Caltrain Modernization
EMU Procurement
Boarding Height

CAC Meeting
May 20, 2015

Context
Average Weekday Ridership
Since 2004 143% increase

Standees: 2015 Maximum Loads

<table>
<thead>
<tr>
<th>Depart SJ</th>
<th>Percent of Seated Capacity (low season)</th>
<th>Percent of Seated Capacity (high season)</th>
</tr>
</thead>
<tbody>
<tr>
<td>7:03 AM</td>
<td>135%</td>
<td>158%</td>
</tr>
<tr>
<td>7:45 AM</td>
<td>128%</td>
<td>150%</td>
</tr>
<tr>
<td>8:03 AM</td>
<td>127%</td>
<td>149%</td>
</tr>
<tr>
<td>5:23 PM</td>
<td>122%</td>
<td>143%</td>
</tr>
<tr>
<td>6:57 AM</td>
<td>122%</td>
<td>142%</td>
</tr>
<tr>
<td>7:50 AM</td>
<td>117%</td>
<td>137%</td>
</tr>
<tr>
<td>6:45 AM</td>
<td>108%</td>
<td>126%</td>
</tr>
<tr>
<td>6:50 AM</td>
<td>106%</td>
<td>124%</td>
</tr>
<tr>
<td>4:39 PM</td>
<td>106%</td>
<td>124%</td>
</tr>
<tr>
<td>7:55 AM</td>
<td>103%</td>
<td>121%</td>
</tr>
<tr>
<td>8:40 AM</td>
<td>102%</td>
<td>119%</td>
</tr>
<tr>
<td>4:23 PM</td>
<td>96%</td>
<td>113%</td>
</tr>
</tbody>
</table>
Exceeding Capacity Today

Rider Average Trip

- Caltrain
  - Average trip length 20-28 miles
  - Average trip time 30-50 minutes
- Other Bay Area Transit Systems
  - BART 14 miles / 24 minutes
  - MUNI 2.8 miles / variable
  - VTA light rail 5.7 miles / 23 minutes
  - ACE 48 miles / 60+ minutes
Regional Transportation Needs

• US 101 and Interstate 280 Congested
• Corridor supports growing economy
  - 14% CA GDP; 52% CA patents; 25% CA tax revenue
• Caltrain Commuter Coalition (formed 2014)
  - 75% caltrain rider's commute to work; 60% choice riders

Need to Maximize Capacity

• Add Cars to Diesel Trains Now
• Caltrain Electrification (2020)
  - More trains / serve more riders
  - Increase station stops and/or reduced travel times
• Level Boarding and Longer Trains
Key Regional Benefits

Note: 2013 BAC Report, generates $2.5B economic activity and 9,600 jobs

PCEP Service Benefits

<table>
<thead>
<tr>
<th>Metric</th>
<th>Today</th>
<th>PCEP</th>
</tr>
</thead>
<tbody>
<tr>
<td>Trains / peak hour / direction</td>
<td>5</td>
<td>6</td>
</tr>
<tr>
<td>Passengers / peak hour / direction</td>
<td>5,100</td>
<td>6,300</td>
</tr>
</tbody>
</table>

Example Baby Bullet Train

- Retain 5-6 stops: 60 minutes
- Retain SF to SJ 60 minutes: 6 stops

Example RWC Station

- Train stops / peak hour: 3

- Retain SF to SJ 60 minutes: 13 stops
Electrification Project

2020 Revenue Service

Important milestones to meet 2020 service date
2 Key Contracts / Milestones

- Design Build Electrification Infrastructure
  - RFQ Issued / 6 Teams Pre Qualified
  - DB RFP Issued
  - Contract Award (Fall 2015)
- Electric Multiple Units (96 cars)
  - RFI Issued (2 – 4 builders interested)
  - **RFP to be issued July 2015**
  - Contract Award (Winter 2015/2016)

EMU Original Plan / Modification Consideration
Information to Car Builders

Summer 2014

• Growing Demand
  - Weekday ridership today: 60,000+
  - Weekday ridership future: 110,000+

• Today
  - 20+ mile trips
  - 96%-135% peak weekday (over capacity in low season)
  - 11% bikes on board

• Future
  - Share train slots (6 Caltrain / 4 HSR) per hour / direction

Request for Information

Summer 2014

<table>
<thead>
<tr>
<th>Attributes</th>
<th>Industry Confirmation</th>
</tr>
</thead>
<tbody>
<tr>
<td>Maximize Capacity</td>
<td>• Bi-level (versus single level)</td>
</tr>
<tr>
<td>Previously Made</td>
<td>• Service proven options</td>
</tr>
<tr>
<td></td>
<td>• Saves costs / time</td>
</tr>
<tr>
<td>US Regulation Compliance</td>
<td>• ADA</td>
</tr>
<tr>
<td></td>
<td>• Buy America</td>
</tr>
<tr>
<td></td>
<td>• FRA Waiver / Alternative Compliant Vehicles Criteria</td>
</tr>
<tr>
<td></td>
<td>• Meet Caltrain Technical / Quality Standards</td>
</tr>
<tr>
<td>Floor Threshold</td>
<td>• 2 double doors per car (low level boarding)</td>
</tr>
<tr>
<td></td>
<td>• ~22” to ~25” most common</td>
</tr>
</tbody>
</table>

Note: Anticipate adequate competition for the RFP
Recommended EMU

- Bi-level car
- 2 double doors (located: ~25” floor)
- Passengers step (1-2) from platform
- ADA passengers and bikes located ~25” level
- ADA use mini highs and wayside lifts

Similar to Today’s Bombardier
Future Level Boarding
(Beyond Electrification)

• Important to Caltrain
• Safety enhancements
• Operating efficiencies
• Passenger convenience
• ADA

Future Level Boarding, continued
(Beyond Electrification)

• Caltrain ~25” Dedicated Level Boarding all stations
• HSR ~50” Dedicated Level Boarding 2 – 3 stations
  - Transbay Terminal Center
  - Millbrae
  - Diridon
Level Boarding Challenges

- Lengthy construction period with revenue service
- CPUC waiver needed for freight corridor
- Tenants with different boarding heights
  - Altamont Corridor Express
  - Capitol Corridor
  - Amtrak
- Station area impacts (e.g. ramps, circulation, etc.)

Request for EMU Modification
Request for EMU Modifications

- Stakeholder request for car modification
- Caltrain bi-level EMU ~25” boarding height
- HSR single level cars ~50” boarding height (different needs than Caltrain)
- Can Caltrain modify EMUs to not preclude ~50” boarding in the future?

Explore Modification Options

- 6 month effort (Dec 2014 to May 2015)
- Car builder interviews w/ HSR
- Technical analysis w/ HSR
- Caltrain operational assessment
Car Builder Interviews

• 7 Participated
• Proposed Modification Solutions
  – Option A Cars with more doors
    (Seat loss 60 - 100 per 6 car train)
  – Option B Cars with traps
    (No seat loss, operational challenge)
• Redesign existing vehicles (not starting from scratch)
• Vehicle delivery (2020 revenue service)
• Competition adequate

Caltrain Operational Assessment
Analysis

- 2 Modification Options
- 2 Timeframes
  - 2020 electrified service without HSR
  - Future blended service with HSR
- Focus Areas
  - Boarding for passengers with and without bikes, ADA
  - Passenger circulation within the cars
  - Operational changes

Terminology

Notes: Caltrain EMU Floor ATOR: 22" - 25" (for this presentation ~25’); HSR Train Floor ATOR: 48" - 51" (for this presentation ~50")
2020 Evaluation
Mixed EMU and Diesel Service

(Using Existing Stations)

Modification A (2020)
Cars with More Doors

- 4 double doors (located: ~25" & ~50")
- ~50" double doors may not be feasible
- Passengers / bikes use ~25" doors (1-2 steps)
- ADA location TBD
  - Located at ~50" (use high doors: need high blocks / wayside lift)
  - Located at ~25" (use low doors: need mini high / wayside lift)
Modification A (2020), continued

Cars with More Doors

High Block

Wayside lift

Mini-High

Modification B (2020)

Cars with Traps

Trap: 3–5 steps

Platform 8”

Open Trap

Close Trap

Single Door w/ Trap
Modification B (2020), continued

Cars with Traps

- 2 single doors w/ traps, 2 single doors no trap
  - All doors to ~50” floor
- Single door access (longer dwell)
- Passengers/bikes use doors w/ traps (3-5 steps)
  - Taller first step or step stool needed
  - Bikes located ~25” level (additional internal steps down)
- ADA location ~50” level
  - At stations high blocks / wayside lifts
- Automatic / manual traps

Future Blended System Evaluation
Full Fleet EMU Service

(HSR and Modified Level Boarding Stations)
Scenario 1: Shared Platform at HSR Stations Only

2-3 Stations: Caltrain / HSR Stations Common Platforms ~50”

25 Stations: Caltrain Level Boarding ~25”

Modification A (Future)
Cars with More Doors; Shared 50” Platforms 2 – 3 Stations

- Continue using both doors
- Seats cannot be restored
- Interior lift needed if ADA ~25” level
- Interior circulation challenges
Modification B (Future)

Cars with Traps; Shared 50” Platforms 2 – 3 Stations

- Continue using traps (longer dwell)
- Interior circulation challenges

Scenario 2: Share Platforms at All Stations

28 Stations: Caltrain / HSR Stations
Common Platforms ~50”
Modification A (Future)
*Cars with More Doors; Shared 50” Platforms All Stations*

- Seal low doors and use high doors only
- Interior reconfiguration / restore seats
- Bike circulation and storage challenge
- Interior lift needed if ADA ~25” level

Modification B (Future)
*Cars with Traps; Shared 50” Platforms All Stations*

- Seal traps
- Single door (dwell impacts)
- Bike circulation and storage challenge
Potential Path Forward

Framework

- HSR / Caltrain blended system partnership
- Blended system not yet defined
  - Community planning
  - Environmental evaluation
- Early investment program (defined / environmentally cleared)
  - CBOSS PTC (2015)
  - Electrification Project (2020)
- Need to make EMU design decision now to not preclude common platforms w/ HSR in future
Cars with More Doors Option

- Challenges Associated with More Doors
  - Seat loss / Passenger circulation inside car
- Short-Term Solution (2020)
  - Design car with 2 sets of doors
  - Keep high doors sealed / use low doors
  - Car configured similar to original EMUs (mitigate challenges)
  - Request HSR to fund modification costs
- Future Blended System (TBD)
  - Evaluate use of high doors (~50")
  - Associated car interior reconfiguration

Future Blended Service

- Additional Work Needed
- Community Planning / Environmental Review
- Blended System Definition
  - Service Plan
  - System Upgrades
  - Infrastructure (passing tracks, maintenance facility)
  - HSR Stations / Caltrain Station Modifications
Next Steps

May – July Activities

• Public Meetings
• Release Draft RFP to Car Builders
• June JPB
  - Update on proposed path forward
  - Seats/Standees/Bikes/Bathroom balance
• July JPB
  - Release EMU RFP
  - Regional funding plan update
Questions

website: www.caltrain.com/emu
email: calmod@caltrain.com