A. Boarding Platform Height

The level-boarding platform, which is 14 inches high, is considered the most desirable system in terms of passenger loading and unloading dwell times. This platform system is not feasible due to the configuration of Muni buses, as demonstrated by field tests which concluded a conflict between a 14-inch high platform and bus vehicle wheel lugs.
Other systems are unable to close the gap to the required 3 inches. In one study by the National Bus Rapid Transit Institute, the Health Line in Cleveland achieved a minimum gap of 4 inches with average gaps of 8.11 and 5.92 inches depending on the station. The same study reported that the EmX BRT in Eugene Oregon achieved a minimum gap of 6.5 inches, with average gaps of 8.55 to 9.73 inches.

EmX overcomes this gap by using bridge plates that deploy from the middle door. AC Transit plans a similar approach with bridge plates that deploy from doors other than the front doors. This prevents the use of all doors for boarding at the platforms since the front doors are blocked by railing to prevent confusion as to where wheelchairs should board. Considering the volume of passengers that the Van Ness BRT is expected to carry this approach is impractical.
Because the boarding islands are only available in the BRT corridor it would mean that wheelchair bound passengers boarding outside the BRT corridor would board at the front door. Then they would have to maneuver through the bus to the middle door where the bridge plate would be available to alight in the BRT corridor. This was considered to be impractical considering the volume of passengers the system is expected to carry. The time it would take for someone in a wheelchair to maneuver from one part of the coach to another would introduce an unacceptable increase in dwell time.

In addition using bridge plates would require having them installed on the entire SFMTA rubber tired fleet or having a limited subset of vehicles which could operate on BRT corridor. The first option is a needless expense and the second greatly restricts operational flexibility and reliability by limiting the vehicles available for BRT service.

Additional Concerns:

New Flyer was contacted about the possibility of shortening the wheel base of the front axle to minimize or eliminate the problem with the lug nuts. The team was informed that because of the retooling necessary this is would be prohibitively expensive.

No docking technology or driver skill can guarantee a docking that is within the ADA limits 100% of the time. In the event that the ramp would need to be deployed to compensate for a poor docking the ramp’s deployment envelope would intersect the 14 inch high platform making the ramp unusable.

The height of the vehicle floor is specified at 14 inches but based on the vehicle load and the condition of the vehicles suspension this height can vary by as much as an inch in either direction, from 13 inches to 15 inches.
A person with a bicycle would be required to step off a 14-inch high platform in order to use the bus’ bike rack. And a 14-inch height is well beyond the established criteria for a step or stair riser. As stated in the California Building Code Section 1009.4.2 - Riser Height and Tread Depth, “....riser heights shall be 7 inches (178 mm) maximum and 4 inches (102 mm) minimum.”

A 6-inch high platform eliminates the need for a 1.5 foot tactile warning strip, which is a savings in both capital and future maintenance costs and improves the ADA path of travel on the platform. In addition it facilitates the loading and unloading of bicycles from the front of the coaches and minimizes the chance for damage to the platform or the coaches should the bus get too close to the platform while docking.

The following platform heights were evaluated:

1. Standard 6-inch high platform - Recommended
2. Standard 8 to 10 - inch high platform
3. Level Boarding Platform
4. Level Boarding Platform with mid-door bridge plate

For details regarding the evaluation of the various platforms, see Table 20: Alternatives for Platform Heights.

**Recommendation:** The 6-inch high platform is the recommended platform height. It is similar to the current configuration used and it meets established step riser criteria for passengers entering/exiting the bus as well as patrons using the bike rack. Furthermore, handrails are not necessary at this platform height.
## Table 20: Alternatives for Platform Heights

<table>
<thead>
<tr>
<th>ALTERNATIVES</th>
<th>DESCRIPTION</th>
<th>PROPERTY / AGENCY</th>
<th>ADVANTAGES</th>
<th>DISADVANTAGES</th>
</tr>
</thead>
<tbody>
<tr>
<td>1 Standard Platform</td>
<td>A 6-inch high platform similar to sidewalk-level boarding</td>
<td>LA Metro Rapid, CA, Kansas City MAX, MO, SFMTA, SF, CA</td>
<td>Handrails not required on ramps, Patron familiarity as this is consistency with SFMTA's existing boarding platform height.</td>
<td>Higher dwell time than level boarding due to steps and/or ramps for disabled passenger required for passenger loading.</td>
</tr>
<tr>
<td>2 Raised Platform</td>
<td>A platform height of between 8 to 10 inches to achieve an optimal step of between 5 to 7 inches</td>
<td>EmX System, Eugene, OR</td>
<td>Easier boarding than standard curb height platform. Reduced risk of damage to buses compared to level boarding height.</td>
<td>Higher dwell time than level boarding due to steps and/or ramps for disabled passengers required for passenger loading. Requires handrails on ramp.</td>
</tr>
<tr>
<td>3 Level-Boarding Platform</td>
<td>Station platform raised 14 to 15-inches to approximately same height as low-floor bus floor height by eliminating vertical gap. Bridge plate at mid-door to allow boarding across horizontal gap between bus and platform</td>
<td>Las Vegas MAX, NV, EmX System, Eugene, OR, Cleveland Health Line, OH</td>
<td>Reduced dwell time because of ease of boarding for all passengers. Potential elimination of ramp deployment. More rail-like experience compared to standard height platform</td>
<td>Does not work with Muni’s New Flyer Xcelsior Buses because of conflict with wheel lugs and front door ramp with platform. Does not comply with established stair criteria (riser height) for a person stepping off of the platform to use the bus bike rack. More risk of injury if patrons should fall from platform.</td>
</tr>
<tr>
<td>4 Level-Boarding Platform with Mid-door Bridge Plate</td>
<td>Station platform raised 14 to 15-inches to approximately same height as low-floor bus floor height by eliminating vertical gap. Bridge plate at mid-door to allow boarding across horizontal gap between bus and platform</td>
<td>EmX System, Eugene, OR</td>
<td>Potential elimination of ramp deployment. More rail-like experience compared to standard height platform</td>
<td>Higher dwell time because all passengers required to board at mid-door. BRT project will not have dedicated bus fleet. Requires entire bus fleet to be outfitted with bridge plates, which is cost prohibitive. Requires wheel chair patrons to move to front of bus for harnessing, payment and unloading outside of BRT corridor. May require railing along edge of platform for safety.</td>
</tr>
</tbody>
</table>