MAX Station Optimization

May 31, 2019
Long a critique of MAX

“Has there been any discussion about reducing the number of stops on the route? I find the 4 stops within 6 blocks downtown perplexing as I often get off and walk to the Orange Line and beat the train I just got off…”

- Rider submission to Service Improvement Process (SIP #530975)
Rail Segment Comparisons

Sunset Goose Hollow Pioneer Courthouse Square Lloyd Center Gateway

- Sunset to Goose Hollow: 5 miles, 3 stations, 9 minutes
- Goose Hollow to Pioneer Courthouse Square: 3 miles, 12 stations, 22 minutes
- Pioneer Courthouse Square to Lloyd Center: 5 miles, 5 stations, 11 minutes
A focus on speed and on-time performance

Similar initiatives to support a growing region:

Investments to date:
- Major on time performance (OTP) focus, bringing average OTP on MAX from 84% to 92%
- Improvements to Steel Bridge to speed travel times
- Changes to emergency response plans that ensure quick clearing of tracks blocked by fallen trees or cars in the right of way
- Changes to the overhead power system to reduce slow orders during hot weather
- Changes to tracks to reduce slow orders during hot weather
- Changes to police procedure to reduce the delays caused by police activity

Investments planned:
- Red Line investments to improve on time performance
- Further investments in Steel Bridge
- Study of dwell time at platform and adjustments to optimize performance
Light Rail Design Circa 1970

- Suburban City
- Close in Neighborhood
- Suburban City
- Close in Neighborhood
- Suburban City

Central Business District
Light Rail Design Circa 2000

Central Business District

- Suburban City
- Close in Neighborhood
- Close in Neighborhood
- Suburban City
- Suburban City
Distances between people and jobs are growing, particularly for communities of concern.

“The number of jobs near the typical Hispanic (-17 percent) and black (-14 percent) resident in major metro areas declined much more steeply than for white (-6 percent) residents, a pattern repeated for the typical poor (-17 percent) versus non-poor (-6 percent) resident.”
Best Practices – Stop Spacing

1/4-mile stop spacing
Stops every 1320 feet or about 5 Portland blocks, with duplicate access (shaded area)

1/3-mile stop spacing
Stops every 1760 feet or about 7 Portland blocks, with duplicate access (shaded area)

Within range of industry Best practices
Best Practices – Stop Spacing

½-mile stop spacing
Stops every 2640 feet or about 10 Portland blocks, with no duplicate access

Within range of industry
Best practices

1-mile stop spacing
Stops every 5280 feet or about 20 Portland blocks, with no duplicate access
Duplication in coverage area of existing stations
Ridership

Approximately 10,000 riders passing through each station proposed for closure.

Note that single direction stations along Morrison & Yamhill have been combined with their pair stations to allow comparison to the other bi-directional stations.

Source: Spring 2018 Census
Stations Under Consideration

An informal review of other transit systems found that no other city in North America has stations that are as close, or closer, to another station as these four.

TriMet’s bus system, with more than 6,600 stops has fewer than 7 percent of stops within 500 feet of an alternative.
Kings Hill/ SW Salmon St

Contextual Distances
“How do you feel about closing the Kings Hill/SW Salmon station?”

Onboard Survey of Affected Riders, N=516

Cells may not add to 100% due to rounding
Mall/SW 4th Ave & Mall/SW 5th Ave

Distances in context of Pioneer Place Mall
Skidmore Fountain

Skidmore Fountain Station

Old Town/Chinatown Station

500’
“How do you feel about closing the Skidmore Fountain station?”

Onboard Survey of Affected Riders, N=511

- Strongly Agree, 28%
- Somewhat Agree, 19%
- Neither Agree nor Disagree, 16%
- Somewhat Disagree, 14%
- Strongly Disagree, 16%
- Don't know, 6%

Cells may not add to 100% due to rounding
What if all riders at the Mall Stations shifted to Pioneer Square?

Fruin’s Level of Service Standards

<table>
<thead>
<tr>
<th>Waiting Area LOS</th>
<th>Requirement</th>
</tr>
</thead>
<tbody>
<tr>
<td>LOS A</td>
<td>&gt;= 13 ft² per person</td>
</tr>
<tr>
<td>LOS B</td>
<td>10-13 ft² per person</td>
</tr>
<tr>
<td>LOS C</td>
<td>7-10 ft² per person</td>
</tr>
<tr>
<td>LOS D</td>
<td>3-7 ft² per person</td>
</tr>
<tr>
<td>LOS E</td>
<td>2-3 ft² per person</td>
</tr>
<tr>
<td>LOS F</td>
<td>&lt; 2 ft² per person</td>
</tr>
</tbody>
</table>
What if all riders at the Mall Stations shifted to Pioneer Square?

Space Available:
(feet)

- Furnishing Zone: 6
- Accessory Zone: 3
- Length: 190
- Appurtenances: -10%

1540 square feet
What if all riders at the Mall Stations shifted to Pioneer Square?

Busiest trips combined: $32 + 39 = 71$
What if all riders at the Mall Stations shifted to Pioneer Square?

Busiest trips combined:
49 + 56 = 105

<table>
<thead>
<tr>
<th>Person Capacity</th>
<th>A</th>
<th>B</th>
<th>C</th>
<th>D</th>
<th>E</th>
<th>F</th>
</tr>
</thead>
<tbody>
<tr>
<td>&gt;=118</td>
<td>49</td>
<td>56</td>
<td></td>
<td></td>
<td></td>
<td></td>
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<tr>
<td>118 - 154</td>
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</tr>
<tr>
<td>154 - 220</td>
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</tr>
<tr>
<td>220 - 513</td>
<td></td>
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<td></td>
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</tr>
<tr>
<td>513 - 770</td>
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<td>&lt;770</td>
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</tbody>
</table>
Impact to dwell times:

MAX Stations have little variation in the dwell times thanks to All-Door Boarding and Off-Board Fare Payment.

Additional riders at alternate stations will have minimal impact on the dwell times of those stations.
Impact to dwell times:

A model was built using average dwell times and ridership at other MAX stations. For this exercise we looked at the unlikely, worst case scenario of all riders shifting exclusively to one alternate station.

Kings Hill to Providence Park
+1357 daily riders, +3 seconds

Mall to Pioneer Square
+6149 daily riders, +1-2 seconds

Skidmore to Old Town/Chinatown
+2245 daily riders, +3 seconds
NW 11th/Everett Streetcar Station Closure and Ridership

Portland Streetcar Ons/Offs: January - April 2016
NW 11th and Couch, Everett, and Glisan
NW 11th/Everett Streetcar Station Closure and Ridership

Portland Streetcar Ons/Offs: 2015 and 2017
NW 11th and Couch, Everett, and Glisan

2015 On/Off: NW 11th & Couch, NW 11th & Everett, NW 11th & Glisan
2017 On/Off: NW 11th & Couch, NW 11th & Everett, NW 11th & Glisan
Travel Time Savings:

<table>
<thead>
<tr>
<th>Westbound</th>
<th>Dwell Time Saved (average in seconds)</th>
<th>Acceleration / Deceleration Time Saved (seconds)</th>
<th>Time Saved (seconds)</th>
<th>Total Time Saved (minutes)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Skidmore Fountain</td>
<td>33</td>
<td>10</td>
<td>43</td>
<td></td>
</tr>
<tr>
<td>Mall/SW 5th Ave</td>
<td>52</td>
<td>10</td>
<td>62</td>
<td></td>
</tr>
<tr>
<td>Kings Hill/SW Salmon</td>
<td>27</td>
<td>10</td>
<td>37</td>
<td></td>
</tr>
<tr>
<td>TOTAL:</td>
<td>112</td>
<td>30</td>
<td>142</td>
<td>2.37</td>
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</table>

<table>
<thead>
<tr>
<th>Eastbound</th>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Kings Hill/SW Salmon</td>
<td>33</td>
<td>10</td>
<td>43</td>
</tr>
<tr>
<td>Mall/SW 4th Ave</td>
<td>26</td>
<td>10</td>
<td>36</td>
</tr>
<tr>
<td>Skidmore Fountain</td>
<td>30</td>
<td>10</td>
<td>40</td>
</tr>
<tr>
<td>TOTAL:</td>
<td>89</td>
<td>30</td>
<td>119</td>
</tr>
</tbody>
</table>

Anticipated 2 – 2:30 minutes each way improvement on travel time or 14% of travel time from Old Town/Chinatown to Goose Hollow
Outreach & Engagement:

- Website
- Nine Open Houses
- Multiple Surveys (including Spanish)
- Postings at stations

Meetings or Presentations with:

- City of Portland, Bureau of Transportation
  - Committee on Accessible Transportation (CAT)
  - Portland Saturday Market
  - Mercy Corp
  - The Nines Hotel
  - Portland Rescue Mission
  - Pioneer Place
  - Pioneer Courthouse Square
  - Apple Store – Management
  - Niketown - Management
  - Lincoln High School
  - MAC
  - Goose Hollow Foothills League
  - University of Oregon
  - Stadium District Business Association
  - Old Town/Chinatown Community Association
  - PBA Transportation Committee
  - Downtown Public Safety Committee
  - Go Lloyd Board
  - NWDA Board
  - Lan Su Chinese Garden
  - Westside Transportation Alliance

- Transportation Equity Advisory Committee (TEAC)
- Multnomah County Commissioners
- Westside Economic Alliance
- Washington County Coordinating Committee
- Central City Concern
Duplication in coverage area of existing stations
Quarter mile coverage area of remaining stations
Conclusions

• Downtown stations have significant duplication.
• Stations can be trimmed – increasing speed without reducing convenience, impacting dwell time or station crowding.
• Travel time savings are significant at the system level.
• Improvements to speed and on time performance will benefit low income and minority communities.
• System riders support consolidations at all stations, but with some differences.
• Each area has unique characteristics.
Recommendation

Retain Skidmore station with review in three years
  • Ridership
  • Development
  • Security
  • Burnside Bridge

Permanent closure of 4th & Mall and 5th & Mall stations

Trial closure of Kings Hill station with review in one year
  • Ridership
  • Operational improvements
  • Security
Benefits:

• 3 minutes every day adds up to 13 hours each year not spent in transit for 10,000 people.

• 1.5 minutes out of 356 trips adds up to 9 operational hours per day to reinvest in service reliability.
Questions?

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