



CALTRAIN MODERNIZATION PROGRAM

**REQUEST FOR INFORMATION (RFI)
FROM
RAILCAR MANUFACTURERS ONLY**

**CONCERNING
PROCUREMENT OF BI-LEVEL ELECTRIC MULTIPLE UNIT (EMU) ROLLING STOCK
FOR THE JPB'S OPERATING TRAIN CORRIDOR
BETWEEN
SAN FRANCISCO AND SAN JOSE
RFI No. 14-PCJPB-P-056**

Issued May 22, 2014

**Alicia Fraumeni, Senior Contract Officer
Contracts & Procurement Department
Peninsula Corridor Joint Powers Board
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1. Introduction

- 1.1 This Request for Information (RFI) is being issued by the Peninsula Corridor Joint Powers Board (JPB) to inform the industry of JPB's plans to electrify its rail operating segment between San Francisco and San Jose, California by December 2019, and to solicit general industry comments and information from interested and qualified railcar manufacturers of bi-level electric multiple unit (EMUs) passenger car trains to be procured by the JPB for revenue operation in the electrified corridor. **The JPB is not soliciting information by this RFI from individual suppliers of railcar components.** Meetings will not be scheduled with individual suppliers of railcar components.
- 1.2 The JPB will consider the information generated by this RFI in conjunction with other data available to the JPB to assist in its outreach efforts with stakeholders and to develop realistic performance requirements and specifications for inclusion in the JPB's Request for Proposal procurement documents scheduled to be issued March 2015.
- 1.3 Manufacturers of bi-level EMU passenger train vehicles are encouraged to respond to this RFI. However, a response is not mandatory in order to participate in any later solicitation process.

2. Submittal of Letter of Interest and Technical Information

- 2.1 In response to this RFI, each interested and qualified railcar manufacturer should submit a Letter of Interest (LOI) to the following address and by the following date:

Address: Alicia Fraumeni, Senior Contract Officer
San Mateo County Transit District
Contracts and Procurement – 2nd Floor
1250 San Carlos Avenue
San Carlos CA 94070-1306

Email: EMU@caltrain.com

Phone: 650-508-6442

Phone: 650-508-6442

Due Date: Letter of Interest is requested no later than **June 16, 2014 by 5 PM (PST).**

- 2.2 Interested and qualified railcar manufacturers should complete and submit the LOI in “Attachment A”, or a letter on company letterhead that addresses the information requested in “Attachment A”, including information regarding their relevant railcar manufacturing qualifications and experience. A responder also may include an additional “Attachment B” that includes additional written information that the railcar manufacturer chooses to submit related to the considerations itemized in Section 6 of this RFI and in “Attachment “B”. Information may be submitted by hard copy or email.
- 2.3 All communications regarding this RFI, and all clarifications and questions related to this RFI must be mailed or emailed to Alicia Fraumeni, Senior Contract Officer, at the address indicated in 2.1 above. In order to facilitate the scheduling of the meetings described in Section 3, interested and qualified railcar manufacturers are encouraged to notify Alicia Fraumeni at their earliest convenience regarding their preferred meeting times. This notification may be provided in advance of submitting technical information by submitting the LOI with items 1 through 5 completed, and with a note that the technical information in Item 6 and in accordance with Attachment “B” will follow.
- 2.4 Responses to this RFI should be in English language only.
- 2.5 “Attachment C” provides railcar manufacturers additional information regarding the JPB’s CBOSS PTC system mentioned in paragraphs 4.2, 6.11 and 6.12.

3. Scheduled Meetings with JPB Staff

- 3.1 In addition to seeking the information discussed in this RFI, the JPB also intends to invite any interested and qualified railcar manufacturers who submit an LOI to meet with JPB staff. Likely meeting location will be at the San Carlos, California office of the JPB. In advance of the meetings, the JPB intends to provide a more detailed set of questions and topics for discussion. In order to maintain a transparent process, the JPB will post on its website the questions and topics for discussion. In addition, the JPB intends on issuing a draft of the technical specifications for industry review prior to issuing an RFP. The agenda, format, content and location of the meeting will be provided in a future mailing.
- 3.2 JPB’s currently planned schedule for meetings is as follows:

Date	Time Window	Time Window
June 23, 2014	1st meeting: 9AM to 12PM	2nd meeting: 1PM to 4PM
June 24, 2014	3rd meeting: 9AM to 12PM	4th meeting: 1PM to 4PM
June 25, 2014	5th meeting: 9AM to 12PM	6th meeting: 1PM to 4PM
June 26, 2014	7th meeting: 9AM to 12PM	8th meeting: 1PM to 4PM
June 27, 2014	9th meeting: 9AM to 12PM	10th meeting: 1PM to 4PM

- 3.3. If interested in scheduling a meeting, please submit your LOI at your earliest convenience (see section 2.3), but in any event not later than Due Date specified in Section 2.1. Please indicate (by time period number shown in the list above), your top three preferred meeting times. Time slots will be issued on a first-come first-serve basis to qualified railcar manufacturers; therefore, an early response to this RFI is advised.

4. CalMod Program Background

- 4.1 The Caltrain Modernization (CalMod) Program is the JPB’s approximately \$1.5 billion early investment program in the peninsula rail corridor consisting of various contracts to: (1) design and

install an advanced signal system ("CBOSS PTC"), (2) electrify the operating rail corridor at 25 kV AC 60 Hz by 2019 and, (3) procure 96 or more EMU vehicles that are compliant with FRA requirements including JPB's FRA waiver conditions and that meet JPB service requirements. The early investment program also will be implemented to support a Blended System with the California High Speed Rail Authority ("CHSRA").

- 4.2 The Communication Based Overlay Signal System (CBOSS) Positive Train Control (PTC) contract was awarded in 2011. Final design is completed. Installation and testing are underway. It is scheduled for placement into revenue service in 2015.
- 4.3 Electrification work under separate contract will include all systems required to complete Electrification of the existing operating rail corridor between CP Lick south of the Tamien station in San Jose in the south, and San Francisco 4th and King terminus in the north. The Electrification system will consist of 25 kV AC 60 Hz traction power substations, 25 kV AC 60 Hz switching and paralleling stations, utility service connections, utility relocations, overhead contact system (OCS), supervisory control and data acquisition (SCADA), communications, central control interface, rail signaling conversion to be compatible with 25 kV AC 60 Hz Electrification track circuits, CPUC and FRA approved rail crossings, operations and maintenance facility modifications, and the integration and coordination of these systems with all other elements of the CalMod Program including EMU vehicles, CBOSS PTC and support future CHSRA blended system.
- 4.4 A Request for Proposal for procurement of 96 or more bi-level EMU passenger train vehicles is currently scheduled for issuance in March 2015. The procurement will be a best value solicitation that considers the overall combination of quality, price, and other elements that, when considered together, provide the greatest overall benefit to the JPB.
- 4.5 Additional information about the CalMod Program is available on the website at:
www.caltrain.com/modernization.
- 4.6 Information about the CalMod Program funding plan is available at:
<http://www.caltrain.com/Assets/Caltrain+Modernization+Program/Documents/Executed+9+Party+MOU.pdf>

5. JPB Rail Operations

- 5.1 Caltrain operates commuter rail passenger service throughout the peninsula corridor from San Francisco to Gilroy under the auspices of the Peninsula Corridor Joint Powers Board (PCJPB or JPB). The northern terminal is at 4th and King in San Francisco where there are local connections to MUNI bus and streetcar services.
- 5.2 Union Pacific retains limited rights to operate freight trains over JPB tracks. The corridor between San Jose and Gilroy will continue to be served with the existing diesel equipment. EMUs will operate for a period of time in mixed service with diesel passenger trains between San Francisco and San Jose.
- 5.3 Caltrain passenger service is currently operated and dispatched by Transit America Services, Inc. (TASI) under contract to JPB. The dispatch center is located in San Jose at the CCF (Central Control Facility).

- 5.4 Caltrain also operates an express service called the Baby Bullet. It utilizes bypass tracks in Brisbane and Sunnyvale as well as a new centralized traffic control system located at the Central Control Facility. The Baby Bullet trains minimize travel time by stopping only at limited stations between San Francisco and the San Jose Diridon Station. As a result, the travel time between San Francisco and San Jose for the express service is 57 minutes, a savings of 33 minutes compared to the 1 hour and 30 minutes for the local service. Current top speed of all trains is 79 mph.
- 5.5 Currently, a total of 92 trains per calendar day operate between Gilroy and San Francisco in a mix of local, limited stop and Baby Bullet express services. Electrification of the alignment at 25 kVac, 60 Hz AC between San Francisco and Tamien will enable the introduction of service-proven bi-level EMU vehicles to meet Caltrain's continually expanding service. Significant operational benefits to be realized from the EMU vehicles include higher acceleration and braking capabilities, a more environmentally-sensitive operation, and simplified operating and maintenance procedures. Caltrain is also a key link to San Francisco in the California High-Speed Rail network. A blended system operation with CHSRA envisions 6 Caltrain and 4 CHSRA trains per each direction per peak hour.

6. Technical Considerations and Information of Interest to JPB

Listed below are several JPB technical considerations on which the JPB is very interested in obtaining feedback from qualified railcar manufacturers:

- 6.1 Electrification will be 25 kV AC 60 Hz served by two primary 2x25 kV AC autotransformer traction power substations, switching and paralleling stations, spaced along approximately 51 miles of double track between San Francisco and San Jose. Precise locations are not yet identified and will be finalized under the Electrification contract.
- 6.2 Bi-level EMUs are envisioned in up to 6-car consists. Numbers of, and combinations and flexibility of combinations - married pairs, triplets, or six-car fixed sets - have not been finalized. Flexibility is valued to allow for shortening of trainsets in off-peak hour revenue service.
- 6.3 EMUs shall be designed to operate in revenue service up to 79 mph when placed into revenue service in 2019 and up to 110 mph when placed into blended systems operation with CHSRA vehicles at a later date.
- 6.4 The JPB is interested in understanding the feasibility, cost impact, design and manufacturing risks related to the EMUs accommodating different platform heights, gaps and ADA requirements. California High Speed Rail's (CHSR) platform interface will be 50" above top of rail (TOR) and 67" respectively from track center. JPB EMUs will interface with existing platform heights and mini-high at 8" and 25" above TOR. The JPB's current plans call for EMUs to be compatible with existing platform heights and existing mini-highs. Given the varying platform heights of 8", 25' and 50", the JPB is interested in how railcar manufacturers have been able to accommodate and interface with varying platform heights, gaps and ADA requirements with their vehicles, and what options exist for the JPB to provide a Level Boarding environment for both JPB and CHSR vehicles.
- 6.5 EMUs must comply with FRA conditions of waiver or alternative compliance vehicle requirements in accordance with applicable FRA rules and regulations.
- 6.6 EMUs must satisfy JPB's fleet management and operations service plan needs.

- 6.7 The JPB is interested in procurement of service-proven bilevel EMU vehicle technologies that are substantially “off-the-shelf” base vehicles. The degree of modification necessary to meet JPB technical performance requirements will be a major consideration.
- 6.8 The JPB is considering inclusion of a 5 or 10 year or longer period of maintenance services in the procurement contract with services to be provided by the selected railcar manufacturer.
- 6.9 EMUs shall comply with Final Environmental Impact Report (FEIR) approved standards for noise and electromagnetic emissions.
- 6.10 The JPB desires to understand options related to vehicle configuration, functionality, aesthetics, and material quality on items such as seating layout/accessibility, bicycle capacity/storage, luggage racks/size, standing arrangements/amenities, doors/platform interface, and toilets number/configuration. The JPB is interested in considering various configurations that maximize seating and bicycle capacity, and optimize functionality.
- 6.11 Vehicle systems technical integration with CBOSS PTC and Electrification will be required and extremely important. Critical interfaces must be identified and properly integrated.
- 6.12 Coordination with CBOSS PTC and Electrification will be required regarding items such as EMU delivery, schedule, staging, testing, burn-in, commissioning in the corridor and relative to O&M facility requirements to accommodate EMUs.

7. RFI Rules of Engagement

- 7.1 This RFI is not and shall not be construed under any circumstances as a pre-requisite or prequalification procedure or step for later participation in the EMU Request for Proposal (RFP) procurement. A failure to respond to this RFI does not prohibit participation in any EMU RFP that the JPB may issue.
- 7.2 The JPB does not seek submittal of any trade secrets or other proprietary information over which a responder may wish to exert rights of confidentiality, exclusive ownership, or other types of continuing control. All information provided by responders may be published or otherwise made publicly available by the JPB in accordance with applicable laws, including the California Public Records Act. Responders should not include proprietary or confidential information with the information contained in any response to this RFI.
- 7.3 Participation in this RFI process is voluntary. The cost for developing the response and participating in this RFI process is the sole responsibility of the responder. The JPB will not reimburse any costs related to this RFI process.
- 7.4 Responder represents and warrants that it has the full right and authority to make offered submissions, information and disclosures, and that such submissions, information and disclosures do not infringe upon or violate the rights of any third party. By submitting a response to this RFI, a responder agrees to hold the JPB harmless with regard to any third party claims asserting any rights over any information submitted as part of a response to this RFI.
- 7.5 The JPB reserves all rights with respect to this RFI including, but not limited to, the right at any time to change or modify the content of the RFI, or the RFI process itself, if such changes satisfy the best interests of the JPB. The schedule set forth in this RFI is subject to change by the JPB.

- 7.6 The JPB makes no representation, warranties, or guarantees that the information contained within this RFI and its attachments is accurate, complete, final, timely, or that it represents the terms, conditions, requirements or specifications that may be included in the subsequent RFP and contract for procurement of the EMUs.
- 7.7 By responding to this RFI and presenting information to the JPB in connection with this RFI, each responder agrees that the JPB may use any information, ideas, and materials the responder provides in any manner the JPB so desires, including but not limited to stakeholder discussions, the development of technical specifications, and inclusion in any procurement documents for the EMUs.
- 7.8 The JPB reserves the right to amend this RFI. Any revisions will be made in writing and will be posted to the JPB's website. Responders are encouraged to frequently check the JPB's procurement website at www.caltrain.com for additions or amendments to the RFI and/or communications from the JPB.
- 7.9 The JPB reserves the right to cancel this RFI at any time.
- 7.10 The primary objective of this RFI process is for the JPB to gather information to assist the JPB in its consideration of available resources, products, options, technologies, and ancillary equipment to successfully upgrade and convert the existing diesel-based system to an electrified one as described herein. The RFI process is neither a part of nor a method for a competitive solicitation.
- 7.11 By submitting a response, responders shall be deemed to have accepted all terms and agreed to all requirements of the RFI including any revisions/additions made thereto by the JPB.

END OF SECTION

APPENDIX A

LETTER OF INTEREST

By submitting this Letter of Interest, the Railcar Manufacturer below is expressing its interest in participating in the RFI process as described in this document.

1. Name of Railcar Manufacturer: _____
2. Address: _____

3. Contact Person including Title/Position, Phone Number, Email Address (please print);

4. Preferred Date/Time (up to three) for Meeting (indicate by number from Section. 3.2):

5. If currently scheduled dates do not work, please propose an alternative date and time (JPB does not guarantee that it can accommodate a different date or time): _____
6. Brief Description of Type of Rolling Stock Manufactured and Supplied (attach information):
 - EMU railcar manufacturing experience, years in production, production capacity
 - Available EMU “off the shelf” offerings and related technical information (for example, crash worthiness and boarding heights)
 - Previous similar projects

APPENDIX B

RAILCAR TECHNICAL INFORMATION

(Additional information related to items in Section 6 of this RFI).

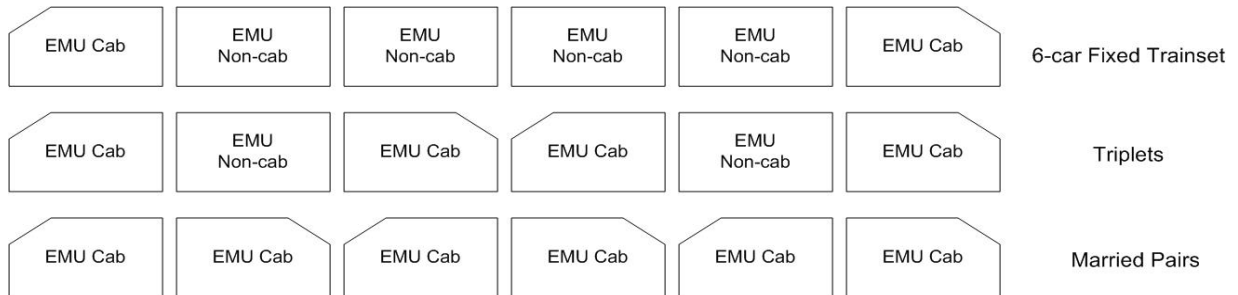
The section numbers in this appendix correlate to the section numbers in the RFI.

6.1. Caltrain Route Map



6.2. Caltrain Fleet Makeup - Possible EMU Configurations

6-car trains, expandable to 8-car trains



6.4. Platform Interface

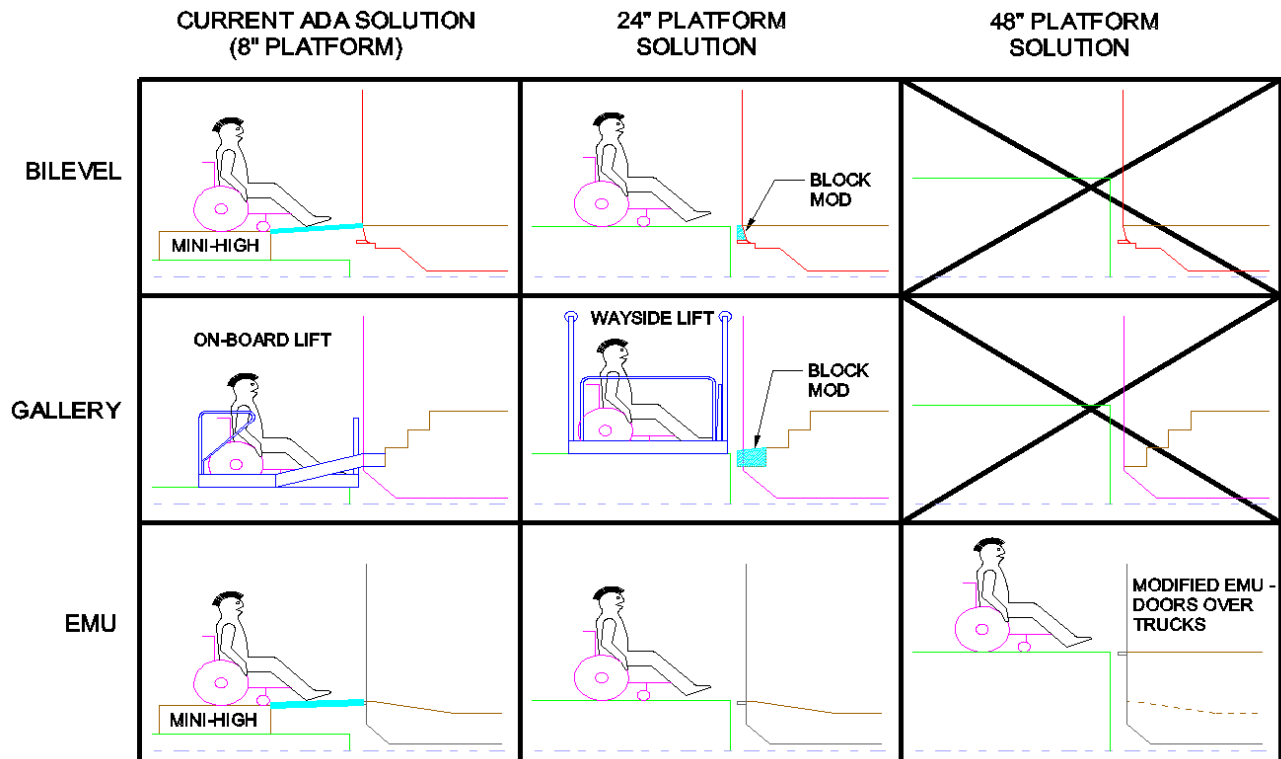
- Current fleet is designed for 8-inch high platforms.
- Ambulatory passengers step up to an 18-inch high step:
 - For Nippon Sharyo Gallery cars, step is interior to car
 - For Bombardier bi-Level cars, step is mounted to exterior of car
- Non-ambulatory passengers board using either:
 - A mini-high platform and a bridge plate (bi-Level cars); or
 - A vehicle-borne powered lift (Gallery cars); or
 - A portable wayside lift (contingency).
- Current platform configuration provides adequate freight car clearances and allows area tenants (ACE, Capitol Corridor, Amtrak, UPRR) to use Caltrain stations.
- Current platform and vehicle configurations meet federal ADA regulations and state CPUC requirements.
- Future conditions consider level boarding (roll-on, roll-off). Two alternatives are:
 - ~25-inch platform (allows use of current fleet)
 - ~50-inch platforms (does not allow use of current fleet, but allows compatibility with CHSRA)
- A table summarizing the platform interface data is shown below:

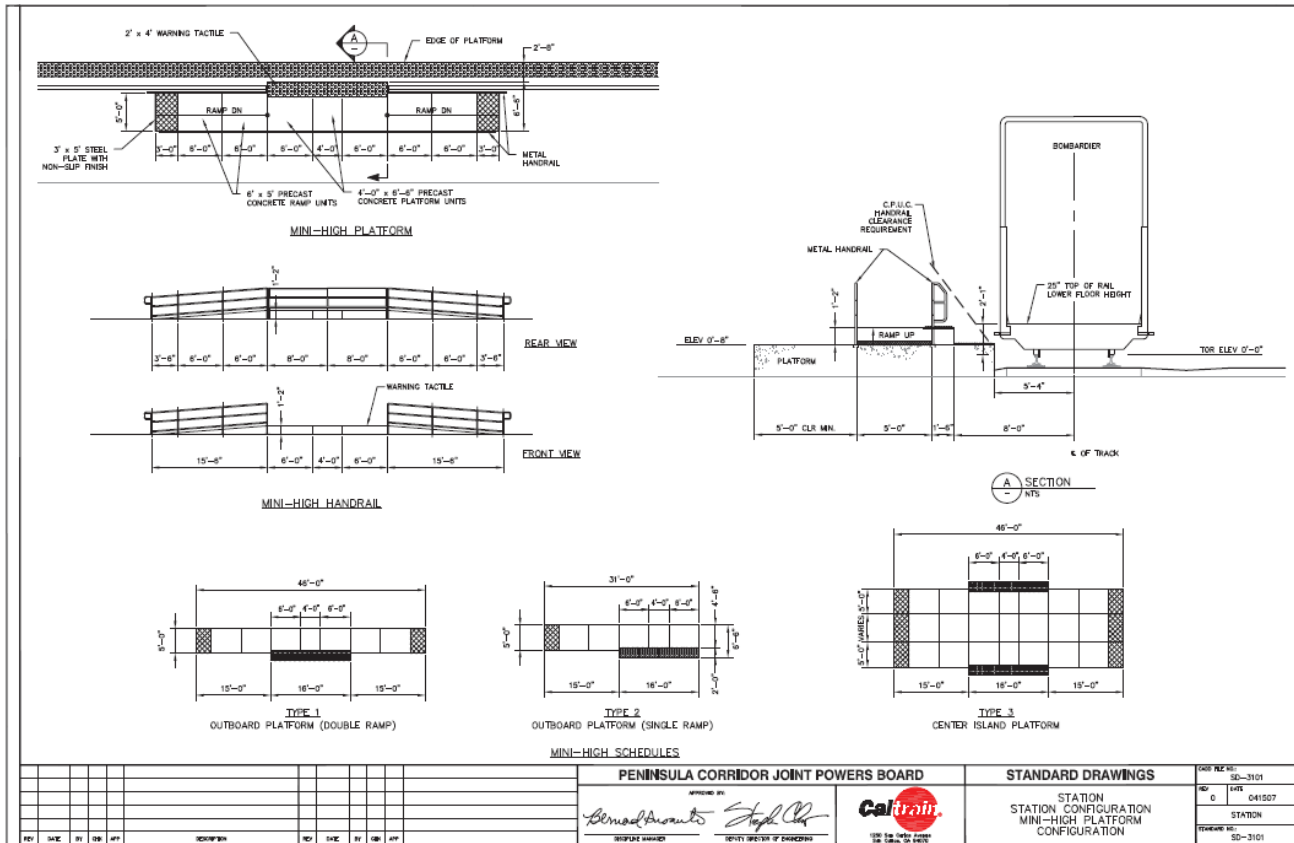
Platform Interface Data

	<u>Bi-Level</u>	<u>Gallery</u>
Platform Height (above top of rail) = 8"		
Platform Edge (from CL of track) = 64"		
First Step Height (in)	18	18
Floor Height (in)	25	45
1/2 Carbody Width at First Step Height (in)	61.1*	58.5
1/2 Carbody Width at Floor Height (in)	57.5	58.5
Max 1/2 Carbody Width (in)	59	58.5
Door Type	Pocket	Pocket

*At face of first step

A sketch of current and viable potential future level boarding scenarios and a drawing of a mini-high platform are provided on the following page.





6.5. Existing FRA Waiver Conditions - (Additional information is available at <http://www.caltrain.com/projectsplans/CaltrainModernization/Documents.html>)

Waived CFRs

- 49 CFR 238.203 Static End Strength
- 49 CFR 238.205 Anti-Climbing Mechanism
- 49 CFR 238.207 Link Between Coupling Mechanism and Carbody
- 49 CFR 238.211 Collision Posts (now achieved through 49 CFR 238.205 Appendix F)
- 49 CFR 238.213 Corner Posts (now achieved through 49 CFR 238.205 Appendix F)

Rolling Stock Measures (in lieu of CFR compliance)

- EN12663 PII Compliance
- EN15227 CI Compliance with following specifics:
 - Train-to-train collision scenario with 8-car like trains (22.5 mph)
 - Truck impact speed 110 km/hr (69 mph)
- Additional train-to-train impact scenario
 - 8-car EMU at 20 mph impacts locomotive at the head of a stationary 5-car train
 - EN 15227 performance criteria for train-to-train collision apply with one exception. Strains in excess of 10 percent would be reviewed on a case-by-case basis.
- Minimum car body ultimate buff (buckling) strength of 1.3 million pounds
 - Maximum load resisted while buckling or crushing
- Show that during the train-to-train impact scenarios specified under waiver Section 5.3.1 do not result in overriding or bypass at the impact interface (cab end) as well as at the intermediate connections within the train
- Provide calculations showing the vertical and horizontal strength of all elements acting to restrain the vehicles during such impacts
- Compliance with the FRA collision post “proxy object cart” impact requirement currently proposed for 49 CFR 238.205 Appendix F
- Calculations showing the amount of deformation of the corner structure of the rail car when the static loads prescribed by 49 CFR 238.213 are applied does not compromise the occupied space
- Compliance with APTA SS-C&S-016-99, Rev 2 (Passenger Seats)
- Compliance with APTA SS-C&S-001-99 (Cab Crew Seating)

Note: Compliance with all applicable CFRs not mentioned above is mandatory. See tables that follow for a short list. Caltrain current and future operation complies with all CFR parts, sub-parts, and paragraphs not listed in this summary table on the following page.

Sub-section	Title/Description
49CFR38	Americans with Disabilities Act (ADA)
49CFR38 Subpart E	Commuter rail cars and systems
49CFR223	Safety Glazing Standards
Appendix A	Certification of glazing materials
49CFR229	Railroad Locomotive Safety Standards
229.51	Aluminum main reservoirs
229.125	Headlights and Auxiliary Lights
229.141	Body Structure, MU Locomotives
49CFR231	Railroad Safety Appliance Standards
231.14	Passenger-train cars without end platforms
49CFR236	Signal and Train Control Systems
236	Signal and Train Control Systems
49CFR238	Passenger Equipment Safety Standards
238.103	Fire Safety
238.105	Train electronic hardware and software safety
238.113	Emergency window exits
238.114	Rescue access windows
238.115	Emergency lighting
238.121	Emergency communication
238.123	Emergency Roof Access
238.201	Scope/alternative compliance
238.209	Forward-facing end structure of locomotives
238.211	Collision posts (compliance with alternate standard okay)
238.213	Corner posts (compliance with alternate standard okay)
238.215	Rollover strength
238.217	Side structure
238.219	Truck-to-carbody attachments
238.221	Glazing
238.225	Electrical systems
238.229	Safety appliances – general
238.230	Safety appliances - new equipment
238.231	Brake system
238.233	Interior fittings and surfaces
238.300 - 321	Subpart D—Inspection, Testing, And Maintenance Requirements For Tier I Passenger Equipment
49CFR239	Passenger Train Emergency Preparedness
239.107	Emergency Exits

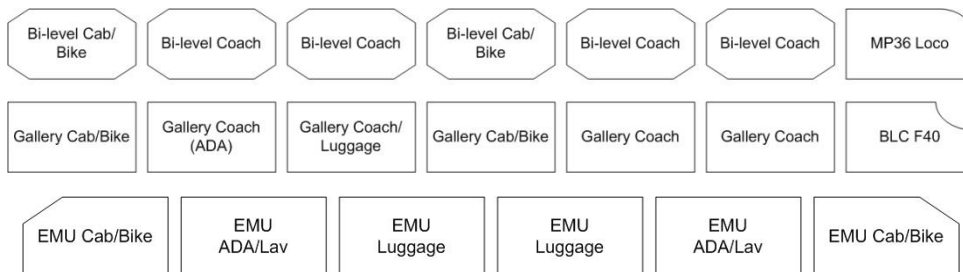
6.6. Caltrain Fleet Makeup – current and future

Current Fleet (simplified)



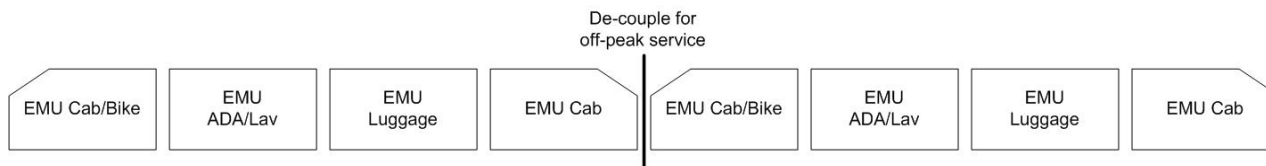
Parameter	Gallery Train	Bi-Level Train
Seated capacity	650	678
ADA compliance	1 car per train	All cars
Bike capacity	80 per train	48 per train
Number in service	15 trains	5 trains

Future Fleet (simplified - conceptual)



Parameter	Gallery Train	Bi-Level Train	EMU Train
Seated capacity	636	822	600
ADA compliance	4 cars per train	All cars	All cars
Bike capacity	80 per train	48 per train	48 per train minimum
Number in service	4 trains	6 trains	16 trains

Final Buildout (simplified - conceptual)

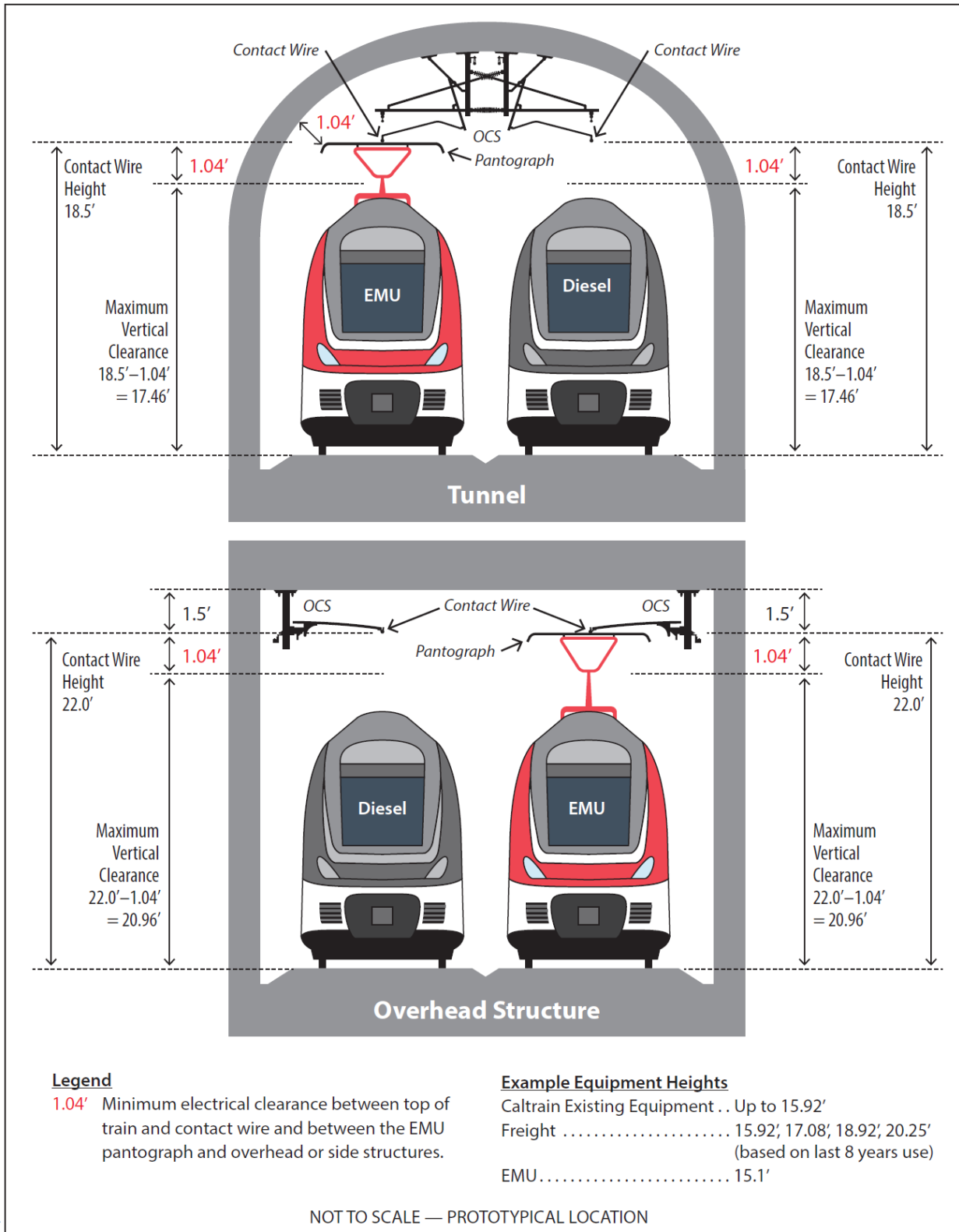


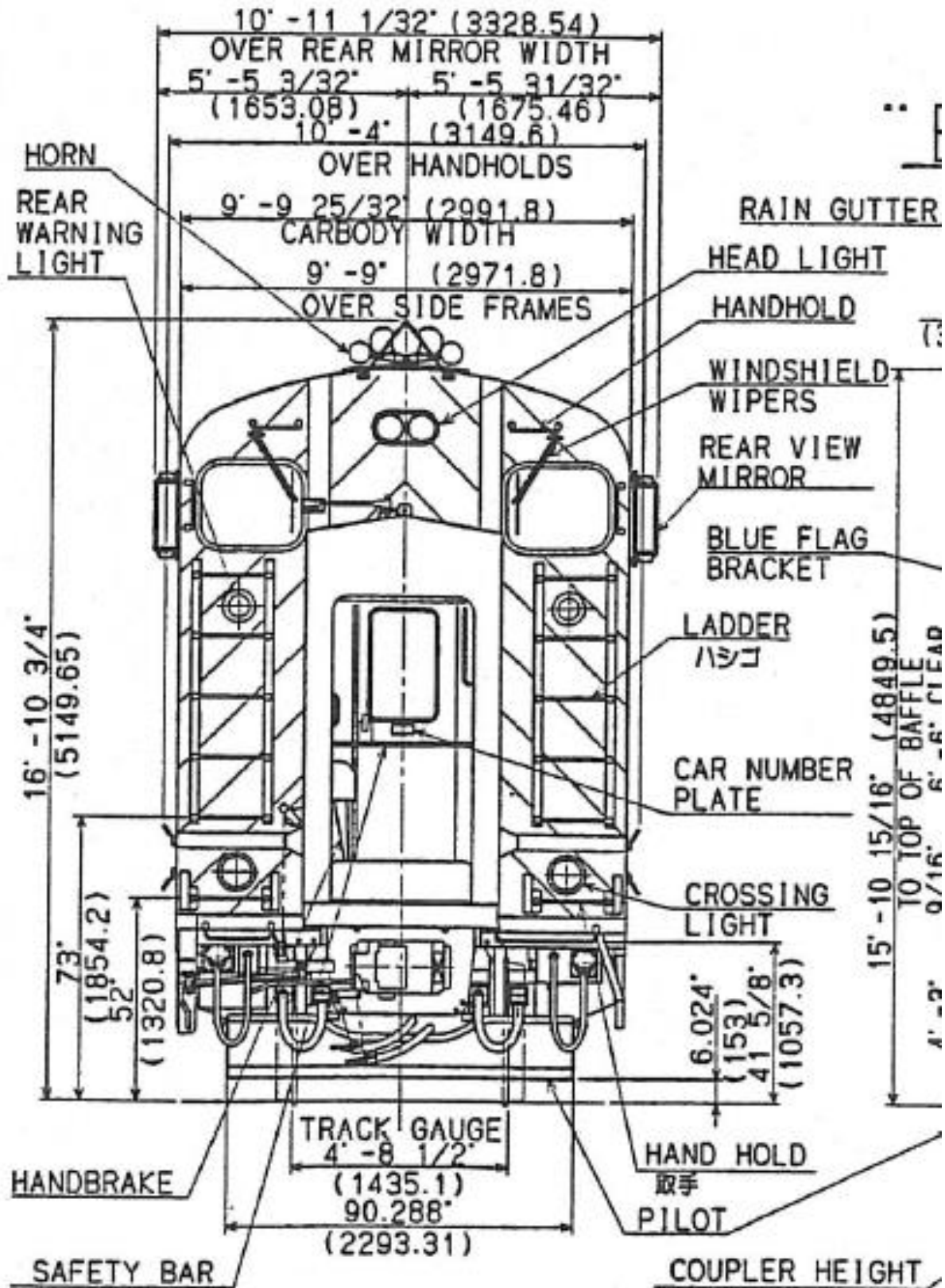
Parameter	Bi-Level Train*	EMU Train
Seated capacity	822	800
ADA compliance	All cars	All cars
Bike capacity	48 per train	48 per train minimum
Number in service	5 trains	25 trains

* Diesel service between Gilroy and San Jose only

6.7. Off-the Shelf Vehicles must fit Caltrain Clearance Diagram

The pictures on the following pages are shown for information only. The formal clearance diagram will be part for the Request for proposal.





APPENDIX C

POSITIVE TRAIN CONTROL TECHNICAL INFORMATION

(Additional information related to item 6.12 in Section 6 of this RFI)

Reason for PTC:

On September 12, 2008, a collision between a freight train and a passenger train in the Los Angeles resulted in 25 fatalities and was one of the worst rail accidents in recent history. This collision led to a major congressional investigation, and in October 2008, H.R. 2095, the Rail Safety Improvement Act (RSIA) was passed by the US government. This Act is now a law mandating Positive Train Control (PTC) on most major passenger and freight rail lines by December 31, 2015. In addition, the RSIA authorized the Federal Railroad Administration (FRA) to develop rules to be incorporated into the Code of Federal Regulations (CFR) regarding PTC. The FRA rule has been written and can be found in 49 CFR 236 Subpart I.

PTC General Description - Additional information is available at:

<http://www.caltrain.com/projectsplans/CaltrainModernization/Documents.html>

At the most fundamental level, PTC must fulfill the following major requirements:

- Prevent train-to-train collisions.
- Prevent overspeed derailments.
- Prevent incursion into established work limits.
- Prevent movement over a switch in the wrong position.

In addition, all PTC systems must be interoperable between any railroads operating on a given territory. For Caltrain, this requirement means that Caltrain's PTC system must be able to operate on Union Pacific Railroad (UPRR) territory, and Caltrain's PTC system must allow UPRR, Altamont Corridor Express (ACE), and Amtrak trains to operate on Caltrain's territory.

Most PTC systems being implemented in the United States are communications based, meaning they use wireless data communications to provide signal and/or speed information to the train. In general, PTC systems can be broken into four segments: onboard (vehicle), wayside, communications, and back office.

Caltrain's PTC system is referred to as the Communications Based Overlay Signal System (CBOSS). The name is derived from the fact that CBOSS is an overlay on top of the existing wayside signaling system that is currently used on the Caltrain corridor. Similar to other PTC systems across the US, CBOSS uses wireless communications to receive signal and speed restriction information to fulfill the requirements of Subpart I. In addition, CBOSS includes a number of enhancements beyond what is required by law, such as station stop enforcement and advanced starts for highway grade crossing activation. For additional information regarding CBOSS functionality, please refer to the Caltrain PTC Development Plan, which is available to the public on www.regulations.gov.

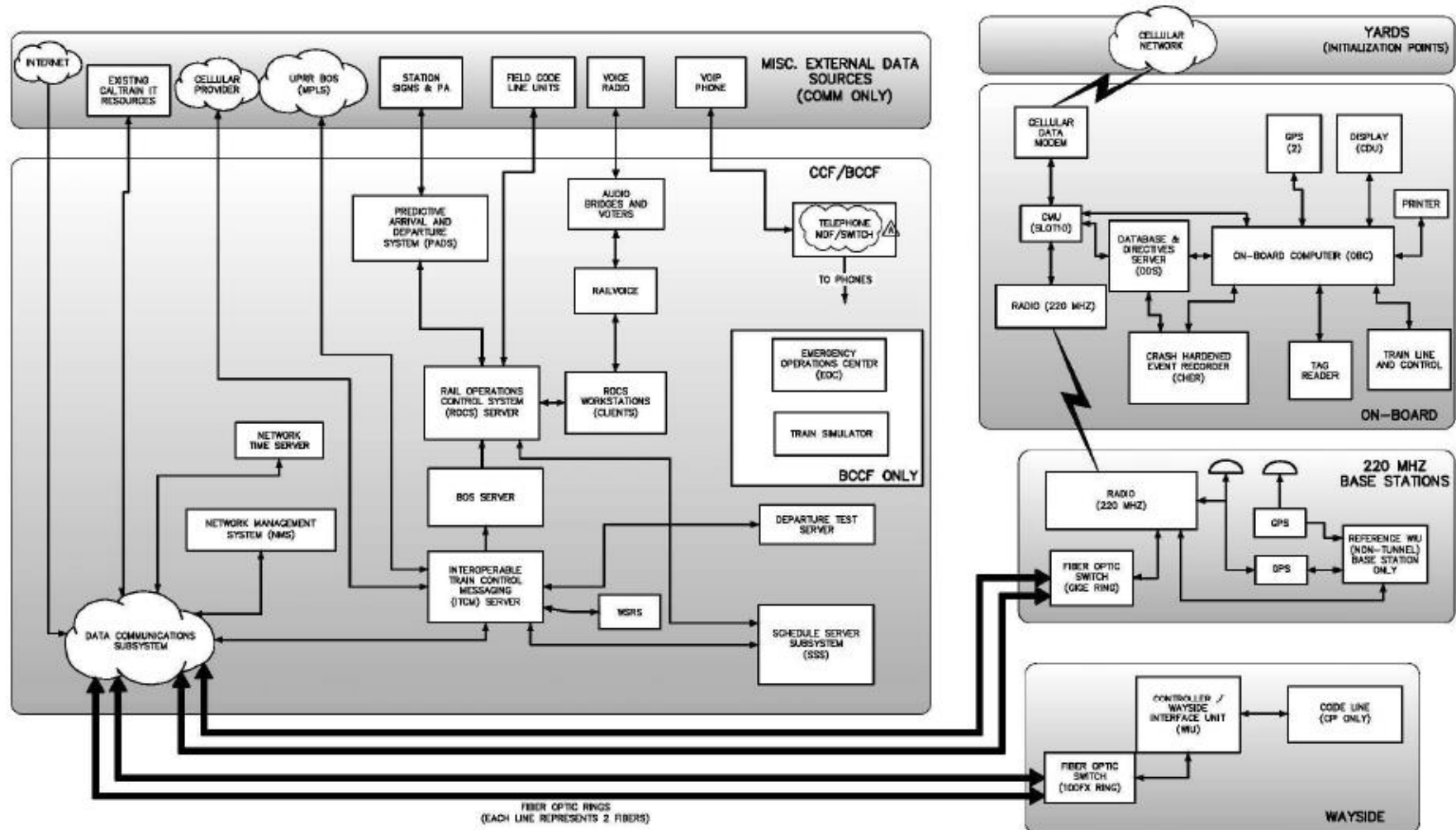
CBOSS System Supplier and Implementation Status:

Caltrain's CBOSS PTC system is being provided by Parsons Transportation Group. General Electric Transportation Systems (GETS) is providing the majority of the onboard PTC equipment as a subcontractor to

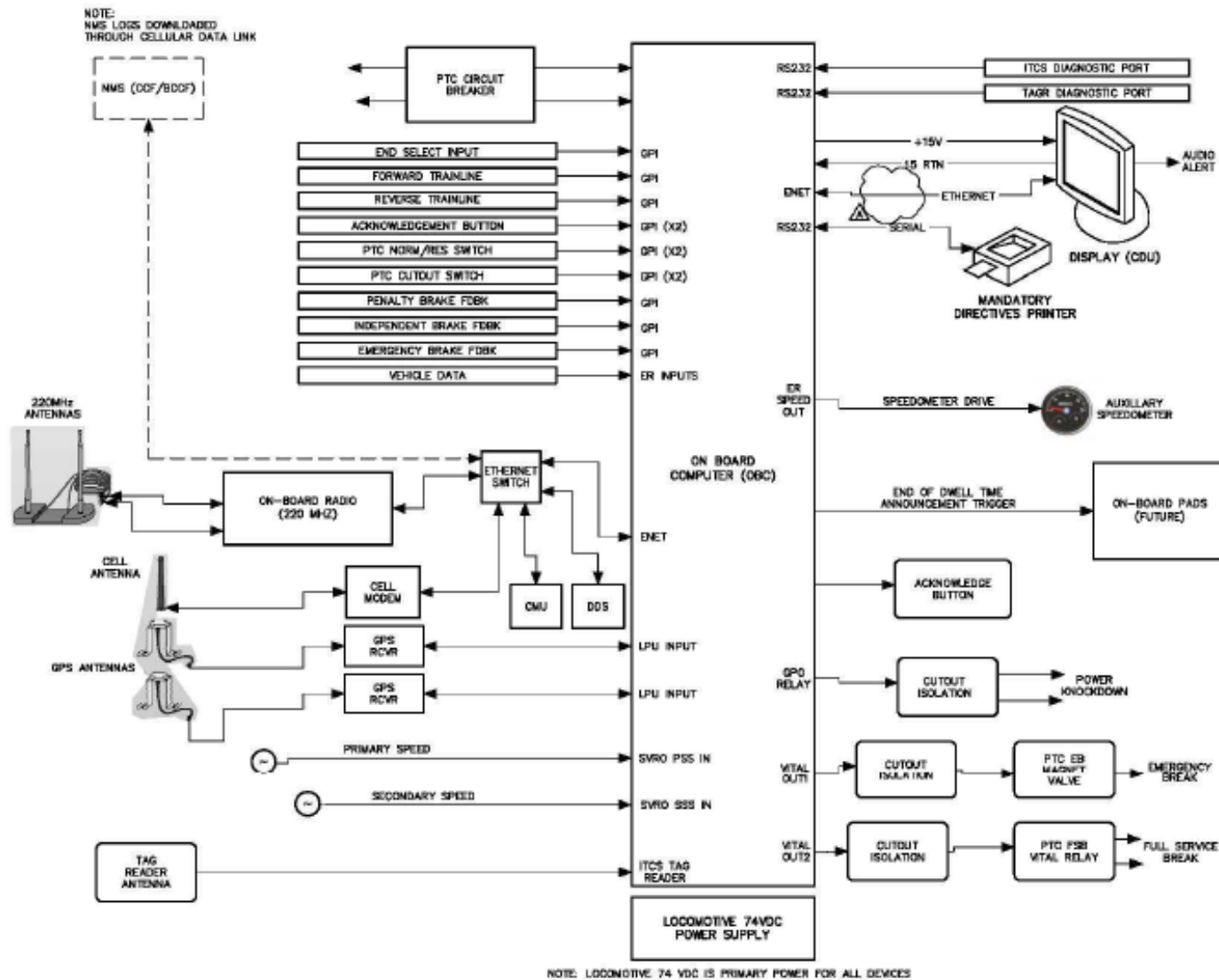
Parsons, though some of the onboard communications equipment is being provided directly by Parsons. GETS refers to the Caltrain PTC system by its brand name, the Interoperable Incremental Train Control System, or I-ITCS. Caltrain has commenced installation of its PTC system, both on the wayside and on its vehicles. Caltrain is on schedule to meet the FRA-mandated deadline of December 31, 2015 for full PTC implementation. Since all PTC infrastructure will be in place by 2015, the anticipated scope of Caltrain's EMU contract will only include onboard equipment for the EMUs and successful integration with Caltrain's PTC system and UPRR's PTC system.

Requirements for Potential Carbuilders:

The figure on the following page is a block diagram that shows the major PTC system components, as well as all of the required interfaces between the onboard system and the other segments of Caltrain's PTC system:



The following page is a more detailed block diagram of the onboard PTC system, including interfaces between the PTC system and other vehicle systems:



As can be seen in the above figure, the onboard PTC system requires interfaces to the vehicles, including a number of vehicle trainlines and the onboard acknowledge switch, plus multiple interfaces to the train's brake system to trigger a penalty brake application and an emergency brake application. The onboard PTC system also provides an output that may be used by the vehicle for onboard announcements.

All PTC antennas will need to be located on the roof of the vehicle. The PTC system requires at least two speed sensors attached to different axles on the vehicle. Additionally, the tag reader and check tag (used to verify tag reader operation) must be installed on a bracket underneath the vehicle. The remainder of the onboard PTC equipment needs to be installed inside the vehicle, with ample electrical locker space provided for items such as the microprocessor-based onboard computers (the OBC and the DDS), an Ethernet switch, a crash-hardened event recorder, the data radio, and a cell modem. Inside the cab, the vehicle must include a display (called the CDU), a printer, and the PTC cutout switch. This description is not a comprehensive list of equipment required for the PTC system, but highlights the major components that must be taken into consideration for integration with a vehicle.

Most of the PTC equipment must be powered directly from a 72VDC vehicle low-voltage power supply. The PTC system includes two DC-DC converters for equipment that needs to be powered at either 24VDC or 12VDC. The PTC system includes some specialty cable harnesses (such as the OBC harness) that are specifically manufactured for this system.

End of Section

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