power components shall be included in Section 2.8 of this Specification as part of the EMC plan.

7.5 Low Voltage dc Power System

7.5.1.1 Requirements

Each car shall be provided with a nominal 72 Vdc ungrounded Low Voltage Power Supply/Battery Charger (LVPS/BC) power system. The system shall consist of an onboard power supply and battery charger connected in parallel with a storage battery.

The input to the LVPS/BC shall nominally be 3-phase power, 480 Volts, 60 Hertz power source from an ungrounded delta connected power system supplied by the locomotive. The LVPS/BC shall operate with input voltage variations of ± 50 Volts and frequency variations of ±3 Hertz continuously. Over and under voltage and reverse polarity protection shall be provided.

Input and output connections shall be made by easily accessible MIL-C-5015 quarter-turn bayonet type connectors. Means shall be provided to prevent cab and coach car units to be installed in the wrong car type if they are not interchangeable.

The unit shall be microprocessor based, with transient and surge protection circuitry necessary to produce reliable performance in a rail transit environment.

The LVPS/BC unit shall include a separate output for the purpose of driving an external Battery Charge Failure Indicator ("BCF"). The circuit shall be arranged so that the indicator light is illuminated if conditions are normal and not illuminated if failure conditions occur. One indicator shall be located above the intermediate level B-end circuit breaker locker in both cab and coach cars. An additional indicator shall be located within the Control Cab compartment.

The low voltage DC power system must meet the requirements of 49CFR238.115 (4) and APTA Standard SS-E-013-99.

Details of the complete low voltage DC system description shall be submitted to the Department for approval **[CDRL]**.

7.5.1.2 Low Voltage Power Supply

The Low Voltage Power Supply (LVPS) section of the unit shall supply regulated 72 Vdc power to all operating loads. The output voltage regulation shall be ± 3% for input voltage variations of ± 50 Volts and frequency variations of ± 3 Hertz, for any load up to continuous rated current. Above this load, the voltage shall decrease to provide current limiting to the rated current for a short circuit condition. On restoration of normal loading, the voltage shall automatically return to its regulated value.

The following low voltage circuit loads shall be normally connected to the LVPS:

1. Communications system
2. Fluorescent DC lighting
3. Door Controls
4. Temperature Controls
5. Wheel slip
6. Other controls/loads as may be required.

Isolation from ground on both positive and negative sides shall be provided. Ground fault detection shall be included and shall be adjustable from 5 to 10 mA. The unit shall operate correctly with either output terminal grounded.

The LVPS shall include a contactor that will connect the batteries to the car loads in the event of HEP or LVPS failure. The changeover shall be automatic and be properly coordinated so as not to cause any cycling of loads. The contactor shall also protect the batteries from complete discharge, by disconnecting the car load when the battery voltage level drops within an adjusted range between 46 and 50 Vdc.

7.5.1.3 Battery Charger

The charger shall be capable of supplying regulated dc power to charge a 48-cell nickel cadmium storage battery of maximum 140 amp-hour capacity in the cab cars and 100 amp-hour capacity in the coach cars. No external loads will be connected across the battery during charging. The charger shall start-up automatically in case of dead battery.

The charger control circuits shall be designed such that any probable failure of the control shall not cause the output voltage to increase above the no-load output voltage in order to prevent damage to the battery from overcharging.

The charger shall provide a constant, dual rate, temperature compensated, voltage and current limited mode of control. The battery charger shall control the charge of the battery as per the battery Supplier charging algorithm. A control signal shall be provided to allow the use of a momentary contact, external test switch to force the charger into the high rate mode regardless of the state of the battery. The charger shall not be damaged by reverse polarity connection of the battery.

The battery can be isolated from the car loads by a two pole manual cutout switch and circuit breaker. These components shall be located in a suitable box adjacent to the battery with provision to prevent gas interaction between the battery box and the switch box. It shall not be possible for the low voltage DC system to be energized through the battery charger when the battery is isolated.

The charger control system shall also include a high temperature alarm and inhibit system. A temperature sensor mounted on a battery cell within each battery compartment shall shutdown the battery charger for a battery high temperature condition of 65° C ±2 °C. The battery charger function shall remain shut down until the battery temperature is below the sensor set point and the reset button on the battery status monitor is pressed. The LVPS portion of the system shall continue to operate normally. The indication of over-temperature shall not be cancelled by opening of the charger input or output power circuit breakers or by opening of the main battery switch.

7.5.1.4 Remote Status Display Module

The LVPS system shall feed input into the Health Status Panel (HSP) located in the B-end locker. The HSP is shared with the HVAC system as detailed in Section 8.5. Touch-screen control will allow operators to toggle between screens and functions.

The monitor shall indicate the following LVPS information as a minimum:

1. LVPS output current and voltage
2. Battery Charger current and Voltage
3. 480 Vac On
4. DC ground Fault
5. LVPS and Battery Charger current limit
6. Battery Over temperature
7. Boost/Float Charge
8. Open Battery Circuit
9. Defective or Discharged Batteries
10. LVPS failed
11. LVPS maintenance required
12. LVPS/BC overheating
13. Wrong LVPS/BC installed
14. Switches for alarm test and reset

7.5.1.5 Batteries and Battery Compartment

A 48-cell, nominal 64 Vdc, nickel-cadmium battery (Hoppecke or approved equal) shall be provided. There will be separate batteries for cab and coach cars. The battery shall be of appropriate capacity and shall be sufficient to enable all the low voltage DC circuits to operate normally for a period of at least three hours over the ambient temperature conditions described in Section 2.2 without the battery charger being on to charge the battery providing the battery is fully charged at the start of the cycle. The battery supplier shall recommend a charging algorithm that will enable the batteries to meet the above requirements. Operation (Ref. Section 7.7) of the side doors on one side of the car at five minute intervals shall be considered as normal operation over this period. After three hours, the battery voltage at the loads shall not have fallen below 52 Vdc.

The battery and enclosure shall be designed in accordance with 49CFR238.225 (b).

The battery shall be mounted in two weatherproof ventilated enclosures with the battery raised to generally clear the bottom. The enclosure covers shall be designed to be removable without using tools. The battery shall be mounted on a roll-out tray accessible from the exterior of the car. Proper ventilation shall be provided to prevent accumulation of gases. Details of the battery enclosures and the battery description and specification shall be submitted to the Department for approval **[CDRL]**.

7.5.2 120 Vac Power Systems

Each car shall also be provided with a 120 Vac, single phase, 60 Hz electrical system. All 120 Vac electrical outlets circuits shall be GFI protected. The system shall consist of two onboard, single phase power transformers providing power to:

1. UL listed duplex, twist-lock electrical outlets located in the interior of the car. The outlets shall be located at either end of each level and one in each intermediate level; a total of six (6) receptacles for use by maintenance personnel. One switched incandescent light fixture and u-ground convenience outlet shall be provided in the area of each HVAC unit.

2. UL Listed, standard duplex electrical outlets located in the interior of the car. An outlet shall be located at each worktable for laptop computer users. The outlets shall be on a separate circuit breaker.

3. Fresh air and exhaust fans.

4. Car interior lighting.

5. Service lights (except for crew locker).

6. Cab heater.

7. Other circuits as may be required.

7.6 Trainlines

7.6.1 Locomotive Control Trainline

A 27-wire trainline system shall be provided on each car for remote control of the locomotive from a control cab car or another locomotive at the opposite end of the train. The trainline wires shall run through the car body interior and terminate in 27-pin Pyle National or equivalent receptacles on both sides of the car at each end. Receptacles shall be provided at each end of the car and an 80 inch jumper cable assembly shall be provided with each car. The locomotive control receptacles and jumper plugs shall be colored yellow.

The locomotive control trainline wire assignments shall be AAR standard.

7.6.2 Car Control Trainline

A 27-wire trainline system shall be provided to allow remote control of car functions such as door opening and closing, layover heat control, PA intercom, door safety interlocks, and buzzers. The trainline wire shall run through the car body interior from end to end and terminate in Pyle National or equivalent 27-pin receptacles on the ends of the car. The door interlock loop shall be accomplished with dummy receptacles. Receptacles shall be provided at each end of the car and an 80 inch jumper cable assembly shall be provided with each car. The car control receptacles and jumper cables shall be colored red. The dummy plug shall be colored black with a stainless steel handle.

The door control trainlines shall be arranged to allow for proper operation of the passenger entry door system regardless of the orientation or location of the car in the consist.

7.6.3 Spare Trainlines

Three (3) spare car control trainline wires shall be run from end to end of each car, ends coiled and stowed in the car control trainline connector boxes. Three (3) spare locomotive trainline wires shall be run from end to end of each car, ends coiled and stowed in the locomotive control trainline connector boxes.

Trainline wire sizes shall be 10 AWG.

7.6.4 Miscellaneous

Receptacles and trainline jumper cables shall also be compatible with existing AAR standard locomotive equipment and shall employ established control circuit designations. To guard against interference from outside sources, all communications wiring shall be shielded. Trainline jumper cables shall be colored to match respective receptacles.

Trainline jumper cables shall only be interchangeable with corresponding cables of the same function.

7.7 Door Controls and Signal System

7.7.1 Door Controls

The side door system shall include the doors on both sides of the car, the pneumatic door operators (refer to Part 3 Section 3.10) and the door controls and indicators.

The door controls shall consist of, but not limited to a door control module, door control stations, passenger door open pushbuttons, crew hold open switches, staff key switches and emergency pull rings.

The Door Control Module shall house the logic boards and relays that control the side door system. The logic boards shall be programmable. LEDs shall be provided on the logic boards to monitor input and output signals to aid in troubleshooting. The Door Control Module shall also house critical relays such as zero speed, left hand door interlock, right hand door interlock, required for control of the door system. The Door Control Module shall be located in the A end intermediate locker and shall be connectorized.

The side doors on all cars shall be equipped with local Passenger Door Open Pushbuttons located inside and outside the car for use by the passengers. The Passenger Door Open Pushbuttons shall initiate door opening only. The exterior Passenger Door Open Pushbuttons shall be mounted approximately 50 inches above top of rail. The interior Passenger Door Open Pushbuttons shall be mounted on the handholds adjacent to the side door openings. When opened by Passenger Enable Button, doors shall automatically reclose after 15 second delay after activation. At this time, the normal four second closing cycle will start. The automatic door close delay can be adjusted in four second increments around the nominal value of 15 seconds.

Remote operation of door opening and door closing shall be provided by two Door Control Stations, one on each side, at the lower level side doors on all cars. These controls shall be trainlined and shall control the doors on each side of the train, in all the cars in a train of up to ten cars. Features of the Door Control Stations located at the lower level of each car shall be as follows:

- Keyed lock to secure Door Control Stations.
- Setup switch with ON/OFF positions to activate/deactivate Door Control Stations.
- Red pushbutton switch to open passenger side doors adjacent to and forward of the activated Door Control Station.
- Red pushbutton switch to open passenger side door rearward of the activated Door Control Station.
- Blue Crew Open pushbutton switch to open one leaf to the passenger side doors adjacent to the activated Door Control Station.
- Green pushbutton switch to close passenger side doors adjacent to and forward of the activated Door Control Station.
- Green pushbutton switch to close passenger side doors rearward of the activated Door Control Station.
- Yellow pushbutton switch to enable all local Passenger Door Open Pushbuttons on the same side of the train as the activated Door Control Station to allow passenger-controlled opening of individual doors from either the inside or outside of the car. The two pushbuttons shall be located on the cab console at a location designated by the Department **[Client Submission]**.
- Conductor's signal buzzer Black pushbutton. The trainline signal buzzer shall be mounted on the rear face of the control panel.
- Separate public address and intercom system receptacles.

- White intercommunication system sonalert pushbutton.

- One Green-lens lamp complete with LED indicator on the Door Control Station shall indicate that all doors on the train are closed when illuminated. The Green lamp shall be identified as "Door Closed".

- On both sides of each car, located on the vertical grab handle adjacent to the Door Control Station, a Crew Hold Open switch shall be provided to hold open the single door leaf nearest to the activated Door Control Station for the use by the train crew only. This Crew Hold Open switch shall be enabled only when the adjacent Door Control Station is activated. When the Crew Hold Open switch is depressed and the Door Control Station is activated the "Door Closed" indicator shall illuminate even though the door panel is open.

- One Amber-lens lamp complete with LED indicator on the Door Control Station shall indicate if a Door Control Station within the train consist has been activated. Once the conductor activates a Door Control Station within the consist, the Amber lamp on that Door Control Station shall remain extinguished. The Amber lamp on all other Door Control Stations shall flash, warning all other personnel that a Door Control Station within the consist has been activated. The Amber lamp shall be identified as "Door Station Activated".

The following operating functions shall be provided:

1. The operation of individual doors by passengers by means of Green illuminated Passenger Door Open Pushbuttons inside and outside all car door openings. This function shall only be possible when the doors are enabled. An integral indicator light within the Passenger Door Open Pushbutton, when illuminated shall indicate that it has been enabled. When an individual door has been opened by a passenger, it shall remain open until the end of a pre-determined period, at which time the audible/visual door close warning shall be activated and the door shall close. However, the door shall remain enabled. It shall be possible to cancel the enable function by the operation of the "doors close" pushbutton at the door control station.

2. A door position interlock circuit that includes a release relay circuit. The car door interlock relay logic shall not assume the doors are closed until the passenger release relay is de-energized.

3. Opening of the side door leaf at each side of the car from both the inside and the outside of the car using a staff key shall be possible. Crew key operation of doors shall only be possible if the zero speed trainline signal is present and shall open the door interlock circuit when activated. The outside crew switch shall have a hinged, spring-loaded, weatherproof cover.

4. If an emergency pull ring is activated either inside or outside of the car, the corresponding side doors shall open under power. Should power not be available, then the operation of the device shall unlock the door operating mechanism enabling the doors to be pushed open manually. The device shall not allow the doors to be re-closed under power until it has been manually reset. It shall be possible to activate this device by

pulling a red ring located behind frangible covers both inside and outside the car. See Section 3.10.2.

5. Activation of a Door Control Station with the door control switch set to the "On" position shall "short circuit" the "Door Open" trainline for the opposite side of the train to prevent simultaneous actuation of Door Control Stations on both sides of the train.

6. With a key inserted and the door control switch on the Door Control Station set to the "On" position, the door open trainlines on the selected side of the train shall be short circuited until a "Doors Open" switch on the same Door Control Station is actuated.

7. Suitable safeguards shall be integrated with the door controls to prevent the doors from opening while the train is in motion (zero speed system - #8 below) and to prevent the train from moving if any side door on the train is open (door interlock system - #9 below).

8. When the system does not detect a zero speed signal and the zero speed bypass switch is not activated, it shall not be possible to open any side door from any Door Control Station, any staff switch, or Passenger Door Open Pushbutton. The zero speed system shall be activated when zero speed is detected on the locomotive and the trainline is energized at 66 ± 14 Vdc. Should the train move at a speed above the threshold of the zero speed detector on the locomotive, the zero speed trainline shall be de-energized. A "Zero Speed Bypass" switch and indicator shall be provided in each cab car and for use by the operator in the event of a zero speed detection malfunction.

9. When the system does not detect a door interlock signal and the door interlock bypass switch is not activated, it shall not be possible to move the train under power. The door interlock system shall only be activated when all side doors on each car in the train are closed (or individual doors bypassed by its cutout switch) activating each car interlock system and, in turn, energizing the 74 Vdc door interlock trainline to the locomotive. Visual indication as to the status of each door interlock shall be provided by door interlock indicator lights mounted on the ceiling at each side door location. When a door interlock switch is OPEN, the associated door interlock indicator light shall illuminate. A "Door Interlock Bypass" switch and indicator shall be provided in each cab car for use by the operator in the event of a door interlock system malfunction which cannot be corrected by use of the individual cutout switches.

10. Suitable cutout switches for each door leaf to isolate the doors and controls from the trainlines. The cutout switches shall disconnect the pneumatic solenoid valves from the control circuits and shall bypass the door leaf position interlock switches so as to cause the car door interlock relay to indicate a doors closed condition. The switches shall be located in the door pockets near the door operator and shall be clearly labeled as to their function and switch positions.

11. Suitable door leaf position interlock switches on each door leaf which shall detect when each door is fully closed. The switch shall be actuated by the door leaf or an attachment to it and not by any part of the actuating mechanism. All switches shall be connected in series and all switches must be closed or bypassed by the cutout switch in order to energize the car door interlock relay.

12. The door operators shall be arranged so that the door leaves open when the air solenoid valves are electrically energized. Each door operator shall have a two position air shutoff valve. Valve position: "Open" shall be normal with "Closed" as a vented off position to isolate the operator from the air supply and vent air from the operator. This will allow the door to be manually moved to and locked in the closed position as an emergency in-service measure.

13. All door control relays, including the zero speed and the door interlock relays, shall be mounted on one common panel and all wiring shall be brought to terminal blocks with screw terminals that will accept ring tongue lugs. All relays shall be fully enclosed in dust tight enclosures with screw or Faston terminals.

14. The locomotive traction (Gen. Field) will be interlocked with the door circuit so that traction cannot be achieved unless continuity within the door interlock system is reached (doors are closed or failed door system is bypassed).

15. Provisions shall be made for opening the single door leaf nearest each Door Control Station (crew door).

    Control of crew doors shall be accomplished by using the Crew Open pushbutton located on each Door Control Station and the Crew Hold Open switch located on the vertical grab handle adjacent to each Door Control Station.

    Activation of the Crew Open pushbutton shall cause the door to open and remain in that position until closed by a trainline "Door Close" signal or by loss of the zero speed signal. The grab handle mounted Crew Hold Open switch, when depressed, shall delay the closing of the crew door even when all train doors have been commanded to close by the trainline signals.

16. For the Wheelchair Lift Trainline Interlock functionality, interior staff switches shall be provided to enable crew personnel, by use of the staff key, to open the side door pair adjacent to the wheelchair lifts at each end/side of the car. Local staff key operation of doors shall only be possible if the zero-speed trainline signal is present, and shall open the door interlock circuit when activated. Stow status of wheelchair lifts shall be provided to the door control module as a 72Vdc input. If the wheelchair lift stowed signal is present, the local door pair of doors shall close on a trainline close command, a local door switch command, or on loss of zero-speed, regardless of the source of the doors open command. If the wheelchair lift stowed signal is not present, the local pair of doors shall only close on the local door switch close command, regardless of the source of the doors open command. Neither a trainline close command nor a loss of zero-speed shall close the local door pair when the wheelchair lift stowed signal is not present. Normal door close delay and warning light and sonalert activation apply to local door.

17. Cab car controls shall include a "Door Hold Closed" function. The function will be controlled by a switch or push button to inhibit the opening of doors by the conductor. The switch or push button shall prevent the door opening until cancelled by the engineer. If a latching push button is used, it will be lit to show the state of the contacts (lit when doors are prevented from opening) The Contractor will interface with Locomotive manufacturer to insure that the "Door Hold Closed" function can be activated from the

Locomotive when used in pull mode and submit proposed design to the Department for review and approval **[CDRL].**

7.7.2 Signal System

A suitable trainlined electric buzzer, intercommunication signal system shall be available between all Door Control Stations and an appropriately equipped locomotive or cab car when any Door Control Station is activated. When any Door Control Station is activated and the signal buzzer pushbutton is depressed, the signal shall be audible at all Door Control Stations throughout the train. The electric buzzer signal system shall have a distinctively different tone from the private communication signal buzzer utilized between any car and locomotive. It shall operate from the low voltage dc system.

The signal system shall comply with applicable radio interference regulations.

7.8 Interior Lighting

The interior lighting shall be in accordance with the applicable FRA regulations and rules, and APTA standards in effect at the times prescribed in Section 1.4. .

Main interior lighting shall be provided by two longitudinal rows of fluorescent fixtures located throughout the car, and by stand-alone fluorescent fixtures in each door vestibule suitably mounted to minimize shock. All fluorescent lamps shall be Cool White in color.

Main interior lighting shall be powered from the 120 Vac power system. Certain lights of the main interior lighting shall be low voltage DC fixtures that are powered by the low voltage dc power system. At each passenger door and vestibule area, two of the fluorescent light fixtures shall be DC lights. As long as the battery based circuits are functional, these DC lights will also come on in the event of a loss of HEP to augment the emergency lighting. All lighting fixture lenses are to be made of polycarbonate material or approved equal, in full accordance with the requirements of the Flammability and Smoke Emission Guidelines. All fluorescent fixtures shall be equipped with suitable shock hazard protection to minimize the risk of personal injury during service and maintenance activities.

The lighting shall be as uniform as practical throughout the car. The average intensity of illumination with nominal voltage available at the fluorescent lamps shall satisfy the following criteria:

Location	Method of Measurement	Intensity
Passenger Seats (except as noted)	At an elevation of 33 inches above the floor and on the upper surface of a transverse 45° plane	30 foot-candles
Vestibule Seats	At an elevation of 33 inches above the floor and on the upper surface of a transverse 45° plane	10 foot-candles
Window Seats	At an elevation of 33 inches above the floor and on the upper	22 foot-candles

Location	Method of Measurement	Intensity
	surface of a transverse 45° plane	
Passenger Aisles	At the floor	5 foot-candles
Entrances and Exits	At the floor within 20 inches from the door, inside the car	5 foot-candles
Vestibules and Stairways	Equal to or exceeding AAR requirements as measured at the floor according to Section 5 of the AAR Electrical Manual	5 foot-candles

The following lights shall use LEDs

- Toilet occupied sign
- Run number sign
- End door lights
- Cab ceiling light
- Stairwell light fixtures
- Emergency lights

7.8.1 Fluorescent Lamp Ballasts

The fluorescent lighting fixtures shall contain electronic dc inverter or electronic 120 Vac ballast mounted on or near the lighting fluorescent fixtures. Power for the inverter ballast units shall be from the auxiliary power system. The over-temperature setting for the ballast shall be less than the temperature rating for the other components of the light fixture. Each ballast shall operate one or two T-8 fluorescent lamps unless otherwise approved by the Department. The frequency of the inverter ballast output shall be not less than 18 kHz and each ballast shall be protected against application of reverse polarity. Power protection circuit breakers shall be provided on the main circuit breaker panel.

7.8.2 Independent Powered Emergency Lighting

The emergency lighting system shall perform in accordance with the requirements of 49 CFR 238.115, 239.101 and APTA Standard SS-E-013-99. The emergency lighting system consists of capacitance storage LEDs which are independent of the battery power and shall provide sufficient illumination for a period of at least one and a half hours (90-minutes) in the aisles, stairways, doorways and steps to permit safe evacuation of the car. Details of the emergency lighting system shall be provided to the Department **[CDRL]**.

Independent capacitance interior lights (upper, lower and intermediate levels) comprise the emergency lighting system, which shall activate upon loss of HEP. Interior emergency lighting shall be provided in areas as follows:

1. Aisles.
2. End doorways.
3. Stairways.

4. Vestibule areas
5. Toilet room

7.8.3 Service Lights

Service lights shall be installed in the following locations for maintenance personnel:

1. Two 120 Vac service lights in the attic located near each roof mounted HVAC unit controlled by an ON-OFF switch.

2. One 120 Vac service light in the attic located near each fresh air fan controlled by an ON-OFF switch.

3. One DC service light located in the crew locker controlled by a limit switch activated by opening the crew locker door (cab car only).

4. One 120 Vac service light in the toilet room utility compartment controlled by a limit switch activated by opening the door to the compartment (cab car only).

7.9 Exterior Lights

The exterior lights shall comply with the applicable sections of 49 CFR 221 and 49 CFR 229.

7.9.1 Status Light

A single side status light fixture shall be provided on each side of each car. The design and location of the fixtures shall assure visibility of the fixture in any aspect of sunlight and darkness by employees at track level or in control cabs.

The status light fixture shall consist of an assembly of three LED lamps mounted in a single housing. The indicator colors shall be as follows:

1. Red Color: DOOR OPEN
   (Displayed only on car(s) with a door open).

2. Amber color: BRAKES APPLIED
   (Displayed when the brake cylinder pressure is greater than 10-psi).

3. White Color: EMERGENCY BRAKE APPLIED
   (Displayed on any car where the emergency brake actuator has been activated and/or the door control station is activated).

Access to the fixture for easy lamp replacement and cleaning shall be by a convenient, removable panel accessible from the car interior. Lenses and housings shall be watertight.

The status lights shall be powered by 72Vdc.

7.9.2 End Door Area and Stairways

Lamps, designed for railway service, shall be located externally (one over each end door of the coach car and one over the B-end end door of the cab car) in such a manner as to illuminate the intercar passageways. The lamps shall be housed in suitable watertight housings.

The stairway to the upper level shall have lights to provide illumination of the steps. Lamps shall be LED type. The end door way and stairway lighting shall be powered by 72Vdc.

7.9.3 Rear Warning Lights

A receptacle and mounting device for a portable rear warning light shall be provided at the A- and B-ends of the coach cars, and the B-end of the cab cars. One portable rear warning light shall be provided with each cab car. The warning light and luminosity shall comply with FRA requirements. The rear warning light receptacle shall be powered by 72Vdc.

7.9.4 Marker Lights (Cab Car Only)

A weatherproof red marker light assembly shall be installed below the level of the windshield on each side of the F-end of the cab car. The marker light shall be LED type meeting FRA luminosity requirements. Two indicators in the cab shall show that the marker lights are illuminated.

The marker lights shall be powered by 72Vdc system.

7.9.5 Headlights (Cab Car Only)

A headlight assembly with two 200 Watt PAR56 lamps shall be mounted above the end door at the cab end of the cab car. The aiming of the lamps shall be adjustable and shall be initially set to illuminate a person standing upright in the middle of straight section of track 800-feet in front of the car on a dark, clear night. The fixture shall be relampable from the exterior of the car.

The headlights shall be powered by 72Vdc.

7.9.6 Auxiliary Lights (Cab Car Only)

Auxiliary lights shall comply with requirements of 49 CFR 229.125. Auxiliary light fixtures, complete with 350 Watt PAR56 lamps, shall be located at the lower right and left sides on the F-end of the cab car. The auxiliary lights shall be aimed so the beams cross at a point 400-feet from the car at 50 ±2 inches above top of rail.

The 72Vdc auxiliary lights shall be powered by an Exterior Light Control Unit (normally powered by 120 Vac) and shall operate continuously when energized. The auxiliary lights shall be activated through the Headlight/Auxiliary switch located in the control cab. If the headlight/auxiliary switch is on, it shall be possible to cause the auxiliary lights to flash alternatively either by manual control or if either the horn or bell is actuated. It shall also be possible to manually deactivate the flashing auxiliary lights.

7.9.7 Car Number Lights (Cab Only)

A car number light assembly shall be installed above the cab side and non-cab side windows at the cab end of the cab car. The light assembly shall illuminate the cab car road number, upon activation of the car number light switch located in the cab. Each light assembly will be illuminated by LEDs, powered by the low voltage dc system. The Department shall provide road numbers for integration to the vehicle signage.

7.10 Public Address and Intercom System

All cars shall be equipped with a trainlined Public Address and Intercom system (PA/IC) system. The PA/IC system shall operate from the low voltage DC car supply and protected with circuit breakers located in an electrical locker. PA/IC circuits connected to intercar audio and remote control lines shall be protected from component failure due to accidental shorting or grounding of the lines. The PA/IC equipment described shall make use of the car control trainline, wiring, and jumper cables described in Section 7.3.

The cab and coach cars shall be equipped with communications equipment from which crew personnel may make an announcement over the train Public Address (PA) system or engage in private conversation with other crew personnel, a passenger or the Operator through the Intercom (IC) system. As a minimum, the communications equipment common to both cab and coach cars shall include a PA/IC amplifier, handset and holder, communication stations, interior and exterior speakers.

7.10.1 PA/IC Amplifier

The PA/IC amplifier shall be mounted in the attic space of the A end of the BiLevel car. The PA/IC unit shall be on a quick release AAR type radio base so that it can be readily removed from the front of the assembly.

The unit shall have an audio output of 40 watts Rms (adjustable). The unit shall be designed to operate from the 72Vdc low voltage power supply and shall be complete with transient filtering. The unit shall incorporate at a minimum, the following indicators and controls on the front panel:

1. Handset Level- sets volume to handset earpiece.
2. Trainline Level- sets audio level to trainline
3. Speaker Level- sets audio level on trainline
4. Power Supply Indicators- displays input/output voltage
5. Bar Graph- indicates audio output level
6. On-Off LED- indicates when switch is on and car battery is present
7. Handle- for ease of removal or transport.

7.10.2 Handset and Holder

Handsets shall be equipped with a normally closed push-to-talk switch. The handset cord shall be equipped with an adequate strain relief fitting where it is attached to the handset. A handset holder shall be provided with each handset.

7.10.3 Interior and Exterior Speakers

Each vehicle shall be equipped with a minimum of eighteen interior speakers located throughout the car such as to provide a uniform audio level throughout each passenger compartment. The interior speakers shall be arranged for replacement from the front and sufficient length shall be provided in the wiring for this purpose. Each vehicle shall also be equipped with four weather resistant exterior speakers installed on the exterior of the car sides near each set of doors to enable the broadcasting of messages to passengers on the platform from the public address system from within the car.

7.10.4 One-way Communication (Public Address)

The Public Address (PA) system shall be designed to allow the crew to make paging announcements for distribution through the interior speakers. For a crew member to initiate a PA announcement, a handset must be plugged into the PA receptacle at one of the lower level Door Control Stations. Once the handset has been plugged in, the audio from the handset shall be placed on the PA audio trainlines once the push-to-talk switch is depressed. PA announcements shall be simultaneously broadcast over the interior and exterior speakers when the door control station is energized and the doors are opened. Exterior speakers shall also be activated when the' Door Enable' feature of the door system has been activated.

There shall be no feedback between car speakers and the control station handset when the Public Address system is in use.

7.10.5 Two-way Intercommunications (Intercom)

For IC communication between crew members within the train consist, a handset must be plugged into the IC receptacle at one of the lower level Door Control Stations. Once a handset has been plugged in, the audio from the handset shall be placed on the IC audio train lines. To signal other crew members that an IC call has been requested, the crew member shall depress the IC CALL pushbutton located above the IC receptacle. Once the pushbutton has been depressed the sonalerts at each Door Control Station throughout the train consist shall activate for as long as the pushbutton is depressed. Handset to handset communication shall be initiated once a crew member at an alternate lower level Door Control Station plugs his handset into the IC receptacle.

- Private communication between crew members in the locomotive (if appropriately equipped), in an operative cab car or at one side of the side door located control stations.

- Communication between passengers and crewmember in the operative cab (of cab car or appropriately equipped locomotive), shall be provided via passenger emergency communication stations. A total of two passenger emergency intercom stations shall be provided and shall function in compliance with 49 CFR 238.121.

7.11 Automatic Train Announcement System

All cars shall be equipped with a trainlined Automatic Train Announcement System (ATAS) to provide communications in the cars. The Vendor shall provide details of the automatic train announcement system for review and approval by the Department **[CDRL]**. The ATAS system shall operate from the low voltage DC car supply and be protected with circuit breakers located in an electrical locker. ATAS circuits connected to intercar audio and remote control lines shall be protected from component failure due to accidental shorting or grounding of the lines. The ATAS equipment described shall make use of the car control trainline, wiring, and jumper cables.

The ATAS shall be capable of the following:

1. Public Address Announcements (PA) through the communication stations located at the lower level and/or through the Head End Controller (HEC) located on the cab rear wall (refer to Section 6.5.2.6).

2. Intercom Communication (IC) between train crew personnel through the communications stations located at the lower level and/or through the Head End Controller (HEC) located on the cab rear wall.

3. Automatic audio/visual annunciation of passenger service announcements through the interior and exterior speakers and LED display signs.

4. Passenger emergency communication between passengers and the Operator through the Passenger Emergency Communication (PEC) stations and the Head End Controller (HEC) located on the cab rear wall.

The ATAS system shall be comprised of one In-Car Communication Unit, one Head End Controller complete with handset and holder (cab car only), two Passenger Emergency Communication units, eight LED interior display signs, eighteen interior speakers and four exterior speakers. The communication system shall also be comprised of the following located on each of the Door Control Stations; Intercom receptacle and indicator, Public Address receptacle and indicator, Communication Request sonalert pushbutton and Communication Request sonalert.

7.11.1 In-Car Communication Units

Each vehicle shall be equipped with one In-Car Communication Unit. The In-Car Communication Unit shall manage the communications in the car. The In-Car Communication Unit shall oversee the routing of the automated audio/visual announcement system, the passenger communication system, the public address system and the intercom system. The In-Car Communication Unit shall be complete with a memory card which stores automatic announcement messages and routes configuration information. The In-Car Communication Unit shall incorporate a playback device used to play audio and visual text messages to the passengers. The Head End Controller shall control the playback device through trainline communication. Messages shall only be activated from the ICCU directly through the HEC communication circuit. Changes to routes or announcement updates shall be made possible by replacing the memory card or by downloading from the memory card in the HEC. All level controls (handset, PEI, PA, etc.) for the ATAS system shall be capable of being adjusted at the In-Car Communication Unit.

7.11.2 Head End Controller

Each cab car shall be equipped with one Head End Controller (HEC). Refer to Section 6.5.2.6 for a description of the HEC.

7.11.3 Passenger Emergency Communication Unit

Each vehicle shall be equipped with 2 Passenger Emergency Communication (PEC) units. The PEC units shall provide passengers intercom communication with the Operator if an emergency situation arises. The PEC shall be complete with an Emergency Call button and an integral indicator light. When the passenger activates the pushbutton the indicator light shall flash until acknowledged at the HEC by the Operator after which the indicator light remains illuminated. The pushbutton shall be recessed to prevent nuisance activation.

7.11.4 LED Display Signs

Each vehicle shall be equipped with eight LED display signs located throughout the interior of the car. The display signs shall provide the means for the HEC and the In-Car Communications Unit to annunciate visual data to the passengers in conjunction with audio messages.

7.12 AEI (RF) Tags

a. Two AEI (RF) tags, pre-coded for the Universal Machine Language Equipment Register (UMLER), shall be installed on each locomotive in compliance with AAR standard S-918, latest issue.

b. The Reporting Marks for the cars are CFRC and car numbers and are found in section 3.18 of this technical specification.

7.13 Radio Interference

The Vendor shall ensure that the communications equipment including, but not limited to, the train radio, hand-held radios, the PA, and the intercommunications systems are free from onboard as well as externally caused interference. The Vendor shall submit to the Department for review and approval the communications system design **[CDRL]**.

The application of control components such as filtering, shielding, and bonding shall conform to sound engineering practices and, wherever possible, shall be an integral part of the car electrical system.

Interference sources, such as the electric buzzer intercommunication signal system or other trainline signals, etc., shall be considered and adequately suppressed as required.

7.14 WiFi System

A vehicle WiFi system shall be provided to include: circuit breaker, wiring, modem(s), antenna(s), power supply and controller to provide and receive signals (to be provided by others) to be repeated on cars. The Vendor shall provide details of the WiFi system for review and approval by the Department **[CDRL]**.

7.15 Wiring Diagrams

The Vendor shall provide schematic wiring diagrams for review and approval by the Department **[CDRL]**. These wiring diagrams shall separately show the high voltage and the low voltage systems, the door control circuits, lighting circuits, climate control circuits, communication circuits, and trainline wire assignments. These schematics shall be included in the maintenance and repair manuals. The schematics shall be revised to include modifications, repairs and reworks performed throughout the execution of this Contract.

SECTION 8

8 HEATING, VENTILATION AND AIR CONDITIONING

8.1 General

The HVAC system shall provide a comfortable temperature controlled environment of the passenger areas considering:

1. Passenger load of 215 people.
2. Frequency of door openings associated with passenger loading and unloading.
3. Design ambient conditions (See Section 2.2).
4. Solar load.
5. Internal electrical load.
6. Carbody thermal losses.
7. Fresh air load.
8. Heat losses due to train motion.

An integrated heating, ventilation, and air conditioning (HVAC) system shall be provided. The system shall be designed to maintain the specified interior passenger area temperature and humidity and to also assure adequate interior ventilation. ASHRAE Standard 55-1992 "Thermal Environmental Conditions for Human Occupancy" shall be used as a guide in determining system capacities. The Vendor shall prepare, and submit for the Department's approval, a detailed heating and cooling load analysis along with recommended heating, cooling, and ventilation capacities **[CDRL]**.

In no case shall the heating capacity be less than 40 kW (not including the forced air control cab heater) or the total refrigeration capacity be less than 237,000 Btu/Hr. The HVAC unit manufacturer and heater manufacturers shall conduct qualification testing to verify that the units provide the design heating and cooling capacity. The HVAC unit shall have a minimum 10 ton overall unit capacity.

The HVAC system shall be powered primarily from the 480 Vac, 3 phase, 60 Hz supply. The fresh air blowers shall be powered by the 120 Vac, single phase, 60 Hz power supply. The temperature controls shall operate from the low voltage dc power supply. To minimize the effects of motor inrush currents on the head end power system, the controls shall incorporate a method to provided random starting of the refrigerant compressor motors and overhead heaters.

The HVAC system shall be controlled by a temperature control using a sufficient number of temperature sensors to properly regulate heating and cooling in response to temperature changes inside and outside the car. Temperature sensors in the car body shall be located to accurately reflect temperature changes without being unduly influenced by external heat sources or solar radiation.

HVAC system circuit breakers and temperature control adjustment devices shall be accessible only to the operating crew. Circuit breakers, controls, and relays shall be inaccessible to the passengers.

8.2 Air Conditioning

The cars shall be cooled using two self contained HVAC units provided to meet the requirements of this Section. The HVAC units shall be installed above the ceiling of the intermediate level at each end of the car.

The air conditioning system shall be designed and adequately sized to maintain a 75° ±2°F interior car temperature measured at the return air grille at the normal ambient conditions specified in Section 2.2. Interior relative humidity shall not exceed 60%. For ambient temperatures greater than 100°F, the air conditioning system shall be capable of maintaining a delta T of 25°F below the ambient temperature up to 107°F.

Each HVAC unit shall be totally self-contained and shall consist of a compressor/condenser section and an evaporator section with electric heating units.

For major repairs, the HVAC units shall be removable through suitable roof hatches. Routine service operations shall be largely performed through hinged access panels accessible from the inside of the car. Access to the condenser fan shall be through the discharge outlet in the roof.

The HVAC unit shall be mounted above drip pans. The drip pans shall catch the moisture (condensate) removed by the evaporator and shall also reduce objectionable noise that might be transmitted to the passenger area. The drip pans shall be designed and constructed to minimize sloshing of the condensate, eliminate water dripping on passengers, and maintain carbody pressurization. Insulation shall be provided to minimize heat loss and noise and to prevent condensation on the ceiling interior. The drained condensate shall be directed to the roadbed through the carbody structure without leakage and shall not be discharged on car structure, wheels, brakes, or electrical equipment. Access to the drip pans shall require the removal of a minimum number of ceiling panels. The ceiling panels providing access to the drip pans, shall be held by square-key latches. All fasteners securing the drip pans shall be of stainless steel or other non-corrosive material.

The refrigeration system shall include, as a minimum, the following components and features:

1. R- 410A or approved equal non-ozone depleting refrigerant.
2. Two scroll type refrigerant compressors to provide 50% and 100% capacity control.
3. Compressor shutdown control shall be by means of a pump down cycle sensing suction line pressure.
4. Condenser fan and motor assemblies.
5. Condenser coil assemblies.
6. Filter driers, discharge line check valves, and moisture and liquid indicators.
7. Liquid line solenoid valves.
8. Thermal expansion valves.
9. Evaporator coil assemblies.

For cab compartment air conditioning refer to Section 6.5.10 of this Specification.

8.3 Heating

The cars shall be electrically heated. The system shall compensate for carbody losses and fresh air heating loads.

The heating system shall be designed and adequately sized to maintain a 70° ±2°F interior temperature throughout the car measured at the return air grille at the normal ambient conditions specified in Section 2.2. Overhead heat of 22.5 kW @ 480 Vac shall be provided and shall have a full range of control from 0 to 22.5 kW based on solid state relay technology.

The overhead heaters shall be protected against overheating caused by the loss of sufficient air over the heater elements.

The sidewall heaters, or floor heating, shall provide 20.6 kW of heating power. The side wall heater shall be enclosed by a stainless steel heater grille with perforated holes. The grille shall be designed to provide a smooth transition with the side wall. The grilles shall be designed to prevent debris from entering the heating space and contacting the heater elements. The grilles shall be fitted with interior baffles to assist the convection air flow. The temperature of any portion of the grilles that could come in contact with passengers shall not exceed 140°F at nominal supply voltage and an interior air temperature of 70°F ±2°F.

Threshold heaters, which are activated at an outside temperature of 46°F, shall be provided for the door thresholds, In addition, a convection heater for the door track will be provided at the floor level of each door pocket.

Layover heat shall be supplied by the sidewall heat or overhead heat or a combination of both and shall maintain a minimum interior temperature of 45° ±5°F. During layover heating, the evaporator fans shall operate and the fresh air fan motors shall be shut off.

The heating system shall include, as a minimum, the following components and features:

1. Forced air electrical overhead heat.
2. Heater over temperature protection devices.
3. Sidewall heaters

For cab compartment heating refer to Section 6.5.10

8.4 Ventilation

The design of the ventilation system, including fresh air and recirculating air intakes, ducts, and diffusers, shall provide controlled movement of conditioned air to all occupied areas of the car. The ventilation system shall be arranged so that in the event of failure of one of the air conditioning units, air from the other unit shall (with the exception of the mid-level at the end containing the failed unit) be distributed throughout the car.

The ventilation system shall be designed and constructed to comply with the requirements of 49 CFR 238.103. The Vendor shall demonstrate compliance through design, analysis and testing as approved by the Department **[CDRL]**. The ventilation system shall be designed and integrated into the vehicle to ensure that it does not contribute to the lethality of a fire in unoccupied spaces.

Conditioned air shall be delivered to the passenger areas through adjustable linear diffusers which may be integral with the main interior lighting fixtures. The total air flow from the two evaporator blower fans shall be a minimum of 5500 cfm. Fresh air shall be induced upstream to the air filters by fresh air fans located at each end of the car. The fresh air fan motors shall be two-speed, shall be powered from the 120 Vac supply, and shall be easily accessible through hinged ceiling panel. The total normal fresh air flow shall not be less than 1000 cfm with the reduced fresh air flow at approximately one-half of the normal; this occurs when the ambient temperature is below 20°F or when the return air is above 78°F during the extreme maximum ambient air temperature conditions of Section 2.2. The fresh air blowers shall be shut down whenever the side doors are open or the car is in the layover heat mode.

To prevent toilets odors from entering the passenger areas, each toilet room shall be provided with a 120 Vac exhaust fan that shall discharge not less than 60 cfm of air to the car exterior. Conditioned air shall be introduced into the toilet room through a dedicated supply air grille sized for the application and located under the sink.

The ventilation system shall provide a minimum carbody pressurization of 0.1-inch H_2O at full fresh air flow with all exterior doors and windows closed and the toilet room exhaust fan running.

Air filters shall be provided in the return air duct to filter the return and fresh air mixture. The filter element shall be a 2 inch thick Farr 30/30 pleated-type filter or approved equal. Access to the filter shall be through the return air grille which shall be hinged along one side.

The ventilation system shall include, as a minimum, the following components and features:

1. Evaporator blower and motor assemblies.
2. Fresh air fan and motor assemblies.
3. Air flow detection switches.
4. Mixed air filters.

8.5 Controls

Heating and cooling control shall be by a controller using sensors for temperature data. The output of the controller shall drive electromechanical relays and contactors which shall, in turn, control electrical power to the heater elements, motors, and various control devices. The changeover between heating and cooling shall be automatic and, except for the first stage of overhead heat (reheat), shall preclude the simultaneous operation of heating and air conditioning. A microprocessor based temperature controller providing software control and modification of temperature set points, as well as the control and modification of various functions such as reheat, shall be provided.

As a minimum, the following temperature sensors shall be required:

1. Return air sensor at each HVAC unit return air grille.
2. Duct air sensor at each HVAC unit downstream of the evaporator motor.
3. Floor heat sensors at floor level in each of four sidewall heating control zones.

4. Ambient temperature sensors located in a position that accurately reflects outside temperatures.

An automatic operating "Summer/Winter" control shall, in the "Winter" position, lockout the air conditioning. The control shall be set by a date in the Health Status Panel when the system will change automatically from the "Summer" to the "Winter" mode. The system default settings are March 1 for "Summer" mode and December 1 for "Winter" mode. These dates can be adjusted in the Health Status Panel. The Health Status Panel can force "Summer" or "Winter" mode for the purpose of testing. Both heating and air conditioning layover control shall be provided. The layover selection shall be integrated with the "Summer/Winter" switch. In the "Winter" mode, layover heating shall maintain a carbody interior temperature of 45° ± 5°F. In "Summer" mode, layover cooling shall maintain a carbody interior temperature of 75° ±2°F. The air conditioning system in layover "Summer" mode shall function as usual except that there shall be no fresh air induction. In layover "Winter" mode, the air conditioning system shall be disabled.

The layover mode shall be automatically enabled whenever the brake pipe pressure falls below 50 psi or when the locomotive or cab car brake controller is placed in the emergency position. The enabling of layover shall be trainlined.

The HVAC system shall be controlled and monitored by the Health Status Panel located in the B-end locker. Both Air Conditioning units and LVPS shall feed input into the Health Status Panel. The Health Status Panel shall use touch-screen control to toggle between screens and functions. The Health Status Panel shall permit password level access to permit setting changes and shall accept USB memory stick download and uploads.

The HVAC System will react to the temperature of the return air as shown:

- Below 70°F Heating (while the temperature is rising) and below 69°F Heating (while the temperature is dropping).
- 70°F to 73°F Ventilation (while the temperature is rising) and 69°F to 71°F (this occurs only while the temperature is dropping).
- 71°F to 73°F Partial Cooling with Reheat (this occurs only while the temperature is dropping).
- 73°F to 75°F Partial Cooling without Reheat (while the temperature is rising) and 73°F to 74°F (while the temperature is dropping).
- 74°F to 75°F Full Cooling with Reheat (this occurs only while the temperature is dropping).
- Full cooling above 75°F.

During all modes of air conditioning, the interior relative humidity shall not exceed 60%.

The control system shall include, as a minimum, the following components and features:

1. Health Status Panel.

2. Temperature sensors.

3. Motor starters.

4. Motor protective devices.

5. Heat contactors.

The Car builder shall submit a temperature control schedule and a detailed description of operation for approval by the Department **[CDRL]**.

SECTION 9

9 BRAKE EQUIPMENT

9.1 Brake Performance

The full-service brake rate of one train of four 154,000 lb, BiLevel cars, plus one 285,000 lb dry-weight locomotive with an assumed full service brake rate of 2.0 mphps over the entire operation speed range (0 mph to 79 mph) under all load conditions shall be 2.0 mphps, ±10 percent. The maximum instantaneous rate during a stop shall not exceed 3.2 mphps. Evidence of brake rate confirmation shall be submitted to the Department for approval **[CDRL]**.

Higher braking rates shall be possible by adjustment.

During an emergency brake application, the brake cylinder pressures shall be 20 percent higher than full-service pressures. The emergency brake rates shall be higher than the full-service brake rates by proportionately the same amount, up to the limit of wheel-to-rail adhesion.

The braking efforts by the disc shall be maximized to the safe limit of the thermal capability of the discs.

Brake-cylinder pressure shall be modulated by a load-weigh system in proportion to the car weight on the air springs. In the event that load-weigh-sensing pressure is lost, the brake rate shall not be less than 90% of the empty car weight brake rate.

9.2 Brake Control

The brake system shall be WABCO 26-C brake equipment or equal. All parts necessary to complete the efficient operation of this equipment shall be supplied, installed, and tested in accordance with APTA requirements.

The brake valve portions associated with the 26-C brake system shall, to the greatest possible extent, be interconnected by, and mounted on, a manifold assembly. The manifold assembly shall be installed in a location from which it is accessible from the interior of the car, for the purpose of changing out the individual valve portions, or the entire manifold assembly. The number of valve portions that are required to be installed under the car shall be limited to the absolute minimum that is consistent with the proper function of the air brake system in all required modes. Sound attenuation shall be provided to prevent transmission of audible noises to the passenger compartment.

Design and construction of laminated manifolds shall be of a type that has proven service history.

9.3 Reservoirs

Reservoirs shall be rigidly attached to the car body, preferably on the same side and as close as practical to the control valve and relay valve. Auxiliary reservoirs shall be sloped toward one end where a 1/2-inch N.P.T. drain plug shall be installed.

Main reservoirs shall be pressure tested in accordance with FRA and AAR requirements. Certificates of acceptable pressure testing shall be traceable to each main reservoir's serial number and shall be included in the Car History Book to be provided to the Department upon delivery of vehicle.

9.4 Passenger Emergency Valves

Two Passenger Emergency valves shall be located in positions adjacent to diagonally opposite side doorways in accordance with APTA Standard SS-M-007-98. On a cab car, an additional valve shall be located in the cab area and shall be accessible for operation from outside the cab wall when the full width cab is not in use. The valves shall, when actuated, cause an emergency brake application to the train and cause the emergency brake indicator on the side of the car to light. Access shall be readily available to reset valve.

9.5 Truck Brakes

The brake system on each truck shall consist of:

- A tread-brake actuator and shoe acting on each wheel for a total of four tread-brake assemblies per truck, and
- A disc-brake actuator with friction pads acting on a disc mounted on each axle totaling two disc-brake assemblies per truck.

The composite disc/shoe system satisfying the requirements of Section 9.1 shall have braking capability apportioned approximately 37:63 between discs and shoes respectively.

Wheel-tread brake units shall be equipped with composition-type brake shoes, size, and type as specified by the brake system subVendor.

9.6 Air Piping

All piping shall be assembled with as few fittings as is practical and in accordance with AAR Standards. (See Section 11.10.1). The welding of the air brake system piping will follow AAR Recommended Practice S-402, latest revision. The line between the 26-C Brake Control Unit and the combined volume/selector reservoir shall be steel or copper protected as noted in Section 11.10.1.1 of this Specification. The main reservoir train line shall be level or sloped from the center of the car into two small drain reservoirs equipped with manual drain valves, located at both ends of the lower underframe. All branch lines must be taken at the centerline or higher from the Main Reservoir and Brake Pipe lines. From each tank the line shall rise to the end level. Each drain valve shall be operable by an extension lever from trackside, on the same side of the car as the brake control equipment. In normal operation, the valve shall be closed (off) when the lever is pushed in. Pinless gladhands shall be supplied. Test-gauge fittings shall be supplied at the D-7 operating unit located under the stairs in a compartment at the A-end lower level of the car. In order to maintain air-brake-system air pressure in the event of an air spring failure, suitable by-pass valve(s) shall be installed. Brake cylinder shut-off, vented valves, painted yellow, shall isolate each truck, and shall be accessible from track side. Hose shall be utilized only in locations where flexibility is required. Length of hoses shall be minimized.

Each drain valve shall have a guard to prevent damage from track debris.

Hoses shall be installed on each end and aligned so that coupled cars will traverse the trackage both on the main line and in the yards. The Vendor shall provide tooling to ensure the locations are consistent from car-to-car so that coupling, car-to-car, will keep the correct hose location in all cases.

Hose supports, chains or approved equivalent shall be applied to the end-of-car hoses to prevent coupled or uncoupled hose ends from dropping below 2-3/4 inches above top of rail. These supports shall not interfere with proper operation of the hoses on coupled or uncoupled cars in the yards or on the mainline.

Prior to installation of any brake system valves and accessories, the piping system must be blown free of grit, scale, or any foreign material, while mechanically excited. See Sections 11.1.7 and 11.10.1.

9.7 Hand Brake

A hand brake shall be provided at the B-end of the car. The hand brake shall be Peacock Model 840 with a 20-inch-long handle or approved equal. The handbrake chain shall conform to the latest APTA Specifications. The hand brake performance shall comply with requirements of APTA Standard SS-M-006-98 for a manually operated mechanical parking brake.

The arrangement of the hand brake and mechanism must result in safe, efficient performance, and be accessible for maintenance.

The hand brake shall be installed so as not to present a hazard to passengers and shall be located so that a crewman has ample clearance and freedom to safely and effectively apply the hand brake.

The hand brake with associated rigging shall apply the brakes on one tread brake unit on each axle of the B-end truck.

Hand-brake-cable slack adjustment to be the pin-and-clevis style or approved equal.

9.8 Wheel Slide System

A wheel-slide protective system, WABCO type E-7 or approved equal, shall be provided.

The microprocessor-controlled, wheel-slide control system shall detect random, back-to-back, and synchronous wheel slides at all four axles, by means of inductive speed sensors at axle-mounted toothed wheels. Slide correction shall be made on a per truck basis, by a dump valve located as close as possible to the air piping connection to the truck. Wheel-slide protection shall be effective from any car speed down to 5 mph.

9.8.1 Fail Safe

The slide system shall be fail-safe, such that the normal system failure mode shall render the slide system ineffective and shall not prevent the application of brakes at any rate less than desired. Separate fail-safe timing and override of friction brake release on each truck shall also be provided. The operation of the dump valves shall be energized-to-dump or energize-to-lap. The detection and control system shall be powered from the low-voltage dc power system.

The system shall operate over the full-demand range-of-service braking and during emergency braking. During a service or emergency braking (as detected by a drop of brake pipe pressure below 50 psi), the dump valves shall be de-energized (and remain de-energized until the car has come to a complete stop) if an unsuccessful slide correction lasting longer than 5 seconds is detected.

9.8.2 Wheel Size Variation

The wheel-slide correction system shall function properly with differences up to 2 inches in diameter among the wheels of a vehicle (but not on the same axle). The equipment shall be self-calibrating, requiring no manual adjustment to compensate for wheel diameter variations.

9.8.3 Speed Pickups

The axle-speed sensors shall be of proven, rugged design for direct application to the bearing-housing sensor brackets. The sensors shall be fitted with waterproof, quick-disconnect connectors and shall be supplied with the necessary armored truck cabling. For each of the four, wheel slide axle-speed sensors installed on cab and trailer cars, the cabling shall include a car body mounted junction box near the associated axle. On the cab car, an additional axle-speed sensor is required for the cab speedometer and shall be installed opposite the wheel slide axle-speed sensor on the third axle from the B-end. The junction box for this axle, then, shall accommodate an additional cable and appropriate connector. Waterproof, quick-disconnect fitting shall be applied to each junction box and each end of each cable. A split-ring gear shall be installed to allow removal without pressing off the wheel assembly.

9.8.4 Self Test

To expedite servicing and maintenance of the car on a daily basis, the unit shall be equipped with a self-test feature for internal/external fault diagnosis. The unit shall provide indication if it declares itself defective for any reason, or it shall be equipped with a test-position control switch to manually provide a quick check of the system components.

SECTION 10

10 WATER AND WASTE SYSTEM

10.1 General – Cabs with toilet

The Contract shall consist of cab cars with toilet rooms and coach cars without. Cab cars provided with toilet rooms shall have a water supply and waste system. The toilet door shall be lockable from the interior by the passenger and also from the exterior (passenger compartment) by a crew member using the conductor's key. With the exception of the undercar water fill lines, and the toilet retention tank, all of the components associated with this system shall be located in a utility compartment behind the toilet compartment rear wall which is accessible through a hinged door. Illumination of the utility compartment shall be provided by a wall mounted 120 Vac service light.

The water system shall have a minimum onboard capacity of 22 US gallons. The onboard water shall be used for hand washing.

Raising of water shall be by compressed air. A suitable pressure reducing valve shall be connected to the main reservoir and shall provide an output pressure of 10 to 15 psig which shall be used to pressurize the water and toilet flush system.

Grey water shall be discharged directly to the roadbed, however, the holding tank shall incorporate the appropriate fitting to permit the future installation of grey water drain into the holding tank. The tank shall be supplied with the appropriate plug installed in this fitting.

Toilet waste shall be gravity drained to a holding tank mounted directly below the toilet hopper.

The total water and waste system for a cab car equipped with a toilet shall be approved by the Department **[CDRL]**.

10.1.1 Water Tank

Water storage shall be provided by one stainless steel tank mounted in the B-end vestibule area next to the partition bulkhead. The water storage tank shall comply with the latest edition of the ASME "Unfired Pressure Vessel Code". The tank shall be insulated and provided with an antifreeze heater and automatic drain valve.

10.1.2 Premixed Conditioning Solution Tank

Premixed conditioning solution shall be provided by one stainless steel tank mounted in the B-end vestibule area next to the partition bulkhead. The premixed conditioning solution storage tank shall comply with the latest edition of the ASME "Unfired Pressure Vessel Code

10.1.3 Water Fill Arrangement

A wayside water fill nozzle with an overflow outlet shall be installed, one on each side of the cab car (for a total of 2 inlet nozzles). The water filling system shall permit the wayside water supply pressure to overcome the car water raising pressure. A completely filled system shall be indicated by a steady flow of water from a separate water flow outlet located under the car.

10.1.4 Premixed Conditioning Solution Fill Arrangement

Premixed conditioning solution shall consist of water, biocide and glycol (as necessary). A wayside premixed solution fill nozzle with an overflow outlet shall be installed on each side of the cab car (for a total of 2 inlet nozzles). The premixed solution filling system shall permit the wayside premixed solution supply pressure to overcome the car premixed solution raising pressure. A completely filled system shall be indicated by a flow of premixed solution from a separate flow outlet located near the fill nozzle.

10.1.5 Piping

A properly sized network of copper lines shall be installed to connect the water tank to the water filling equipment, wash basin and toilet, and to provide a means for draining the system to the roadbed. Shut off valves with identification tags shall be provided at major equipment locations. A main drain valve shall be provided. An automatic thermostatic drain valve shall be installed. The drain valve shall automatically empty the water system when the utility compartment interior temperature falls below 34°F. Piping shall be installed in a manner that will prevent the formation of air or water pockets when the system is drained.

A properly sized network of stainless steel lines shall be installed to connect the premixed conditioning solution storage tank to the filling equipment, toilet, and to provide a means for draining the system. A main drain valve shall be provided. The use of an automatic drain valve is prohibited.

The use of flexible tubing shall be minimized.

10.1.6 Waste System

Waste sanitation shall be provided by a flushing arrangement. When the toilet is flushed, a measured amount of premixed conditioning solution consisting of a mixture of biocide, glycol anti-freeze and water shall be introduced into the toilet hopper by a flush ring mounted in the toilet hopper. Toilet flushing shall be initiated by a pushbutton located on the side wall of the toilet room. The premixed conditioning solution storage tank shall have a minimum capacity of 39 US gallons.

The waste retention tank shall have a minimum capacity of 55 US gallons. The tank shall be protected against freezing by the introduction of premixed conditioning solution with anti-freeze properties each time the toilet is flushed. The use of automatic drain valves is strictly prohibited. A waste tank drain receptacle with a shut off valve and dust cap shall be mounted on both sides of the cab car (for a total of 2 outlets). The waste retention tank shall be fitted with an internal water washing arrangement that shall use the yard water supply for tank cleaning; there shall be a cleanout attachment nozzle installed on each side of the cab car (for a total of 2 inlet nozzles).

SECTION 11

11 MATERIALS AND WORKMANSHIP

11.1 General

This Section is applicable to all parts of the car whether provided by the Vendor or by the Vendor's SubVendors. Accordingly, all the requirements of this Section apply to the design and construction of equipment furnished by the Vendor and its subVendors.

All materials and workmanship shall be in accordance with industry-accepted practices and shall be consistent with the intended application and end use of the manufactured parts.

11.1.1 Standards

At the times prescribed in Section 1.4. , all materials and manufacturing techniques shall meet the latest revision of the appropriate APTA, AAR, ANSI, AISI, IEEE and ASTM Specifications and Standards and FRA regulations, unless otherwise specified and approved.

11.1.2 Commercial Materials

Any commercial materials which are not covered by a specification shall be clearly identified on the drawings by the commercial trade name or number, the name and address of the manufacturer, and a description of the material composition.

11.1.3 Joining Surfaces

All joining surfaces shall be clean and free from dirt, grease, scale, and other contaminants prior to attachment or joining so as not to compromise the process.

11.1.4 Operating Environment

All materials to be used in the construction of these cars must be chosen such that they will economically and safely achieve their function for the design life of the car in the environment outlined in Section 2.2.

11.1.5 Interior Cleaning

Fabrics and other non-metallic materials used for interior appointments shall not be affected by industrial compounds recommended and used for cleaning such materials. Where any commonly used cleaner or lubricant will be detrimental to any material, it shall be noted on the component drawing and in the service-support manuals.

11.1.6 Cleaning During Car Construction

During car construction, adequate care shall be taken to prevent drill cuttings or other swarf from accumulating in areas which after subsequent assemblies become inaccessible. A progressive program shall be employed to prevent and remove such accumulations. Where drilling or other work has to be performed after installation of air brake equipment and piping or electrical equipment and wiring, adequate precautions, including covering of such equipment if necessary, shall be taken to prevent possible future problems. Before delivery of each car, a final clean up shall be made to assure all debris is removed from the car interior. Areas of particular concern, but not limited to these areas are:

1. All electrical junction boxes, conduits and other wire runs, lockers, panels, heaters, exposed-terminal blocks where retained metallic debris is critical.

2. Air-conditioning drip pans including water drains.

3. Door pockets where later car movement could cause door problems due to debris in door tracks.

4. Ceiling panels where subsequent movement can dislodge debris which could fall onto electrical equipment.

5. All air brake components and associated piping, tubing, fittings, and hardware. These items shall be cleaned, capped, and left capped until connected. The systems shall then be purged and cleaned.

11.1.7 Fire Safety

All materials inside the cars shall be selected to minimize combustion and propagation of fire. Combustible material used in the construction of the car shall satisfy the flammability, smoke emission, and toxicity requirements of this Specification, 49 CFR 238.103, and NFPA 130, latest version at the times prescribed in Section 1.4. . In case of conflict, the most restrictive requirement shall prevail. The Vendor shall comply with all provisions of 49 CFR 238.103 (c), Fire Safety Analysis for Procuring New Passenger Equipment, and APTA RP-PS-005-00, "Fire Safety Analysis of Existing Passenger Rail Equipment".

Compliance of the materials with these requirements shall be documented with test reports and certificates issued by industry recognized, independent testing laboratories. Demonstration of compliance may consist of reports and/or certificates issued for previous applications of the same materials in the same environment, if applicable. For test reports submitted from previously performed tests, the Vendor shall demonstrate that materials included in the test report are identical to the actual materials used in the construction of the vehicles. Test reports dated no more than 5 years from Contract Award Date demonstrating conformance to FST requirement can be used. Test reports dated earlier than 10 years, but later than 5 years from Contract Award Date can be used provided the submitted reports are accompanied by a certificate of compliance from the material manufacturer; the certificate must state that the formulation of the material in the report is the same as the material furnished.

A matrix showing the type of materials, where used, flammability and smoke emission test identity, test facility, test requirements, test results, and nature and quantity of the products of combustion shall be submitted by the Vendor **[CDRL]**.

The Vendor shall be responsible for conformance with these standards for itself and its subVendors and suppliers. The Department may, at its discretion, require that the current batch of material being provided for this contract be retested for conformance with these standards.

11.1.8 Toxicity

The Vendor shall establish a review and analysis program for approval to minimize the use of materials and products recognized to release toxic products of combustion. Those materials and products generally recognized to release toxic products of combustion shall be identified by the Vendor and submitted to the Department for review **[CDRL]**. Any such materials and products approved for use in the construction of these vehicles shall be addressed in the Fire Safety Hazards Analysis.

Alternatively and with the exception of electrical wiring, materials tested for flammability and smoke emission shall be tested for toxicity using Bombardier standard SMP 800-C Materials meeting either of these standards shall be considered acceptable as for toxicity of combustion smoke and do not need review. The results of smoke toxicity tests shall be submitted in the Smoke, Flame and Toxicity Matrix described in Section 11.1.7.

11.1.9 Finishing Materials

Finishing materials shall be applied to commercially-acceptable tolerances with respect to flatness, finish, and fitting of joints, as applicable. Materials should be integrally-colored, of uniform color throughout the car, and fabricated to extend durability and provide consistency of appearance throughout car life.

11.2 Structural and Sheet Metals

The materials used shall be in accordance with APTA Standard SS-C&S-034-99.

11.2.1 Aluminum

General: Aluminum-alloy mill products shall be identified by designations prescribed by the Aluminum Association and shall conform to specifications contained in the Association's publication *"Aluminum Standards and Data."*

Alloys to be used for the car body structure are as follows, or approved equal:

1. Other Extrusions: AA6061-T6 and AA6351-T6.
2. Exterior sheeting: AA5086-H32 and AA5454-H32.
3. Roof sheeting: AA3003 H34.
4. Body Posts, Roof Bows, Horizontal Rails, and second floor crossings: AA6061-T6 and AA 6351-T6.

Design Stresses: All aluminum structural members shall be designed in accordance with the requirements of the Aluminum Association's (AA), "Specification for Aluminum Structures" and "Engineering Data for Aluminum Structures." Proper allowance shall be made for the effects of fatigue, and for column and plate stability effects.

Fabrication and Fastening: The forming of aluminum parts, their joining by bolting, riveting, and welding and the protection of contact surfaces shall conform to the requirements of the Aluminum Company of America's Technical Report No. 524, "Specification Covering Use of Aluminum in Passenger Carrying Railway Vehicles," except as otherwise specified herein.

Fabrication techniques shall be such that the strength and corrosion resistance of the aluminum shall not be impaired nor the surface finish permanently marred or discolored during construction.

11.2.2 Stainless Steel

General: Stainless steel shall conform to the mechanical properties indicated in the AISI Standards for the specified alloy. All materials, workmanship, and identification markings shall conform to the requirements of the AISI committee on Stainless Steel Procedures. Stainless steel used in the interior shall be AISI 300-series or approved equal. If used, structural stainless steel components assembled by fusion

or resistance welding shall be of AISI-type 301L, 301LN, or SUS301L (with Nitrogen) and shall conform to the requirements of ASTM A666 except that the carbon content shall not exceed 0.03 percent and type 301LN and SUS 301L (with Nitrogen) shall not exceed 0.25 percent nitrogen. Other stainless steels conforming to ASTM A666 or A240 are acceptable for non-welded applications.

Alloys to be used for the car body structure are as follows, or approved equal:

1. Center under-pans: Stainless Steel Type 304 or approved equal.

Finishing Methods: Surface finishes shall be uniform and of such texture that the original finish will be maintained through repeated brush washings.

Buffing and polishing of stainless steel, where required, shall be done without the use of any composition-containing iron or iron oxide.

11.2.3 Steel

General: Steel used in the underframe and other parts of the car body structure (including equipment compartments) shall be a high strength, low-alloy steel, with smooth surfaces in accordance with industry standards. Application shall be as follows.

1. End underframe, centersills, crossbearers, collision posts, side sill and side plates and anti-telescoping beams: ASTM A-588, ASTM A-656 or approved equal.

2. End sub-floor steel sheets: ASTM A-606 or approved equal.

Design Stresses: Structures of low-alloy, high-tensile steel shall be designed so that the sum of the stresses to which any part is subject (except in the case of collision) shall not exceed the corresponding allowable stress values which have been selected by the Vendor.

In selecting the allowable stresses, the Vendor shall have made appropriate allowance for the effects of column, flange, and web stability, local discontinuities and other stress concentrations, strength reduction at welded regions, fatigue loadings, etc.

Sources for selected stresses shall be cited or, static and fatigue test results may be submitted, as justification for selected values.

All steel hardware e.g. bolts, screws, washers, shall be protected from corrosion by appropriate plating of adequate thickness. Measures shall be taken to prevent the risk of galvanic corrosion from bimetallic contact in accordance with the requirements of Section 11.13.

11.3 Steel Other Than Body Structure and Sheeting

11.3.1 Axles

Axles shall be forged steel conforming to SAE/AISI 4140, normalized, oil-quenched and tempered to give Brinell Hardness of 220-270 HB, minimum ultimate tensile strength of 100,000 psi, elongation of 20 percent in 2 inches minimum, reduction of area at 50 percent minimum, yield strength of 80 Ksi minimum.

11.3.2 Wheels

The wheels shall be heat treated, multiple-wear type, 33 inch diameter, Class 'A' curved plate, hub stamped in accordance with AAR Specification M-107-84 latest revision, including AAR Circular Letter C-9201 and APTA SS-M-012-99.

11.3.3 Steel Castings

Steel castings shall comply, shall be tested, inspected and accepted in accordance with procedures of the applicable AAR standards.

The quality of steel castings shall be checked in accordance with the requirements of AAR M-201. Any radiographic testing shall be per ASTM E94 using reference radiographs to ASTM E446 or E186, as may be applicable. The radiographic sensitivity shall be at least 2 percent (2-2T). The surface quality of the steel castings shall be evaluated in accordance with ASTM A802-95 to acceptance level IV. All weld repairs shall meet the requirements of ASTM A488. When castings are found to be unacceptable, they shall be repaired in the original factory of manufacture prior to shipment or by another repair process approved by the Vendor and Department.

All steel castings used in the truck structure shall be made of electric furnace, heat-treated, AAR M-201, Grade B.

11.4 Rubber and Elastomers

11.4.1 General

All rubber shall be so compounded and cured that it shall perform satisfactorily in car operation at any temperature between -40 °F and +160 °F and shall last for a period not less than 5 years or 300,000 miles, whichever comes first, prior to the need for replacement.

11.4.2 Tests

Unless otherwise specifically stated herein, all tests shall be conducted according to the latest revision (as of proposal due date of April 2010) of ASTM test procedures for rubber goods or approved equal.

11.4.3 Window and Door Sealing

The compounding of the sealing material shall be such as to preclude discoloration or staining of neighboring areas, particularly from water drainage.

11.4.4 Truck Parts

Rubber-truck springs shall be compounded, designed, and cured as to meet the load and other requirements of these Specifications. To maintain required operational characteristics of suspension components and because of their physical location (external to occupant compartment), these rubber components shall not be subject to FST requirements.

The rubber shall be resistant to oil, grease, and acid. If used, air springs shall be molded, natural rubber.

11.4.5 Elastomers

All elastomers other than rubber shall be neoprene or equal, or better suited alternative materials. Equal or alternative materials shall conform to applicable ASTM requirements or approved equal.

11.5 Glazing

11.5.1 General

Glazing used shall meet the following material criteria:

1. Windshield glazing shall be a single-glaze, certified FRA Type I clear laminated safety glass, meeting all the applicable requirements of ANSI Z-26.1 and U.S. Code of Federal Regulations, 49 CFR 223, including Appendix A. The glazing may incorporate an anti-spall shield on the interior side. The glazing shall be clear tint. The glazing shall be nominally 0.560 inch thick. The glazing's maximum solar energy transmittance shall not exceed 70%.

2. Cab End Door Window glazing shall be a single-glaze, certified FRA Type I clear laminated safety glass, meeting all the applicable requirements of ANSI Z-26.1 and U.S. Code of Federal Regulations, 49 CFR 223, including Appendix A. The glazing shall be clear tint. The glazing shall be nominally 0.560 inch thick. The glazing maximum solar energy transmittance shall not exceed 90%.

3. Non-cab End Door Window glazing shall be a single-glaze, certified FRA Type II clear laminated safety glass, meeting all the applicable requirements of ANSI Z-26.1 and U.S. Code of Federal Regulations, 49 CFR 223, including Appendix A. The glazing shall be clear tint. The glazing shall be nominally 0.375 inch thick. The glazing's maximum solar energy transmittance shall not exceed 90%.

4. Side Door Window glazing shall be a single-glaze, certified FRA Type II clear laminated safety glass, meeting all the applicable requirements of ANSI Z-26 and U.S. Code of Federal Regulations, 49 CFR 223, including Appendix A. The glazing shall be clear tint. The glazing shall be nominally 0.375 inch thick. The glazing's maximum solar energy transmittance shall not exceed 90%.

5. Cab Car Control Station Sliding Window assembly shall be double-glazed. The outer pane shall be nominally 0.250-inch thick, clear laminated safety glass. The inner pane shall be nominally 0.250-inch thick, clear laminated safety glass. The double-glazed assembly shall have a nominally 0.250-inch dead air space separating the inner and outer panes. The double-glazed assembly shall be certified FRA Type II and meet all the applicable requirements of ANSI Z-26.1 and U.S. Code of Federal Regulations, 49 CFR 223, including Appendix A. The double-glazed assembly shall be clear tint. The double-glazed assembly's maximum solar energy transmittance shall not exceed 85%.

6. Side (Non-Emergency) Window assemblies shall be double-glazed. The outer pane shall be nominally 0.250-inch thick, gray-tinted tempered safety glass unless specified otherwise by the Department. The inner pane shall be nominally 0.375-inch thick, clear laminated safety glass. The double-glazed assembly shall have a nominally 0.375-inch dead air space separating the inner and outer panes. The double-glazed assembly shall be certified FRA Type II and meet all the applicable requirements of ANSI Z-26.1 and U.S. Code of Federal Regulations, 49 CFR 223, including Appendix A. The double-glazed assembly's visible light

transmission shall be 24% to 28%. The double-glazed assembly's maximum solar energy transmittance shall not exceed 50%.

7. Side Emergency Window assemblies shall be double-glazed. The outer pane shall be nominally 0.250-inch thick, gray-tinted tempered safety glass unless specified otherwise by the Department. The inner pane shall be nominally 0.375-inch thick, clear laminated safety glass. The double-glazed assembly shall have a nominally 0.375-inch dead air space separating the inner and outer panes. The double-glazed assembly shall be certified FRA Type II and meet all the applicable requirements of ANSI Z-26.1 and U.S. Code of Federal Regulations, 49 CFR 223, including Appendix A. The double-glazed assembly's visible light transmission shall be 24% to 28%. The double-glazed assembly's maximum solar energy transmittance shall not exceed 50%.

8. Non-Cab Intermediate Level Windscreen glazing shall be a single-glaze, nominally 0.380-inch thick tempered safety glass. The glazing shall be gray tint. The light transmission shall be 24% to 28%. The exposed surface shall have SAE J673 #1 edge finish.

9. Cab Intermediate Level Windscreen glazing shall be a single-glaze, nominally 0.380-inch thick tempered safety glass. The cab partition wall glazing shall be clear tint. The other intermediate windscreen glazing shall be gray tint and light transmission shall be 24% to 28%. The exposed surface shall have SAE J673 #1 edge finish.

11.5.2 Flatness

When an individual glass light is laid on a truly flat surface, the glass shall not indicate a bow of more than 0.03-inches per lineal foot in any direction.

11.5.3 Overlap

The overlap of one sheet of laminated glass with respect to the other at an edge shall not exceed 1/32-inch. Corners and burrs shall be ground smooth and all edges shall be sealed.

11.5.4 Bonding

The bond between the sheets of laminated safety sheet glass and the membrane shall be of such quality that when the glass is broken by shock, by twisting, or by direct impact, there will be no material separation between laminations. No sheets of laminated glass containing unbonded areas shall be accepted.

11.5.5 Dimensional Tolerance

The overall dimensions of individual lights as supplied shall be held within 1/16 of the dimension ordered. The thickness of individual lights shall have a tolerance of ±0.020 inches.

11.5.6 Color

When examined over a white background, there shall be no appreciable color variation in the individual lights of laminated safety glass.

11.5.7 Haze

Lights of laminated safety glass shall be so nearly free from haze that the laminated glass shall approximate the same clarity as a light of non-laminated plate glass of the same thickness, when tested in accordance with Section 11.5.10.

11.5.8 Specks and Scratches

Occasional specks of foreign material or scratches are permissible outside of the central three-quarters of a light provided such specks do not exceed 0.020 inches in the greatest dimension and scratches do not exceed three inches in length. The Department reserves the right to determine which lights are to be rejected.

11.5.9 Distortion

Laminated safety glass shall produce no apparent distortion on a straight line at 45° to the plane of the glass.

11.5.10 Testing

All questions regarding the quality of the glass shall be settled by the test methods described in ANSI's most recent revision of American Standard Z26.1, "Safety Code of Glass for Glazing Motor Vehicles Operating on Land Highways".

11.6 Wire and Cable

11.6.1 General

All car wire and cable shall be insulated, cross-linked polyolefin materials or equal as approved by the Department. Wire insulation shall meet the requirements of APTA Standard SS-E-001-98.

All wire, cable, terminal blocks, relays, resistors, and all other electrical items shall be clearly marked for identification. Identification and marking shall be approved by the Department **[CDRL]**.

11.6.2 Conductor Sizes

Selection of wire size shall be based on the required current carrying capacity, voltage drop, physical strength, temperature, and flexibility requirements in accordance with applicable APTA, AAR, ICEA, ASTM, NEC or MIL Standards and Specifications and Section F of the *AAR Manual of Standards and Recommended Practices.*

Single conductor wire for control and auxiliary circuits shall not be smaller than 18 AWG .

Design wire ampacity shall comply with APTA RP-E-009-98 Table7.1.1. When more than three conductors are applied in a raceway or cable, the ampacities shall be derated, as described in APTA RP-E-009-98 Table 8.1.1.

Minimum wire sizes shall be as follows:

1. Wire pulled through conduits or wire way: 18AWG.

2. Wire on electronic units, cards, and card racks: 22 AWG.

The Department may approve smaller wire sizes for selected applications upon submission of appropriate applicable data for justification.

11.7 Wiring

11.7.1 General

Wire insulation shall be rated for 600 Vac/1000 Vdc and the thickness shall be as listed in column B of Table 3-1 of ICEA Publication S-66-524 (NEMA WC7). Insulation shall be colored (gray or similar). Wires smaller than 8 AWG shall be indelibly marked, for proper circuit identification, by means of hot stamping on the wire surface throughout the length of the wire. Each designation shall be no more than 3 inches from the last designation on the 24 inches of wire nearest termination and 36 inches apart on the rest of the wire run. Wires larger than 8 AWG and multi-conductor cables shall be marked at each end with circuit designations which are identical to those shown on circuit schematics. Heat shrink tubing of proper size shall be printed with the wire designations shall be installed on the ends of the wire in an easily visible position as close to the termination as practical.

The Vendor shall submit to the Department for review and approval, a procedure for installation of wiring and cable, including the criteria and procedures for the repair of damaged wire or cable **[CDRL]**.

Providing the Vendor's procedure has been followed, the repair of installed damaged wire and cable may be allowed, but only as specifically approved by the Department. Any repairs are to be noted in the car record.

Wiring shall be in accordance with accepted industry practices and applicable North American Standards, including those of APTA, AAR, ANSI, ASTM, IEEE, and NEC. The Vendor shall provide a listing of applicable standards and proof of compliance. If standards other than North American standards are referenced, the Vendor shall provide proof that the non-North American standard is equivalent to the appropriate North American standard, and that all requirements are met. Deviations from approved standards shall be only on a case by case basis and specifically approved by the Department.

Where possible, wiring which operates at 480 Vac or 120 Vac shall not be placed in the same conduits, junction boxes, or ducts with wires operating at low voltage dc. When a given piece of electrical apparatus needs to be connected 480 Vac or 120 Vac and low voltage dc, all wiring to the apparatus shall be insulated for the higher voltage.

11.7.2 Terminals

Where possible, plug and receptacle connectors shall be used to make connections to electrical devices that may need replacement. Wire connections shall otherwise be made using crimped lugs or ferrules terminated on stud-type or screwed terminal strips or cage clamp or approved equal.

Terminal strips, described above, shall be used for all car builder wiring connections.

Terminals for wire and cable shall be of the crimp or compression type. Terminals shall be applied in accordance with the manufacturer's recommended tools and procedures. Approved terminals include AMP PIDG ring tongue and .250 inch series Faston or approved equal.

All terminal studs shall be plainly and permanently marked so that the circuits may be easily identified. Wiring shall be routed so as to minimize obscuring of terminal markings.

Service loops allowing a minimum of three re-terminations shall be provided in the wiring to terminal strips. Conductors shall be protected by suitable means such as insulation grip to minimize breakage of the conductor at or near the terminal.

Butt connectors shall not be used except in cases such as noted below.

The splicing shall be avoided. When splicing is necessary, the splice shall occur in the open or in accessible enclosures or junction boxes. Splices in conduit are strictly forbidden. The splicing methods shall be approved by the Department **[CDRL]**.

11.7.3 Undercar Wiring

Undercar wiring shall be run in galvanized steel EMT conduit or liquid tight flexible conduit. In lieu of using a conduit or wire raceway, the trainline power cable may be cleated in place at frequent intervals using cable cleats made from wood or neoprene material. The clamping arrangement shall prevent excessive squeezing of the cables. Strain relief bushings shall be used at locations leaving and entering conduit, wire raceways, or equipment enclosures. However, cleated wiring shall not interfere with access to undercar equipment. Care shall be taken to prevent inductive heating caused by individual phases passing through magnetic components such as steel enclosures.

11.7.4 Conduits, Junction Boxes, and Fittings

All externally mounted junction boxes, terminal boxes, pull boxes, or fittings, etc. shall be fully weatherproof. All conduits and cables entering these boxes shall enter via weatherproof fittings. Where there is a possibility of water or condensation accumulating in a box, drain holes shall be provided.

Equipment areas containing non-insulated electrical devices at more than 120 volts to ground shall be plainly marked with warning signs worded "DANGER - XXX VOLTS". Covers for electrical junction boxes shall be accessible at all times without having to remove other equipment.

Conduits shall be made from steel with compression fittings or equal. Wire raceways shall be made from corrosion resistant sheet steel with weatherproof junctions. Conduits used in the car interior may be thin wall aluminum.

The bend radii of all conduits shall be as large as reasonable to facilitate wire pull through. Conduit bends shall be by machine without producing wrinkles on the inner surface of the bend. Conduit fittings at boxes or bulkheads shall have retained plastic inserts to protect wiring from damage due to abrasion on sharp edges. Where wires exit from conduits at locations other than above, the end of the conduit may be flared to prevent wire damage. Conduit fills shall not exceed those allowed by the National Electrical Code, NFPA Publication No. 70-1981.

Suitable drip loops shall be provided in the conductors at the equipment compartments to further minimize the possibility of the entry of water. Where such conductors pass through a car structural or other member, a means shall be used to prevent damage to the conductors due to chafing.

Within the car body in areas not subject to inadvertent contact by damaging objects, nonmetallic tubing or plastic cable ties may be used in lieu of metallic conduit or wire ways if approved by the Department.

Covers for undercar fittings, etc., shall use gaskets of proven materials. If threaded fasteners are used to retain covers, they shall be made from stainless steel. The use of tapped holes with threaded fasteners is to be avoided wherever possible. Anchor nuts or retained tapping plates are the preferred hardware. Interiors of boxes shall be suitably protected by paint against condensation and corrosion. When more than one supplier is used, all fittings which require covers an area of the same size shall be supplied by the same manufacturer.

It shall be possible to replace terminal blocks without requiring access to the back of the mounting surface.

All terminal blocks shall be permanently identified including those on subVendor supplied equipment except for terminal blocks that are integral to the light fixtures. Identification shall be as per pertinent schematic wiring drawings.

For maintenance purposes, access to junction boxes, panels, and other wiring areas shall be as easy and simple as possible. Except for under car mounted junction boxes and distribution boxes located in the attic, covers shall be retained using quick removal fasteners or latches. Tapped holes shall not be used unless specifically approved by the Department.

11.7.5 Grounding

Except where noted, all electrical circuits shall be completely insulated from the carbody.

The carbody shall be grounded to each truck frame by means of a separate cable which shall be sized to safely ground the car under normal conditions.

The 120 Vac, 60 Hz, single phase service shall be separately and firmly grounded to the carbody structure and have a green indicating color band applied at the terminations.

All apparatus operating at 480 Vac and not directly grounded to the carbody through its mounting shall have grounding straps. This particularly applies to resilient mounted motors.

11.8 Welding

11.8.1 Responsibility

The Vendor shall be responsible for the quality of the welding and brazing done including that done by subVendor. All welders employed in the making of welds on structures or products built under these Specifications shall have been tested to determine their ability to operate the welding equipment to be used in making the types of welds required hereafter and to produce satisfactory welds therewith. Welders shall be certified in accordance with AWS or CSA standards, or other recognized Welding Standards that must be agreed to by the Department, to perform the work in the contract. The Vendor shall identify products and equipment where non AWS or CSA certified welders are used in their manufacturing. For any such products and equipment using non AWS or CSA certified welders, the Vendor shall submit descriptions of their intended use and details of the Vendor's proposed approval procedure for approval by the Department.

11.8.2 Cleaning

Before welding of any sort is started, parts to be joined shall be properly cleaned of coatings and films such as rust, oxide, mill scale, oil, grease, corrosion products, and other foreign materials. Any corrosion protection removed for welding shall be replaced after welding is completed.

11.8.3 Welding

Welding procedures shall comply with the latest issues at contract signing of AWS D15.1*"Railroad Welding Specification", "Specifications Covering Use of Aluminum in Rapid Transit and Other Passenger-Carrying Railway or Railroad Vehicles",* Aluminum Company of America; of AWS D1.1 *"Structural Welding Code – Steel"* and with AWS D1.2*"Structural Welding Code - Aluminum"* or CSA-W47.1, *"Certification for Fusion Welding of Steel Structures"*, CSA-W47.2, *"Certification of Companies for Fusion Welding of Aluminum"* and CSA-W59, *"Welded Steel Construction (Metal Arc Welding)".*

Structural welding of stainless steel by the fusion-arc process shall be governed by AWS D1.6-99. Prequalified welding procedures are not permitted. The Vendor shall select proven fusion-welded fatigue allowable stress values. These fatigue allowable stresses shall not exceed the lesser of fatigue limits specified in AWS D1.1-98, Chapter 2, or 50 percent of the joint strength level calculated from ASME strength allowable in ASME Section VIII Tables UHA-23 and UW 12.

11.8.4 Riveting

Portions of the car body design may be of riveted construction. Riveting procedures shall be based on principles and practices acceptable in the rail transit industry. Solid rivets shall be installed in accordance with Vendor's Manufacturing Process Specifications.

Hot-driven steel rivets shall not be used. Holes for aluminum rivets shall be drilled and countersunk in accordance with accepted industry practices.

Huck rivets and other commercially available rivets systems may be used in accordance with the manufacturer's recommendations.

11.9 Paint and Painting

11.9.1 Equipment Compartment and Locker Paints

,Except for the A end and B end intermediate level lockers, the inside of all control equipment compartments and electrical locker enclosures shall receive at least one coat of white paint. Paint system shall be approved by the Department **[CDRL]**.

11.9.2 Trucks

The Vendor shall apply one coat of metal primer on all exposed surfaces of trucks, excepting the wheels, axles, brake rotors, brake shoes, brake linings, and exposed elastomers, hoses, cables, and wiring.

Before shipment of the truck to the car builder's site, the Vendor shall clean off all accumulated dust, dirt, or other foreign matter by means appropriate to the purpose and shall then spray and air dry a final coat of black truck paint of a type that will not conceal cracks that may develop in service. Truck paint system shall be approved by the Department **[CDRL]**.

11.9.3 Battery Enclosure

All carbon steel battery enclosures shall be given one coat of alkaline-resistant paint.

11.9.4 Lettering and Numbering

Lettering, numbering, and logos shall be approved adhesive-backed material and applied to the exterior and interior of the cars, and on trucks as applicable. Breakers, switches, and gauges shall be properly and clearly identified. All electrical items such as terminal blocks, relays, and resistors shall be clearly and permanently identified as per applicable Vendor or subVendor wiring drawings.

11.10 Piping and Tubing

11.10.1 Air Brake Piping

11.10.1.1 Materials

Car body air piping shall conform to the *AAR Manual of Standards and Recommended Practices* on brakes and brake equipment. Procedures for cleaning air brake piping before welding, after welding, and before valves are installed, shall conform to the AAR Section E *"Specification for the Welding of Air Brake Pipe and Fittings for Railroad Cars"*, pages 128 through 131. Copper tubing shall be used in all locations except as specifically approved by the Department. Copper tubing shall be SAE J528 or ASTM B75 and the fittings shall be of an approved type. All copper tubing located under the car shall be protected with *"Armaflex"* or approved equal. The use of flexible hose shall be minimized and shall be as approved by the Department **[CDRL]**.

11.10.1.2 Joints and Fittings

Sweat-type fittings of wrought copper or cast brass shall be used except that compression fittings shall be used at removable equipment.

11.10.1.3 Routing and Clamping

All piping shall be installed in a manner allowing for efficient maintenance using the least possible number of fittings. It shall be so routed as to preclude or minimize moisture accumulation and to minimize damage from outside sources. Condensate traps shall be installed as necessary. Sufficient clamps shall be installed to ensure against vibration and rattling.

11.10.2 Refrigerant Piping

Except for tubing used in the construction of heat exchangers, refrigerant and condensate drain piping shall be copper tubing conforming to ASTM B88 Type "K".

Where forming of the piping is not possible or practical, wrought copper sweat type fittings conforming to ANSI Standard B16.22 shall be used for joining tubing sections. All tubing ends shall be de-burred prior to joining.

Refrigeration circuit tubing shall be joined using brazing alloy BAg-7 or BAg-2 conforming to Federal Specification QQ-B-650-B. Condensate tubing may be joined using soft solder. To prevent oxidation on the interior of the piping, all brazing shall be done with the affected section of piping flooded with nitrogen. After brazing, the joint exterior shall be wiped and any flux residue cleaned from the tubing and fittings. Refrigerant piping shall be thoroughly cleaned prior to being charged with refrigerant.

Piping subject to condensation shall be insulated with an approved refrigerant piping insulation.

11.10.3 Water Piping

Piping shall be seamless copper tubing in accordance with SAE J528b or ASTM B75 and sized for the service intended.

Fittings shall be sweat type wrought copper or cast brass in accordance with ANSI Standards B16.22 and B16.18 or "Swage-lok" compression type.

Piping shall be joined using silver solder conforming to AWS BAg-2 for cast brass fittings and to AWS BCup-3 brazing filler metal for wrought copper fittings. The use of solder with lead content is strictly forbidden. The exterior of brazed joints shall be wiped clean after brazing. Flux shall be cleaned from the piping interior of brazed joints.

The piping shall be routed and sloped to allow for proper drainage. The low points of the system shall be equipped with automatic thermostatic drain valves that shall discharge all water when the local ambient falls below approximately 40°F.

After installation, the complete water system shall be sanitized.

11.11 Bearing Life

Bearing life shall be in conformance with the requirements in AAR Specification M934-82 or with *"B-10"* life, whichever requirement is for longer life. Minimum *"B-10"* life shall be 500,000 miles of operation.

The *"B-10"* life of a bearing means that no more than 10 percent of the bearings will have failed solely because of spalling due to fatigue during that period and that 90 percent of the bearings shall continue in service beyond the period.

11.12 Plymetal and Plywood

All floor panels shall be in compliance with U.S. Product Standard PS 1-95, or appropriate equivalent.

11.12.1 Plymetal

The panels utilized in the construction of the cars shall be structurally-laminated of stainless steel or similar material on both sides of the plywood. Dry shear strength shall not be less than 250 psi. The bonding process shall be done in a platen press under uniform pressure to assure continuous structural bond throughout. Facing shall be 0.016-inch thick, 28 gauge, type 304 stainless steel with No. 2 standard finish or approved equal.

11.12.2 Plywood

All plywood panels shall be manufactured in accordance with the requirements of Grade-Structural I of the National Bureau of Standards Voluntary Product Standard (American Plywood Association) PS 1-95, or appropriate equivalent. Each panel shall be formed from one piece; scarf and finger jointed panels are not permitted. All panels shall be sealed and waterproofed with an epoxy based system on all edges and cutouts, as soon as possible after fabrication. All exposed edges of the panels, joints between panels, fastener heads, and opening of panels used in areas accessible to moisture shall be sealed with a

watertight, fireproof sealant. All panels, as ultimately used in the car, shall be in accordance with the requirements of the flammability and smoke emission specifications.

11.13 Corrosion Prevention

All exposed surfaces shall be suitably finished to prevent corrosion during storage and operation, in accordance with the following general requirements:

Areas exposed to dirt shall be designed to minimize retention of dirt and moisture, and sections that may retain moisture or dirt shall be provided with adequate drainage and ventilation and shall be accessible for cleaning. Under-pans or covers, suitably sealed, may be used where applicable to protect underframe sections.

Joints and crevices shall be sealed with a polysulphide, butyl rubber, or equivalent sealant which is resistant to the environment, shall not absorb moisture and shall remain resilient and maintain its sealing properties for the life of the vehicle.

Metal surfaces shall be treated with surface preparation and primer materials specific for the metal with due consideration for the severity of exposure to which the surface is subjected.

The joining of dissimilar metals or metal and wood shall be minimized and where unavoidable particular care shall be taken to prevent galvanic corrosion in the case of dissimilar metals or, in the case of wood and metal, concentration cell or chemical corrosion.

Where possible, bolts and rivets shall be at a similar electrochemical-solution potential to the metals being joined, or shall be isolated from them by means of plastic or other non-metallic coatings.

11.14 Plastics and Fiberglass

11.14.1 Thermoplastics

The interior finish of the car shall incorporate formed-thermoplastic components, such as window masks. This material shall be in compliance with the Flammability and Smoke Emission Standards, and shall not show stress cracks on any molded surfaces after 10 years of use.

Thermoformed plastic material shall be color impregnated and shall have anti-static characteristics if such characteristics are not naturally present in this material. All applications shall be in full compliance with the requirements of this Specification.

11.14.2 Fiberglass

Reinforced Parts Produced by Hand Lay-Up or Chop-Gun Techniques

11.14.2.1 General

Fiberglass-reinforced plastic (FRP) composite is an engineered material consisting of a combination of reinforcement fibers in a thermoset polymer resin matrix, where the reinforcement has an aspect ratio that enables the transfer of load between fibers, and fibers are chemically bonded to the resin matrix. Depending on the molding process and the strength requirements of the product, the Department requires an analysis to support any proposed design.

All applications are to be considered high performance unless otherwise approved by the Department.

FRP shall be manufactured by an open molding or matched die molding process. The production techniques shall ensure that the glass fiber reinforcement is uniformly distributed throughout the final product in such a manner as to avoid resin-rich or resin-starved sections. Finished gel-coated surfaces shall have a minimum gloss value of 85 when measured with a 60° glossometer and shall exhibit no print through of the reinforcements or have any appreciable orange peel.

Exposed sharp edges will not be allowed on any parts.

The reinforced composite component shall be gel-coated on all exposed surfaces. The surfaces shall withstand, without any physical deformation or structural damage, the environmental conditions and resistance to acids, alkalis, and cleaning solutions recommended by the Vendor.

11.14.2.2 Construction

1. Resin

   The resin shall be of good commercial grade, thermosetting, matrix material selected to meet the physical properties of this Specification and molding process requirements.

2. Reinforcement

   The fiberglass reinforcement shall be mat, fabric woven roving, continuous roving, chopped spun roving, chopped roving or swirl mat as required to meet the physical properties of this Specification and the molding process requirements. The proposed glass content shall be confirmed through testing to ASTM D 2584.

3. Gel Coat

   The gel coat shall be resistant to scuffing, fire, weather, and cleaning agents. If the surface of the FRP panel is to be painted, a primer gel coat shall be used, and the part shall be painted in accordance with Section 11.9. If the FRP panel does not receive paint, then the gel coat shall be pigmented to match the color selected by the Customer.

4. Additives

   Additives, fillers, monomers, catalysts, activators, pigments, fire retardants, and smoke inhibitors shall be added to the resin mixes to obtain finished products with the required physical, flammability, and smoke emissions characteristics of this Specification.

   Mineral filler shall not exceed 28% of finished weight for any preformed matched die molding process.

11.14.2.3 Strength Requirements

Independent laboratory test reports shall be provided confirming that the production reinforced plastic material complies with the Bombardier SMP requirements and the following standards. Test specimens shall be conditioned in accordance with ASTM D 618.

Mechanical Property	ASTM Test	Performance
Tensile Strength-except end cap	D 638	10,000 lbf/in^2
Tensile Strength-end cap	D 638	4200 lbf/in^2
Compressive Strength-except end cap	D 695	18,000 lbf/in^2
Compressive Strength-end cap	D 695	5,000 lbf/in^2
Flexural Strength-except end cap	D 790	15,000 lbf/in^2
Flexural Strength-end cap	D 790	3,000 lbf/in^2
Impact Strength-except end cap	D 256	8 foot pounds per inch of notch
Impact Strength-end cap	D 256	5 foot pounds per inch of notch
Hardness-including end cap	—	45 Barcol

11.14.3 Melamine

Melamine on or in panels shall be color-impregnated, and of design, quality, and color. A sample will be submitted for approval by the Department **[CDRL]**. Melamine shall resist abuse and vandalism, and resist scratching and marking. All applications shall have characteristics equivalent to those of material supplied by Arborite^{TM}. Balanced applications of melamine shall be used to prevent warpage, drumming, or poor adhesion. Gloss finishes shall not be used. The unexposed balance sheet shall not be subject to the same finish or quality requirements as the side exposed to the passengers.

11.15 Upholstery and Covering Materials

11.15.1 Seat Cushion

Seat cushion material shall be in accordance with the requirements of the Flammability and Smoke Emission Guidelines. The cushion shall be of uniform composition, having a porous surface and open cells to provide breathability. The flame resistant properties of the cushion material shall not change when exposed to liquids, nor when its consistency changes under normal use. Cushion foam (Chestnut Ridge Safeguard or Safeguard XL, or Magnifoam) shall be molded in one piece or may be assembled by laminating pieces together, to achieve the required contour. If adhesives are used in the foam lamination process, this shall not change the flame resistant properties of the assembly.

Seat back flexible foam (CR Safeguard) shall meet the following physical property criteria when tested without upholstery material:

1. Tensile Strength: 8.0 lbf/psi minimum when tested to ASTM D3574-95 Test E.
2. Elongation: 150 percent minimum when tested according to ASTM D3574-95 Test E.
3. Compression Set at 50 percent constant deflection: 10 percent maximum when tested according to ASTM D3574-95 Test D.
4. Thickness Loss: 5 percent maximum.
5. Tear Strength: 30 percent minimum when tested according to ASTM D3574-95 Test H.

Seat bottom flexible foam (CR Safeguard XL,) shall meet the following physical criteria when tested without upholstery material:

1. Tensile Strength: 12.0 lbf/psi minimum when tested to ASTM D3574-95 Test E.
2. Elongation: 150 percent minimum when tested according to ASTM D3574-95 Test E.
3. Compression Set at 50 percent constant deflection: 10 percent maximum when tested according to ASTM D3574-95 Test D.
4. Thickness Loss: 5 percent maximum.
5. Tear Strength: 2.5 lbf/psi minimum when tested according to ASTM D3574-95 Test H.

11.15.2 Woven Fabrics

Fabric used for seat upholstery shall be made of a proven flame resistant polyester (100% CS Trevira). The maximum fabric shrinkage shall be 2 percent in either the warp or fill direction. Selection of the fabric shall be approved by the Department **[CDRL]**.

Seat upholstery material shall be subjected to the physical tests of textile products required by the latest revision of the following ASTM methods, and the results shall not be less than the following values:

Test No.	Description	Criteria (Polyester)
D-3776	Fabric Weight	12 oz/sq yd without back coating
D-3775	Fabric Count	Warp: (ends) 75 epi Fill: (picks) 40 to 72 ppi
D-3597, Section 7.1	Breaking Strength	Warp: 200 lbs. Fill: 200 lbs.
D-3597, Section 7.2	Tear Strength (Tongue)	Warp: 20 lbs. Fill: 14 lbs.
D-3597, Section 7.3	Yarn Slippage	Warp: 75 lbs. Fill: 75 lbs.
D-3597, Sections 7.6, 7.7, 7.9, 7.10	Color Fastness To:	Water: Class 4 min. Solvent: Class 4 min. Crocking: Class 4 min., wet or dry Light: Grade 4 min. for 80 standard hours
D-4966-89 12kpa	Martindale Abrasion Test	20,000 cycles – no breaks

11.15.3 Fabric Backed Vinyl

If exercised, vinyl used for seat upholstery shall be made of woven, transportation grade fabric-backed vinyl. The material shall be in full accordance with the requirements of the Flammability and Smoke Emission Guidelines.

Fabric-backed vinyl used for seat upholstery shall not be less than the following values:

Property Description	Uniroyal NaugaTrans Plus		Morbern Ambassador ULS	
	Method	Result	Method	Result
Tensile Strength	CCFA-17	Machine direction 110 Cross direction 100	ASTM D571	Warp = 97 Fill = 91
Seam Strength	CCFA-14	88 warp x 70 fill	CCFA-14	56.8 warp x 45.6 fill
Tear Strength (Tongue)	CCFA-16b	9.3 warp x 7.2 fill	191A-5134	Warp = 5.5 Fill = 7.5
Tear Strength (Trapezoid)	CCFA-16c	Machine direction 14 Cross direction 12	ASTM D1117	Warp = 19.0 Fill = 16.5

Property Description	Uniroyal NaugaTrans Plus		Morbern Ambassador ULS	
	Method	Result	Method	Result
Colorfastness – 200 hrs.	SAEJ1885	Pass	ASTM G135-001	No appreciable fading, discolouration or stiffness
Adhesion of Coating	CCFA-3a	Machine direction 3lb/in Cross direction 3 lb/in	ASTM D751	Warp = 4 lb/in Fill = 4 lb/in

11.15.4 Rubber Floor Covering

Rubber floor covering material shall be in full accordance with Flammability and Smoke Emission requirements and consistent with the use and its application. The material shall be non-staining, non-discoloring and 100 % non-oil extended. No whitening (limestone) shall be used in the compound.

At room temperature, the material shall bend around a 3/4 inch diameter mandrel without breaking, cracking, crazing or showing any change in color. The material shall meet the requirements of ASTM F 1344, in addition to other requirements described in this Specification.

SECTION 12

12 SOFTWARE

12.1 General

All computer hardware and software to be provided under this Contract, whether resident within a microprocessor-controlled intelligent subsystem, provided as part of test or interface equipment, provided for the purpose of post-download data analysis and processing, or incorporated within training technology, is subject to general process of Contractor's software development.

SECTION 13

13 PASSENGER COMFORT

13.1 General

The Vendor shall ensure that the vehicle is designed and built so that the noise, ride quality, and vibration criteria outlined in this Specification are met. The cars shall be designed and constructed to minimize the effects of rattles, creaking, squeaking and other noise that may emanate from the doors, structure, accessories or trucks in order to achieve the noise requirements of Section 12.2.2 and to produce acceptable environments for passengers and crew.

13.2 Audible Noise

13.2.1 Auxiliary Equipment

The Vendor shall devote particular attention to the design of the car and its auxiliary equipment to obtain quiet operation and shall ensure that the noise and vibration criteria specified herein are not exceeded. Particular attention shall be given to the design of all equipment to ensure minimum generation of noise and vibration, and to the attenuation of airborne and solid-borne noise and vibration along the path from source-to-passenger. The car design shall adequately attenuate noise and vibration generated by wheels and rails, wind, motors, rotating equipment, and all other car elements and equipment to ensure that the limitations on interior noise and vibration are not exceeded; this shall be accomplished by: vibration isolators; enclosures or baffles; seals; acoustical absorption; mass; bracing; car body panels with adequate sound transmission loss; interior panels with adequate sound transition; or other appropriate methods.

Noise levels from equipment not specifically mentioned herein shall be controlled by the Vendor to ensure that the interior noise and vibration limits for the complete car are satisfied.

13.2.2 Noise Criteria

Noise criteria specified shall apply to measurements taken in an empty car (AW0):

1. Noise produced by operation of cars at 79 mph on FRA Class IV-jointed track without special track work or level crossings, and with wheel tread and railhead in new condition, shall not exceed the following sound pressure levels when measured inside the car at all locations that are 4 feet above the floor surface and at least 2 feet from car body surfaces.

    a. Upper level: 63 to 70 dBA (slow response).

    b. Lower level: 70 to 75 dBA (slow response).

    c. Door vestibules: 73 to 76 dBA (slow response).

    d. Intermediate-end compartments: 71 to 74 dBA (slow response).

2. Noise produced in a stationary car by the individual operation of equipment, operating under normal conditions, such as air-circulating fans, door operators, fluorescent lamps, and air conditioning shall not exceed 70 dBA (slow response) when the noise is measured inside the car at all locations at least 1.0 foot from any car body surface, except at doors, where the measurement shall be taken 2 feet from the surface.

3. Noise produced in a stationary car by the simultaneous operation of all equipment, operating under normal conditions, shall not exceed 70 dBA (slow response), when the noise is measured inside the car at all locations at least 1 foot from any car body surface, except at doors, where the measurement shall be taken 2 feet from the surface.

4. Noise produced in a stationary car by the operation of all side doors on one side of the car, with all auxiliary systems operating simultaneously under normal conditions, shall not exceed 78 dBA (fast response) when the noise is measured inside the car at least 2 feet from the door surface of the door and 5 feet-3 inches above the floor.

5. Exterior noise produced from a stationary car by auxiliary equipment shall not exceed 77 dBA (slow response) at 15 feet from track centerline at a height of 5 feet-6 inches above top of rail.

13.2.3 Applicable Documents

For the purposes of general information and interpretation, agreed portions of the following documents (or their equivalents) are to be used: USASI - SI.4 - 1983 - *General Purpose Sound Level Meters,* ISO - 1231 - Part VII - *Quantities and Units of Acoustics.*

13.3 Ride Quality

The ride quality shall not be less than the following values when the car is traveling at normal operating speeds at AW0 car weight on FRA Class 5 track:

1. Lateral: ISO Reduced Comfort Boundary, 2 hours, total journey
2. Vertical: ISO Reduced Comfort Boundary, 2 hours, total journey

(Reference: International Standard 2631 "Guide for the Evaluation of Human Exposure to Whole-Body Vibration, 2nd edition, 1978-01-15.")

Method of Evaluation: Ride quality shall be determined, using a Hewlett Packard 3561a Dynamic Signal Analyzer or equivalent, from playback of unweighted signal outputs from vertical and lateral accelerators located at the longitudinal center line of a BiLevel car at the leading intermediate level above the truck center line, and at both ends of the upper and lower level at the nearest passenger seat from the trucks. The signal analysis shall be used to provide an accumulated ride quality over the entire journey including acceleration and braking, but excluding station stops.

SECTION 14

14 QUALITY ASSURANCE

14.1 Scope

This Section specifies minimum requirements for Quality Control/Quality Assurance activities to ensure that materials and services conform to all Contract requirements.

14.2 Application

The requirements of this Section apply:

1. To the extent specified in the Contract.
2. To the Vendor.
3. To the SubVendors in possession of and performing work on the material to be used for this Contract.

14.3 Responsibility

14.3.1 Responsibilities of Those Performing the Work

To establish, conduct, control and document in accordance with the requirements of this Section, all inspection, verification, testing and other activities needed to demonstrate that materials and services conform with Contract and referenced specification requirements including, as applicable, the technical literature associated with Vendor's and SubVendor's products and components.

14.3.2 Quality Assurance Representative's Responsibilities

To survey and verify the quality of the Work until the Work is completed and accepted, including but not limited to the following:

1. Verification of inspection and testing methods.
2. Establishment of discrete, quality verification points in the manufacturing process.
3. Verification of "first-off" (First Article Inspection) or pre-production samples as applicable.
4. Verification of quality characteristics of subcontracted items which cannot be inspected at the Vendor's facility.
5. Verification of Vendor's compliance with Contract requirements relating to quality operation/administration.

14.3.3 Quality Assurance During Commissioning & Warranty

The Department may appoint an additional inspector(s) to ensure all cars are commissioned in a correct and expedient manner. Retrofits and warranty work shall also be subject to the Department's inspection and approval by the Department or the Quality Assurance Representative.

14.4 Definitions

Certain words and phrases used in this Section such as Quality Assurance Representative, Evaluation, Vendor, Objective Evidence, etc., have specific meanings. Those are defined in Section 1.

14.5 Applicable Documents

The quality assurance requirements of all Federal, industry and regulatory specifications that apply to the Work are included under this Section. It is the Vendor's responsibility to ensure that the completed vehicle(s) comply with all applicable specifications for their intended rail transportation service operation.

CSA Z299 may be submitted as an alternate. Written approval by the Department is necessary for alternate references.

14.6 Requirements

14.6.1 Quality Program

The Vendor shall establish and follow a documented Quality Program for all operations involving verification of conformance to quality and contractual standards and specifications. The Quality Program shall outline the Vendor's practices. The Vendor's Quality Program shall be submitted to the Department for approval. **[CDRL]**

14.6.2 Quality Organization

The Vendor, before proceeding with the work, shall appoint a representative authorized to resolve quality matters.

Inspectors shall be other than those who performed the work and shall not report directly to immediate supervisors responsible for producing the work being inspected.

14.6.3 Inspection Equipment Calibration

The Vendor shall provide objective evidence to the QA Representative that suitable inspection devices for inspecting the material:

1. Are in a known state of calibration.
2. Can provide valid measurements.
3. Are being re-calibrated in accordance with governing requirements.

14.6.4 Inspection Records

The Vendor shall:

1. Keep records of all inspections as objective evidence that Contract requirements are met for one year after the contract is completed or as specified in the Contract and shall notify the Department when records are being disposed.
2. Positively identify in these records the material, specific inspections performed, and results obtained.

3. If measurements are not possible, include in the records the number of conforming items, the number rejected, and nature of the defects.

4. Make copies of these records available to the Department who will accept them as evidence of the quality of the product.

5. Prepare forms for the release of material as required by the Contract.

6. Maintain stamps, tags, routing cards, move tickets, tote box cards, or other devices that positively indicate the inspection status of items.

7. Establish and maintain a system for tags or stamped impressions that indicate final inspection of items.

8. Show the identity of the Vendor and the inspector on inspection stamps.

14.6.5 Interpretation of Technical Data

The Vendor shall direct all questions about the meaning of intent of Specifications, drawings, and related Contract requirements to the Department.

14.6.6 Control of Nonconforming Material

The Vendor shall:

1. Positively identify nonconforming material.

2. Provide holding areas or methods for segregating nonconforming material.

3. Prevent unauthorized use, shipment, or mixing with conforming material.

4. Document methods for repairing or reworking nonconforming material.

5. Maintain adequate records clearly identifying the material, the nature, and extent of nonconformance and its disposition.

14.7 Verification of Quality Assurance

14.7.1 Accommodation, Facilities and Assistance

The Vendor shall provide the QA Representative with the following assistance at no cost to the Department:

1. Suitable working accommodation on the premises of the party performing the work, including private office accommodations, furniture, and telephones for two persons. In addition, a fax machine and access to a copier machine shall also be provided.

2. Reasonable use of inspection and test equipment.

3. Assistance needed to document, move, and release material.

4. Access to all applicable work areas and to subVendors, at all applicable times.

14.7.2 Initial Evaluation

The QA Representative may initially evaluate the inspection facilities and procedures to ensure they meet the requirements of the Contract and this Section.

14.7.3 Continuing Evaluation and Verification

The QA Representative may frequently survey and verify, as required, the control of inspection.

Verification by the Quality Assurance Representative shall not relieve the Vendor of his responsibility to provide acceptable material nor shall it preclude subsequent rejection.

14.7.4 Corrective Action

When the QA Representative informs the party performing the work of deviations from established procedures, or poor practices which might affect the quality of material, or when a control is not effective, the Vendor shall promptly correct the condition. Should the Vendor fail to do this promptly, the QA Representative may suspend acceptance of material until the condition is corrected. Having taken this action, the QA Representative and the Vendor shall meet and determine the appropriate corrective action(s) for the affected item(s).

14.8 Preparation for Delivery

The Vendor shall inspect preservation, packaging, packing, and marking to ensure they conform to Contract requirements.

14.9 Quality Assurance During Commissioning and Warranty

The Department may appoint additional inspector(s) to ensure all cars are commissioned in a correct and expedient manner. Retrofits and warranty work shall also be subject to inspection and approval by the Department (or the Quality Assurance Representative)

14.10 Alternative Inspection Methods and Equipment

Test methods and equipment may be used other than those specified in the Contract if they provide, as a minimum, equivalent evidence that the material is in conformance with the Contract requirements. Prior to using alternate methods or equipment described, they shall be in a written proposal and demonstrated to the QA Representative that they effectively substantiate product quality. Where there is a dispute for borderline cases, the methods and equipment specified in the Contract shall prevail.

14.11 Receiving Inspection (Delivery Punchlist)

Within 72 hours of delivery of the completed car(s) at Rand Yard, the Contractor's and Department's representatives shall visually inspect the car(s) for damage, loss, vandalism, or other discrepancies incurred during shipment.

A Delivery Punchlist listing all such damage, loss, vandalism, or other discrepancies shall be prepared and signed by the Contractor's representative(s) the Department's representative(s).

Any discrepancies noted in the Delivery Punchlist shall be adjusted, repaired, or replaced by the Contractor.

The Contractor shall submit a detailed corrective action plan, which will be followed by the Contractor and Subsuppliers, to the Department for acceptance.

Any defects in apparatus, material, or workmanship disclosed by inspections and listed in the Delivery Punchlist, shall be corrected at the Contractor's expense on a date to be mutually agreed to between the parties.

SECTION 15

15 TESTING

15.1 General

The proposed BiLevel car shall be a service proven, developed design. Compliance with the technical requirements of these Specifications shall be demonstrated by qualification tests and recorded in official test report documents. The results of all tests, as stated in the Contract Test Program Plan (TPP), shall be submitted to the Department for acceptance **[CDRL]**. Test reports for previously performed qualification tests may be submitted by the Vendor in lieu of conducting the qualification tests described in this Section for those items that are similar to the items addressed in the test reports. Where the item applied to these cars differs from the item addressed in the test report for the previously conducted qualification test, the Vendor may propose to demonstrate compliance to the Contract requirements through written explanation, analysis, design presentation and supplemental testing in lieu of conducting the qualification tests described in this Section.

Test reports for previously performed qualification tests shall be submitted the Department, as called up on the test program plan. The Vendor shall submit a test plan for demonstrating compliance with the requirements for review and approval by the Department **[CDRL]**. The plan shall address static and dynamic tests to be conducted at the component, system and vehicle levels.

The Vendor shall, prior to commencement of any tests, reach agreement with the Department on specifications for the tests including procedures, reference standards or codes, detailed instrumentation specification, and proposed format of the test report. The Vendor shall provide the Department with the agreed versions of the above test procedure material **[CDRL]**.

Evidence of timely calibration of the instruments traceable to the standards set by the National Institute of Standards and Technology (NIST) shall be available to the Department upon request. The Vendor shall communicate to the Department, prior to commencement of any test, where and when the tests will be performed. This information shall be provided in sufficient time to permit the Department to attend the tests.

Written reports of all tests performed on the cars and their components shall be available to the Department for review and acceptance. In the event tests indicate that equipment does not meet the requirements of these Specifications, the corrective action and subsequent retest shall be at no cost to the Department. Testing shall be repeated until the test shows that the requirements of these Specifications have been met, or an accepted Specification Change Request is issued. All tests, except as otherwise agreed to or as indicated to be done at the Authorities facility in the TPP, shall be performed at the Plants of the Vendor or the subVendors.

Tests described in this section are, except as noted above, the responsibility of the Vendor and are considered by the Department to be the minimum requirements. Prequalification, by tests of previous BiLevel vehicles and by service proven history, shall not relieve the Vendor of the responsibility for the integrity of the design and quality of the delivered cars.

Tests are categorized as:

- Qualification Tests

  Tests in this category shall demonstrate design compliance and performance capability relative to these Specifications. These tests shall be performed on the number of cars, devices, or assemblies specified for that particular test.

- Shop Tests

  Tests in this category are to prove that assembly and installation has been properly done. These tests are performed on every car, device, or assembly specified.

15.2 Structural Qualification Tests

15.2.1 Carbody Structural Qualification Test

The car body structure shall be tested in accordance with APTA and AAR requirements (in effect at the time of proposal due date of April 2010) to prove compliance of the structure with these Specifications. The APTA standards require tests on the collision posts and corner posts. These tests may be waived for an existing, tested and certified car design that is structurally similar to the cars described in these Specifications. Structural equivalence of this existing, tested and certified car design can also be demonstrated by a Finite Element Analysis, subject to the approval of the Department. The structural test report shall be submitted to the Department **[CDRL]**.

15.2.2 Truck Structural Qualification Test

The first production truck shall be subjected to vertical, transverse, and brake load tests. These tests may be waived for an existing, tested and certified truck design that is similar to the trucks described in these Specifications. The test report shall be submitted to the Department **[CDRL]**.

15.3 Vehicle Dynamic Qualification Test

If required, vehicle dynamic qualification tests shall be performed on the cars on track provided by the Department. The locomotive and the train crew shall also be provided by the Department. Test technicians and test equipment shall be provided by the Vendor.

At the discretion of the Department, dynamic vehicle tests may be waived if such tests have been performed on similar cars or similar equipment on a previous contract or contracts.

15.4 Vehicle Static Qualification Test

If required, vehicle static qualification tests shall be performed on cars by the Vendor, typically at the Vendor's Plants. At the discretion of the Department, in plant vehicle tests may be waived if such tests have been performed on similar cars or similar equipment on a previous contract or contracts.

15.5 Vehicle Shop Test

15.5.1 Carbody Watertightness Test

Each assembled car, with all windows and doors installed, shall be subjected to a water spray test to verify carbody water tightness. Exterior apparatus that may affect water tightness of the car body shall be installed at the time of testing.

Water shall be sprayed on the roof and sides from nozzles located approximately 48 inches from the car side. Particular care is to be taken to concentrate the spray in the area of carbody joints, seals, doors, windows, and air intakes. All car body ends shall be sprayed with water from nozzles located in planes parallel to and approximately 24 inches away from the end sheets of the car. Pre-assembly water tests may be utilized for testing of specific car body sections to demonstrate the water tightness integrity of sides or roofs.

Spraying shall commence for a minimum of 10 minutes prior to inspection, and shall run continuously during the inspection activities.

All leaks found during the water tests shall be corrected and the car retested to the satisfaction of the Department.

15.5.2 Air Brake Test

The Vendor shall perform testing on the air brake equipment on all cars to ensure compliance with these Specifications, the manufacturer's test codes, applicable FRA requirements, and APTA Standard SS-M-005-98.

All air piping, including hoses and couplings, shall be charged to not less than 125 percent of working pressure and all pipe joints or fittings shall be tested with a soap solution. All air leaks shall be corrected before an APTA single car test is performed. Every car shall be tested with a standard APTA single car testing device using the code of tests covering its use. The testing shall include an approved brake pipe restriction test.

15.5.3 Side Door Test

The side doors, and their operating equipment, shall be checked and adjusted on all cars to ensure attainment of the specified speed of operation, smooth and proper functioning of controls, obstruction detecting, signals, interlocks, and seals. Prior to shipment, each completed door installation shall be cycled from closed-to-open-to-closed once every 20 seconds for a minimum period of six consecutive hours.

This test shall be monitored and any failures recorded. In the event of a failure, the complete test shall be repeated after corrective action has been taken by the Vendor or its subVendors.

15.5.4 Carbody and Equipment Dimensional Tests

Heights of couplers, intermediate and lower level finished floors shall be measured on each car with the car on level, tangent track and all air suspension bellows, if applicable, at normal height. The results shall meet the requirements of Section 2.4.

15.5.5 HVAC Test

With the air conditioning system operating, a refrigerant leakage test shall be conducted on all joints in the refrigerant system. Any leaks shall be corrected and the leakage test repeated.

The HVAC system shall be adjusted and tested to meet the requirements of these Specifications, including a hot room test if required. If the proposed car has already been tested in a similar configuration, the system shall be functionally tested and diffusers adjusted to comply with Section 8.4. The car body static pressure shall also be measured. Corrective action shall be taken if the measured value

is less than 0.1 inches of water gauge at full fresh air flow with all exterior doors and windows closed and the toilet room exhaust fan running.

15.5.6 Water Piping Test

The completed water piping system shall be pressure tested by charging the system to 1.5 times its working pressure. During a 30-minute test period, there shall be no indication of a loss of pressure in the system.

15.5.7 Electrical Wiring Test

The Vendor shall verify the integrity of the car wiring by checking for circuit continuity and proper polarity in accordance with APTA-SS-E-001-98. After assembly and installation of all equipment, the tests listed below shall be performed.

If any manufacturing or assembly, other than that required to correct problems discovered during testing, is carried out after testing is completed, the Department shall have the authority to require that the appropriate tests be repeated.

15.5.7.1 Carbody Wiring Insulation Test

To ensure that the insulation of all wire and cable installed by the Vendor has not been damaged before or during installation, both insulation resistance and dielectric strength testing shall be done on all completed cars.

15.5.7.1.1 Insulation Resistance Test

The insulation resistance to ground of each voltage supply system shall be measured and recorded. The following minimum values shall apply:

Nominal Circuit Voltage	Resistance to Ground
72 Vdc	3 Megohms
120 Vac rms	4 Megohms
480 Vac rms	5 Megohms

A 500 volt megger shall be used to measure the 72 Vdc system and a 1000 volt megger shall be used to measure the 120 Vac and the 480 Vac systems. All solid state components shall be removed or isolated to prevent damage. The batteries shall also be disconnected. Perform the ground insulation test by disconnecting all ground wires, connecting all the circuits of a given voltage together, and testing each nominal voltage system separately. During the testing of a given supply, all other supply circuits shall be grounded. If any readings fall below the above values, the defective wiring or components shall be replaced or the readings raised to an acceptable level by other means. A copy of the recorded insulation resistance readings, together with an outline of the method used, shall be supplied with the car acceptance forms.

When the insulation resistance test is successfully passed, dielectric strength test shall be performed as outlined below.

15.5.7.1.2 Dielectric Strength Test

A high potential ac insulation to ground test shall be performed in accordance with APTA SS-E-001-98 on all circuits and apparatus, unless specified to and approved by the Department. The initial test shall be done at 3080 Vac for 480 Vac circuits, 1144 Vac for 72 Vdc and 1240 Vac for 120 Vac circuits, with the voltage applied for one minute without any insulation breakdown. Any wire, cable, or equipment that does not meet the requirements of the test shall be removed and replaced. After the replacement of any defective parts, materials, or equipment, the affected circuits shall be retested. Retesting shall be done with the above test voltage levels reduced by 15%. Shields shall not be subject to hi-pot tests.

15.5.7.2 SubVendor Apparatus Insulation Test

To ensure that the insulation in the individual items of Sub SubVendor apparatus is adequate, components furnished by SubVendor that are assembled and wired into package units at the point of manufacture, the SubVendor shall perform insulation integrity testing. A certified test report for tests of insulation made on components being furnished for this Contract shall be made available to the Department upon request. Requirements for these certified tests shall be mutually agreed upon between the Vendor and the Department.

15.5.8 Installation Test

The purpose of these tests is to ensure that the individual items of equipment have been correctly connected after assembly to the car.

On each car, wiring circuits shall be examined to ensure correct connections after assembly and installation of all equipment in accordance with relative wiring diagrams.

15.5.9 Trainline Wiring Test

The purpose of this test is to ensure the train line wiring does not have any high resistance connections.

All equipment connected to trainline wiring shall be complete before this test is conducted and shall remain connected throughout this test. The battery switch shall be in the OFF position and all control positions on the cars shall be in the OFF position.

The voltage required to pass a direct current of 2 amperes through each control trainline circuit shall be measured and shall not exceed 1.25 volts per car measured from the trainline receptacle at one end of the car to the receptacle at the other end of the car. The voltage required to pass a current of 2 amperes through each communications trainline shall not exceed 2.25 volts.

15.6 Post Delivery Vehicle Tests and Commissioning

After delivery, and prior to final acceptance of the Vehicles, the Vendor shall confirm that the car is completely operational and ready for service. Certain specified routine tests and final inspections shall be performed to ensure that no damage or defects have occurred during the period between car completion and car delivery.

Functional tests shall include, but not be limited to, the air brake system, side door operation and control, HVAC system, lighting system, communication system, trainlines, power phasing, low voltage DC supply, and battery charging. In addition, on cab control cars, the auxiliary equipment, appliances and controls will be similarly tested.

It shall be possible to functionally test all equipment on a single car basis.

Post Delivery Testing may be static, dynamic in compliance with the requirements of the Test Program Plan. The test and commissioning procedures shall be submitted to the Department for review and acceptance **[CDRL]**.

Within 72 hours of the notification by the Vendor to the Department of completion of the post-delivery testing in accordance with the Test Program Plan, the Department shall issue a Final Acceptance Certificate. If any Vehicle is placed into revenue service prior to the issuance of a Final Acceptance Certificate or if the Final Acceptance Certificate is not issued within 72 hours, the Vehicle is deemed to have received a Final Acceptance Certificate and the Vendor shall not be liable for any damage due to such delay for final acceptance. Minor defects, which are defects which do not affect the revenue service of the vehicle, will be allowed and will not prevent the issuance of the Final Acceptance Certificate. Such minor defects shall be listed as "open items" and the open items list ("Open Items List") shall be attached to the Final Acceptance Certificate. Both parties shall mutually agree on the date of closure of all open items described in the Open Items List.

15.7 Systems Safety Certification

The Vendor shall provide a system safety certification report that covers all testing and calculations performed, showing compliance with all appropriate standards and regulations. A system safety certification plan shall be submitted to the Department for review and approval at the beginning of the project **[CDRL]**.

15.8 Car History Book

A car history book shall be maintained for each vehicle.

SECTION 16

16 DOCUMENTATION AND TRAINING PROGRAM

16.1 Scope

16.1.1 Purpose

This Section defines the procedures by which the Department shall obtain assurance that operational requirements have received early consideration so that the specified performance can be both obtained and sustained economically.

To this end, this Section requires that suitable management organization(s) and systems exist to ensure that appropriate and comprehensive documentation is developed, maintained and delivered. The documentation shall be fully updated and factual, demonstrating, verifying and certifying that the cars are built to the standards specified.

In addition, this Section also addresses the requirements for supporting activities and Training Programs.

16.1.2 Definitions

Certain words and phrases used in this Section such as Vendor, Department, etc., have specific meanings. These are defined in Section 1.2.

16.2 Deliverable Documentation

The deliverable documentation shall include top level assembly drawings, parts lists, test plans, test reports, circuit diagrams, materials certificates of compliance (as required) and other requested engineering analysis. Detail production engineering and assembly drawings are not provided.

Deliverable documentation shall be in the English language. Units of measurements shall be in US units.

No standard, specification, material, process, or component may be specified in the design unless it, or an acceptable equivalent, is available to be obtained by the Authority or prior approval has been given by the Department for its use.

The deliverable documentation shall be in the form of:

1. 8 1/2" x 11" US standard letter size bond paper for all correspondence and narrative submittals.

2. 22" x 34", 11" x 17", or 8 1/2" x 11" size sheet shall be used for drawings. Larger sizes may be utilized upon approval by the Department.

3. Where agreed to with the Department, ".pdf" or other electronic means of document transfer may be used. *(Note: in an effort to expedite documentation transfer in an efficient and ecologically responsible fashion, the Vendor shall approach the Department at the beginning of the Project to discuss which deliverable articles may be distributed in electronic format only).*

The documentation (or electronic version of such documentation) to be delivered shall include, as a minimum, the following:

- Management Plan **[CDRL],**

- Schedule Report,
- Five copies of "As built" drawings plus a reproducible set (or appropriate electronic copies), **[CDRL]**
- Specification Review Conferences Minutes,
- Conformed (as-built) Specification **[CDRL]**,
- Progress Photographs,
- Car History Books **[CDRL]**,
- Clearance Outline, Static and Dynamic **[CDRL]**,
- Wire Run Lists **[CDRL]**
- Integrated Schematics Manual **[CDRL]**,
- Vendor's List of Recommended Spare Parts **[CDRL]**,
- Test Reports (per Test Program Plan) and Certificates of Compliance (as required) **[CDRL]**,
- Operating Instructions Manuals **[CDRL]**,
- Maintenance Procedures Manual **[CDRL]**,
- Training Manuals **[CDRL]**,
- Illustrated Parts Catalog **[CDRL]**,
- Camera Ready Copy (1) of all Manuals and Training Materials **[CDRL].**

16.2.1 Design Progress Requirements

Design progress meetings shall be held monthly, or as required, with the Department to allow monitoring of progress and any other relative information communication. This does not preclude intermediate communications as is required.

The Vendor shall submit progress reports, per a period agreed to by the Department, recording the activities for the period.

The Vendor shall, in cooperation with the Department Chief Operating Officer (COO), coordinate the interfaces between the Vendor and the provider of the diesel electric passenger locomotives.

16.2.2 Management Plan

To demonstrate an organized and systematic approach to the design task, the Vendor shall submit a plan which will show how the proposed program will be structured and function. It is not the intention of these Specifications to require creation of unique and special procedures when existing procedures are satisfactory. The management plan is not required to be submitted with the Vendor's Bid.

16.2.3 Design Evaluation

When specific quantitative or qualitative requirements are called for in the other Sections of these Specifications, the Vendor shall show, either by analysis, provision of existing relevant data or by test, that the design will match the requirement.

Such analysis and testing may take into account the effects of shelf life, environmental conditions during transport, and handling during assembly and may, where applicable, include all associated subsystems down to the lowest tier.

If the Vendor elects to use analytical methods, it shall be the responsibility of the Vendor to provide evidence which will substantiate the data and methods used.

Failure to meet the requirements above shall require testing, per the test program plan, to evaluate the design in question against specific requirements. Notice shall be given so the Department or a representative can be present if so desired, and the test shall be conducted. In any case, a test report will be prepared and a copy made available to the Department.

Failures encountered during testing must be analyzed for cause, and appropriate corrective action taken, including retesting at the discretion of the Department.

16.3 Manuals and Catalogs

16.3.1 Types and Quantities

The Vendor shall furnish manuals for use by vehicle operators and maintenance personnel in accordance with the requirements of this Specification. Manuals to be supplied as part of this Contract are as follows:

- Operating Instructions Manual 75 copies
- Maintenance Procedures Manual 25 copies
- Illustrated Parts Catalogs 12 copies
- Training Manuals 10 copies
- Integrated Schematics Manual 25 copies

The Vendor shall also provide a copy of all manuals and catalogs identified above on electronic media, in a format that can be edited by the Department.

Within 12 months after NTP, the Vendor shall submit to the Department, for approval, Tables of Contents and sample formats for each type of manual and for the Illustrated Parts Catalog **[CDRL].**

Delivery of the draft manuals and catalogs shall be shall in accordance with the Milestone Payout schedule Exhibit "B-1". The Department shall review the technical content of the draft manuals and catalogs and submit any and all proposed changes to Bombardier no later than 45 days after the completion of the initial training phase; in order to incorporate any maintenance and/or operations concerns highlighted during the initial training session. The updated manuals and catalogs, incorporating all necessary changes, shall be completed and delivered to the Department 60 days after receipt of the changes requested by the Department.

16.3.2 Operating Instructions Manual

The Operating Instructions Manual (OIM) shall contain all information needed for the proper operation of the vehicle. It shall include general vehicle familiarization material, such as:

- Location, function and operation of controls, gauges, indicators and switches;
- Discussion of the trucks, couplers, lights, environmental control, and other features of the vehicle which the operator may not be in a position to control or adjust but of which the operator should have some basic knowledge;
- Emergency equipment and procedures;

- Troubleshooting and Operator corrective actions.

The manual shall be logically organized with systems and elements considered in descending order of importance. Care shall be taken that all statements and illustrations are clear, positive, and accurate, with no possibility of incorrect implications or assumptions.

16.3.3 Maintenance Procedures Manual

The Maintenance Procedures Manual ("MPM") shall enable the maintenance staff to have with them, in convenient form, all information needed for preventive maintenance inspections, on-vehicle running maintenance and adjustment, and on-line trouble diagnosis of each system including such data as troubleshooting guides, equipment specifications and schematics for the vehicles and each of its systems. It shall also include, in a separate section, all information needed for periodic inspection and servicing requirements, including lubrication, inspection and adjustment of all apparatus. The MPM shall contain a detailed analysis of each component of the vehicle so that the maintenance staff can effectively service, inspect, maintain, adjust, troubleshoot, repair, replace, and overhaul vehicle and components. The MPM shall include instructions for using portable test units (PTUs) for maintenance, adjustment, test, and troubleshooting functions.

16.3.4 Illustrated Parts Catalogs

The Illustrated Parts Catalogs ("IPC") shall enumerate and describe every component with its related parts for the vehicles, PTUs and special tools. The IPC shall include a column for the customer part number.

Drawings showing cutaway and exploded views of subassemblies and components shall be used to permit identification of all parts. Parts common to different components (for example, bolts and nuts) shall bear the same Vendor's number in all components. Each part or component shall be identified as being part of the next higher assembly.

16.3.5 Training Manuals

Training manuals shall contain sufficient material to aid the Vendor in performing the requirements of Section 15.6.

16.3.6 Integrated Schematics Manual

The Integrated Schematics Manual (ISM) shall enable the maintenance staff to have with them, in convenient schematic form, information needed for on-line trouble diagnosis of electrical or pneumatic systems.

16.3.7 Manual Formats

All publications shall be in loose leaf form and use 20 pound offset paper. They shall be in four general categories and sized as follow:

- Operating Instructions Manual — Pocket Size
- Maintenance Procedures & Integrated Schematic Manuals — Standard Size
- Parts Catalog — Standard Size
- Training Manuals — Standard Size

Pocket size manuals shall be 4-1/4 in wide, 8-1/2 in high, and not more than 1-1/4 in thick. They shall be bound using plastic binding combs (Cerlox type) along the 4-1/4 in dimension and the pages therein shall be as large as can be accommodated without damage. The front and back cover shall be plasticized and sized to protect the pages inside.

Standard size manuals shall be reproduced on pages that are 8-1/2 x 11 in. three-hole punched The binder cover shall be 10 in. to 10-1/2 in. wide (depending on ring size) and 11-1/2 in. to 12 in. high. The binders shall not exceed 3 in. overall thickness. Folded pages will be permitted (11 x 17 in., "Z" - folded) where the information to be conveyed cannot be presented clearly on single pages. Manuals for 8-1/2 x 11 in. pages may be divided into multiple volumes if the required material cannot be accommodated within the maximum binder thickness. A Table of Contents shall be provided in each volume.

All covers shall be approximately 1/16 in thick, resistant to oil, moisture, and wear, to a high degree commensurate with their intended uses. Standard size loose-leaf three-ring type binders shall be used. Diagrams and illustrations shall not be loose or in pockets. All printed material shall be clearly reproducible by standard dry copying machines.

Operating Instructions Manuals, Maintenance Procedures & Integrated Schematic Manuals, Parts Catalogs and Training Manuals shall also be provided in an electronic format. The electronic format for each shall be submitted for review and approval of the Department.

All documents or drawings which include information in a language other than English shall include an English translation adjacent to the non-English passage. All dimensions given in metric units shall also state the English unit equivalents parenthetically next to the metric dimensions.

16.4 Diagnostic Test Equipment

16.4.1 General

The Vendor shall provide all equipment specified in this Section for comprehensive in-service testing of vehicles. All of the test equipment identified in Sections 15.4.2 and 15.4.3 shall be delivered at the same time as the acceptance of the first vehicle. Standard test instruments used in the bench testers should be the "ruggedized" or a "field" version of the particular item. All Portable Test Units (PTUs) shall be delivered as specified in this document.

16.4.2 Maintenance Facility Bench Test Devices

If required, one set of bench test devices shall be supplied by the Vendor for the purpose of testing, troubleshooting, and calibrating all electrical, electronic, mechanical, electro-mechanical, pneumatic, and hydraulic components of each vehicle subsystem.

If required, Bench Test Devices shall be provided for HVAC, Brakes, Doors and Communications subsystems.

Test units shall be for use in maintenance and repair facilities. The Vendor shall ensure compatibility of all test units with the Department's maintenance facilities. A list of proposed bench test devices shall be provided in the Vendor's proposal.

16.4.3 Portable Test Units

Three portable test units (PTUs) shall be supplied to the Department **[CDRL]**. PTUs shall be notebook computers configured to interface with the on-board systems listed below and loaded with all necessary software to provide the functionality required by this Section. Three identical units shall be supplied, including all necessary interface cables.

The software to be loaded in each PTU is as follows;

- Software (as required) for the Air Comfort System,
- Download and Analysis software for the Event Recorder System,
- Radio Service Software (as required) for the Radio System,
- Modification Software for the passenger information, Interior Messaging Signs and Pre-Recorded Announcements
- Download Software for Cameras and Audio Recordings on DVR.
- The Vendor shall provide licensed software for each of the subsystems on a CD format for the Department to load on additional PTUs, if a PTU must be replaced.
-

16.4.4 Special Tools

The Vendor shall supply one set of any required special tools as required by the Department. Special tools include but are not limited to any jigs, fixtures, equipment, gauges, hand tools, power tools, or other tools and equipment necessary to maintain, repair, assemble, and disassemble the vehicle or subsystems, which are not commonly available from commercial tool suppliers.

All special tools, other than the PTUs and bench testers that are required to maintain the vehicle, shall be supplied along with complete manuals explaining the use of the tool and its care and maintenance.

A list of proposed special tools and equipment shall be provided in the Vendor's proposal.

16.5 Replacement Parts

16.5.1 Recommended Spare Parts

The Vendor shall furnish a list of recommended spare parts for use during the operating period identified in this Contract. The list of recommended spare parts shall be predicated on the Vendor and SubVendor experience with the equipment in service on other properties and the maintenance requirements expected for the Department. Consumption rate data and data on lead time for procurement of replacement parts shall be made available to the Department in support of these spare parts recommendations. Spare parts recommendation shall consider the longest possible lead-time to obtain parts from the source.

The recommended spare parts list shall include the parts description, Vendor's part number, quantity recommended, the unit prices for individual parts or carsets of equipment, and the extended price based on the recommended quantities.

16.5.2 Spare Parts for Warranty Repairs

The spare parts ordered by the Department for support of revenue operations will, when approved by the Department, be made available for warranty repairs or warranty parts replacement. In such an event, the Vendor shall replace the Department furnished parts with new parts to replace those used for warranty repairs within thirty (30) days.

16.6 User Education

16.6.1 General

The Vendor shall provide an educational program for the Department designated personnel, of a quality and depth sufficient to permit such personnel to safely and satisfactorily operate, service, and maintain the vehicles and all carborne equipment, and to train other Department personnel in the operation and maintenance of the vehicles. The educational program shall begin concurrent with delivery of the first vehicle or prior to start of revenue service. This program shall include classroom and hands-on instruction through the use of actual equipment, mockups, models, manuals, diagrams, and parts catalogs, as applicable. Optionally, mockups and models may be produced and used. The Vendor shall assume no knowledge of the features of the vehicles on the part of the designated personnel, and shall design the program to bring the level of knowledge to one fully adequate for the objective. The Vendor may assume that the Department personnel have the basic skills pertinent to their respective crafts.

The Vendor shall, within ninety (90) days after award of the Vehicle Contract, submit an educational program outline and a schedule for the Department's approval, that identifies milestones for submitting the course outlines, instructor and student guides, and for conducting classes. The training outline shall identify each module of instruction and the general topics to be taught and indicate the order in which modules will be presented.

As training materials are being developed, the Vendor shall work closely with Department staff to ensure that Department standards are being met, with respect to the course organization, content, and overall quality of written documents.

Vehicles and spare parts on the Department's property may be utilized for educational purposes, insofar as this use does not interfere with the acceptance program or other usage by the Department. The Department will make available, upon proper notice, cars and trains at accessible shop locations for instructional purposes. All vehicle equipment and spare parts utilized for training purposes shall be restored to new equipment condition, if necessary, by the Vendor subsequent to use for training purposes and the Vendor shall provide full warranty for this equipment.

All training materials, such as training aids and lesson plans, shall become the property of the Department at the completion of the training program. The Vendor shall be responsible for the condition of these materials for the duration of the training program, and shall replace all damaged materials unless the damage results from neglect by the Department. Lesson plans shall be updated as required during the course of instruction.

Instructors provided by the Vendor shall be fully capable of transmitting in-depth technical information that can be understood by participants.

The program shall be conducted in Department classrooms with furniture supplied by the Department (desks, tables, lecterns, etc.). Classes shall be scheduled eight (8) hours per day, five (5) work days per week. Department holidays shall be observed. Class instruction periods shall normally be fifty (50)

minutes in duration with a ten (10) minute break between periods of instruction. Length of practical application periods shall be established by the Vendor.

16.6.2 Operations Training

The Vendor operations training shall instruct one (1) group of 10 representatives. Each course shall consist of classroom time and practical on-train operation. Topics to be covered in the operations training program shall include, but not be limited to the following: vehicle specifications, controls and indicators; vehicle systems (i.e., friction brake, electrical, truck and coupler assemblies, door control, environmental, lighting and communications); vehicle operations (i.e., actual operation of the vehicle in maintenance yards or on the main track, as applicable); troubleshooting procedures; and recovery operations.

16.6.3 Maintenance Training

The Maintenance Training shall consist of three major subgroups, Maintenance training, Management Familiarization training and Emergency Response training:

16.6.3.1 Maintenance Training

The Vendor shall provide maintenance training sessions for one group of 10 representatives. The courses shall consist of classroom hours and hands-on hours in Department maintenance facility, working on actual equipment.

Department employees shall be exposed to the depth of detail that is necessary for the performance of preventive and corrective maintenance operations. Students shall be afforded the opportunity to perform the more complex maintenance functions on the vehicle and in the shop, in addition to troubleshooting systems with faults artificially introduced in the equipment while using the appropriate subsystem test devices.

The Maintenance Training shall instruct on the systems outlined in Table 2 as applicable to the vehicle delivered.

16.6.3.2 Management Familiarization Training

The Management Familiarization training shall instruct one group of 10 representatives. The course shall consist of classroom time and time on the train. The course shall provide a general overview of the vehicles and explain the main features of the major systems and components installed.

16.6.3.3 Emergency Response Training

The Emergency Response training shall instruct one group of 10 representatives. Each course shall consist of classroom time and time on the train. Topics to be covered in the emergency response course shall include, but not be limited to, emergency equipment location, vehicle access, recovery operations, etc.

16.6.4 Training Program Duration

NOTE: The actual training program and the total duration depend on the equipment installed on the delivered vehicle. Additional training can be provided upon request.

The typical training program breaks down into the following courses and course durations:

Table 1. Operations Training

Course	Title	Duration
Op 1	Operator Training	24 hrs
	TOTAL:	24 hrs

Table 2. Maintenance Training

Course	Title	Duration
MF 1	Management Familiarization	4 hrs
Maint 1	Familiarization and Overview	8 hrs
Maint 2	Carbody and Operating Cab (Cab cars only)	8 hrs
Maint 3	Lighting	8 hrs
Maint 4	Auxiliary Power / Head End Power	24 hrs
Maint 5	HVAC	24 hrs
Maint 6	Truck	16 hrs
Maint 7	Coupler and Draft Gear	8 hrs
Maint 8	Brakes, Pneumatic Distribution System	40 hrs
Maint 9	Side Doors	24 hrs
Maint 10	Toilet / Water / Waste (if applicable)	8 hrs
Maint 11	Communications and Destination Signs (if applicable)	16 hrs
Maint 12	Event Recorder / Monitoring / ATS (if applicable)	24 hrs
Maint 13	Preventive Maintenance	8 hrs
ER 1	Emergency Response	8 hrs
	TOTAL without ATS :	212 hrs
	Total with ATS :	228 hrs

16.6.5 Train the Trainer Training

The Vendor's Training Program shall also include a Train the Trainer parallel course of training. The training materials to be delivered will include a separate complete package to be used as a Train the Trainer Program. It will include all of the material for the basic training class such as; instructors guides, student guides, reference materials, syllabus for all classes, power point presentations and handouts.

"The Train the Trainer Class will be approximately one week in duration. It will be split one half the week mechanical trainer and one half the week operators trainer.

Class size for each class is up to six Trainers.

The Vendor should expect to jointly develop the content of the Train the Trainer Class with the Department and the Contract Operator and Maintainer."

SECTION 17

17 WARRANTY / SUBSTITUTIONS

Vendor shall warranty the following for all new vehicles:

a. Elastomers, the structure of the car body, the underframe, and the truck frames for a period of five (5) years from the date each car is delivered to the Department.
b. All other pertinent parts, for a period of two (2) years from the date of delivery of each car.
c. Spare parts for two (2) years from date of installation. In no case shall the warranty period exceed three (3) years from date of delivery of spare parts.

All retrofits for the remainder of the warranty period or for one (1) year from the date of retrofit completion per vehicle, whichever period is greater.

The Vendor shall have approved prior to delivery of the first Car, the warranty procedures for the Department.

Vendor shall warranty that the vehicles shall be in accordance with the Contract Documents when accepted and shall warranty against defect due to faulty design, poor workmanship, or poor material during the foregoing respective periods of warranty. If any part or parts thereof proved defective either in design, materials or workmanship during the respective periods of warranty, the Department shall promptly notify the Vendor, and the Vendor shall repair or replace, as mutually agreed by both parties, such part or parts without expense to the Department.

It shall be understood that the Vendor shall be responsible for all costs of labor and material for defect identification and location, and for the removal, repair, or replacement of defective parts, and for alterations, repairs, tests, and adjustments in connection therewith, made to obtain specified car performance. Replaced and/or repaired items shall be warranted for the remainder of the warranty period or for one (1) year, whichever period is the greater.

In the event the Department incurs extra costs, including consultant costs, which are directly attributable to the Vendor's performance, or lack thereof, the total extra costs for the related labor, materials, equipment and/or consultant services will be the sole responsibility of the Vendor, including consultant efforts reviewing drawings, conducting inspections and monitoring FMI procedures.

During the respective period of warranty, all vehicle parts or material caused to be damaged as the result of a defect in design, material, or workmanship in other vehicle parts or material, shall be repaired or replaced at the expense of the Vendor. Failure reports must accompany all repaired parts.

The Vendor shall, within ten (10) days from notification of warranty claim deliver replacement parts; prior Department authorization is required for return period exceeding ten (10) days. The Vendor shall maintain support material necessary to eliminate any extended removal of vehicle from revenue service. Failure reports must accompany all repaired parts.

In no case shall any correction of defects in design, material, or workmanship take the form of an increase in maintenance requirement beyond that specified in the Contract Documents, described in the original edition of the maintenance instructions, approved in the Baseline design, or submitted by the Vendor at the time of proposal (April 2010) for the Contract.

Where 25 percent of the quantity of a warranted item fails or where 25 percent of vehicles per a fleet type are affected during the warranty period, the Department may classify the total of such items as a failure, including those items for which the warranty period expired before the Department recognized the failure. The Vendor shall be responsible for all costs of labor and material, for defect identification and location, and for removal, repair or replacement of defective parts, and for alterations, repairs, tests and adjustments in connection therewith made to obtain vehicle performance. All such replaced or repaired items shall be warranted for the remainder of the warranty period or for one (1) year, whichever period is greater.

The Vendor shall provide an on-site Warranty Coordinator to handle and coordinate with the Department all warranty issues for the duration of the warranty period. The warranty coordinator shall respond to all issues within one (1) business day of notification.

Any repair or retrofit work required to fulfill these warranties shall be accomplished with minimum disruption to the Department's operation and its maintenance facility; however, as a condition precedent to the Vendor's liability under this Warranty and Warranty of End Product, the Vendor shall have been given notice of the defect(s), reasonable access to the defective part(s), and the defective part(s) shall not have been changed or altered without the Vendor's knowledge, whether by additions, subtractions or otherwise, in any manner whatsoever.

If a vehicle is removed from revenue service for one (1) week or more for warranty/repair/retrofit work, the duration of the time the vehicle is removed from service will extend the warranty period accordingly.

Due to the regular maintenance demands on Department facilities and on the Department's operation personnel, it may be possible to undertake only minimal adjustment, repair, or replacement work on equipment prior to Final Acceptance. The Vendor shall, in such an event, be responsible for securing facilities and personnel to complete all additional work required for the duration of the Contract.

Notwithstanding the foregoing, all implied warranties of merchantability and 'fitness for a particular purpose are excluded from any obligation contained in this procurement.

APPENDIX A

List of CDRLs

#	Section	Subject
1	1.4, 2.1	Standards compliance and exceptions – Compliance matrix
2	2.1, 15.2	Static and dynamic clearance diagrams
3	3.6	Interior panel colour schemes
4	3.7.2	Interior flooring colour schemes
5	3.7.2	Floor covering samples and data sheets
6	3.7.2	Interior flooring arrangement design
7	3.8.1	Emergency window assembly and installation design
8	3.9	Seat arrangement and installation
9	3.9, 11.15.2	Seat color and pattern
10	3.9	Seat covering
11	3.8.1, 3.14	Exterior finish: Color scheme, lettering, signage and all graphics, tags and other lettering, including emergency window removal decals.
12	3.17.1	Low Location Exit Path Marking
13	3.16, 3.18, 3.22	Car numbers, logos, signboards, signage and other graphics, including toilet room decals, emergency window removal decals, and emergency signage
14	3.23	Installation of the work tables
15		Not Used
16	4.5	Axle pressure graphs and inspection data sheets
17	6.3	Arrangement of the operating controls
18	6.5.9	Pilot clearance diagram
19	7.1	Car control trainline design data, including wire and pin assignments
20	7.1	Details package for all trainlines and connections
21	7.5.1.1	Details of the complete low voltage DC system
22	7.5.1.5	Details of the battery enclosures and the battery description and specification
23	7.8.2	Details of the independent powered emergency lighting system
24	7.11	Details of the automatic train announcement system
25	7.12.1	Details of the communication system
26	7.13	Details of the WiFi system
27	7.14, 15.2	Wiring diagrams
28	8.1	Heating and cooling load analysis along with recommended heating, cooling, and ventilation capacities
29	8.4	Ventilation - Demonstrate compliance with the requirements of 49 CFR 238.103 through design, analysis and testing
30	8.5	HVAC - Temperature control schedule and a description of operation
31	9.1	Evidence of brake rate compliance
32	10.1	Water and waste system for toilet
33	11.1.8	Fire Safety – A matrix showing the type of materials, where used, flammability and smoke emission test identity, test facility, test requirements, test results, and nature and quantity of the products of combustion.

#	Section	Subject
34	11.1.9	Toxicity – Identification of materials and products generally recognized to release toxic products of combustion
35	11.6.1	Wire and cables - Identification and marking
36	11.7.1	Wiring - procedures for the repair of damaged wire or cable
37	11.7.2	Splicing methods
38	11.9.1	Equipment Compartment and Locker Paints
39	11.9.2	Truck paint system
40	11.10.1.1	Air Brake Piping - Use of flexible hose
41	11.14.3	Melamine color sample
42	13.6.1	Quality program
43	14.1, 14.2.1, 14.2.2, 15.2	Test results
44	14.1	Test Program Plan for demonstrating compliance
45	14.1, 14.6, 15.2	Test procedures
46	14.7	Systems Safety Certification Plan
47	15.2	Management Plan
48	15.2	Five copies of the "as-built" car drawings
49	51.2	"As-built" conformed specification
50	15.2	Car history book
51	15.2	Integrated schematics manual
52	15.2	Recommended spare parts list
53	15.2	Operators instructions manual
54	15.2	Maintenance procedures manual
55	15.2	Training manuals
56	15.2	Illustrated parts catalog
57	15.2	Camera ready copies of manuals
58	15.3.1	Sample formats for each type of manual and for the Illustrated Parts Catalog
59	15.4.3	Portable test units

APPENDIX B

List of Samples to be delivered:

#	Section	Subject
1	3.72	Flooring Material Samples – refer to CDRL #3
2	3.9	Seat Material Samples – refer to CDRL #10
3	3.14	Exterior Colour Scheme (Paint) Samples – refer to CDRL #11
4	3.8.1, 3.14, 3.16, 3.18, 3.22	Interior/Exterior Signage Samples (as required) – refer to CDRL #11, 13
5	11.14.3	Melamine Samples – refer to CDRL #41
6	15.3.1	Sample format for each type of manual and for the Illustrated Parts Catalog – refer to CDRL # 58

APPENDIX C

List of Client Submissions:

#	Section	Subject
1	3.18	Sequence of car numbers
2	7.3.1	Details of the HEP and Control trainline pin configurations of all possible CFCRT Transit locomotives
3	7.7.1	Location of two pushbuttons on the cab console

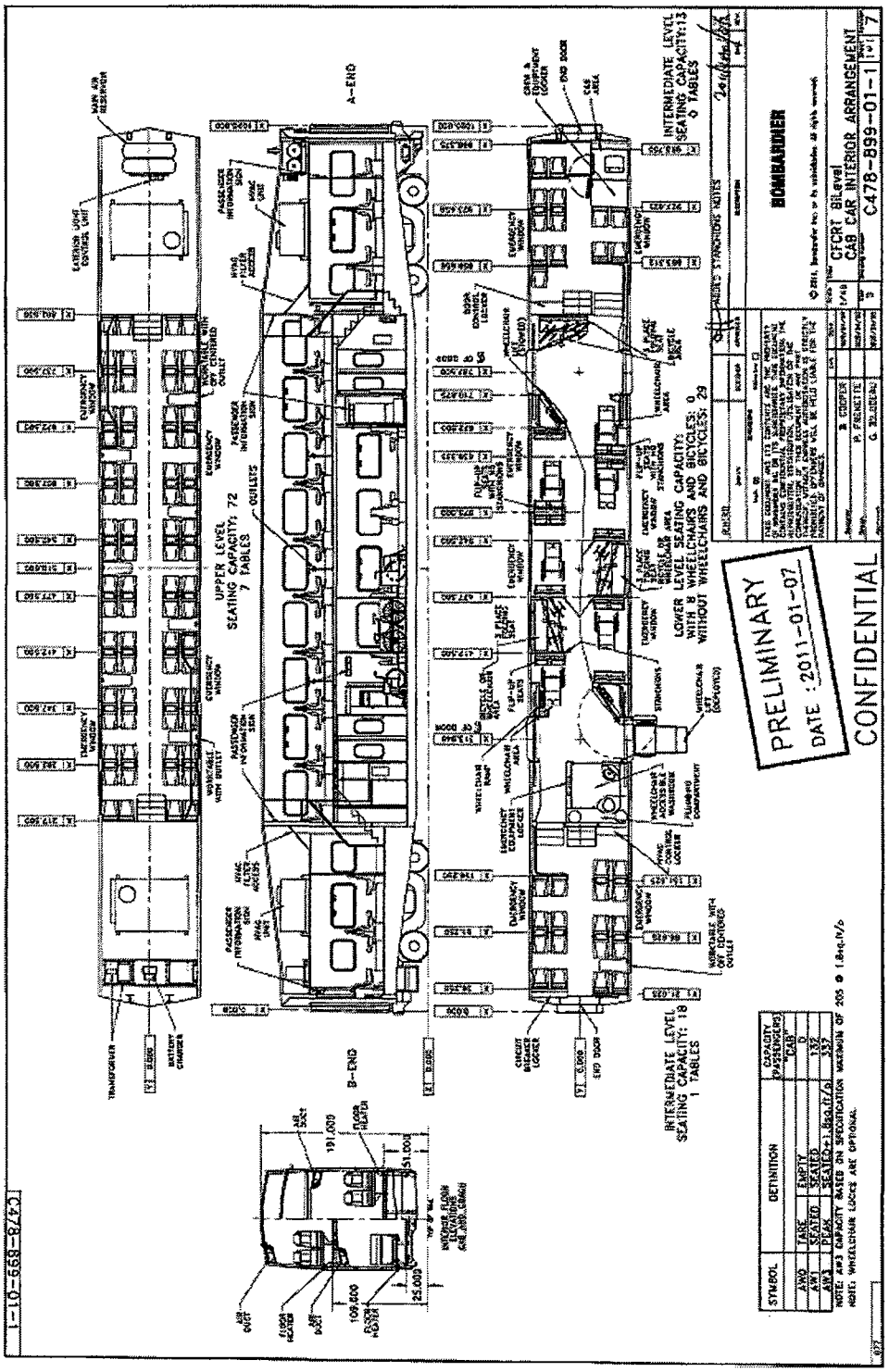
APPENDIX D

General Car Arrangement Layouts:

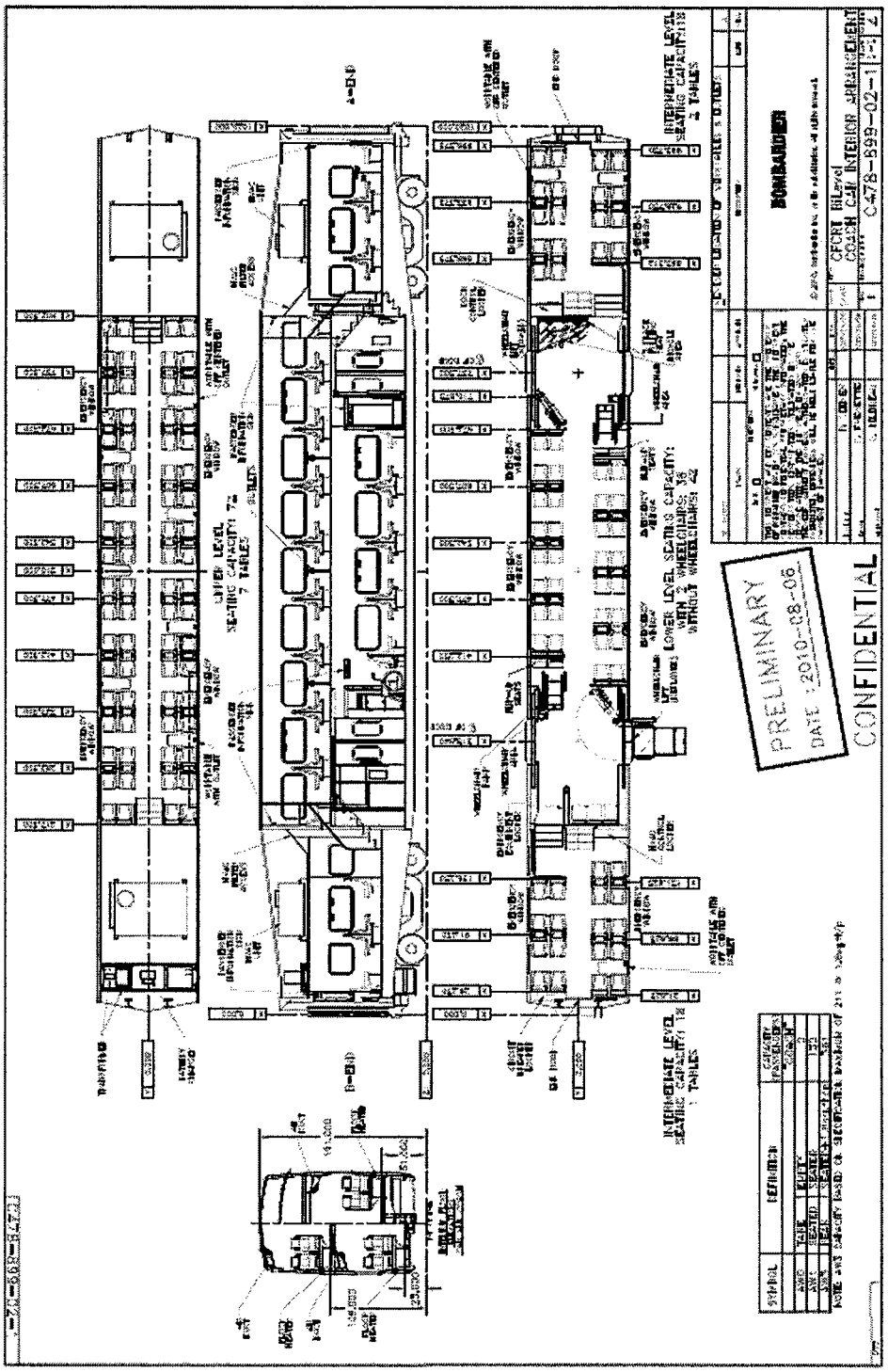
Appendix D1: Cab – Drawing C478-899-01-1 Rev. 7

Appendix D2: Coach – Drawing C478-899-02-1 Rev. 4

Appendix D1: Cab Car Interior Arrangement



Appendix D1: Coach Interior Arrangement



APPENDIX E

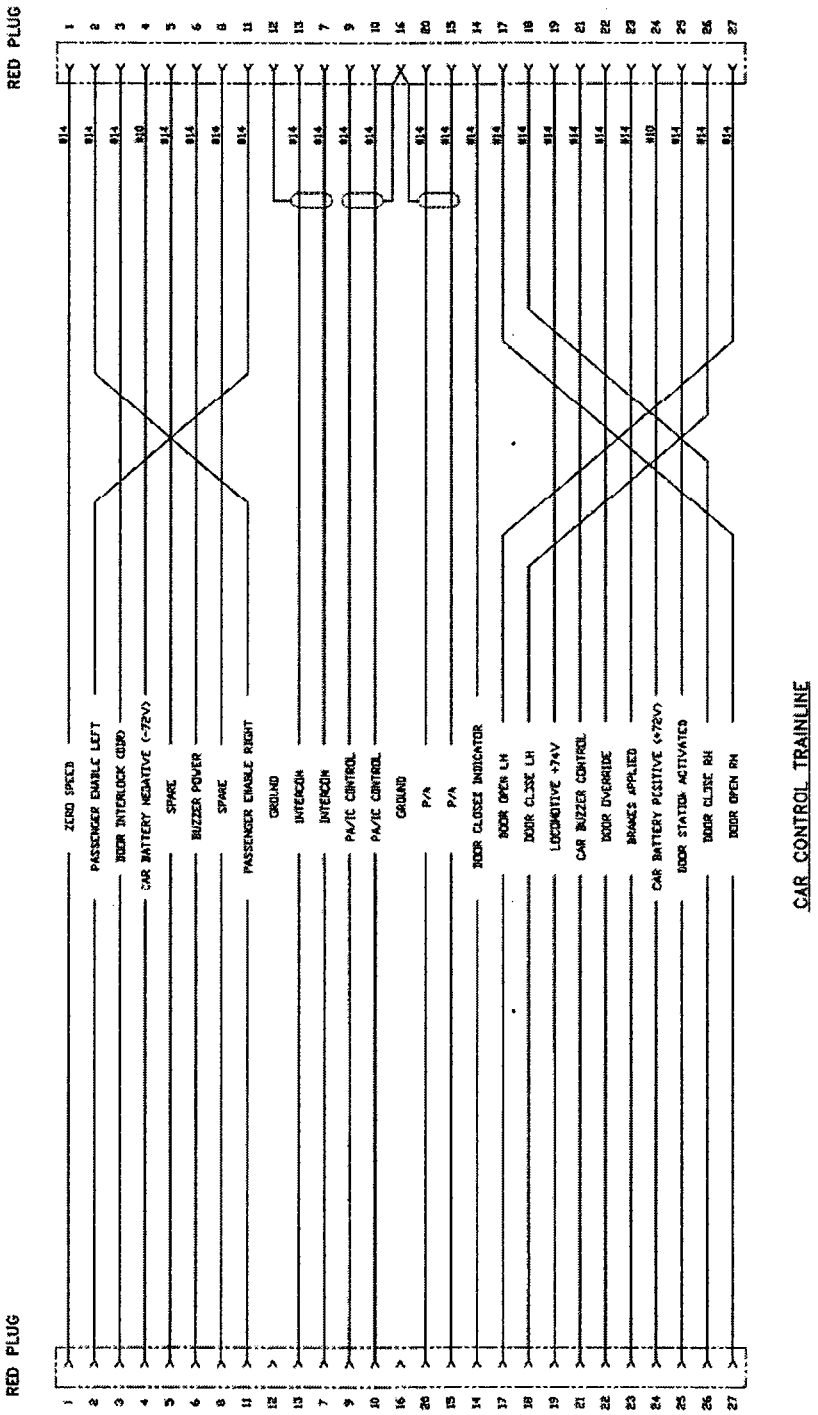
Locomotive MU Control Trainline Assignments;

Intercar Jumpers – Locomotive (Bombardier Drawing Ref. 246-551-20-0104-02)

APPENDIX F

Communication Control Trainline Assignments

Intercar Jumpers – Car (Bombardier Drawing Ref. 246-551-20-0104-01)



Florida Department of Transportation
District 5

EXHIBIT E

REQUIRED CONTRACT PROVISIONS FOR FEDERAL TRANSIT ADMINISTRATION FEDERAL-AID ROLLING STOCK CONTRACTS

For

Central Florida Commuter Rail Transit (CFCRT)
Bi-Level Coaches and Cab Cars Vehicles

Financial Projects Number(s): 412994-6-53-01
Federal Aid Project Number(s): TBD
Contract Number: TBD

January 12, 2011

REQUIRED CONTRACT PROVISIONS FOR FEDERAL TRANSIT ADMINISTRATION FEDERAL-AID ROLLING STOCK CONTRACTS

FLY AMERICA REQUIREMENTS

The Vendor agrees to comply with 49 U.S.C. 40118 (the "Fly America" Act) in accordance with the General Services Administration's regulations at 41 CFR Part 301-10, which provide that recipients and subrecipients of Federal funds and their contractors are required to use U.S. Flag air carriers for U.S Government-financed international air travel and transportation of their personal effects or property, to the extent such service is available, unless travel by foreign air carrier is a matter of necessity, as defined by the Fly America Act. The Vendor shall submit, if a foreign air carrier was used, an appropriate certification or memorandum adequately explaining why service by a U.S. flag air carrier was not available or why it was necessary to use a foreign air carrier and shall, in any event, provide a certificate of compliance with the Fly America requirements. The Vendor agrees to include the requirements of this section in all subcontracts that may involve international air transportation.

CARGO PREFERENCE REQUIREMENTS

Cargo Preference - Use of United States-Flag Vessels - The Vendor agrees: a. to use privately owned United States-Flag commercial vessels to ship at least 50 percent of the gross tonnage (computed separately for dry bulk carriers, dry cargo liners, and tankers) involved, whenever shipping any equipment, material, or commodities pursuant to the underlying contract to the extent such vessels are available at fair and reasonable rates for United States-Flag commercial vessels; b. to furnish within 20 working days following the date of loading for shipments originating within the United States or within 30 working days following the date of 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. to include these requirements in all subcontracts issued pursuant to this contract when the subcontract may involve the transport of equipment, material, or commodities by ocean vessel.

ENERGY CONSERVATION

The Vendor 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.

CLEAN WATER

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

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

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.] - Vendors 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.

APPENDIX A, 49 CFR PART 20--CERTIFICATION REGARDING LOBBYING

Certification for Contracts, Grants, Loans, and Cooperative Agreements

(To be submitted with each bid or offer exceeding $100,000)

The undersigned [Vendor] certifies, to the best of his or her knowledge and belief, that:

(1) No Federal appropriated funds have been paid or will be paid, by or on behalf of the undersigned, to any person for influencing or attempting to influence an officer or employee of an agency, a Member of Congress, an officer or employee of Congress, or an employee of a Member of Congress in connection with the awarding of any Federal contract, the making of any Federal grant, the making of any Federal loan, the entering into of any cooperative agreement, and the extension, continuation, renewal, amendment, or modification of any Federal contract, grant, loan, or cooperative agreement.

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

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

certify and disclose accordingly.

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

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

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

_____ Signature of Vendor's Authorized Official

Robert E. Furniss
Vice President
_____ Name and Title of Vendor's Authorized Official

3 June 2011
_____ Date

ACCESS TO RECORDS

The following access to records requirements apply to this Contract:

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

2. Where the Purchaser is a State and is the FTA Recipient or a subgrantee of the FTA Recipient in accordance with 49 C.F.R. 633.15, Vendor agrees to provide the Purchaser, the FTA Administrator or his authorized representatives, including any PMO Contractor, access to the Vendor'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.

3. Where the Vendor 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, Vendor agrees to provide the Purchaser, FTA Administrator, the Comptroller General of the United States or any of their duly authorized representatives with access to any books, documents, papers and record of the Vendor which are directly pertinent to this contract for the purposes of making audits, examinations, excerpts and transcriptions.

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

5. The Vendor shall provide to the U.S. Secretary of Transportation and the Comptroller General of the United States, or their duly authorized representatives, access to all third party records as required by 49 U.S.C. section 5325 (g). The Vendor shall further provide sufficient access to third party procurement records as needed for compliance with Federal laws and regulations or to assure Project management as determined by FTA.

6. The Vendor agrees to permit any of the foregoing parties to reproduce by any means whatsoever or to copy excerpts and transcriptions as reasonably needed.

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

8. Vendor shall also include in its subcontracts the requirement that the subcontractors shall provide to the U.S. Secretary of Transportation and the Comptroller General of the United States or their duly authorized representatives access to all third party contract records as required by 49 U.S.C. section 5325 (g), and shall further provide sufficient access to third party procurement records as needed for compliance with Federal laws and regulations or to assure Project management as determined by FTA.

FEDERAL CHANGES

Vendor shall at all times comply with all applicable Federal laws, regulations, and directives, including without limitation those listed directly or by reference in the Master Agreement between the Florida Department of Transportation and FTA, as they may be amended or promulgated from time to time during the term of this contract, except to the extent that FTA determines otherwise in writing, which Master Agreement is hereby incorporated herein by this reference. All standards or limits in the Grant Agreement or Cooperative Agreement for the Project, and in the Master Agreement, are minimum requirements, unless modified by FTA.

Vendor's failure to so comply shall constitute a material breach of this contract.

CLEAN AIR

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

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

AIR POLLUTION AND FUEL ECONOMY

Vendor must comply with any applicable Federal air pollution control and fuel economy regulations, such as EPA regulations, "Control of Air Pollution from Mobile Sources, 40 CRF Part 85; EPA regulations, "Control of Air Pollution from New and In-Use Motor Vehicles and New and In-Use Motor Vehicle Engines, "40 CFR Part 86; and EPA regulations, "Fuel Economy of Motor Vehicles," 40 CFR Part 600.

RECYCLED PRODUCTS

Recovered Materials - The Vendor agrees to comply with all the requirements of Section 6002 of the Resource Conservation and Recovery Act (RCRA), as amended (42 U.S.C. 6962), including but not limited to the regulatory provisions of 40 CFR Part 247, and Executive Order 12873, as they apply to the procurement of the items designated in Subpart B of 40 CFR Part 247.

CONTRACT WORK HOURS AND SAFETY STANDARDS

(1) **Overtime requirements** - No contractor or subcontractor contracting for any part of the contract work which may require or involve the employment of laborers or mechanics shall require or permit any such laborer or mechanic in any workweek in which he or she is

employed on such work to work in excess of forty hours in such workweek unless such laborer or mechanic receives compensation at a rate not less than one and one-half times the basic rate of pay for all hours worked in excess of forty hours in such workweek.

(2) **Violation; liability for unpaid wages; liquidated damages** - In the event of any violation of the clause set forth in paragraph (1) of this section the contractor and any subcontractor responsible therefor shall be liable for the unpaid wages. In addition, such contractor and subcontractor shall be liable to the United States (in the case of work done under contract for the District of Columbia or a territory, to such District or to such territory) for liquidated damages. Such liquidated damages shall be computed with respect to each individual laborer or mechanic, including watchmen and guards, employed in violation of the clause set forth in paragraph (1) of this section, in the sum of $10 for each calendar day on which such individual was required or permitted to work in excess of the standard workweek of forty hours without payment of the overtime wages required by the clause set forth in paragraph (1) of this section.

3) **Withholding for unpaid wages and liquidated damages** - The Department shall upon its own action or upon written request of an authorized representative of the Department of Labor withhold or cause to be withheld, from any moneys payable on account of work performed by the contractor or subcontractor under any such contract or any other Federal contract with the same prime contractor, or any other federally-assisted contract subject to the Contract Work Hours and Safety Standards Act, which is held by the same prime contractor, such sums as may be determined to be necessary to satisfy any liabilities of such contractor or subcontractor for unpaid wages and liquidated damages as provided in the clause set forth in paragraph (2) of this section.

(4) **Subcontracts** - The contractor or subcontractor shall insert in any subcontracts the clauses set forth in paragraphs (1) through (4) of this section and also a clause requiring the subcontractors to include these clauses in any lower tier subcontracts. The prime contractor shall be responsible for compliance by any subcontractor or lower tier subcontractor with the clauses set forth in paragraphs (1) through (4) of this section.

No Obligation by the Federal Government.

(1) The Vendor acknowledges and agrees 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 Vendor, or any other party (whether or not a party to that contract) pertaining to any matter resulting from the underlying contract.

(2) The Vendor 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.

Program Fraud and False or Fraudulent Statements or Related Acts.

(1) The Vendor acknowledges that the provisions of the Program Fraud Civil Remedies Act of 1986, as amended, 31 U.S.C. § 3801 et seq. and U.S. DOT regulations, "Program Fraud Civil Remedies," 49 C.F.R. Part 31, apply to its actions pertaining to this Project. Upon execution of the underlying contract, the Vendor certifies or affirms the truthfulness and accuracy of any statement it has made, it makes, it may make, or causes to be made, pertaining to the underlying contract or the FTA assisted project for which this contract work is being performed. In addition to other penalties that may be applicable, the Vendor further acknowledges that if it makes, or causes to be made, a false, fictitious, or fraudulent claim, statement, submission, or certification, the Federal Government reserves the right to impose the penalties of the Program Fraud Civil
Remedies Act of 1986 on the Vendor to the extent the Federal Government deems appropriate.

(2) The Vendor also acknowledges that if it makes, or causes to be made, a false, fictitious, or fraudulent claim, statement, submission, or certification to the Federal Government under a contract connected with a project that is financed in whole or in part with Federal assistance originally awarded by FTA under the authority of 49 U.S.C. § 5307, the Government reserves the right to impose the penalties of 18 U.S.C. § 1001 and 49 U.S.C. § 5307(n)(1) on the Vendor, to the extent the Federal Government deems appropriate.

(3) The Vendor 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.

GOVERNMENT-WIDE DEBARMENT AND SUSPENSION (NONPROCUREMENT)

The Vendor is required to comply with 2 CFR 1200 and 2 CFR 180, Subpart 3, and must include the requirement to comply with 2 CFR 180, Subpart 3, as supplemented by 2 CFR 1200, in any lower tier covered transaction it enters into. By signing and submitting its bid or proposal, the bidder or proposer certifies as follows:

The certification in this clause is a material representation of fact relied upon by the Department. If it is later determined that the bidder or proposer knowingly rendered an erroneous certification, in addition to remedies available to the Department, 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 2 CFR 1200 and 2 CFR 180, 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.

PRIVACY ACT

Contracts Involving Federal Privacy Act Requirements - The following requirements apply to the Vendor and its employees that administer any system of records on behalf of the Federal Government under any contract:

(1) The Vendor agrees to comply with, and assures the compliance of its employees with, the information restrictions and other applicable requirements of the Privacy Act of 1974,

5 U.S.C. § 552a. Among other things, the Vendor agrees to obtain the express consent of the Federal Government before the Contractor or its employees operate a system of records on behalf of the Federal Government. The Vendor understands that the requirements of the Privacy Act, including the civil and criminal penalties for violation of that Act, apply to those individuals involved, and that failure to comply with the terms of the Privacy Act may result in termination of the underlying contract.

(2) The Vendor also agrees to include these requirements in each subcontract to administer any system of records on behalf of the Federal Government financed in whole or in part with Federal assistance provided by FTA.

CIVIL RIGHTS REQUIREMENTS

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

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

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

upgrading, demotion or transfer, recruitment or recruitment advertising, layoff or termination; rates of pay or other forms of compensation; and selection for training, including apprenticeship. In addition, the Vendor agrees to comply with any implementing requirements FTA may issue.

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

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

(3) Access for Individuals with Disabilities. Vendor agrees to comply with all applicable provisions of 49 U.S.C. section 5301 (d), all applicable provisions of section 504 of the Rehabilitation Act of 1973, as amended, 29 U.S.C. section 794, and all applicable provisions of the Americans with Disabilities Act of 1990 (ADA), as amended, 42 U.S.C. sections 12010 et. seq, and all applicable provisions of the Architectural Barriers Act of 1968, as amended, 42 U.S. C. section 4151 et seq,. Vendor also agrees to comply with applicable implementing Federal regulations, and any later amendments thereto, and agrees to follow applicable Federal implementing directives, except to the extent FTA approves otherwise in writing. Among those regulations implementing Section 505 and the ADA are DOT regulations, "Nondiscrimination on the Basis of Handicap in Programs and Activities Receiving or Benefiting from Federal Financial Assistance, 49 CFR Part 27, and "Transportation Services for individuals with Disabilities (ADA)," 49 CFR Part 37, and Joint ATBCB/DOT regulations, "Americans with Disabilities (ADA) Accessibility Specifications for Transportation Vehicles," 36 CFR Part 1192 and 49 CFR Part 38.

(4) The Vendor 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.

TRANSIT EMPLOYEE PROTECTIVE AGREEMENTS

Transit Employee Protective Provisions. (1) The Vendor agrees to the comply with applicable transit employee protective requirements as follows:

(a) General Transit Employee Protective Requirements - To the extent that FTA determines that transit operations are involved, the Vendor agrees to carry out the transit operations work on the underlying contract in compliance with terms and conditions determined by the U.S. Secretary of Labor to be fair and equitable to protect the interests of employees employed under this contract and to meet the employee protective requirements of 49 U.S.C. A 5333(b), and U.S. DOL guidelines at 29 C.F.R. Part 215, and any amendments thereto. These terms and conditions are identified in the letter of certification from the U.S.

DOL to FTA applicable to the FTA Recipient's project from which Federal assistance is provided to support work on the underlying contract. The Vendor agrees to carry out that work in compliance with the conditions stated in that U.S. DOL letter. The requirements of this subsection (1), however, do not apply to any contract financed with Federal assistance provided by FTA either for projects for elderly individuals and individuals with disabilities authorized by 49 U.S.C. § 5310(a)(2), or for projects for nonurbanized areas authorized by 49 U.S.C. § 5311. Alternate provisions for those projects are set forth in subsections (b) and (c) of this clause.

(b) Transit Employee Protective Requirements for Projects Authorized by 49 U.S.C. § 5310(a)(2) for Elderly Individuals and Individuals with Disabilities - If the contract involves transit operations financed in whole or in part with Federal assistance authorized by 49 U.S.C. § 5310(a)(2), and if the U.S. Secretary of Transportation has determined or determines in the future that the employee protective requirements of 49 U.S.C. § 5333(b) are necessary or appropriate for the state and the public body subrecipient for which work is performed on the underlying contract, the Vendor agrees to carry out the Project in compliance with the terms and conditions determined by the U.S. Secretary of Labor to meet the requirements of 49 U.S.C. § 5333(b), U.S. DOL guidelines at 29 C.F.R. Part 215, and any amendments thereto. These terms and conditions are identified in the U.S. DOL's letter of certification to FTA, the date of which is set forth Grant Agreement or Cooperative Agreement with the state. The Vendor agrees to perform transit operations in connection with the underlying contract in compliance with the conditions stated in that U.S. DOL letter.

(c) Transit Employee Protective Requirements for Projects Authorized by 49 U.S.C. § 5311 in Nonurbanized Areas - If the contract involves transit operations financed in whole or in part with Federal assistance authorized by 49 U.S.C. § 5311, the Vendor agrees to comply with the terms and conditions of the Special Warranty for the Nonurbanized Area Program agreed to by the U.S. Secretaries of Transportation and Labor, dated May 31, 1979, and the procedures implemented by U.S. DOL or any revision thereto.

(2) The Vendor also agrees to include the any applicable requirements in each subcontract involving transit operations financed in whole or in part with Federal assistance provided by FTA.

Buy America Requirements

The Vendor agrees to comply with 49 U.S.C. 5323(j) and 49 C.F.R. Part 661, and any amendments thereto, which provide that Federal funds may not be obligated unless all steel, iron, and manufactured products used in FTA-funded projects are produced in the United States, unless a waiver has been granted by FTA or the product is subject to a general waiver, or except as provided in 49 C.F.R. 661.11. 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) and 49 C.F.R. 661.11.

A bidder or offeror must submit to the FTA recipient the appropriate Buy America certification

(below).

If steel, iron, or manufactured products (as defined in 43 CFR 661.3 and 661.5) are being procured, the appropriate certificate as set forth below shall be completed and submitted by each bidder or offerer in accordance with the requirement contained in 43 CFR 661.13(b).

Certificate of Compliance with Buy America Requirements

The bidder or offeror hereby certifies that it will comply with the requirements of 49 U.S.C. 5323(j)(1) and the applicable regulations in 49 C.F.R. Part 661.

Date _____

Signature _____

Company _____

Name _____

Title _____

Certificate of Non-Compliance with Buy American Requirements

The bidder or offeror hereby certifies that it cannot comply with the requirements of 49 U.S.C. 5323(j), but it may qualify for an exception pursuant to 49 U.S.C. 5323(j)(2), as amended, and the applicable regulations in 49 C.F.R. 661.7.

Date _____

Signature _____

Company _____

Name _____

Title _____

If buses or other rolling stock (including train control, communication, and traction power equipment) are being procured, the appropriate certificate as set forth below shall be completed and submitted by each bidder in accordance with the requirement contained in 49 CFR 661.13 (b).

Certificate of Compliance with Buy America Rolling Stock Requirements.

The bidder or offeror hereby certifies that it will comply with the requirements of 49 U.S.C. 5323(j) and the applicable regulations at 49 CFR 661.11.

Date 3 June 2011

Signature _____

Company_____

Name _____

Title _____

Certificate of Non-Compliance with 49 U.S.C. 5323(j) Buy American Rolling Stock Requirements

The bidder or offeror hereby certifies that it cannot comply with the requirements of 49 U.S.C. 5323(j), but may qualify for an exception to the requirement consistent with 49 U.S.C. 5323(j)(2)(C) and the applicable regulations in 49 CFR 661.7.

Date _____

Signature _____

Company_____

Name _____

Title _____

PRE-AWARD AND POST-DELIVERY AUDIT REQUIREMENTSs

The Vendor agrees to comply with 49 U.S.C. § 5323(m) and FTA's implementing regulations, "Pre-Award and Post –Delivery Audits of Rolling Stock Purchases, "49 CFR Part 663, that do not conflict with 49 U.S.C. Section 5323 (m). The Vendor agrees to provide the Department with the pre-award certifications, post-delivery certifications, and the certifications regarding Federal motor vehicle safety standards, as set forth in 49 CFR Part 663.

(1) Buy America Requirements: The Vendor shall complete and submit a declaration certifying either compliance or noncompliance with Buy America. If the Bidder/Offeror certifies compliance with Buy America, it shall submit documentation which lists 1) component and subcomponent parts of the rolling stock to be purchased identified by manufacturer of the parts, their country of origin and costs; and 2) the location of the final assembly point for the rolling stock, including a description of the activities that will take place at the final assembly point and the cost of final assembly.

(2) Solicitation Specification Requirements: The Vendor shall submit evidence that it will be capable of meeting the bid specifications.

(3) Federal Motor Vehicle Safety Standards (FMVSS): the Vendor shall submit 1) manufacturer's FMVSS self-certification sticker information that the vehicle complies with relevant FMVSS or 2) manufacturer's certified statement that the contracted vehicles will not be subject to FMVSS regulations.

Exhibit E – Central Florida Commuter Rail Transit Attachment – Required Contract Provisions for Federal Transit Administration Federal-Aid Rolling Stock Contracts - 1-12-11

Buy America Certificate Of Compliance With FTA Requirements For Buses, Other Rolling Stock, Or Associated Equipment

(To be submitted with a bid or offer exceeding the small purchase threshold for Federal assistance programs, currently set at $100,000.)

Certificate of Compliance

The bidder hereby certifies that it will comply with the requirements of 49 U.S.C. Section 5323(j)(2)(C), Section 165(b)(3) of the Surface Transportation Assistance Act of 1982, as amended, and the regulations of 49 C.F.R. 661.11:

Date: 3 June 2011

Signature: John E Furmis

Company Name: Bombardier Transit Corporation

Title: Vice President

Certificate of Non-Compliance

The bidder hereby certifies that it cannot comply with the requirements of 49 U.S.C. Section 5323(j)(2)(C) and Section 165(b)(3) of the Surface Transportation Assistance Act of 1982, as amended, but may qualify for an exception to the requirements consistent with 49 U.S.C. Sections 5323(j)(2)(B) or (j)(2)(D), Sections 165(b)(2) or (b)(4) of the Surface Transportation Assistance Act, as amended, and regulations in 49 C.F.R. 661.7.

Date: _____

Signature: _____

Company Name: _____

Title: _____

SENSITIVE SECURITY INFORMATION

Vendor must protect, and take measures to ensure that its subcontractors protect, "sensitive security information" made available during the administrator of the contract or subcontract to ensure compliance with 49 U.S.C. Section 40119 (b) and implementing DOT regulations, "Protection of Sensitive Security Information,' 49 CFR Part 15, and with 49 U.S.C. Section 114 (r) and implementing Department of Homeland Security regulations, "Protection of Sensitive Security Information," 49 CFR 1520.

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. The Vendor shall not perform any act, fail to perform any act, or refuse to comply with any Florida Department of Transportation requests which would cause Florida Department of Transportation to be in violation of the FTA terms and conditions.

CENTRAL FLORIDA COMMUTER RAIL TRANSIT
BI-LEVEL COACHES AND CAB CARS
EXHIBIT "F"

SOFTWARE CODE AND DESIGN MATERIAL ESCROW AGREEMENT

This Agreement made this _____ day of _____, 20__ between the State of Florida, Department of Transportation, with a principal office at 719 South Woodland Boulevard, DeLand FL 32720 (the "Department"), Bombardier Transit Corporation, with its principal office at of 101 Gibraltar Road, Suite 112, Horsham, PA 19044("Vendor"), the Florida Department of Financial Services ("Escrow Agent") and by the subcontractors additionally executing this Agreement either on the original or in separate counterparts ("Subcontractors");

WITNESSETH:

WHEREAS, Vendor and Department have entered enter into a Standard Written Agreement ("Sales Contract") whereby Vendor will sell to Department certain rolling stock and other property described therein; and

WHEREAS, the Sales Contract requires Vendor to deposit in escrow with Escrow Agent certain source code and other materials (the "Deposit Materials"); and

WHEREAS, some of the Deposit Materials are owned by Subcontractors and not Vendor;

WHEREAS, the availability of the Deposit Materials is critical to Department in the conduct of its business and, therefore, Department needs access to the Deposit under certain limited circumstances; and

WHEREAS, Vendor and Subcontractors desire to have availability of the Deposit Materials limited to occurring only under certain circumstances; and

WHEREAS, Vendor, Subcontractors and Department desire to establish an arrangement to provide for the retention, administration and controlled access of the Deposit Materials; and

WHEREAS, Escrow Agent has agreed to accept, hold and release the Deposit Materials under the terms and conditions of this Agreement;

NOW, THEREFORE, in consideration of the premises, promises, representations, understandings and the mutual covenants contained herein, the Department, the Vendor, Subcontractors and the Escrow Agent hereby agree as follows:

ARTICLE 1 -- DEPOSITS

1.1. Obligation of the Vendor. The Vendor has the responsibility to ensure all Subcontractors from which Deposit Materials are required according to the Sales Contract (Schedule of Payment Values, Milestone 12) will execute this Agreement prior to the Notice to Proceed. Upon completion of such execution by all required Subcontractors, the Vendor will provide the Department with the Agreement's signature pages executed by all required Subcontractors.

1.2. Obligation to Make Deposit. Vendor and/or Subcontractors shall deliver the Deposit Materials to Escrow Agent prior at the times stated in the Sales Contract. The Deposit Materials shall include, but not be limited to, a copy of the documented source code, libraries, other source components, compilers, and linkers so that, when compiled, linked and otherwise manipulated to create the runtime/executable image for the delivered software, creates a complete and fully operational run-time/executable version of the delivered software. Vendor and/or Subcontractors shall notify the Department in writing of the time and place of the delivery of the Deposit Materials no less than one week in advance.

1.3. Identification of Tangible Media. Prior to the delivery of the Deposit Materials to Escrow Agent, Vendor or Subcontractor shall conspicuously label for identification each document, magnetic tape, disk, or other tangible media upon which the Deposit Materials are written or stored. Additionally, Vendor or Subcontractor shall complete Appendix "A" to this Agreement by listing each such tangible media by the item label description, the type of media and the quantity. Appendix "A" shall be signed by Vendor or Subcontractor and delivered to Escrow Agent with the Deposit Materials. A copy of Appendix "A" is attached hereto and incorporated herein.

1.4. Deposit Inspection. When Escrow Agent receives the Deposit Materials and the Appendix "A", it will conduct a deposit inspection by visually matching the labeling of the tangible media containing the Deposit Materials to the item descriptions and quantity listed on the Appendix "A". In addition, Department may elect to cause a verification of the Deposit Materials at the time of delivery in accordance with Section 1.6 below at Vendor's expense. Vendor or Subcontractor shall have the right to be present at the verification.

1.5. Acceptance of Deposit. At completion of the deposit inspection and a verification, if elected, if Escrow Agent determines that the labeling of the tangible media matches the item descriptions and quantity on Appendix "A", Escrow Agent will date and sign Appendix "A" in triplicate, with Vendor or Subcontractor, Department, and Escrow Agent each retaining an original. If Escrow Agent determines that the labeling does not match the item descriptions or quantity on Appendix "A" or the verification elected by the Department is not satisfactory, Escrow Agent will (a) note the discrepancies in writing on Appendix "A"; (b) date and sign Appendix "A" in triplicate with the exceptions noted; and (c) reject the delivery of the Deposit Materials. Vendor and/or Subcontractor shall be obligated to promptly correct the discrepancies and redeliver the Deposit

Materials in accordance with the delivery procedures contained in this Agreement; provided that this provision shall not relieve the Vendor from the consequences of failing to properly deliver the Deposit Materials in accordance with the requirements of the Sales Contract.

1.6. Vendor's and Subcontractor's Representations. Vendor and Subcontractor represents as follows, with relation to their respective Deposit Materials:

(a.) They lawfully possesses and will possess full right, title and interest to all of the Deposit Materials deposited with Escrow Agent;

(b.) With respect to all of the Deposit Materials, they have the right and authority to grant to Department the rights as provided in this Agreement;

(c.) The Deposit Materials are not and will not be subject to any lien or other encumbrance;

(d.) The Deposit Materials consist of the proprietary technology and other materials identified in the Sales Contract; and

(e.) The Deposit Materials are readable and useable in their current form or, if any portion of the Deposit Materials is encrypted, the decryption tools and decryption keys have also been deposited.

1.7. Verification. In a verification, Department may evaluate the deposit to verify the deposit of: (a) Deposit Materials required and fully complying with the Sales Contract; and (b)(i) the hardware and software configurations reasonably necessary to maintain the Deposit Materials; (ii) the hardware and software configurations reasonably needed to compile the Deposit Materials; and (iii) the compilation instructions.

1.8. Deposit Updates. Vendor and Subcontractor shall update the Deposit Materials within ten business (10) days of each release of a new version, patch, upgrade or alteration of the product/system integrated in the equipment which is subject to the Sales Contract. It is understood that "Updates" will be limited only to updates necessary to keep the vehicle operational in manner intended at the end of the warranty period. Such updates will be added to the existing deposit. All deposit updates shall be listed on a new Appendix "A". The processing of all deposit updates shall be in accordance with Sections 1.2 through 1.6 above. All references in this Agreement to the Deposit Materials shall include the initial Deposit Materials and any such new versions, patches, updates or alterations.

1.9. Removal of Deposit Materials. The Deposit Materials may be removed and/or exchanged only as provided in this Agreement.

ARTICLE 2 -- CONFIDENTIALITY AND RECORD KEEPING

2.1. Confidentiality. Escrow Agent shall maintain the Deposit Materials in a secure, locked facility which is accessible only to authorized representatives of Escrow Agent. Escrow Agent shall have the obligation to use the same standard the Escrow Agent uses to protect its own confidential information, but in no event, less than a reasonable standard of care, to protect the confidentiality of the Deposit Materials. Except as provided in this Agreement, Escrow Agent shall not disclose, transfer, make available, or use or access the Deposit Materials. If Escrow Agent receives a request for a public record pursuant to Chapter 119, Florida Statutes, or a subpoena or any other order from a court or other judicial tribunal pertaining to the disclosure or release of the Deposit Materials, Escrow Agent will immediately notify Vendor and Subcontractor unless prohibited by law. Escrow Agent will not be required to fail to comply with Chapter 119, Florida Statutes, or disobey any order from a court or other judicial tribunal.

2.2. Confidential Information. Escrow Agent will be under no obligation to maintain the confidentiality of Deposit Material, to the extent that the Deposit Material includes information that: (a) at the time of disclosure or thereafter becomes a part of the public domain through no act or omission by Escrow Agent or their officers or employees; or (b) was at the time of disclosure already in Escrow Agent's lawful possession without any obligations of confidentiality as evidenced by written records kept by Escrow Agent in the ordinary course of business or by proof of actual use by Escrow Agent; or (c) is subsequent to disclosure lawfully disclosed to Escrow Agent by a third party who did not acquire the information under an obligation of confidentiality from or through Vendor or Subcontractor.

ARTICLE 3 -- GRANT OF RIGHTS TO DEPARTMENT

3.1. Title to Media. Vendor and Subcontractor hereby transfer to Department the title to the media upon which the proprietary technology and materials are written or stored. However, this transfer does not include the ownership of the proprietary technology and materials contained on the media such as any copyright, trade secret, patent or other intellectual property rights.

3.2. Right to Make Copies and Derivative Works. Department shall have the right to make copies of and derivative works from the Deposit Materials as reasonably necessary to perform this Agreement. Department shall copy all copyright, nondisclosure, and other proprietary notices and titles contained on the Deposit Materials onto any copies or derivative works made by Department. With all Deposit Materials submitted to Department, Vendor and Subcontractor shall provide any and all instructions as may be necessary to duplicate or incorporate the Deposit Materials, including but not limited to the hardware and/or software needed.

ARTICLE 4 -- RELEASE OF DEPOSIT

4.1. Release Conditions. As used in this Agreement, "Release Conditions" shall mean the existence of any one or more of the following circumstances, uncorrected for more than ten (10) days:

(a.) If a Vendor or Subcontractor is no longer in business, or no longer supports the product and has not transferred the rights to the design to another entity that does support the product;

(b.) If, based on an independent third party assessment, Vendor, Subcontractor, their sub-supplier or any successor no longer supports the product at a reasonable cost;

4.2. Filing for Release. If Department believes in good faith that a Release Condition has occurred, Department may provide to Vendor and Subcontractor written notice of the occurrence of the Release Condition. Vendor and/or Subcontractor shall have ten (10) business days from its receipt of such notice to notify the Department of its agreement to the release or file an action for a Declaratory Judgment to have a court determine whether a Release Condition has occurred. It is understood that the occurrence of a release condition shall be determined on a deposit by deposit basis..

4.3. Release of Deposit. Upon the Vendor's or Subcontractor's agreement, or the entry of a Declaratory or other form of Judgment ruling that a Release Condition has occurred, Escrow Agent shall release the Deposit Materials to the Department. The Department shall provide Escrow Agent with a copy of Vendor's or Subcontractor's agreement or any Judgment authorizing release of the Deposit Materials along with instructions as to how the release shall occur.

4.4. Right to Use Following Release. Upon release of the Deposit Materials in accordance with this Article 4, Department shall have the right to use the Deposit Materials for the sole purpose of continuing the benefits afforded to Department by the Sales Contract. Department shall be obligated to maintain the confidentiality of the released Deposit Materials subject to Section 2.1 and 2.2 of this Agreement and the right to make the Deposit Materials available to the Department's vendors for the sole and exclusive purpose of continuing the benefits provided under the Sales Contract.

ARTICLE 5 -- TERM AND TERMINATION

5.1. Term of Agreement. This Agreement shall be effective during the period that the equipment for which Deposit Materials have been provided remains in use. The Department shall notify Vendor and/or Subcontractor and Escrow Agent at such time that the equipment for which Deposit Materials have been provided no longer remains in use.

5.2. Disposition of Deposit Materials Upon Termination. Subject to the provisions

concerning release of the Deposit Materials, upon expiration of this Agreement, Escrow Agent shall deliver the Deposit Materials in accordance with instructions of Vendor or Subcontractor. If there are no instructions, Escrow Agent may return the Deposit Materials to Vendor or Subcontractor who has made the deposit in a manner chosen by Escrow Agent. Escrow Agent shall have no obligation to return the Deposit Materials if the Deposit Materials have been released to the Department in accordance with Article 4.

5.3. Survival of Terms Following Termination. Upon termination of this Agreement, the following provisions of this Agreement shall survive:

(a.) Vendor's and Subcontractor's Representations (Section 1.5);

(b.) The obligations of confidentiality with respect to the Deposit Materials including the provisions of Section 2.1 and 2.2;

(c.) The rights granted in the sections entitled Right to Make Copies and Derivative Works(Section 3.2) and Right to Use Following Release (Section 4.4), if a release of the Deposit Materials has occurred prior to termination;

(d.) The provisions of Article 6; and

(e.) Any provisions in this Agreement which specifically state they survive the termination of this Agreement.

ARTICLE 6 -- GENERAL PROVISIONS

6.1. Dispute Resolution. Escrow Agent shall act in accordance with any agreement between Vendor and/or Subcontractor and Department or any court judgment and may, in addition, pursue and rights and remedies that Escrow Agent has under the law. The Department shall notify Escrow Agent of any agreement between Vendor and/or Subcontractors and Department or of any judgment.

6.2. Entire Agreement. This Agreement, which includes exhibits described and incorporated herein, embodies the entire understanding among the parties with respect to its subject matter and supersedes all previous communications, representations or understandings, either oral or written. Department's only obligations to Vendor or Subcontractors are as set forth in this Agreement. No amendment or modification of this Agreement shall be valid or binding unless signed by the parties hereto.

6.3. Notices. All notices, invoices, payments, deposits and other documents and communications shall be given to the parties at the addresses specified below. It shall be the responsibility of the parties to notify each other as provided in this Section in the event of a change of address. The parties shall have the right to

rely on the last known address of the other parties. Unless otherwise provided in this Agreement, all documents and communications may be delivered by First Class mail.

Vendor: Bombardier Transit Corporation
Attn: SunRail Project Manager
101 Gibraltar Road, Suite 112,
Horsham, PA 19044

Department: Florida Department of Transportation,
District Five
Attn: SunRail Project Manager
719 South Woodland Boulevard
DeLand, Fl 32720

Escrow Agent: Florida Department of Financial Services
Bureau of Collateral Management
Division of Treasury
200 East Gaines Street
Tallahassee, FL 32399-0300

Subcontractor: At the address provided in the signature block.

6.4. Severability. In the event any provision of this Agreement is found to be invalid, voidable or unenforceable, the parties agree that unless it materially affects the entire intent and purpose of this Agreement, such invalidity, voidability or unenforceability shall affect neither the validity of this Agreement nor the remaining provisions herein, and the provision in question shall be deemed to be replaced with a valid and enforceable provision most closely reflecting the intent and purpose of the original provision.

6.5. Successors and Assignment. This Agreement shall be binding upon and shall inure to the benefit of the successors and assigns of the parties. The Department may assign this Agreement with prior written consent of the Vendor; provided, however, that no consent is required in order for the Department to assign this Agreement to the Central Florida Commuter Rail Commission or such other governmental entity establish to take over SunRail after expiration of the Department's period of operation.

6.6. Controlling Law. This Agreement is to be governed and construed in accordance with the laws of Florida, without regard to its conflict of law provisions. The

parties consent to the jurisdiction of the appropriate state court.

6.7. Time is of the essence in the performance under this Agreement.

IN WITNESS WHEREOF, the Parties have executed this Agreement the day and year first above written.

State of Florida
Department of Transportation

By: _____

Name: _____

Title: _____

Date: _____

Department

Legal Review

_____
District Chief Counsel

Bombardier Transit Corporation

By: Robert E. Furniss

Name: Robert E. Furniss

Title: Vice President

Date: 3 June 2011

Vendor

State of Florida
Department of Financial Services

By: _____

Name: _____

Title: _____

Date: _____

Escrow Agent

_____	_____
(Name of Subcontractor)	(Name of Subcontractor)
By: _____	By: _____
Name: _____	Name: _____
Title: _____	Title: _____
Address:	Address:
_____	_____
_____	_____
_____	_____
Date: _____	Date: _____
Subcontractor	Subcontractor
_____	_____
(Name of Subcontractor)	(Name of Subcontractor)
By: _____	By: _____
Name: _____	Name: _____
Title: _____	Title: _____
Address:	Address:
_____	_____
_____	_____
_____	_____
Date: _____	Date: _____
Subcontractor	Subcontractor

APPENDIX A

DESCRIPTION OF DEPOSIT MATERIALS

Company Name:_____.

Company Address: _____

Contract Number: ITN-DOT-08-09-5003-CCC

Product Name: _____ Version: _____

DEPOSIT MATERIAL DESCRIPTION:
Quantity Media Type & Size Label Description of Each Separate Item

____ Disk 3.5" or ____
____ DAT tape ____mm
____ CD-ROM
____ Data cartridge tape ____
____ TK 70 or ____ tape
____ Magnetic tape ____
____ Documentation
____ Other _____

PRODUCT DESCRIPTION:
Environment: _____

DEPOSIT MATERIAL INFORMATION:
Is the media or are any of the files encrypted? Yes / No If yes, please include any passwords and the decryption tools.
Encryption tool name_____ Version:_____

Hardware required:
_____
Software required: _____
Other required information: _____

I certify for Vendor that the above described Deposit Materials have been transmitted to Department:

Signature: _____
Print Name: _____
Date: _____

Exhibit "G"
State of Florida
PUR 1000
General Contract Conditions
Central Florida Commuter Rail Transit
BI-LEVEL COACHES AND CAB CARS
Financial Project Number 412994-6-53-01

Contents

Sections deleted PUR 1000, 4, 5, 11, 12, 13, 15 19, 20, 21, 22, 23, 25, 26, 27, 29, 31, 35, 40, 41, 42.

47. Severability.

1. Definitions. The definitions contained in s. 60A-1.001, F.A.C. shall apply to this agreement. The following additional terms are also defined:

(a) "Contract" means the legally enforceable agreement that results from a successful solicitation. The parties to the Contract will be the Customer and Contractor.

(b) "Customer" means the State agency or other entity identified in a contract as the party to receive commodities or contractual services pursuant to a contract or that orders commodities or contractual services via purchase order or other contractual instrument from the Contractor under the Contract. The "Customer" may also be the "Buyer" as defined in the PUR 1001 if it meets the definition of both terms.

(c) "Product" means any deliverable under the Contract, which may include commodities, services, technology or software.

(d) "Purchase order" means the form or format a Customer uses to make a purchase under the Contract (e.g., a formal written purchase order, electronic purchase order, procurement card, contract or other authorized means).

2. Purchase Orders. In contracts where commodities or services are ordered by the Customer via purchase order, Contractor shall not deliver or furnish products until a Customer transmits a purchase order. All purchase orders shall bear the Contract or solicitation number, shall be placed by the Customer directly with the Contractor, and shall be deemed to incorporate by reference the Contract and solicitation terms and conditions. Any discrepancy between the Contract terms and the terms stated on the Contractor's order form, confirmation, or acknowledgement shall be resolved in favor of terms most favorable to the Customer. A purchase order for services within the ambit of section 287.058(1) of the Florida Statutes shall be deemed to incorporate by reference the requirements of subparagraphs (a) through (f) thereof. Customers shall designate a contract manager and a contract administrator as required by subsections 287.057(15) and (16) of the Florida Statutes.

3. Product Version. Purchase orders shall be deemed to reference a manufacturer's most recently release model or version of the product at the time of the order, unless the Customer specifically requests in writing an earlier model or version and the contractor is willing to provide such model or version.

~~**4. Price Changes Applicable only to Term Contracts.** If this is a term contract for commodities or services, the following provisions apply.~~

~~(a) Quantity Discounts. Contractors are urged to offer additional discounts for one time delivery of large single orders. Customers should seek to negotiate additional price concessions on quantity purchases of any products offered under the Contract. State Customers shall document their files accordingly.~~

~~(b) Best Pricing Offer. During the Contract term, if the Customer becomes aware of better pricing offered by the Contractor for substantially the same or a smaller quantity of a product outside the Contract, but upon the same or similar terms of the Contract, then at the discretion of the Customer the price under the Contract shall be immediately reduced to the lower price.~~

~~(c) Sales Promotions. In addition to decreasing prices for the balance of the Contract term due to a change in market conditions, a Contractor may conduct sales promotions involving price reductions for a specified lesser period. A Contractor shall submit to the Contract Specialist documentation identifying the proposed (1) starting and ending dates of the promotion, (2) products involved, and (3) promotional prices compared to then-authorized prices. Promotional prices shall be available to all Customers. Upon approval, the Contractor shall provide conspicuous notice of the promotion.~~

Sections deleted PUR 1000, 4, 5, 11, 12, 13, 15 19, 20, 21, 22, 23, 25, 26, 27, 29, 31, 35, 40, 41, 42.

(d) Trade-In. Customers may trade in equipment when making purchases from the Contract. A trade-in shall be negotiated between the Customer and the Contractor. Customers are obligated to actively seek current fair market value when trading equipment, and to keep accurate records of the process. For State agencies, it may be necessary to provide documentation to the Department of Financial Services and to the agency property custodian pursuant to Chapter 273, F.S.

(e) Equitable Adjustment. The Customer may, in its sole discretion, make an equitable adjustment in the Contract terms or pricing if pricing or availability of supply is affected by extreme and unforeseen volatility in the marketplace, that is, by circumstances that satisfy all the following criteria: (1) the volatility is due to causes wholly beyond the Contractor's control, (2) the volatility affects the marketplace or industry, not just the particular Contract source of supply, (3) the effect on pricing or availability of supply is substantial, and (4) the volatility so affects the Contractor that continued performance of the Contract would result in a substantial loss.

5. Additional Quantities. For a period not exceeding ninety (90) days from the date of solicitation award, the Customer reserves the right to acquire additional quantities up to the amount shown on the solicitation but not to exceed the threshold for Category Two at the prices submitted in the response to the solicitation.

6. Packaging. Tangible product shall be securely and properly packed for shipment, storage, and stocking in appropriate, clearly labeled, shipping containers and according to accepted commercial practice, without extra charge for packing materials, cases, or other types of containers. All containers and packaging shall become and remain Customer's property.

7. Inspection at Contractor's Site. The Customer reserves the right to inspect, at any reasonable time with prior notice, the equipment or product or plant or other facilities of a Contractor to assess conformity with Contract requirements and to determine whether they are adequate and suitable for proper and effective Contract performance.

8. Safety Standards. All manufactured items and fabricated assemblies subject to operation under pressure, operation by connection to an electric source, or operation involving connection to a manufactured, natural, or LP gas source shall be constructed and approved in a manner acceptable to the appropriate State inspector. Acceptability customarily requires, at a minimum, identification marking of the appropriate safety standard organization, where such approvals of listings have been established for the type of device offered and furnished, for example: the American Society of Mechanical Engineers for pressure vessels; the Underwriters Laboratories and/or National Electrical Manufacturers' Association for electrically operated assemblies; and the American Gas Association for gas-operated assemblies. In addition, all items furnished shall meet all applicable requirements of the Occupational Safety and Health Act and state and federal requirements relating to clean air and water pollution.

9. Americans with Disabilities Act. Contractors should identify any products that may be used or adapted for use by visually, hearing, or other physically impaired individuals.

10. Literature. Upon request, the Contractor shall furnish literature reasonably related to the product offered, for example, user manuals, price schedules, catalogs, descriptive brochures, etc.

11. Transportation and Delivery. Prices shall include all charges for packing, handling, freight, distribution, and inside delivery. Transportation of goods shall be FOB Destination to any point within thirty (30) days after the Customer places an Order. A Contractor, within five (5) days after receiving a purchase order, shall notify the Customer of any potential delivery delays. Evidence of inability or intentional delays shall be cause for Contract cancellation and Contractor suspension.

12. Installation. Where installation is required, Contractor shall be responsible for placing and installing the product in the required locations at no additional charge, unless otherwise designated on the Contract

Sections deleted PUR 1000, 4, 5, 11, 12, 13, 15 19, 20, 21, 22, 23, 25, 26, 27, 29, 31, 35, 40, 41, 42.

~~or purchase order. Contractor's authorized product and price list shall clearly and separately identify any additional installation charges. All materials used in the installation shall be of good quality and shall be free of defects that would diminish the appearance of the product or render it structurally or operationally unsound. Installation includes the furnishing of any equipment, rigging, and materials required to install or replace the product in the proper location. Contractor shall protect the site from damage and shall repair damages or injury caused during installation by Contractor or its employees or agents. If any alteration, dismantling, excavation, etc., is required to achieve installation, the Contractor shall promptly restore the structure or site to its original condition. Contractor shall perform installation work so as to cause the least inconvenience and interference with Customers and with proper consideration of others on site. Upon completion of the installation, the location and surrounding area of work shall be left clean and in a neat and unobstructed condition, with everything in satisfactory repair and order.~~

~~**13. Risk of Loss.** Matters of inspection and acceptance are addressed in s. 215.422, F.S. Until Delivery, risk of loss or damage shall remain with the Contractor. The Contractor shall be responsible for filing, processing, and collecting all damage claims. To assist the Contractor with damage claims, the Customer shall: record any evidence of visible damage on all copies of the delivering carrier's Bill of Lading; report damages to the carrier and the Contractor; and provide the Contractor with a copy of the carrier's Bill of Lading and damage inspection report. When a Customer rejects a product, Contractor shall remove it from the premises within ten days after notification or rejection. Upon rejection notification, the risk of loss of rejected or non-conforming product shall remain with the Contractor. Rejected product not removed by the Contractor within ten days shall be deemed abandoned by the Contractor, and the Customer shall have the right to dispose of it as its own property. Contractor shall reimburse the Customer for costs and expenses incurred in storing or effecting removal or disposition of rejected product.~~

14. Transaction Fee. The State of Florida has instituted MyFloridaMarketPlace, a statewide eProcurement System ("System"). Pursuant to section 287.057(23), Florida Statutes (2002), all payments shall be assessed a Transaction Fee of one percent (1.0%), which the Contractor shall pay to the State, unless exempt pursuant to 60A-1.032, F.A.C.

For payments within the State accounting system (FLAIR or its successor), the Transaction Fee shall, when possible, be automatically deducted from payments to the Contractor. If automatic deduction is not possible, the Contractor shall pay the Transaction Fee pursuant to Rule 60A-1.031(2), F.A.C. By submission of these reports and corresponding payments, Contractor certifies their correctness. All such reports and payments shall be subject to audit by the State or its designee.
Contractor shall receive a credit for any Transaction Fee paid by the Contractor for the purchase of any item(s) if such item(s) are returned to the Contractor through no fault, act, or omission of the Contractor. Notwithstanding the foregoing, a Transaction Fee is non-refundable when an item is rejected or returned, or declined, due to the Contractor's failure to perform or comply with specifications or requirements of the agreement.

Failure to comply with these requirements shall constitute grounds for declaring the Contractor in default and recovering reprocurement costs from the Contractor in addition to all outstanding fees. **CONTRACTORS DELINQUENT IN PAYING TRANSACTION FEES MAY BE SUBJECT TO BEING REMOVED FROM THE DEPARTMENT OF MANAGEMENT SERVICES' VENDOR LIST AS PROVIDED IN RULE 60A-1.006, F.A.C.**

~~**15. Invoicing and Payment.** Invoices shall contain the Contract number, purchase order number if applicable, and the appropriate Vendor identification number. The State may require any other information from the Contractor that the State deems necessary to verify any purchase order placed under the Contract.~~

~~At the State's option, Contractors may be required to invoice electronically pursuant to guidelines of the Department of Management Services. Current guidelines require that Contractor supply electronic~~

Sections deleted PUR 1000, 4, 5, 11, 12, 13, 15 19,
20, 21, 22, 23, 25, 26, 27, 29, 31, 35, 40, 41, 42.

~~invoices in lieu of paper-based invoices for those transactions processed through the system. Electronic invoices shall be submitted to the Customer through the Ariba Supplier Network (ASN) in one of the following mechanisms – EDI 810, cXML, or web-based invoice entry within the ASN.~~

~~Payment shall be made in accordance with sections 215.422 and 287.0585 of the Florida Statutes, which govern time limits for payment of invoices. Invoices that must be returned to a Contractor due to preparation errors will result in a delay in payment. Contractors may call (850) 413-5516 Monday through Friday to inquire about the status of payments by State Agencies. The Customer is responsible for all payments under the Contract.~~

16. Taxes. The State does not pay Federal excise or sales taxes on direct purchases of tangible personal property. The State will not pay for any personal property taxes levied on the Contractor or for any taxes levied on employees' wages. Any exceptions to this paragraph shall be explicitly noted by the Customer in the special contract conditions section of the solicitation or in the Contract or purchase order.

17. Governmental Restrictions. If the Contractor believes that any governmental restrictions have been imposed that require alteration of the material, quality, workmanship or performance of the products offered under the
Contract, the Contractor shall immediately notify the Customer in writing, indicating the specific restriction. The customer reserves the right and the complete discretion to accept any such alteration or to cancel the Contract at no further expense to the Customer.

18. Lobbying and Integrity. Customers shall ensure compliance with Section 11.062, FS and Section 216.347, F.S. The Contractor shall not, in connection with this or any other agreement with the State, directly or indirectly (1) offer, confer, or agree to confer any pecuniary benefit on anyone as consideration for any State officer or employee's decision, opinion, recommendation, vote, other exercise of discretion, or violation of a known legal duty, or (2) offer, give, or agree to give to anyone any gratuity for the benefit of, or at the direction or request of, any State officer or employee. For purposes of clause (2), "gratuity" means any payment of more than nominal monetary value in the form of cash, travel, entertainment, gifts, meals, lodging, loans, subscriptions, advances, deposits of money, services, employment, or contracts of any kind. Upon request of the Customer's Inspector General, or other authorized State official, the Contractor shall provide any type of information the Inspector General deems relevant to the Contractor's integrity or responsibility. Such information may include, but shall not be limited to, the Contractor's business or financial records, documents, or files of any type or form that refer to or relate to the Contract. The Contractor shall retain such records for the longer of (1) three years after the expiration of the Contract or (2) the period required by the General Records Schedules maintained by the Florida Department of State (available at: http://dlis.dos.state.fl.us/barm/genschedules/gensched.htm). The Contractor agrees to reimburse the State for the reasonable costs of investigation incurred by the Inspector General or other authorized State official for investigations of the Contractor's compliance with the terms of this or any other agreement between the Contractor and the State which results in the suspension or debarment of the Contractor. Such costs shall include, but shall not be limited to: salaries of investigators, including overtime; travel and lodging expenses; and expert witness and documentary fees. The Contractor shall not be responsible for any costs of investigations that do not result in the Contractor's suspension or debarment.

~~**19. Indemnification.** The Contractor shall be fully liable for the actions of its agents, employees, partners, or subcontractors and shall fully indemnify, defend, and hold harmless the State and Customers, and their officers, agents, and employees, from suits, actions, damages, and costs of every name and description, including attorneys' fees, arising from or relating to personal injury and damage to real or personal tangible property alleged to be caused in whole or in part by Contractor, its agents, employees, partners, or subcontractors, provided, however, that the Contractor shall not indemnify for that portion of any loss or damages proximately caused by the negligent act or omission of the State or a Customer.~~

~~Further, the Contractor shall fully indemnify, defend, and hold harmless the State and Customers from any suits, actions, damages, and costs of every name and description, including attorneys' fees, arising~~

Sections deleted PUR 1000, 4, 5, 11, 12, 13, 15 19,
20, 21, 22, 23, 25, 26, 27, 29, 31, 35, 40, 41, 42.

from or relating to violation or infringement of a trademark, copyright, patent, trade secret or intellectual property right, provided, however, that the foregoing obligation shall not apply to a Customer's misuse or modification of Contractor's products or a Customer's operation or use of Contractor's products in a manner not contemplated by the Contract or the purchase order. If any product is the subject of an infringement suit, or in the Contractor's opinion is likely to become the subject of such a suit, the Contractor may at its sole expense procure for the Customer the right to continue using the product or to modify it to become non-infringing. If the Contractor is not reasonably able to modify or otherwise secure the Customer the right to continue using the product, the Contractor shall remove the product and refund the Customer the amounts paid in excess of a reasonable rental for past use. The customer shall not be liable for any royalties.

The Contractor's obligations under the preceding two paragraphs with respect to any legal action are contingent upon the State or Customer giving the Contractor (1) written notice of any action or threatened action, (2) the opportunity to take over and settle or defend any such action at Contractor's sole expense, and (3) assistance in defending the action at Contractor's sole expense. The Contractor shall not be liable for any cost, expense, or compromise incurred or made by the State or Customer in any legal action without the Contractor's prior written consent, which shall not be unreasonably withheld.

20. Limitation of Liability. For all claims against the Contractor under any contract or purchase order, and regardless of the basis on which the claim is made, the Contractor's liability under a contract or purchase order for direct damages shall be limited to the greater of $100,000, the dollar amount of the contract or purchase order, or two times the charges rendered by the Contractor under the purchase order.

This limitation shall not apply to claims arising under the Indemnity paragraph contain in this agreement. Unless otherwise specifically enumerated in the Contract or in the purchase order, no party shall be liable to another for special, indirect, punitive, or consequential damages, including lost data or records (unless the contract or purchase order requires the Contractor to back up data or records), even if the party has been advised that such damages are possible. No party shall be liable for lost profits, lost revenue, or lost institutional operating savings. The State and Customer may, in addition to other remedies available to them at law or equity and upon notice to the Contractor, retain such monies from amounts due Contractor as may be necessary to satisfy any claim for damages, penalties, costs and the like asserted by or against them. The State may set off any liability or other obligation of the Contractor or its affiliates to the State against any payments due the Contractor under any contract with the State.

21. Suspension of Work. The Customer may in its sole discretion suspend any or all activities under the Contract or purchase order, at any time, when in the best interests of the State to do so. The Customer shall provide the Contractor written notice outlining the particulars of suspension. Examples of the reason for suspension include, but are not limited to, budgetary constraints, declaration of emergency, or other such circumstances. After receiving a suspension notice, the Contractor shall comply with the notice and shall not accept any purchase orders. Within ninety days, or any longer period agreed to by the Contractor, the Customer shall either (1) issue a notice authorizing resumption of work, at which time activity shall resume, or (2) terminate the Contract or purchase order. Suspension of work shall not entitle the Contractor to any additional compensation.

22. Termination for Convenience. The Customer, by written notice to the Contractor, may terminate the Contract in whole or in part when the Customer determines in its sole discretion that it is in the State's interest to do so. The Contractor shall not furnish any product after it receives the notice of termination, except as necessary to complete the continued portion of the Contract, if any. The Contractor shall not be entitled to recover any cancellation charges or lost profits.

23. Termination for Cause. The Customer may terminate the Contract if the Contractor fails to (1) deliver the product within the time specified in the Contract or any extension, (2) maintain adequate progress, thus endangering performance of the Contract, (3) honor any term of the Contract, or (4) abide by any statutory, regulatory, or licensing requirement. Rule 60A-1.006(3), F.A.C., governs the procedure

Sections deleted PUR 1000, 4, 5, 11, 12, 13, 15 19, 20, 21, 22, 23, 25, 26, 27, 29, 31, 35, 40, 41, 42.

~~and consequences of default. The Contractor shall continue work on any work not terminated. Except for defaults of subcontractors at any tier, the Contractor shall not be liable for any excess costs if the failure to perform the Contract arises from events completely beyond the control, and without the fault or negligence, of the Contractor. If the failure to perform is caused by the default of a subcontractor at any tier, and if the cause of the default is completely beyond the control of both the Contractor and the subcontractor, and without the fault or negligence of either, the Contractor shall not be liable for any excess costs for failure to perform, unless the subcontracted products were obtainable from other sources in sufficient time for the Contractor to meet the required delivery schedule. If, after termination, it is determined that the Contractor was not in default, or that the default was excusable, the rights and obligations of the parties shall be the same as if the termination had been issued for the convenience of the Customer. The rights and remedies of the Customer in this clause are in addition to any other rights and remedies provided by law or under the Contract.~~

24. Force Majeure, Notice of Delay, and No Damages for Delay. The Contractor shall not be responsible for delay resulting from its failure to perform if neither the fault nor the negligence of the Contractor or its employees or agents contributed to the delay and the delay is due directly to acts of God, wars, acts of public enemies, strikes, fires, floods, or other similar cause wholly beyond the Contractor's control, or for any of the foregoing that affect subcontractors or suppliers if no alternate source of supply is available to the Contractor. In case of any delay the Contractor believes is excusable, the Contractor shall notify the Customer in writing of the delay or potential delay and describe the cause of the delay either (1) within ten (10) days after the cause that creates or will create the delay first arose, if the Contractor could reasonably foresee that a delay could occur as a result, or (2) if delay is not reasonably foreseeable, within five (5) days after the date the Contractor first had reason to believe that a delay could result. **THE FOREGOING SHALL CONSTITUTE THE CONTRACTOR'S SOLE REMEDY OR EXCUSE WITH RESPECT TO DELAY.**

Providing notice in strict accordance with this paragraph is a condition precedent to such remedy. No claim for damages, other than for an extension of time, shall be asserted against the Customer.
The Contractor shall not be entitled to an increase in the Contract price or payment of any kind from the Customer for direct, indirect, consequential, impact or other costs, expenses or damages, including but not limited to costs of acceleration or inefficiency, arising because of delay, disruption, interference, or hindrance from any cause whatsoever. If performance is suspended or delayed, in whole or in part, due to any of the causes described in this paragraph, after the causes have ceased to exist the Contractor shall perform at no increased cost, unless the Customer determines, in its sole discretion, that the delay will significantly impair the value of the Contract to the State or to Customers, in which case the Customer may (1) accept allocated performance or deliveries from the Contractor, provided that the Contractor grants preferential treatment to Customers with respect to products subjected to allocation, or (2) purchase from other sources (without recourse to and by the Contractor for the related costs and expenses) to replace all or part of the products that are the subject of the delay, which purchases may be deducted from the Contract quantity, or (3) terminate the Contract in whole or in part.

~~**25. Changes.** The Customer may unilaterally require, by written order, changes altering, adding to, or deducting from the Contract specifications, provided that such changes are within the general scope of the Contract. The Customer may make an equitable adjustment in the Contract price or delivery date if the change affects the cost or time of performance. Such equitable adjustments require the written consent of the Contractor, which shall not be unreasonably withheld. If unusual quantity requirements arise, the Customer may solicit separate bids to satisfy them.~~

~~**26. Renewal.** Upon mutual agreement, the Customer and the Contractor may renew the Contract, in whole or in part, for a period that may not exceed 3 years or the term of the contract, whichever period is longer. Any renewal shall specify the renewal price, as set forth in the solicitation response. The renewal must be in writing and signed by both parties, and is contingent upon satisfactory performance evaluations and subject to availability of funds.~~

Sections deleted PUR 1000, 4, 5, 11, 12, 13, 15 19,
20, 21, 22, 23, 25, 26, 27, 29, 31, 35, 40, 41, 42.

~~**27. Purchase Order Duration.** Purchase orders issued pursuant to a state term or agency contract must be received by the Contractor no later than close of business on the last day of the contract's term to be considered timely. The Contractor is obliged to fill those orders in accordance with the contract's terms and conditions. Purchase orders received by the contractor after close of business on the last day of the state term or agency contract's term shall be considered void.~~

~~Purchase orders for a one-time delivery of commodities or performance of contractual services shall be valid through the performance by the Contractor, and all terms and conditions of the state term or agency contract shall apply to the single delivery/performance, and shall survive the termination of the Contract.~~

~~Contractors are required to accept purchase orders specifying delivery schedules exceeding the contracted schedule even when such extended delivery will occur after expiration of the state term or agency contract. For example, if a state term contract calls for delivery 30 days after receipt of order (ARO), and an order specifies delivery will occur both in excess of 30 days ARO and after expiration of the state term contract, the Contractor will accept the order. However, if the Contractor expressly and in writing notifies the ordering office within ten (10) calendar days of receipt of the purchase order that Contractor will not accept the extended delivery terms beyond the expiration of the state term contract, then the purchase order will either be amended in writing by the ordering entity within ten (10) calendar days of receipt of the contractor's notice to reflect the state term contract delivery schedule, or it shall be considered withdrawn.~~

~~The duration of purchase orders for recurring deliveries of commodities or performance of services shall not exceed the expiration of the state term or agency contract by more than twelve months. However, if an extended pricing plan offered in the state term or agency contract is selected by the ordering entity, the contract terms on pricing plans and renewals shall govern the maximum duration of purchase orders reflecting such pricing plans and renewals.~~

~~Timely purchase orders shall be valid through their specified term and performance by the Contractor, and all terms and conditions of the state term or agency contract shall apply to the recurring delivery/performance as provided herein, and shall survive the termination of the Contract.~~

~~Ordering offices shall not renew a purchase order issued pursuant to a state term or agency contract if the underlying contract expires prior to the effective date of the renewal.~~

28. Advertising. Subject to Chapter 119, Florida Statutes, the Contractor shall not publicly disseminate any information concerning the Contract without prior written approval from the Customer, including, but not limited to mentioning the Contract in a press release or other promotional material, identifying the Customer or the State as a reference, or otherwise linking the Contractor's name and either a description of the Contract or the name of the State or the Customer in any material published, either in print or electronically, to any entity that is not a party to Contract, except potential or actual authorized distributors, dealers, resellers, or service representative.

~~**29. Assignment.** The Contractor shall not sell, assign or transfer any of its rights, duties or obligations under the Contract, or under any purchase order issued pursuant to the Contract, without the prior written consent of the Customer. In the event of any assignment, the Contractor remains secondarily liable for performance of the contract, unless the Customer expressly waives such secondary liability. The Customer may assign the Contract with prior written notice to Contractor of its intent to do so.~~

30. Antitrust Assignment. The Contractor and the State of Florida recognize that in actual economic practice, overcharges resulting from antitrust violations are in fact usually borne by the State of Florida. Therefore, the contractor hereby assigns to the State of Florida any and all claims for such overcharges as to goods, materials or services purchased in connection with the Contract.

~~**31. Dispute Resolution.** Any dispute concerning performance of the Contract shall be decided by the Customer's designated contract manager, who shall reduce the decision to writing and serve a copy on the Contractor. The decision shall be final and conclusive unless within twenty one (21) days from the date of receipt, the Contractor files with the Customer a petition for administrative hearing. The Customer's decision on the petition shall be final, subject to the Contractor's right to review pursuant to Chapter 120~~

Sections deleted PUR 1000, 4, 5, 11, 12, 13, 15 19, 20, 21, 22, 23, 25, 26, 27, 29, 31, 35, 40, 41, 42.

~~of the Florida Statutes. Exhaustion of administrative remedies is an absolute condition precedent to the Contractor's ability to pursue any other form of dispute resolution; provided, however, that the parties may employ the alternative dispute resolution procedures outlined in Chapter 120.~~

~~Without limiting the foregoing, the exclusive venue of any legal or equitable action that arises out of or relates to the Contract shall be the appropriate state court in Leon County, Florida; in any such action, Florida law shall apply and the parties waive any right to jury trial.~~

32. Employees, Subcontractors, and Agents. All Contractor employees, subcontractors, or agents performing work under the Contract shall be properly trained technicians who meet or exceed any specified training qualifications. Upon request, Contractor shall furnish a copy of technical certification or other proof of qualification. All employees, subcontractors, or agents performing work under the Contract must comply with all security and administrative requirements of the Customer and shall comply with all controlling laws and regulations relevant to the services they are providing under the Contract. The State may conduct, and the Contractor shall cooperate in, a security background check or otherwise assess any employee, subcontractor, or agent furnished by the Contractor. The State may refuse access to, or require replacement of, any personnel for cause, including, but not limited to, technical or training qualifications, quality of work, change in security status, or non-compliance with a Customer's security or other requirements. Such approval shall not relieve the Contractor of its obligation to perform all work in compliance with the Contract. The State may reject and bar from any facility for cause any of the Contractor's employees, subcontractors, or agents.

33. Security and Confidentiality. The Contractor shall comply fully with all security procedures of the United States, State of Florida and Customer in performance of the Contract. The Contractor shall not divulge to third parties any confidential information obtained by the Contractor or its agents, distributors, resellers, subcontractors, officers or employees in the course of performing Contract work, including, but not limited to, security procedures, business operations information, or commercial proprietary information in the possession of the State or Customer. The Contractor shall not be required to keep confidential information or material that is publicly available through no fault of the Contractor, material that the Contractor developed independently without relying on the State's or Customer's confidential information, or material that is otherwise obtainable under State law as a public record. To insure confidentiality, the Contractor shall take appropriate steps as to its personnel, agents, and subcontractors. The warranties of this paragraph shall survive the Contract.

34. Contractor Employees, Subcontractors, and Other Agents. The Customer and the State shall take all actions necessary to ensure that Contractor's employees, subcontractors and other agents are not employees of the State of Florida. Such actions include, but are not limited to, ensuring that Contractor's employees, subcontractors, and other agents receive benefits and necessary insurance (health, workers' compensations, and unemployment) from an employer other than the State of Florida.

~~**35. Insurance Requirements.** During the Contract term, the Contractor at its sole expense shall provide commercial insurance of such a type and with such terms and limits as may be reasonably associated with the Contract. Providing and maintaining adequate insurance coverage is a material obligation of the Contractor. Upon request, the Contractor shall provide certificate of insurance. The limits of coverage under each policy maintained by the Contractor shall not be interpreted as limiting the Contractor's liability and obligations under the Contract. All insurance policies shall be through insurers authorized or eligible to write policies in Florida.~~

36. Warranty of Authority. Each person signing the Contract warrants that he or she is duly authorized to do so and to bind the respective party to the Contract.

37. Warranty of Ability to Perform. The Contractor warrants that, to the best of its knowledge, there is no pending or threatened action, proceeding, or investigation, or any other legal or financial condition, that would in any way prohibit, restrain, or diminish the Contractor's ability to satisfy its Contract

Sections deleted PUR 1000, 4, 5, 11, 12, 13, 15 19, 20, 21, 22, 23, 25, 26, 27, 29, 31, 35, 40, 41, 42.

obligations. The Contractor warrants that neither it nor any affiliate is currently on the convicted Vendor list maintained pursuant to section 287.133 of the Florida Statutes, or on any similar list maintained by any other state or the federal government. The Contractor shall immediately notify the Customer in writing if its ability to perform is compromised in any manner during the term of the Contract.

38. Notices. All notices required under the Contract shall be delivered by certified mail, return receipt requested, by reputable air courier service, or by personal delivery to the agency designee identified in the original solicitation, or as otherwise identified by the Customer. Notices to the Contractor shall be delivered to the person who signs the Contract. Either designated recipient may notify the other, in writing, if someone else is designated to receive notice.

39. Leases and Installment Purchases. Prior approval of the Chief Financial Officer (as defined in Section 17.001, F.S.) is required for State agencies to enter into or to extend any lease or installment-purchase agreement in excess of the Category Two amount established by section 287.017 of the Florida Statutes.

~~**40. Prison Rehabilitative Industries and Diversified Enterprises, Inc. (PRIDE).** Section 946.515(2), F.S. requires the following statement to be included in the solicitation: "It is expressly understood and agreed that any articles which are the subject of, or required to carry out, the Contract shall be purchased from the corporation identified under Chapter 946 of the Florida Statutes (PRIDE) in the same manner and under the same procedures set forth in section 946.515(2) and (4) of the Florida Statutes; and for purposes of the Contract the person, firm, or other business entity carrying out the provisions of the Contract shall be deemed to be substituted for the agency insofar as dealings with such corporation are concerned." Additional information about PRIDE and the products it offers is available at http://www.pridefl.com.~~

~~**41. Products Available from the Blind or Other Handicapped.** Section 413.036(3), F.S. requires the following statement to be included in the solicitation: "It is expressly understood and agreed that any articles that are the subject of, or required to carry out, this contract shall be purchased from a nonprofit agency for the Blind or for the Severely Handicapped that is qualified pursuant to Chapter 413, Florida Statutes, in the same manner and under the same procedures set forth in section 413.036(1) and (2), Florida Statutes; and for purposes of this contract the person, firm, or other business entity carrying out the provisions of this contract shall be deemed to be substituted for the State agency insofar as dealings with such qualified nonprofit agency are concerned." Additional information about the designated nonprofit agency and the products it offers is available at http://www.respectofflorida.org.~~

~~**42. Modification of Terms.** The Contract contains all the terms and conditions agreed upon by the parties, which terms and conditions shall govern all transactions between the Customer and the Contractor. The Contract may only be modified or amended upon mutual written agreement of the Customer and the Contractor. No oral agreements or representations shall be valid or binding upon the Customer or the Contractor. No alteration or modification of the Contract terms, including substitution of product, shall be valid or binding against the Customer. The Contractor may not unilaterally modify the terms of the Contract by affixing additional terms to product upon delivery (e.g., attachment or inclusion of standard preprinted forms, product literature, "shrink wrap" terms accompanying or affixed to a product, whether written or electronic) or by incorporating such terms onto the Contractor's order or fiscal forms or other documents forwarded by the Contractor for payment. The Customer's acceptance of product or processing of documentation on forms furnished by the Contractor for approval or payment shall not constitute acceptance of the proposed modification to terms and conditions.~~

43. Cooperative Purchasing. Pursuant to their own governing laws, and subject to the agreement of the Contractor, other entities may be permitted to make purchases at the terms and conditions contained herein. Non-Customer purchases are independent of the agreement between Customer and Contractor, and Customer shall not be a party to any transaction between the Contractor and any other purchaser.

Sections deleted PUR 1000, 4, 5, 11, 12, 13, 15 19, 20, 21, 22, 23, 25, 26, 27, 29, 31, 35, 40, 41, 42.

State agencies wishing to make purchases from this agreement are required to follow the provisions of s. 287.042(16)(a), F.S. This statute requires the Department of Management Services to determine that the requestor's use of the contract is cost-effective and in the best interest of the State.

44. Waiver. The delay or failure by the Customer to exercise or enforce any of its rights under this Contract shall not constitute or be deemed a waiver of the Customer's right thereafter to enforce those rights, nor shall any single or partial exercise of any such right preclude any other or further exercise thereof or the exercise of any other right.

45. Annual Appropriations. The State's performance and obligation to pay under this contract are contingent upon an annual appropriation by the Legislature.

46. Execution in Counterparts. The Contract may be executed in counterparts, each of which shall be an original and all of which shall constitute but one and the same instrument.

47. Severability. If a court deems any provision of the Contract void or unenforceable, that provision shall be enforced only to the extent that it is not in violation of law or is not otherwise unenforceable and all other provisions shall remain in full force and effect.

Sections deleted PUR 1000, 4, 5, 11, 12, 13, 15 19, 20, 21, 22, 23, 25, 26, 27, 29, 31, 35, 40, 41, 42.

Ehxibit "H"
State of Florida
PUR 1001
General Instructions to Respondents
Central Florida Commuter Rail Transit
BI-LEVEL COACHES AND CAB CARS
Financial Project Number 412994-6-53-01

Contents

1. Definitions. The definitions found in s. 60A-1.001, F.A.C. shall apply to this agreement. The following additional terms are also defined:

(a) "Buyer" means the entity that has released the solicitation. The "Buyer" may also be the "Customer" as defined in the PUR 1000 if that entity meets the definition of both terms.
(b) "Procurement Officer" means the Buyer's contracting personnel, as identified in the Introductory Materials.
(c) "Respondent" means the entity that submits materials to the Buyer in accordance with these Instructions.
(d) "Response" means the material submitted by the respondent in answering the solicitation.
(e) "Timeline" means the list of critical dates and actions included in the Introductory Materials.

2. General Instructions. Potential respondents to the solicitation are encouraged to carefully review all the materials contained herein and prepare responses accordingly.

~~**3. Electronic Submission of Responses.** Respondents are required to submit responses electronically. For this purpose, all references herein to signatures, signing requirements, or other required acknowledgments hereby include electronic signature by means of clicking the "Submit Response" button (or other similar symbol or process) attached to or logically associated with the response created by the respondent within MyFloridaMarketPlace. The respondent agrees that the action of electronically submitting its response constitutes:~~

Sections deleted PUR 1001 3, 4, 5, 12, 13, 14, 19, 20, 21.

- ~~an electronic signature on the response, generally,~~
- ~~an electronic signature on any form or section specifically calling for a signature, and~~
- ~~an affirmative agreement to any statement contained in the solicitation that requires a definite confirmation or acknowledgement.~~

~~**4. Terms and Conditions.** All responses are subject to the terms of the following sections of this solicitation, which, in case of conflict, shall have the order of precedence listed:~~

- ~~Special Conditions and Instructions,~~
- ~~Instructions to Respondents (PUR 1001),~~
- ~~General Conditions (PUR 1000), and Introductory Materials.~~

~~The Buyer objects to and shall not consider any additional terms or conditions submitted by a respondent, including any appearing in documents attached as part of a respondent's response. In submitting its response, a respondent agrees that any additional terms or conditions, whether submitted intentionally or inadvertently, shall have no force or effect. Failure to comply with terms and conditions, including those specifying information that must be submitted with a response, shall be grounds for rejecting a response.~~

~~**5. Questions.** Respondents shall address all questions regarding this solicitation to the Procurement Officer. Questions must be submitted via the Q&A Board within MyFloridaMarketPlace and must be RECEIVED NO LATER THAN the time and date reflected on the Timeline. Questions shall be answered in accordance with the Timeline. All questions submitted shall be published and answered in a manner that all respondents will be able to view. Respondents shall not contact any other employee of the Buyer or the State for information with respect to this solicitation. Each respondent is responsible for monitoring the MyFloridaMarketPlace site for new or changing information. The Buyer shall not be bound by any verbal information or by any written information that is not contained within the solicitation documents or formally noticed and issued by the Buyer's contracting personnel. Questions to the Procurement Officer or to any Buyer personnel shall not constitute formal protest of the specifications or of the solicitation, a process addressed in paragraph 19 of these Instructions.~~

6. Conflict of Interest. This solicitation is subject to chapter 112 of the Florida Statutes. Respondents shall disclose with their response the name of any officer, director, employee or other agent who is also an employee of the State. Respondents shall also disclose the name of any State employee who owns, directly or indirectly, an interest of five percent (5%) or more in the respondent or its affiliates.

7. Convicted Vendors. A person or affiliate placed on the convicted Vendor list following a conviction for a public entity crime is prohibited from doing any of the following for a period of 36 months from the date of being placed on the convicted Vendor list:

- submitting a bid on a contract to provide any goods or services to a public entity;
- submitting a bid on a contract with a public entity for the construction or repair of a public building or public work;
- submitting bids on leases of real property to a public entity;
- being awarded or performing work as a contractor, supplier, subcontractor, or consultant under a contract with any public entity; and
- transacting business with any public entity in excess of the Category Two threshold amount ($25,000) provided in section 287.017 of the Florida Statutes.

8. Discriminatory Vendors. An entity or affiliate placed on the discriminatory vendor list pursuant to section 287.134 of the Florida Statutes may not:

- submit a bid on a contract to provide any goods or services to a public entity;
- submit a bid on a contract with a public entity for the construction or repair of a public building or public work;
- submit bids on leases of real property to a public entity;

Sections deleted PUR 1001 3, 4, 5, 12, 13, 14, 19, 20, 21.

- be awarded or perform work as a contractor, supplier, sub-contractor, or consultant under a contract with any public entity; or
- transact business with any public entity.

9. Respondent's Representation and Authorization. In submitting a response, each respondent understands, represents, and acknowledges the following (if the respondent cannot so certify to any of following, the respondent shall submit with its response a written explanation of why it cannot do so).

- The respondent is not currently under suspension or debarment by the State or any other governmental authority.
- To the best of the knowledge of the person signing the response, the respondent, its affiliates, subsidiaries, directors, officers, and employees are not currently under investigation by any governmental authority and have not in the last ten (10) years been convicted or found liable for any act prohibited by law in any jurisdiction, involving conspiracy or collusion with respect to bidding on any public contract.

- Respondent currently has no delinquent obligations to the State, including a claim by the State for liquidated damages under any other contract.
- The submission is made in good faith and not pursuant to any agreement or discussion with, or inducement from, any firm or person to submit a complementary or other noncompetitive response.
- The prices and amounts have been arrived at independently and without consultation, communication, or agreement with any other respondent or potential respondent; neither the prices nor amounts, actual or approximate, have been disclosed to any respondent or potential respondent, and they will not be disclosed before the solicitation opening.
- The respondent has fully informed the Buyer in writing of all convictions of the firm, its affiliates (as defined in section 287.133(1)(a) of the Florida Statutes), and all directors, officers, and employees of the firm and its affiliates for violation of state or federal antitrust laws with respect to a public contract for violation of any state or federal law involving fraud, bribery, collusion, conspiracy or material misrepresentation with respect to a public contract. This includes disclosure of the names of current employees who were convicted of contract crimes while in the employ of another company.
- Neither the respondent nor any person associated with it in the capacity of owner, partner, director, officer, principal, investigator, project director, manager, auditor, or position involving the administration of federal funds:
  - Has within the preceding three years been convicted of or had a civil judgment rendered against them or is presently indicted for or otherwise criminally or civilly charged for: commission of fraud or a criminal offense in connection with obtaining, attempting to obtain, or performing a federal, state, or local government transaction or public contract; violation of federal or state antitrust statutes; or commission of embezzlement, theft, forgery, bribery, falsification or destruction of records, making false statements, or receiving stolen property; or
  - Has within a three-year period preceding this certification had one or more federal, state, or local government contracts terminated for cause or default.
- The product offered by the respondent will conform to the specifications without exception.
- The respondent has read and understands the Contract terms and conditions, and the submission is made in conformance with those terms and conditions.
- If an award is made to the respondent, the respondent agrees that it intends to be legally bound to the Contract that is formed with the State.
- The respondent has made a diligent inquiry of its employees and agents responsible for preparing, approving, or submitting the response, and has been advised by each of them that he or she has not participated in any communication, consultation, discussion, agreement, collusion, act or other conduct inconsistent with any of the statements and representations made in the response.

Sections deleted PUR 1001 3, 4, 5, 12, 13, 14, 19, 20, 21.

- The respondent shall indemnify, defend, and hold harmless the Buyer and its employees against any cost, damage, or expense which may be incurred or be caused by any error in the respondent's preparation of its bid.
- All information provided by, and representations made by, the respondent are material and important and will be relied upon by the Buyer in awarding the Contract. Any misstatement shall be treated as fraudulent concealment from the Buyer of the true facts relating to submission of the bid. A misrepresentation shall be punishable under law, including, but not limited to, Chapter 817 of the Florida Statutes.

10. Manufacturer's Name and Approved Equivalents. Unless otherwise specified, any manufacturers' names, trade names, brand names, information or catalog numbers listed in a specification are descriptive, not restrictive. With the Buyer's prior approval, the Contractor may provide any product that meets or exceeds the applicable specifications. The Contractor shall demonstrate comparability, including appropriate catalog materials, literature, specifications, test data, etc. The Buyer shall determine in its sole discretion whether a product is acceptable as an equivalent.

11. Performance Qualifications. The Buyer reserves the right to investigate or inspect at any time whether the product, qualifications, or facilities offered by Respondent meet the Contract requirements. Respondent shall at all times during the Contract term remain responsive and responsible. In determining Respondent's responsibility as a Vendor, the agency shall consider all information or evidence which is gathered or comes to the attention of the agency which demonstrates the Respondent's capability to fully satisfy the requirements of the solicitation and the contract.

Respondent must be prepared, if requested by the Buyer, to present evidence of experience, ability, and financial standing, as well as a statement as to plant, machinery, and capacity of the respondent for the production, distribution, and servicing of the product bid. If the Buyer determines that the conditions of the solicitation documents are not complied with, or that the product proposed to be furnished does not meet the specified requirements, or that the qualifications, financial standing, or facilities are not satisfactory, or that performance is untimely, the Buyer may reject the response or terminate the Contract. Respondent may be disqualified from receiving awards if respondent, or anyone in respondent's employment, has previously failed to perform satisfactorily in connection with public bidding or contracts. This paragraph shall not mean or imply that it is obligatory upon the Buyer to make an investigation either before or after award of the Contract, but should the Buyer elect to do so, respondent is not relieved from fulfilling all Contract requirements.

~~**12. Public Opening.** Responses shall be opened on the date and at the location indicated on the Timeline. Respondents may, but are not required to, attend. The Buyer may choose not to announce prices or release other materials pursuant to s. 119.071(1)(b), Florida Statutes. Any person requiring a special accommodation because of a disability should contact the Procurement Officer at least five (5) workdays prior to the solicitation opening. If you are hearing or speech impaired, please contact the Buyer by using the Florida Relay Service at (800) 955-8771 (TDD).~~

~~**13. Electronic Posting of Notice of Intended Award.** Based on the evaluation, on the date indicated on the Timeline the Buyer shall electronically post a notice of intended award at http://fcn.state.fl.us/owa_vbs/owa/vbs_www.main_menu. If the notice of award is delayed, in lieu of posting the notice of intended award the Buyer shall post a notice of the delay and a revised date for posting the notice of intended award. Any person who is adversely affected by the decision shall file with the Buyer a notice of protest within 72 hours after the electronic posting. The Buyer shall not provide tabulations or notices of award by telephone.~~

~~**14. Firm Response.** The Buyer may make an award within sixty (60) days after the date of the opening, during which period responses shall remain firm and shall not be withdrawn. If award is not made within sixty (60) days, the response shall remain firm until either the Buyer awards the Contract or the Buyer~~

Sections deleted PUR 1001 3, 4, 5, 12, 13, 14, 19, 20, 21.

~~receives from the respondent written notice that the response is withdrawn. Any response that expresses a shorter duration may, in the Buyer's sole discretion, be accepted or rejected.~~

15. Clarifications/Revisions. Before award, the Buyer reserves the right to seek clarifications or request any information deemed necessary for proper evaluation of replies from all respondents deemed eligible for Contract award. Failure to provide requested information may result in rejection of the response.

16. Minor Irregularities/Right to Reject. The Buyer reserves the right to accept or reject any and all bids, or separable portions thereof, and to waive any minor irregularity, technicality, or omission if the Buyer determines that doing so will serve the State's best interests. The Buyer may reject any response not submitted in the manner specified by the solicitation documents.

17. Contract Formation. The Buyer shall issue a notice of award, if any, to successful respondent(s), however, no contract shall be formed between respondent and the Buyer until the Buyer signs the Contract. The Buyer shall not be liable for any costs incurred by a respondent in preparing or producing its response or for any work performed before the Contract is effective.

18. Contract Overlap. Respondents shall identify any products covered by this solicitation that they are currently authorized to furnish under any state term contract. By entering into the Contract, a Contractor authorizes the Buyer to eliminate duplication between agreements in the manner the Buyer deems to be in its best interest.

~~**19. Public Records.** Article 1, section 24, Florida Constitution, guarantees every person access to all public records, and Section 119.011, Florida Statutes, provides a broad definition of public record. As such, all responses to a competitive solicitation are public records unless exempt by law. Any respondent claiming that its response contains information that is exempt from the public records law shall clearly segregate and mark that information and provide the specific statutory citation for such exemption.~~

~~**20. Protests.** Any protest concerning this solicitation shall be made in accordance with sections 120.57(3) and 287.042(2) of the Florida Statutes and chapter 28-110 of the Florida Administrative Code. Questions to the Procurement Officer shall not constitute formal notice of a protest. It is the Buyer's intent to ensure that specifications are written to obtain the best value for the State and that specifications are written to ensure competitiveness, fairness, necessity and reasonableness in the solicitation process.~~

~~Section 120.57(3)(b), F.S. and Section 28-110.003, Fla. Admin. Code require that a notice of protest of the solicitation documents shall be made within seventy-two hours after the posting of the solicitation.~~

~~Section 120.57(3)(a), F.S. requires the following statement to be included in the solicitation: "Failure to file a protest within the time prescribed in section 120.57(3), Florida Statutes, shall constitute a waiver of proceedings under Chapter 120, Florida Statutes."~~

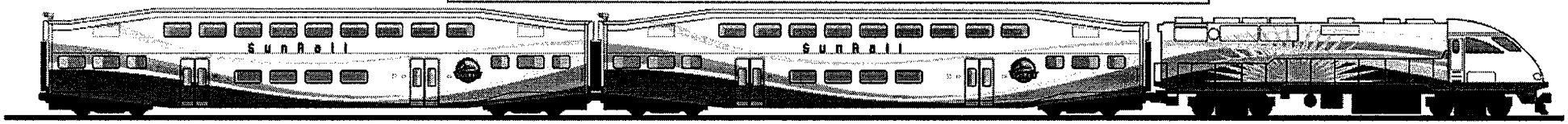
~~Section 28-110.005, Fla. Admin. Code requires the following statement to be included in the solicitation: "Failure to file a protest within the time prescribed in Section 120.57(3), Florida Statutes, or failure to post the bond or other security required by law within the time allowed for filing a bond shall constitute a waiver of proceedings under Chapter 120, Florida Statutes."~~

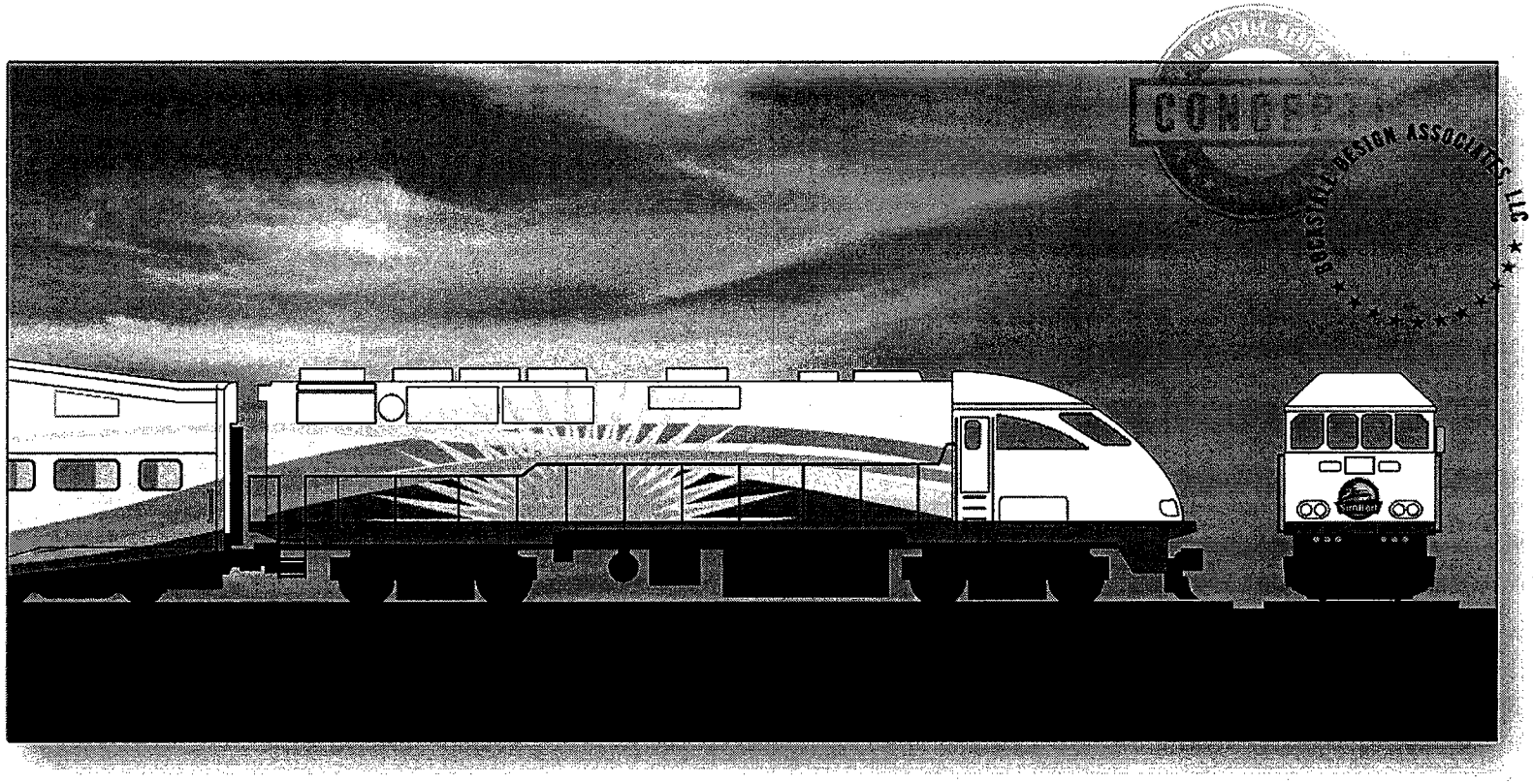
~~**21. Limitation on Vendor Contact with Agency During Solicitation Period.** Respondents to this solicitation or persons acting on their behalf may not contact, between the release of the solicitation and the end of the 72-hour period following the agency posting the notice of intended award, excluding Saturdays, Sundays, and state holidays, any employee or officer of the executive or legislative branch concerning any aspect of this solicitation, except in writing to the procurement officer or as provided in the solicitation documents. Violation of this provision may be grounds for rejecting a response.~~

Sections deleted PUR 1001 3, 4, 5, 12, 13, 14, 19, 20, 21.

Sections deleted PUR 1001 3, 4, 5, 12, 13, 14, 19, 20, 21.

Central Florida Commuter Rail Transit,
Exhibit "I", Train Color Scheme Composite





SunRail

Florida Department of Transportation

Train Decoration

Finalist

03

APPENDIX A
IOS 2010 SCENARIO PRELIMINARY TRAIN SCHEDULES

SOUTHBOUND DIRECTION

Train No.	To From	DeBary	Sanford SR 46	Lake Mary	Longwood SR 434	Altamonte Springs	Maitland	Winter Park	Florida Hospital	Orlando LCS	Church Street	ORMC/ Amtrak	Sand Lake	Layover
2	From Yard	5:30	5:36	5:43	5:49	5:53	5:58	6:03	6:09	6:14	6:17	6:19	6:26	0:18
3	From Yard	6:00	6:06	6:13	6:19	6:23	6:28	6:33	6:39	6:44	6:47	6:49	6:56	0:18
4	From Yard	6:30	6:36	6:43	6:49	6:53	6:58	7:03	7:09	7:14	7:17	7:19	7:26	0:18
5	From Yard	7:00	7:06	7:13	7:19	7:23	7:28	7:33	7:39	7:44	7:47	7:49	7:56	0:18
1		7:30	7:36	7:43	7:49	7:53	7:58	8:03	8:09	8:14	8:17	8:19	8:26	0:18
2		8:00	8:06	8:13	8:19	8:23	8:28	8:33	8:39	8:44	8:47	8:49	8:56	To Yard
1		10:00	10:06	10:13	10:19	10:23	10:28	10:33	10:39	10:44	10:47	10:49	10:56	0:18
1		12:30	12:36	12:43	12:49	12:53	12:58	13:03	13:09	13:14	13:17	13:19	13:26	0:18
1		15:00	15:06	15:13	15:19	15:23	15:28	15:33	15:39	15:44	15:47	15:49	15:56	0:18
2	From Yard	15:30	15:36	15:43	15:49	15:53	15:58	16:03	16:09	16:14	16:17	16:19	16:26	0:18
3	From Yard	16:00	16:06	16:13	16:19	16:23	16:28	16:33	16:39	16:44	16:47	16:49	16:56	0:18
4	From Yard	16:30	16:36	16:43	16:49	16:53	16:58	17:03	17:09	17:14	17:17	17:19	17:26	0:18
5	From Yard	17:00	17:06	17:13	17:19	17:23	17:28	17:33	17:39	17:44	17:47	17:49	17:56	0:18
1		17:30	17:36	17:43	17:49	17:53	17:58	18:03	18:09	18:14	18:17	18:19	18:26	0:18
2		18:00	18:06	18:13	18:19	18:23	18:28	18:33	18:39	18:44	18:47	18:49	18:56	0:18
1		20:00	20:06	20:13	20:19	20:23	20:28	20:33	20:39	20:44	20:47	20:49	20:56	0:18

NORTHBOUND DIRECTION

Train No.	To From	Sand Lake	ORMC Amtrak	Church Street	Orlando LCS	Florida Hospital	Winter Park	Maitland	Altamonte Springs	Longwood SR 434	Lake Mary	Sanford SR 46	DeBary	Layover
1	From Yard	6:15	6:22	6:24	6:26	6:32	6:37	6:43	6:48	6:52	6:58	7:05	7:11	0:18
2		6:45	6:52	6:54	6:56	7:02	7:07	7:13	7:18	7:22	7:28	7:35	7:41	0:18
3		7:15	7:22	7:24	7:26	7:32	7:37	7:43	7:48	7:52	7:58	8:05	8:11	To Yard
4		7:45	7:52	7:54	7:56	8:02	8:07	8:13	8:18	8:22	8:28	8:35	8:41	To Yard
5		8:15	8:22	8:24	8:26	8:32	8:37	8:43	8:48	8:52	8:58	9:05	9:11	To Yard
1		8:45	8:52	8:54	8:56	9:02	9:07	9:13	9:18	9:22	9:28	9:35	9:41	0:18
1		11:15	11:22	11:24	11:26	11:32	11:37	11:43	11:48	11:52	11:58	12:05	12:11	0:18
1		13:45	13:52	13:54	13:56	14:02	14:07	14:13	14:18	14:22	14:28	14:35	14:41	0:18
1		16:15	16:22	16:24	16:26	16:32	16:37	16:43	16:48	16:52	16:58	17:05	17:11	0:18
2		16:45	16:52	16:54	16:56	17:02	17:07	17:13	17:18	17:22	17:28	17:35	17:41	0:18
3		17:15	17:22	17:24	17:26	17:32	17:37	17:43	17:48	17:52	17:58	18:05	18:11	To Yard
4		17:45	17:52	17:54	17:56	18:02	18:07	18:13	18:18	18:22	18:28	18:35	18:41	To Yard
5		18:15	18:22	18:24	18:26	18:32	18:37	18:43	18:48	18:52	18:58	19:05	19:11	To Yard
1		18:45	18:52	18:54	18:56	19:02	19:07	19:13	19:18	19:22	19:28	19:35	19:41	0:18
2		19:15	19:22	19:24	19:26	19:32	19:37	19:43	19:48	19:52	19:58	20:05	20:11	To Yard
1		21:15	21:22	21:24	21:26	21:32	21:37	21:43	21:48	21:52	21:58	22:05	22:11	To Yard

APPENDIX B
LPA 2013 SCENARIO PRELIMINARY TRAIN SCHEDULES

SOUTHBOUND DIRECTION

Train No.	To From	DeBary	Sanford Amtrak	Lake Mary	Longwood SR 434	Altamonte Springs	Maitland	Winter Park	Florida Hospital	Orlando LCS	Church Street	ORMC/ Amtrak	Sand Lake SR 408	Meadow Woods	Osceola Pkwy.	Kissimmee Amtrak	Poinciana Blvd.	Layover
4	From Yard	5:30	5:36	5:43	5:49	5:53	5:58	6:03	6:09	6:14	6:17	6:19	6:27	6:33	6:37	6:43	6:49	0:25
5	From Yard	6:00	6:06	6:13	6:19	6:23	6:28	6:33	6:39	6:44	6:47	6:49	6:57	7:03	7:07	7:13	7:19	0:25
6	From Yard	6:30	6:36	6:43	6:49	6:53	6:58	7:03	7:09	7:14	7:17	7:19	7:27	7:33	7:37	7:43	7:49	0:25
7	From Yard	7:00	7:06	7:13	7:19	7:23	7:28	7:33	7:39	7:44	7:47	7:49	7:57	8:03	8:07	8:13	8:19	To Yard
1	--	7:30	7:36	7:43	7:49	7:53	7:58	8:03	8:09	8:14	8:17	8:19	8:27	8:33	8:37	8:43	8:49	To Yard
2	--	8:00	8:06	8:13	8:19	8:23	8:28	8:33	8:39	8:44	8:47	8:49	8:57	9:03	9:07	9:13	9:19	0:40
6	--	10:00	10:06	10:13	10:19	10:23	10:28	10:33	10:39	10:44	10:47	10:49	10:57	11:03	11:07	11:13	11:19	0:40
2	--	12:00	12:06	12:13	12:19	12:23	12:28	12:33	12:39	12:44	12:47	12:49	12:57	13:03	13:07	13:13	13:19	0:40
6	--	14:00	14:06	14:13	14:19	14:23	14:28	14:33	14:39	14:44	14:47	14:49	14:57	15:03	15:07	15:13	15:19	0:25
2	--	16:00	16:06	16:13	16:19	16:23	16:28	16:33	16:39	16:44	16:47	16:49	16:57	17:03	17:07	17:13	17:19	0:25
4	From Yard	16:30	16:36	16:43	16:49	16:53	16:58	17:03	17:09	17:14	17:17	17:19	17:27	17:33	17:37	17:43	17:49	0:25
5	From Yard	17:00	17:06	17:13	17:19	17:23	17:28	17:33	17:39	17:44	17:47	17:49	17:57	18:03	18:07	18:13	18:19	0:25
7	From Yard	17:30	17:36	17:43	17:49	17:53	17:58	18:03	18:09	18:14	18:17	18:19	18:27	18:33	18:37	18:43	18:49	To Yard
6	--	17:30	17:36	17:43	17:49	17:53	17:58	18:03	18:09	18:14	18:17	18:19	18:27	18:33	18:37	18:43	18:49	To Yard
1	--	18:00	18:06	18:13	18:19	18:23	18:28	18:33	18:39	18:44	18:47	18:49	18:57	19:03	19:07	19:13	19:19	0:40
5	--	20:30	20:36	20:43	20:49	20:53	20:58	21:03	21:09	21:14	21:17	21:19	21:27	21:33	21:37	21:43	21:49	To Yard

NORTHBOUND DIRECTION

Train No.	To From	Poinciana Blvd.	Kissimmee Amtrak	Osceola Pkwy.	Meadow Woods	Sand Lake SR 408	ORMC Amtrak	Church Street	Orlando LCS	Florida Hospital	Winter Park	Maitland	Altamonte Springs	Longwood SR 434	Lake Mary	Sanford Amtrak	DeBary	Layover
1	From Yard	5:45	5:51	5:56	6:01	6:07	6:14	6:17	6:19	6:24	6:30	6:36	6:41	6:45	6:51	6:58	7:04	0:25
2	From Yard	6:15	6:21	6:26	6:31	6:37	6:44	6:47	6:49	6:54	7:00	7:06	7:11	7:15	7:21	7:28	7:34	0:25
3	From Yard	6:45	6:51	6:56	7:01	7:07	7:14	7:17	7:19	7:24	7:30	7:36	7:41	7:45	7:51	7:58	8:04	To Yard
4	--	7:15	7:21	7:26	7:31	7:37	7:44	7:47	7:49	7:54	8:00	8:06	8:11	8:15	8:21	8:28	8:34	To Yard
5	--	7:45	7:51	7:56	8:01	8:07	8:14	8:17	8:19	8:24	8:30	8:36	8:41	8:45	8:51	8:58	9:04	To Yard
6	--	8:15	8:21	8:26	8:31	8:37	8:44	8:47	8:49	8:54	9:00	9:06	9:11	9:15	9:21	9:28	9:34	0:25
2	--	10:00	10:06	10:11	10:16	10:22	10:29	10:32	10:34	10:39	10:45	10:51	10:56	11:00	11:06	11:13	11:19	0:40
6	--	12:00	12:06	12:11	12:16	12:22	12:29	12:32	12:34	12:39	12:45	12:51	12:56	13:00	13:06	13:13	13:19	0:40
2	--	14:00	14:06	14:11	14:16	14:22	14:29	14:32	14:34	14:39	14:45	14:51	14:56	15:00	15:06	15:13	15:19	0:40
6	--	15:45	15:51	15:56	16:01	16:07	16:14	16:17	16:19	16:24	16:30	16:36	16:41	16:45	16:51	16:58	17:04	0:25
1	From Yard	16:15	16:21	16:26	16:31	16:37	16:44	16:47	16:49	16:54	17:00	17:06	17:11	17:15	17:21	17:28	17:34	0:25
3	From Yard	16:45	16:51	16:56	17:01	17:07	17:14	17:17	17:19	17:24	17:30	17:36	17:41	17:45	17:51	17:58	18:04	To Yard
2	--	17:45	17:51	17:56	18:01	18:07	18:14	18:17	18:19	18:24	18:30	18:36	18:41	18:45	18:51	18:58	19:04	To Yard
4	--	18:15	18:21	18:26	18:31	18:37	18:44	18:47	18:49	18:54	19:00	19:06	19:11	19:15	19:21	19:28	19:34	To Yard
5	--	18:45	18:51	18:56	19:01	19:07	19:14	19:17	19:19	19:24	19:30	19:36	19:41	19:45	19:51	19:58	20:04	0:25
1	--	20:00	20:06	20:11	20:16	20:22	20:29	20:32	20:34	20:39	20:45	20:51	20:56	21:00	21:06	21:13	21:19	To Yard

APPENDIX C
FULL BUILD 2016 SCENARIO PRELIMINARY TRAIN SCHEDULES

SOUTHBOUND DIRECTION

Train No.	To From	DeLand Amtrak	DeBary	Sanford Amtrak	Lake Mary	Longwood SR 434	Altamonte Springs	Maitland	Winter Park	Florida Hospital	Orlando LCS	Church Street	ORMC/ Amtrak	Sand Lake SR 408	Meadow Woods	Osceola Pkwy.	Kissimmee Amtrak	Poinciana Blvd.	Layover
5	From Yard	5:30	5:43	5:49	5:56	6:02	6:06	6:11	6:17	6:22	6:28	6:30	6:33	6:40	6:46	6:51	6:56	7:02	0:27
6	From Yard	6:00	6:13	6:19	6:26	6:32	6:36	6:41	6:47	6:52	6:58	7:00	7:03	7:10	7:16	7:21	7:26	7:32	0:27
7	From Yard	6:30	6:43	6:49	6:56	7:02	7:06	7:11	7:17	7:22	7:28	7:30	7:33	7:40	7:46	7:51	7:56	8:02	To Yard
8	From Yard	7:00	7:13	7:19	7:26	7:32	7:36	7:41	7:47	7:52	7:58	8:00	8:03	8:10	8:16	8:21	8:26	8:32	To Yard
1	–	7:30	7:43	7:49	7:56	8:02	8:06	8:11	8:17	8:22	8:28	8:30	8:33	8:40	8:46	8:51	8:56	9:02	To Yard
2	–	8:00	8:13	8:19	8:26	8:32	8:36	8:41	8:47	8:52	8:58	9:00	9:03	9:10	9:16	9:21	9:26	9:32	0:27
6	–	10:00	10:13	10:19	10:26	10:32	10:36	10:41	10:47	10:52	10:58	11:00	11:03	11:10	11:16	11:21	11:26	11:32	0:27
2	–	12:00	12:13	12:19	12:26	12:32	12:36	12:41	12:47	12:52	12:58	13:00	13:03	13:10	13:16	13:21	13:26	13:32	0:27
6	–	14:00	14:13	14:19	14:26	14:32	14:36	14:41	14:47	14:52	14:58	15:00	15:03	15:10	15:16	15:21	15:26	15:32	0:27
2	–	16:00	16:13	16:19	16:26	16:32	16:36	16:41	16:47	16:52	16:58	17:00	17:03	17:10	17:16	17:21	17:26	17:32	0:27
3	From Yard	16:30	16:43	16:49	16:56	17:02	17:06	17:11	17:17	17:22	17:28	17:30	17:33	17:40	17:46	17:51	17:56	18:02	0:27
4	From Yard	17:00	17:13	17:19	17:26	17:32	17:36	17:41	17:47	17:52	17:58	18:00	18:03	18:10	18:16	18:21	18:26	18:32	To Yard
5	From Yard	17:30	17:43	17:49	17:56	18:02	18:06	18:11	18:17	18:22	18:28	18:30	18:33	18:40	18:46	18:51	18:56	19:02	To Yard
6	–	18:00	18:13	18:19	18:26	18:32	18:36	18:41	18:47	18:52	18:58	19:00	19:03	19:10	19:16	19:21	19:26	19:32	To Yard
1	–	18:30	18:43	18:49	18:56	19:02	19:06	19:11	19:17	19:22	19:28	19:30	19:33	19:40	19:46	19:51	19:56	20:02	0:27
2	–	20:00	20:13	20:19	20:26	20:32	20:36	20:41	20:47	20:52	20:58	21:00	21:03	21:10	21:16	21:21	21:26	21:32	To Yard

NORTHBOUND DIRECTION

To From	Poinciana Blvd.	Kissimmee Amtrak	Osceola Pkwy.	Meadow Woods	Sand Lake SR 408	ORMC Amtrak	Church Street	Orlando LCS	Florida Hospital	Winter Park	Maitland	Altamonte Springs	Longwood SR 434	Lake Mary	Sanford Amtrak	DeBary	DeLand Amtrak	Layover
From Yard	5:30	5:36	5:41	5:46	5:52	5:59	6:02	6:04	6:09	6:15	6:21	6:26	6:30	6:36	6:43	6:49	7:02	0:27
From Yard	6:00	6:06	6:11	6:16	6:22	6:29	6:32	6:34	6:39	6:45	6:51	6:56	7:00	7:06	7:13	7:19	7:32	0:27
From Yard	6:30	6:36	6:41	6:46	6:52	6:59	7:02	7:04	7:09	7:15	7:21	7:26	7:30	7:36	7:43	7:49	8:02	To Yard
From Yard	7:00	7:06	7:11	7:16	7:22	7:29	7:32	7:34	7:39	7:45	7:51	7:56	8:00	8:06	8:13	8:19	8:32	To Yard
–	7:30	7:36	7:41	7:46	7:52	7:59	8:02	8:04	8:09	8:15	8:21	8:26	8:30	8:36	8:43	8:49	9:02	To Yard
–	8:00	8:06	8:11	8:16	8:22	8:29	8:32	8:34	8:39	8:45	8:51	8:56	9:00	9:06	9:13	9:19	9:32	0:27
–	10:00	10:06	10:11	10:16	10:22	10:29	10:32	10:34	10:39	10:45	10:51	10:56	11:00	11:06	11:13	11:19	11:32	0:27
–	12:00	12:06	12:11	12:16	12:22	12:29	12:32	12:34	12:39	12:45	12:51	12:56	13:00	13:06	13:13	13:19	13:32	0:27
–	14:00	14:06	14:11	14:16	14:22	14:29	14:32	14:34	14:39	14:45	14:51	14:56	15:00	15:06	15:13	15:19	15:32	0:27
–	16:00	16:06	16:11	16:16	16:22	16:29	16:32	16:34	16:39	16:45	16:51	16:56	17:00	17:06	17:13	17:19	17:32	0:27
From Yard	16:30	16:36	16:41	16:46	16:52	16:59	17:02	17:04	17:09	17:15	17:21	17:26	17:30	17:36	17:43	17:49	18:02	0:27
From Yard	17:00	17:06	17:11	17:16	17:22	17:29	17:32	17:34	17:39	17:45	17:51	17:56	18:00	18:06	18:13	18:19	18:32	To Yard
From Yard	17:30	17:36	17:41	17:46	17:52	17:59	18:02	18:04	18:09	18:15	18:21	18:26	18:30	18:36	18:43	18:49	19:02	To Yard
–	18:00	18:06	18:11	18:16	18:22	18:29	18:32	18:34	18:39	18:45	18:51	18:56	19:00	19:06	19:13	19:19	19:32	0:27
–	18:30	18:36	18:41	18:46	18:52	18:59	19:02	19:04	19:09	19:15	19:21	19:26	19:30	19:36	19:43	19:49	20:02	To Yard
–	20:30	20:36	20:41	20:46	20:52	20:59	21:02	21:04	21:09	21:15	21:21	21:26	21:30	21:36	21:43	21:49	22:02	To Yard

Table 8 – "Full" Build Estimated Station-to-Station Run Times

Station	Speed (mph) Authorized	Actual	Distance (miles) Mile Post	Increment	Total	Run Time (hr:min:sec)	Dwell Time (hr:min:sec)	Total Time (hr:min:sec)
DeLand Amtrak			750.00		0.00		00:00:00	00:00:00
	79	65		1.10		00:01:41		
Speed Restriction			751.10		1.10		00:00:00	00:01:41
	50	50		0.40		00:00:30		
Speed Restriction			751.50		1.50		00:00:00	00:02:11
	79	65		8.30		00:08:13		
Speed Restriction			759.80		9.80		00:00:00	00:10:25
	60	60		2.01		00:02:23		
DeBary			761.81		11.81		00:00:30	00:13:18
	60	60		1.29		00:01:52		
Speed Restriction			763.10		13.10		00:00:00	00:15:10
	45	45		2.70		00:03:58		
Sanford			765.80		15.80		00:00:30	00:19:38
	60	50		0.50		00:01:01		
Speed Restriction			766.30		16.30		00:00:00	00:20:39
	30	30		0.50		00:01:03		
Speed Restriction			766.80		16.80		00:00:00	00:21:42
	50	50		3.26		00:04:30		
Lake Mary			773.20		20.06		00:00:30	00:26:42
	79	65		4.48		00:05:14		
Longwood			777.68		24.54		00:00:30	00:32:26
	60	60		2.77		00:03:41		
Altamonte Springs			780.45		27.31		00:00:30	00:36:36
	50	50		1.55		00:02:20		
Speed Restriction			782.00		28.86		00:00:00	00:38:56
	40	40		1.25		00:02:08		
Maitland			783.25		30.11		00:00:30	00:41:34
	30	30		2.34		00:05:11		
Winter Park / Amtrak			785.59		32.45		00:00:30	00:47:15
	30	30		2.31		00:05:07		
Florida Hospital			787.90		34.76		00:00:30	00:52:52
	30	30		1.90		00:04:15		
LYNX Central Station			789.80		36.66		00:01:00	00:58:07
	30	30		0.70		00:01:44		
Church St.			790.50		37.36		00:00:30	01:00:21
	30	30		0.90		00:02:09		
Orlando Amtrak			791.40		38.26		00:00:30	01:03:00
	40	40		2.20		00:03:42		
Speed Restriction			793.60		40.46		00:00:00	01:06:41
	79	65		1.00		00:01:17		
Speed Restriction			794.60		41.46		00:00:00	01:07:58
	60	65		1.90		00:02:07		
SR 408 / Sand Lake Road			796.50		43.36		00:00:30	01:10:35
	79	65		4.55		00:05:18		
Meadow Woods			801.05		47.91		00:00:30	01:16:23
	79	65		2.75		00:03:16		
Speed Restriction			803.80		50.66		00:00:00	01:19:40
	65	65		0.70		00:00:58		
Osceola Parkway			804.50		51.36		00:00:30	01:21:07
	65	65		2.50		00:03:04		
Speed Restriction			807.00		53.86		00:00:00	01:24:11
	45	45		1.04		00:01:39		
Kissimmee Amtrak			808.04		54.90		00:00:30	01:26:20
	45	45		0.76		00:01:20		
Speed Restriction			808.80		55.66		00:00:00	01:27:40
	79	65		4.80		00:05:11		
Poinciana Boulevard			813.60		60.46		00:00:00	01:32:50
TOTAL					60.46	01:24:50	00:08:00	01:32:50
						Avg. Speed =	39.1	mph

NOTES:
1. Distances based on CFCRT station locations.
2. Run times based on acceleration & deceleration rates for MP-36PH-3C locomotive + 2 coach cars (per Systra Consulting, Sept. 19, 2008).
3. Run times include 5.0% allowance for passenger comfort, dispatching delays, ADA compliance (per Systra Consulting, Sept. 19, 2008).
4. Maximum 65 mph speed assumed; reduced speeds up to Authorized Speed (CSX Track Chart).

Table 9 – Operating Requirements for Commuter Rail Scenarios

PARAMETER	IOS	LPA	FULL BUILD
One-Way Run Time (min:sec)	56:48	79:33	92:50
Layover Time	18:12	25:27	27:10
Round-Trip Cycle Time (Peak)	150:00	210:00	240:00
Frequency (peak/mid/eve)	30/120/120	30/120/120	30/120/120
Peak Trainsets	5	7	8
Peal Locomotives	5	7	8
Peak Passenger Cars	10	14	16
Standby Passenger Cars	4	4	4
Fleet Passenger Cars	14	18	20
Annual Revenue Train-Hours	10,400	14,600	16,600
Annual Revenue Car-Miles	525,000	810,000	1,006,000
Route Miles	31.6	48.6	60.8
Stations	12	16	17
Daily Revenue Train Trips	32	32	32

MARSH

Certificate of Insurance

No. **US-L-2010-1170** Dated: **February 24, 2011**

This document supersedes any certificate previously issued under this number

This is to certify that the Policy(ies) of insurance listed below ("Policy" or "Policies") have been issued to the Named Insured identified below for the policy period(s) indicated. This certificate is issued as a matter of information only and confers no rights upon the Certificate Holder named below other than those provided by the Policy(ies).

Notwithstanding any requirement, term or condition of any contract or any other document with respect to which this certificate may be issued or may pertain, the insurance afforded by the Policy(ies) is subject to all the terms, conditions and exclusions of such Policy(ies). This certificate does not amend, extend or alter the coverage afforded by the Policy(ies). Limits shown are intended to address contractual obligations of the Named Insured.

Limits may have been reduced since Policy effective date(s) as a result of a claim or claims.

Certificate Holder:	**Named Insured and Address:**
Florida Department of Transportation - District 5 **719 South Woodland Boulevard, MS 524** **DeLand, FL 32720** **Attn.: Roger P. Masten**	**Bombardier Transit Corporation** **101 Gibraltar Road** **Suite 112** **Horsham, PA 19044**

This certificate is issued regarding:

Contract / Project Name: CFCRT (Central Florida Commuter Rail Transit) Bi-Level Coaches and Cab Cars

Scope of Work: Design, manufacturing and procurement of 14 BiLevel cars and option for up to 46 cars

Type(s) of Insurance	Insurer(s)	Policy Number(s)	Effective/ Expiry Dates	Sums Insured Or Limits of Liability	
PRIMARY LIABILITY	Allianz Global Risks US Insurance Company	CGL2002943	Jun 30, 2010 to Jun 30, 2011	each occurrence and in the annual aggregate, as applicable.	USD 1,000,000

Additional information:

NOTE: The Allianz Primary Liability policy no.CGL2002943 was placed by Seabury & Smith, Inc. (San Antonio, Texas). Marsh Canada Limited has only acted in the role of consultant to the client with respect to the placement of the policy.

Florida Department of Transportation - District 5 is added as an Additional Insured solely with respect to the liability arising out of and limited to the contractual obligations as contained within the agreement (CFCRT (Central Florida Commuter Rail Transit) Bi-Level Coaches and Cab Cars) in effect between Florida Department of Transportation - District 5 and Bombardier Transit Corporation - subject always to the terms, conditions, limitations and exclusions as contained within the policy so certified above.

The above referenced policy affords public liability insurance for a combined limit of $1,000,000 ($500,000 per person) per occurrence and in the annual aggregate as applicable for bodily injury and property damage.

Notice of cancellation:

Should any of the policies described herein be cancelled before the expiration date thereof, the insurer(s) affording coverage will endeavour to mail 30 days written notice to the certificate holder named herein, but failure to mail such notice shall impose no obligation or liability of any kind upon the insurer(s) affording coverage, their agents or representatives, or the issuer of this certificate.

Marsh Canada Limited
1981 McGill College Avenue
Suite 820
Montréal, QC H3A 3T4
Telephone: 514-285-5862
Fax: 514-285-6692
pierrealexandre.lussier@marsh.com

Marsh Canada Limited

By: 

Pierre-Alexandr Lussier

CERTIFICATE OF LIABILITY INSURANCE

DATE (MM/DD/YYYY): 2/24/2011

THIS CERTIFICATE IS ISSUED AS A MATTER OF INFORMATION ONLY AND CONFERS NO RIGHTS UPON THE CERTIFICATE HOLDER. THIS CERTIFICATE DOES NOT AFFIRMATIVELY OR NEGATIVELY AMEND, EXTEND OR ALTER THE COVERAGE AFFORDED BY THE POLICIES BELOW. THIS CERTIFICATE OF INSURANCE DOES NOT CONSTITUTE A CONTRACT BETWEEN THE ISSUING INSURER(S), AUTHORIZED REPRESENTATIVE OR PRODUCER, AND THE CERTIFICATE HOLDER.

IMPORTANT: If the certificate holder is an ADDITIONAL INSURED, the policy(ies) must be endorsed. If SUBROGATION IS WAIVED, subject to the terms and conditions of the policy, certain policies may require an endorsement. A statement on this certificate does not confer rights to the certificate holder in lieu of such endorsement(s).

PRODUCER	CONTACT NAME:	Heather Gratto	
Marsh USA, Inc. 6500 Sheridan Drive, Suite 114 Williamsville, NY 14221	PHONE (A/C, No, Ext):	1-866-616-0088	FAX (A/C, No):
	EMAIL ADDRESS:	Heather.gratto@marsh.com	

INSURED	INSURER(S) AFFORDING COVERAGE	NAIC #
Bombardier Transit Corporation 101 Gibraltar Road, Suite 112 Horsham, PA, 19044	INSURER A: ACE American Insurance Company	22667
	INSURER B: Indemnity Insurance Company of North America	43575
	INSURER C:	
	INSURER D:	

COVERAGES **CERTIFICATE NUMBER: WC-89** **REVISION NUMBER:**

THIS IS TO CERTIFY THAT THE POLICIES OF INSURANCE LISTED BELOW HAVE BEEN ISSUED TO THE INSURED NAMED ABOVE FOR THE POLICY PERIOD INDICATED. NOTWITHSTANDING ANY REQUIREMENT, TERM OR CONDITION OF ANY CONTRACT OR OTHER DOCUMENT WITH RESPECT TO WHICH THIS CERTIFICATE MAY BE ISSUED OR MAY PERTAIN, THE INSURANCE AFFORDED BY THE POLICIES DESCRIBED HEREIN IS SUBJECT TO ALL THE TERMS, EXCLUSIONS AND CONDITIONS OF SUCH POLICIES. LIMITS SHOWN MAY HAVE BEEN REDUCED BY PAID CLAIMS.

INSR LTR	TYPE OF INSURANCE	ADDL INSR	SUBR WVD	POLICY NUMBER	POLICY EFF (MM/DD/YYYY)	POLICY EXP (MM/DD/YYYY)	LIMITS	
	GENERAL LIABILITY ☐ COMMERCIAL GENERAL LIABILITY ☐ CLAIMS-MADE ☐ OCCUR ☐ ——— ☐ ——— GEN'L AGGREGATE LIMIT APPLIES PER: ☐ POLICY ☐ PRO ☐ LOC						EACH OCCURRENCE	$
							DAMAGE TO RENTED PREMISES (Ea occurrence)	$
							MED EXP (Any one person)	$
							PERSONAL & ADV INJURY	$
							GENERAL AGGREGATE	$
							PRODUCTS - COMP/OP AGG	$
	AUTOMOBILE LIABILITY ☐ ANY AUTO ☐ ALL OWNED AUTOS ☐ SCHEDULED AUTOS ☐ HIRED AUTOS ☐ NON-OWNED AUTOS						COMBINED SINGLE LIMIT (Ea accident)	$
							BODILY INJURY (Per person)	$
							BODILY INJURY (Per accident)	$
							PROPERTY DAMAGE (Per accident)	$
								$
	☐ **UMBRELLA LIAB** ☐ OCCUR ☐ **EXCESS LIAB** ☐ CLAIMS-MADE ☐ DEDUCTIBLE ☐ RETENTION $						EACH OCCURRENCE	$
							AGGREGATE	$
								$
								$
A A A A B	**WORKERS COMPENSATION AND EMPLOYERS' LIABILITY** Y/N ☐ ANY PROPRIETOR/PARTNER/EXECUTIVE OFFICER/MEMBER EXCLUDED? **(Mandatory in NH)** If yes, describe under DESCRIPTION OF OPERATIONS below	N/A	X	WLR C4 6471623 (AZ, CA, MA) SCF C4 6471635 (WI) WCU C4 6471659 (AZ) WCU C4 6471660 (KS) WLR C4 6471647 (AOS)	2/1/2011	2/1/2012	☒ WC STATU-TORY LIMITS ☐ OTH-ER	
							E.L. EACH ACCIDENT	$2,000,000 US
							E.L. DISEASE - EA EMPLOYEE	$2,000,000 US
							E.L. DISEASE - POLICY LIMIT	$2,000,000 US

DESCRIPTION OF OPERATIONS / LOCATIONS / VEHICLES (Attach ACORD 101, Additional Remarks Schedule, if more space is required)
Re: CFCRT (Central Florida Commuter Rail Transit Bi-Level Coaches and Cab Cars)
Design, manufacturing and procurement of 14 BiLevel cars and option for up to 46 cars

CERTIFICATE HOLDER

Florida Department of Transportation - District 5
719 South Woodland Boulevard, MS 524
DeLand, FL 32720

CANCELLATION

SHOULD ANY OF THE ABOVE DESCRIBED POLICIES BE CANCELLED BEFORE THE EXPIRATION DATE THEREOF, NOTICE WILL BE DELIVERED IN ACCORDANCE WITH THE POLICY PROVISIONS.

AUTHORIZED REPRESENTATIVE

Lisa Drolet

STATE OF FLORIDA DEPARTMENT OF TRANSPORTATION

PERFORMANCE BOND

375-040-27
PROCUREMENT
OGC - 10/04

KNOW ALL MEN BY THESE PRESENTS: That we, Bombardier Transit Corporation (name) _____ (hereinafter called Vendor) of 101 Gibraltar Road, Suite 112, Horsham, PA 19044 (address) _____ and _____ (name) _____ (hereinafter called Surety) of _____ (address), duly authorized to do business in the State of Florida, are held and firmly bound unto the State of Florida in the full and just sum of Nine Million and no/100 Dollars ($ 9,000,000.00), lawful money of the United States of America, to be paid to the Florida Department of Transportation (hereinafter called the Department), to which payment will and truly to be made we bind ourselves, our heirs, executors, administrators, successors and assigns, jointly and severally and firmly by these presents;

WHEREAS, the above Vendor has subscribed to an agreement with the Department to bear the date of _____, for contractual services agreement in connection with Central Florida Commuter Rail B-Level Coaches and Cab Cars Financial Project No. 412994-6-53-02 _____ in Volusia, Seminole, Orange and Osceola County(ies), particularly known as Contract No. _____ (hereinafter called the Agreement), upon certain terms and conditions in said Agreement more particularly mentioned; and

NOW, THEREFORE, The condition of this obligation is such that if the above Vendor in all respects will comply with the terms and conditions of said Agreement, and its obligations thereunder, including the Scope of Services, Specifications, General Conditions, Special Conditions, Bid Blank therein referred to and made a part thereof, and such alterations as may be made in said conditions and specifications, as therein provided for; and, further, if such Vendor will promptly make payment to all persons supplying labor, material, equipment and supplies, used directly or indirectly by the said Vendor or any subcontractor(s) in the prosecution of the work provided for in said Agreement, and promptly will pay all State Workers' Compensation and Unemployment Compensation taxes incurred in the performance of the said Agreement and will pay to the Department any amount in money or property, the Department may lose or be overcharged or otherwise defrauded of, by reason of any wrongful or criminal act of the Vendor, its agents, or employees, then this obligation is to be void; otherwise, to be and remain in full force and virtue in law.

WITNESS the signature of the Vendor and the signature of the Surety by _____ its _____ (Agent or Attorney-in-Fact, or otherwise) with seals of said Vendor and Surety hereunto affixed this _____ day of _____, _____.

_____
Surety

BY: _____
Signature

TITLE: _____
Attorney-in-Fact/Agent

(Surety Seal)

Name/Telephone #: _____

Address: _____

Bombardier Transit Corporation
Vendor

BY: _____
Authorized Signature(s)

TITLE: _____

ATTEST: _____
Secretary/Notary

BY: _____
Signature

NOTE: Attach Power of attorney showing authority of Surety's Agent or Attorney-in-Fact. This bond is not for public works contracts required by Section 255.05, Florida Statutes.

Central Florida Commuter Rail Transit,
Bi-Level Coaches and Cab Cars
Financial Project No. 412994-6-53-02

WARRANTY BOND

KNOW ALL MEN BY THESE PRESENTS:

That we _____, hereinafter called the "Principal", and _____, a surety company authorized to do business in the State of Florida, having is principal place of business at:

_____
(street address of home office)

_____
(city, state, zip code)

hereinafter called the "Surety", are held and firmly bound unto the State of Florida Department of Transportation, hereinafter called the "Obligee", in the full and just sum of $_____, lawful money of the United States of America, to be paid to the Obligee, to which payment well and truly to be made we bind ourselves, our heirs, executors, administrators, successors, and assigns, jointly and severally, firmly by these presents:

WHEREAS, Principal and Obligee have entered into a contract identified as: _____
_____
(hereinafter the "Contract"), which Contract contains certain warranty obligations of the Principal; and

WHEREAS, it is a condition of the Contract that this bond be executed;

NOW, THEREFORE, the condition of this obligation is such that if the above-bounded Principal in all respects shall promptly, faithfully and efficiently comply with its warranty obligations under the Contract and shall indemnify and hold the Obligee harmless against or from all claims, costs, expenses, damages, injury, or loss, either direct or consequential, that Obligee may sustain on account of failure of the Principal to perform as required; and further, if the Surety, at the option of Obligee and upon demand of Obligee, shall, in the event of a default by Principal under the above-described performance obligation, promptly, faithfully and efficiently perform the warranty obligations under contract with an entity other than Principal at Surety's sole cost and expense, then this obligation shall be void; otherwise to be and remain in full force and effect in law.

IN WITNESS WHEREOF, the Principal and the Surety have executed these presents this _____ day of _____, 200_____.