SOUTHWEST CORRIDOR
LIGHT RAIL PROJECT

Steering Committee
Bonita to Bridgeport

May 13, 2019
SWC Cost Elements
Note: Assume 3.5% escalation

Project Scope Target (YOE) 2.375B
2018 Estimate (YOE) 2.733B

To Reach Bridgeport:
• Solve Viaducts Funding:
  • Reduce High Value ROW Costs
  • Reduce O&M Facility:
  • Reduce Bonita to Bridgeport Costs:
  • Continue to Balance Cost Pressures:

Total Cost/Scope Gap: 2.733B / (-0.358M)

A Downtown Tie-in
  + $10-40M

B Marquam Hill Connector
  + $0-20M

C Consolidate Station(s)
  - $3.4-7.5M

D Viaducts
  - $200M

E High Value ROW
  - $15-50M

F B2 - Short Span
  - $0-7.5M

G O&M Facility
  - $15-50M

H 74th Alignment
  - $0-51M

I Upper Boones At-Grade
  - $55M

Updated: 04.02.2019
Options Considered

1. LPA 2018

2. LPA ELEVATED

3. LPA AT-GRADE, REFINED

4. 74TH AVE.

5. 74TH AVE., REFINED

6. EAST OF WES
Detailed traffic study by the end of 2019 will help partners collaborate on at-grade crossing design.

1. Fewer business impacts
2. Lower cost with fewer risks to project schedule
3. Station at Upper Boones Ferry Road serves employment center
4. Multiple potential designs for Bridgeport Station, including option with no business displacements

- Safety – follow industry best practices
- Transit reliability and travel time – make transit fast and easy
- Traffic issue – motor vehicle queuing, level of service, delay – meet 2035 “no-build” conditions (2045 at I-5 ramps)
# Comparison of Options

<table>
<thead>
<tr>
<th>Traffic</th>
<th>LPA 2018</th>
<th>LPA Elevated</th>
<th>LPA at-grade Refined</th>
<th>74th Ave</th>
<th>74th Ave Refined</th>
<th>East of WES</th>
</tr>
</thead>
<tbody>
<tr>
<td>At-grade crossings</td>
<td>72nd Ave Upper Boones, with queuing concern</td>
<td>——</td>
<td>72nd Ave Upper Boones, with queuing concern</td>
<td>——</td>
<td>——</td>
<td>——</td>
</tr>
<tr>
<td>Bridgeport Park &amp; Ride Location</td>
<td>South of Lower Boones</td>
<td>South of Lower Boones</td>
<td>South of Lower Boones</td>
<td>North of Lower Boones</td>
<td>North of Lower Boones</td>
<td>North of Lower Boones</td>
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</table>

<table>
<thead>
<tr>
<th>Light Rail Performance</th>
<th>N/A</th>
<th>30 seconds faster</th>
<th>30 seconds slower</th>
<th>60 seconds faster</th>
<th>60 seconds faster</th>
<th>60 seconds faster</th>
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<tbody>
<tr>
<td>Travel time difference from LPA</td>
<td>Risk of delay</td>
<td>——</td>
<td>Risk of delay</td>
<td>——</td>
<td>——</td>
<td>——</td>
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<table>
<thead>
<tr>
<th>Property Acquisitions</th>
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<tbody>
<tr>
<td>Full or partial acquisitions</td>
<td>31</td>
<td>28</td>
<td>33</td>
<td>32</td>
<td>34</td>
<td>24</td>
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<table>
<thead>
<tr>
<th>Relocations</th>
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<tbody>
<tr>
<td>Business</td>
<td>12</td>
<td>11</td>
<td>8</td>
<td>43</td>
<td>10</td>
<td>9</td>
</tr>
<tr>
<td>Employees</td>
<td>320</td>
<td>270</td>
<td>130</td>
<td>680</td>
<td>190</td>
<td>250</td>
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<table>
<thead>
<tr>
<th>Environmental Impacts</th>
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<th></th>
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<tbody>
<tr>
<td>Acres of floodplain</td>
<td>0.00</td>
<td>0.00</td>
<td>0.00</td>
<td>0.80</td>
<td>0.00</td>
<td>0.00</td>
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<tr>
<td>Acres of wetland</td>
<td>0.01</td>
<td>0.1</td>
<td>0.1</td>
<td>0.56</td>
<td>0.14</td>
<td>0.26</td>
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<table>
<thead>
<tr>
<th>Land Use, Trails</th>
<th></th>
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<tbody>
<tr>
<td>Regional trail opportunities</td>
<td>——</td>
<td>——</td>
<td>——</td>
<td>On-street</td>
<td>On-street</td>
<td>——</td>
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</table>

<table>
<thead>
<tr>
<th>Risks</th>
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</tr>
</thead>
<tbody>
<tr>
<td>Railroad interface</td>
<td>Union Pacific; no existing agreement</td>
<td>Union Pacific; no existing agreement</td>
<td>Union Pacific; no existing agreement</td>
<td>Outside railroad right-of-way</td>
<td>Portland &amp; Western (WES); shared use agreement</td>
<td>Portland &amp; Western (WES); shared use agreement</td>
</tr>
<tr>
<td>Utilities</td>
<td></td>
<td></td>
<td></td>
<td></td>
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<table>
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<tr>
<th>Cost</th>
<th></th>
<th></th>
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<th></th>
<th></th>
<th></th>
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</thead>
<tbody>
<tr>
<td>Difference from most recent full-project cost estimate</td>
<td>(-$55m)</td>
<td>——</td>
<td>(-$53m)</td>
<td>(-$31m)*</td>
<td>(-$77m)*</td>
<td>+$12.5m*</td>
</tr>
</tbody>
</table>

*Risk of additional environmental study
Adjacent freight and light rail tracks will require regrading of Upper Boones Ferry Road, traffic operation and project footprint to be studied.

The short distances between the existing signalized intersections (Sequoia and 72nd) and possible pedestrian crossing locations makes signal coordination challenging and may cause delays for all modes.
Future Planned Projects
MARCH AND APRIL COMMENT CARDS
GATHERED FROM PUBLIC OPEN HOUSES AND ONLINE

PREFERRED OPTIONS

<table>
<thead>
<tr>
<th>Option</th>
<th>Preferred Count</th>
</tr>
</thead>
<tbody>
<tr>
<td>LPA Elevated (Option 2)</td>
<td>103</td>
</tr>
<tr>
<td>74th Ave Refined (Option 5)</td>
<td>57</td>
</tr>
<tr>
<td>LPA Refined (Option 3)</td>
<td>57</td>
</tr>
<tr>
<td>LPA 2018 (Option 1)</td>
<td>57</td>
</tr>
<tr>
<td>East of WES (Option 6)</td>
<td>29</td>
</tr>
<tr>
<td>74th Ave (Option 4)</td>
<td>4</td>
</tr>
</tbody>
</table>

Respondents could choose multiple

TOP OPEN-ENDED COMMENTS

- Concern about business impacts (117)
- Circuit Bouldering Gym (54)
- Concern about traffic impacts (52)
- Cost Considerations (26)
- Prefer lower cost option (17)
- Prefer higher cost for lower impacts (9)
April 25th Open House

- About 30 people; 10 comment cards
- Many supported LPA elevated (for traffic and avoiding business impacts)
- A few supported 74th Ave, refined (for station at 74th & Upper Boones)
- A few supported LPA at-grade, refined
- Many advocated for bike and pedestrian access to stations
Community Advisory Committee (CAC) feedback

- **Unanimous concurrence with staff findings**
- **Additional Considerations:**
  - Safety improvements for people walking and biking at Upper Boones crossing
  - Freight mobility at 72nd & Upper Boones
  - Interconnected signals
  - Robust support for relocated businesses
Detailed traffic study by the end of 2019 will help partners collaborate on at-grade crossing design.

- Safety – follow industry best practices
- Transit reliability and travel time – make transit fast and easy
- Traffic issue – motor vehicle queuing, level of service, delay – meet 2035 “no-build” conditions (2045 at I-5 ramps)

Staff Recommendation: LPA At-Grade, Refined

**Staff Findings on LPA At-Grade, Refined Route**

1. Fewer business impacts
2. Lower cost with fewer risks to project schedule
3. Station at Upper Boones Ferry Road serves employment center
4. Multiple potential designs for Bridgeport Station, including option with no business displacements

**Follow-up on LPA At-Grade, Refined Route**

Detailed traffic study by the end of 2019 will help partners collaborate on at-grade crossing design.

- Safety – follow industry best practices
- Transit reliability and travel time – make transit fast and easy
- Traffic issue – motor vehicle queuing, level of service, delay – meet 2035 “no-build” conditions (2045 at I-5 ramps)
Discussion & Decision
SOUTHWEST CORRIDOR
LIGHT RAIL PROJECT

Steering Committee
Marquam Hill Connector

May 13, 2019
Marquam Hill Connector
Goals & Criteria

• **Access:** Develop equitable, efficient, convenient connections for all users to a number of destinations.

• **Safety:** Create a safe & secure, 24/7 connection for all users.

• **Context:** Enhance & improve the historic, scenic & recreational resources; consider the unique character of the area in the design.

• **Environmental:** Project & enhance natural resources & habitat.
Goals & Criteria

• **Operational:** Provide a long-term, sustainable connection for current & future users.

• **Budget/Schedule:** Be cost effective & timely within the SW Corridor Light Rail project.

• **Experience:** Create a connection that provides a high-quality user experience & inspires civic pride.
Timeline

Connector Type Selected
June 2019

Continued Outreach & Design Work
2019 - 2022
<table>
<thead>
<tr>
<th>Option</th>
<th>Rough Cost Estimate</th>
</tr>
</thead>
<tbody>
<tr>
<td>Bridge + Elevator</td>
<td>$15 – 25 million</td>
</tr>
<tr>
<td>Inclined Elevator (Funicular)</td>
<td>$35 – 45 million</td>
</tr>
<tr>
<td>Aerial Tram</td>
<td>$50 – 85 million</td>
</tr>
<tr>
<td>Tunnel + Elevator</td>
<td>$55 – 125 million</td>
</tr>
</tbody>
</table>
Marquam Hill Access

OHEP  OHSU Hospital Expansion Project (Proposed)
ECEC  Oregon Elks Children’s Eye Clinic (Under Construction)
HRC  Hatfield Research Center

Common 9th Floor
Proposed OHEP 9th Floor Skybridges
Elevator to Common 9th Floor
Interior ADA-accessible connection
Exterior ADA-accessible connection
Proposed ADA-accessible pathway
SW Trail 1
4T Trail

Not to scale
Bridge + Elevator

Pros:

• Simple and cost-effective
• Limited impacts on landscape
• Canopy walk and views
• Several alternatives to study and evaluate
Bridge + Elevator

Cons:

• Longer walking distance
• Visible structure; avoid impacts to designated scenic view corridor
• Safety and exposure to elements
Inclined Elevator

Pros:

• Cool, unique, iconic!
• Limited walking required
• Safe and weather-protected
• Easy to use; similar to an elevator (no attendant required)
Inclined Elevator

Cons:

• More expensive than Bridge and Elevator
• New technology for Portland
• Consider impacts to wildlife and forest
• Avoid expensive utility relocations
Aerial Tram

Pros:

• Good views and fun experience
• Maintains use and identity of Terwilliger Parkway
Aerial Tram

Cons:

• Expensive: capital, operations, maintenance
• Likely user fee
• Possible tower and cable view obstructions
Tunnel + Elevator

Pros:

• Maintains use and identity of Terwilliger Parkway
• Sheltered from the elements
Tunnel + Elevator

Cons:
• Expensive: capital, operations, maintenance
• Does not feel safe and comfortable
• Long walking distance
TriMet Committee on Accessible Transportation (CAT)

Preferred Options

- Bridge + Elevator
- Inclined Elevator
### In-Person Open House

#### How well does the option meet the project goals?

<table>
<thead>
<tr>
<th>Option</th>
<th>Not very well</th>
<th>Not at all</th>
<th>Somewhat</th>
<th>Well</th>
<th>Very well</th>
</tr>
</thead>
<tbody>
<tr>
<td>Inclined Elevator</td>
<td>18%</td>
<td>6%</td>
<td>35%</td>
<td>12%</td>
<td>29%</td>
</tr>
<tr>
<td>Bridge &amp; Elevators</td>
<td>6%</td>
<td>6%</td>
<td>33%</td>
<td>28%</td>
<td>28%</td>
</tr>
<tr>
<td>Aerial Tram</td>
<td>N/A</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Tunnel &amp; Elevators</td>
<td>25%</td>
<td>13%</td>
<td>38%</td>
<td>19%</td>
<td>6%</td>
</tr>
</tbody>
</table>

Total Responses: 17
Online Open House

How well does the option meet the project goals?

<table>
<thead>
<tr>
<th>Option</th>
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<th>Not very well</th>
<th>Somewhat</th>
<th>Well</th>
<th>Very well</th>
</tr>
</thead>
<tbody>
<tr>
<td>Inclined Elevator</td>
<td>9%</td>
<td>14%</td>
<td>22%</td>
<td>25%</td>
<td>30%</td>
</tr>
<tr>
<td>Bridge + Elevator</td>
<td>12%</td>
<td>17%</td>
<td>23%</td>
<td>25%</td>
<td>22%</td>
</tr>
<tr>
<td>Aerial Tram</td>
<td>12%</td>
<td>21%</td>
<td>24%</td>
<td>25%</td>
<td>18%</td>
</tr>
<tr>
<td>Tunnel + Elevator</td>
<td>21%</td>
<td>27%</td>
<td>22%</td>
<td>19%</td>
<td>10%</td>
</tr>
</tbody>
</table>

Total Responses: 291
Options as of May 8

<table>
<thead>
<tr>
<th>Option</th>
<th>Rough Cost Estimate</th>
</tr>
</thead>
<tbody>
<tr>
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</table>
Overview

- Goals & Objectives
- Inventory & Usage
- Existing Park & Rides
- Lessons Learned
- Considerations
- Next Steps
Overview

What are Park & Rides?

- Station access; bring riders from low density areas with limited mode options to high capacity stations
- Typically adjacent to arterials
- Surface lot or structure

Orange Line: SE Tacoma Park & Ride

Blue Line: Sunset Park & Ride
Goals & Objectives

Access:
- Station access for all modes
- Equitable, efficient, convenient

Cost:
- Included in FTA’s cost effectiveness guidelines
- Balance P&R costs within Project
- Weigh against Ridership
- Potential trigger of traffic mitigation
Goals & Objectives

Context:
- Existing land use, density
- Transit oriented development (TOD)
- Future land use, zoning, and community vision
- Responsible use of public resources, land

FEIS:
- Visual impact, environmental impact, etc.
- Respond to DEIS public comments
- Ongoing engagement with public and partners
Background

TriMet Park & Ride Policy (2005)

- In 2040 Regional and Town centers, design facilities that minimize the use of developable urban land
- Prioritize new facilities to provide convenient access for residents of under-served transit areas
- Protect the pedestrian and neighborhood environment and opportunities for Transit-oriented Development (TOD)
- Provide location and design that protects pedestrian and bike traffic safety with a focus on eyes on the street
- Maximize efficiency through the use of partnerships within the public and private sectors
## Existing Park & Rides

**5%**
of TriMet’s weekday ridership originates from Park & Ride

**12,614**
Existing TriMet Park & Ride Spaces

**40%**
of TriMet’s Park & Ride spaces are typically empty on a weekday

### What criteria affects utilization?

<table>
<thead>
<tr>
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<tbody>
<tr>
<td>Westside MAX</td>
<td>3643</td>
<td>82%</td>
<td>85%</td>
<td>X</td>
<td>X</td>
<td>X</td>
<td>X</td>
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<tr>
<td>Eastside MAX</td>
<td>2967</td>
<td>55%</td>
<td>47%</td>
<td>X</td>
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<td>X</td>
<td>X</td>
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<td>Interstate MAX</td>
<td>600</td>
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<td>51%</td>
<td>X</td>
<td>X</td>
<td>X</td>
<td>X</td>
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<td>Green Line MAX</td>
<td>1990</td>
<td>25%</td>
<td>30%</td>
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<td></td>
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<td>X</td>
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<tr>
<td>Orange Line MAX</td>
<td>719</td>
<td>n/a</td>
<td>100%</td>
<td>X</td>
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<td>Westside Bus</td>
<td>1329</td>
<td>68%</td>
<td>62%</td>
<td>X</td>
<td>X</td>
<td>X</td>
<td>X</td>
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<tr>
<td>WES</td>
<td>300</td>
<td>35%</td>
<td>52%</td>
<td>X</td>
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<td>X</td>
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</table>

*Green Line P&R usage has declined, but utilization rate has increased because of a reduction of 300 spaces at Powell P&R.*
Existing Park & Rides

- Park & Ride users *typically* utilize the closest station/P&R
- Predominant use is home-based trips to destinations with restrictive parking policies and costs
- P&Rs; extend ridership sheds
Lessons Learned

- Ridership & Access:
  - Varies within TriMet’s system
  - Is higher where other modes are limited (ex: no sidewalks, bike lanes)
  - Is higher where frequent bus service is limited
  - Is higher at first and last facilities along a MAX line
  - Support those with Accessibility needs
- More use upstream of roadway congestion
- Regional modeling tools have become more sophisticated

Orange Line Park & Ride: Park Ave
Considerations

Capital Cost
• Parking is expensive

Cost Effectiveness
• Required metric by the Federal Transit Administration

Operating Costs / Fees
• Currently available for no charge
• Operating costs - approx. $1 per day per space
• TriMet policy review - consideration of use fees
• Coordination of adjacent/ neighborhood parking and park & ride management
Considerations

Environmental Impact
• Greenhouse Gas (GHG) emissions
• Congestion, air pollution & auto collisions
• Environmental footprint of each mode type

Image Source: LA Metro, First/Last Mile Strategic Plan
Considerations

Transit Oriented Development (TOD)
• Surface parking can evolve into other uses
• TOD catalyzes land use density at station areas
• Leverage investment assets
• Future TriMet TOD Corporate Policy

Photo credit: Walker Macy

Orenco Station, Hillsboro
Considerations

**Mobility is rapidly changing**

- Trends in auto ownership & vehicle miles traveled (VMT)
- Shared ride services (cars, bikes, scooters)
- TriMet as integrated mobility manager
- Autonomous vehicles
Next Steps

June
• Online engagement

June CAC
• More background and discussion
• Potential Park & Ride scenarios

July CAC
• Discussion and recommendations

Ongoing
• Station design
Questions and Comments

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Email:  swcorridor@trimet.org
Phone:  503.962.2150