Improving Bicycle and Pedestrian Access to Transit: Lessons from Boston and Washington DC

Rail-Volution

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Washington DC & Boston

PLANNING

Metrorail Bicycle & Pedestrian Access Improvements Study

DESIGN & IMPLEMENTATION

MBTA Bicycle Parking & Access Enhancements
Metrorail System Overview

- System opened in 1976
- 86 stations
- 106 miles of track
- Dense urban areas
- Suburban Park & Ride
Metro Ridership Projections

- Between 2005 and 2030, average daily rail ridership is expected to grow by over 40%, or 1.5% annually.
- Over the same period, average daily bus ridership is expected to grow by 26%, or 1% annually.
## Access to Metrorail

<table>
<thead>
<tr>
<th>Mode</th>
<th>2002</th>
<th>2007</th>
<th>% Change</th>
</tr>
</thead>
<tbody>
<tr>
<td>Walk</td>
<td>66,432</td>
<td>78,460</td>
<td>18%</td>
</tr>
<tr>
<td>Park&amp;Ride</td>
<td>69,995</td>
<td>68,969</td>
<td>-1%</td>
</tr>
<tr>
<td>Metrobus</td>
<td>28,543</td>
<td>34,952</td>
<td>22%</td>
</tr>
<tr>
<td>Other bus</td>
<td>13,033</td>
<td>17,620</td>
<td>35%</td>
</tr>
<tr>
<td>Dropped Off</td>
<td>21,000</td>
<td>21,911</td>
<td>4%</td>
</tr>
<tr>
<td>Commuter Train</td>
<td>8,675</td>
<td>9,002</td>
<td>4%</td>
</tr>
<tr>
<td>Ride sharing</td>
<td>2,606</td>
<td>2,463</td>
<td>-5%</td>
</tr>
<tr>
<td><strong>Bicycle</strong></td>
<td><strong>969</strong></td>
<td><strong>1,550</strong></td>
<td><strong>60%</strong></td>
</tr>
<tr>
<td><strong>Total AM Peak Trips Reported</strong></td>
<td>216,854</td>
<td>240,512</td>
<td>11%</td>
</tr>
</tbody>
</table>

*Park and Ride = 29%*
The Last Mile Problem...
Study Process

- Online survey & public meeting
- Best practices interviews
- WMATA stakeholder meetings
- Station typologies & case studies

<table>
<thead>
<tr>
<th>Station Types</th>
<th>Case Study</th>
</tr>
</thead>
<tbody>
<tr>
<td>High Density Urban Mixed-Use in a Grid Network</td>
<td>Ballston</td>
</tr>
<tr>
<td>Urban Residential Center</td>
<td>Braddock Road</td>
</tr>
<tr>
<td>Urban Residential Area with a Bus/Automobile Orientation</td>
<td>Rhode Island Avenue</td>
</tr>
<tr>
<td>Campus and Institutional</td>
<td>College Park</td>
</tr>
<tr>
<td>Mixed-Use in a “Pod” Layout</td>
<td>Vienna-Fairfax</td>
</tr>
<tr>
<td>Long-Term Potential for High Density Transit Oriented Development (TOD) or</td>
<td>West Hyattsville</td>
</tr>
<tr>
<td>Planned Unit Development (PUD)</td>
<td></td>
</tr>
<tr>
<td>Suburban Residential Area</td>
<td>Huntington</td>
</tr>
<tr>
<td>Auto Collector/Suburban Freeway</td>
<td>Shady Grove</td>
</tr>
<tr>
<td>Employment Center/Downtown/Urban Core</td>
<td>Gallery Place</td>
</tr>
</tbody>
</table>
Recommendations

- Maintenance & Communications
- Station Assessment & Design
- Transit Oriented Development
- Off-Site Connections & Development
- Mode Share Goals
Potential Access Mode Shift

Is parking for your bike adequate at the station at the beginning of your trip?

Would you consider biking to Metro instead of driving if certain changes were made?
Implementation

- Revise Design Guidelines
- Bicycle Parking
# Metrorail Bicycle Access Goals

<table>
<thead>
<tr>
<th>Bicycle Parking</th>
<th>2020</th>
<th>2030</th>
</tr>
</thead>
<tbody>
<tr>
<td>Bicycle Parking Goal</td>
<td>2.1% of Projected 2020 AM Peak Ridership&lt;sup&gt;13&lt;/sup&gt;</td>
<td>3.5% of Projected 2030 AM Peak Ridership&lt;sup&gt;14&lt;/sup&gt;</td>
</tr>
<tr>
<td>Total Bicycle Parking Spaces Needed</td>
<td>7,113&lt;sup&gt;15&lt;/sup&gt;</td>
<td>12,435&lt;sup&gt;16&lt;/sup&gt;</td>
</tr>
<tr>
<td>Bicycle Parking Currently Provided&lt;sup&gt;17&lt;/sup&gt;</td>
<td>4,113</td>
<td>4,113</td>
</tr>
<tr>
<td>Total New Bicycle Parking Spaces Needed</td>
<td>3,000&lt;sup&gt;18&lt;/sup&gt;</td>
<td>8,322&lt;sup&gt;19&lt;/sup&gt;</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Bicycle Parking Type&lt;sup&gt;20&lt;/sup&gt;</th>
<th>New Short Term&lt;sup&gt;21&lt;/sup&gt; Parking Spaces</th>
<th>693</th>
<th>New Short Term Parking Spaces</th>
<th>1,922</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>New Long Term&lt;sup&gt;22&lt;/sup&gt; Parking Spaces</td>
<td>2,307</td>
<td>New Long Term Parking Spaces</td>
<td>6,400</td>
</tr>
</tbody>
</table>
MBTA System

Massachusetts Bay Transportation Authority
Rapid Transit
Key Bus Routes Map

MBTA Commuter Rail System

New Hampshire

Rhode Island

Legend:
- Red
- Green
- Orange
- Blue
- Yellow
- Black

Notes:
Access & Capacity
Location & Design
Bike Parking Approach

- Bike Parking Needs Assessment & Rankings
  - population & demographics
  - # bike parking spaces
  - # bikes parked
  - # bikes parked not to racks
  - thefts
Toolkit
Facility Siting

- Location
  - Accessibility
  - Visibility
- Site impacts
  - Parking
  - Marketing
  - Utilities
  - Structures
- Property ownership
# Design Guidelines

## Facility Dimensions

<table>
<thead>
<tr>
<th>Rack Type</th>
<th>Capacity/Unit</th>
<th>Depth (Minimum/Desired)</th>
<th>Width Occupied (Minimum/Desired)</th>
<th>Height (low-side)</th>
<th>Aisle Width (Minimum/Desired)</th>
<th>Perimeter Clear Zone (Minimum/Desired)</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>General Use</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Post and ring</td>
<td>2 bikes/post</td>
<td>6'-2&quot;/8'-0&quot;</td>
<td>2'-6&quot;/3'-0&quot;</td>
<td>-</td>
<td>-</td>
<td>1'-8&quot;/3'-0&quot;</td>
</tr>
<tr>
<td>U-Rack</td>
<td>2 bikes/U</td>
<td>6'-2&quot;/8'-0&quot;</td>
<td>2'-6&quot;/3'-0&quot;</td>
<td>-</td>
<td>-</td>
<td>1'-8&quot;/3'-0&quot;</td>
</tr>
<tr>
<td>5 U-Rack on sled</td>
<td>10 bikes/sled</td>
<td>6'-2&quot;/8'-0&quot;</td>
<td>15'-6&quot;/18'-0&quot;</td>
<td>-</td>
<td>-</td>
<td>1'-8&quot;/3'-0&quot;</td>
</tr>
<tr>
<td>Coat hanger</td>
<td>4-8 bike/rack</td>
<td>7'-0&quot;/8'-0&quot;</td>
<td>6'-5&quot;/7'-0&quot;</td>
<td>-</td>
<td>-</td>
<td>1'-8&quot;/3'-0&quot;</td>
</tr>
<tr>
<td>Hinged bike shell</td>
<td>1 bike/shell</td>
<td>7'-4&quot;/8'-0&quot;</td>
<td>3'-3&quot;/4'-0&quot;</td>
<td>-</td>
<td>-</td>
<td>1'-8&quot;/3'-0&quot;</td>
</tr>
<tr>
<td>Bike Locker</td>
<td>1 bike/locker</td>
<td>6'-2&quot;/8'-0&quot;</td>
<td>2'-6&quot;/3'-0&quot;</td>
<td>-</td>
<td>-</td>
<td>1'-8&quot;/3'-0&quot;</td>
</tr>
<tr>
<td><strong>Under Shelter</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
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<td>Post and ring</td>
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<td>6'-10&quot;/7'-0&quot;</td>
<td>-</td>
<td>1'-8&quot;/4'-0&quot;</td>
</tr>
<tr>
<td>5 U-Rack on sled/bench</td>
<td>8 bikes/sled</td>
<td>6'-2&quot;/8'-0&quot;</td>
<td>12'-4&quot;/14'-4&quot;</td>
<td>6'-10&quot;/7'-0&quot;</td>
<td>-</td>
<td>1'-8&quot;/4'-0&quot;</td>
</tr>
<tr>
<td>6 U-Rack on sled</td>
<td>12 bikes/sled</td>
<td>6'-2&quot;/8'-0&quot;</td>
<td>15'-6&quot;/18'-0&quot;</td>
<td>6'-10&quot;/7'-0&quot;</td>
<td>-</td>
<td>3'-0&quot;/4'-0&quot;</td>
</tr>
<tr>
<td>Double Decker</td>
<td>12 bikes/unit</td>
<td>7'-0&quot;/8'-0&quot;</td>
<td>9'-1&quot;/10'-0&quot;</td>
<td>8'-7&quot;/9'-0&quot;</td>
<td>-</td>
<td>1'-6&quot;/4'-0&quot;</td>
</tr>
<tr>
<td>Vertical rack</td>
<td>1 bike/arm</td>
<td>4'-6&quot;/6'-0&quot;</td>
<td>2'-6&quot;/3'-0&quot;</td>
<td>7'-6&quot;/8'-6&quot;</td>
<td>-</td>
<td>1'-6&quot;/4'-0&quot;</td>
</tr>
<tr>
<td><strong>In Cage</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>7 U-Rack on sled</td>
<td>14 bikes/sled</td>
<td>6'-2&quot;/8'-0&quot;</td>
<td>18'-0&quot;/21'-0&quot;</td>
<td>8'-0&quot;/8'-6&quot;</td>
<td>4'-0&quot;/6'-0&quot;</td>
<td>3'-0&quot;/4'-0&quot;</td>
</tr>
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<td>1'-6&quot;/4'-0&quot;</td>
</tr>
</tbody>
</table>
Bike Port Design

Plan View:
- Roof member long 4" x 3/8" square tube
- Roof member 4" x 1/8" square tube
- 8'-6" x 20'-6" concrete slab by others
- 1'-10" x 10'-8" limit of roof
- 18'-8" min.
- 20'-0" min.

Front View:
- Roof panels 1/2" 22-gauge corrugated galvanized steel
- Upright column 4" x 3/8" square tube
- Base plate 9" x 9" x 1/2"
- Wedge anchor bolts 4 1/2" x 5/8" dia. (4 per column)
- Concrete pedestal (1 per column) by others
- Finished grade by others

Side View:
- 1'-5" slope

NOTE:
See specifications for finish
Station Designs

Morton Street

- Prepare concrete pad
- Maintain clear width on all paths of travel
- Relocate existing landscape boulders

Concrete Slab Footprint
Bicycle Shelter Footprint
*Not to scale
South Station
SOUTH STATION CAGE
OPTION-1

TOTAL PARKING
60 SPACES

ATLANTIC AVENUE
SOUTH STATION CAGE
OPTION-2

TOTAL PARKING
72 SPACES

ATLANTIC AVENUE

ENTRANCE AT FOOD COURT

CONCRETE SLAB

ENTRANCE TO PLATFORM

DOOR

TOP RED ELBOW DOWN 130.80
TOP RED ELBOW EL 100.84

TOP WALL EL 123.71

TOP WALL EL 123.79

TOP WALL EL 103.79

RAMP

DOOR

TOP WALL EL 123.71

6'-0" MIN.

6'-8"

32'-0" +/-

8" MIN.

19'-0" +/-
Thank you!

Contact information:

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lcruse@tooledesign.com