

Capital Cost Estimate Update for Projects in Development

System Expansion Committee

February 11, 2021



Why we're here

Provide more detail on the following capital cost estimates for ST3 projects currently in the project development phase:

- Link Light Rail Operation and Maintenance Facility South
- Bus Rapid Transit (BRT) program

Discuss next steps

Discussion only, informing future Board actions.

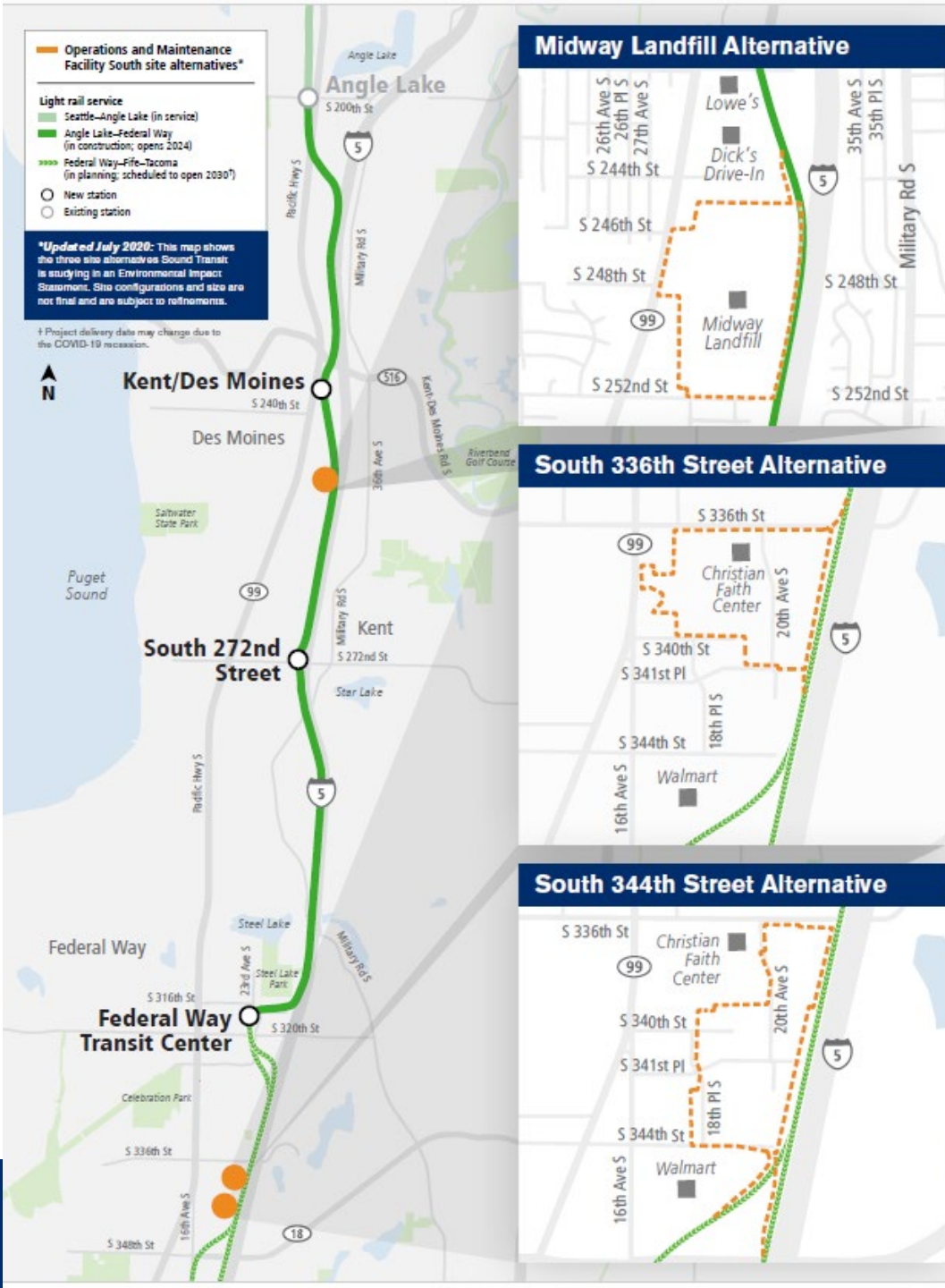
***Link Operations and
Maintenance Facility South***

Operations and Maintenance Facility South

- Heavy maintenance facility.
- Supports 144 light rail vehicles on 59-68 acres.
- Serves system-wide needs.

Three sites:

- **S. 336th St.** (Federal Way).
- **S. 344th St.** (Federal Way).
- **Midway Landfill** (Kent), includes 3 below ground design options.



Change in cost estimates

In millions, 2019\$

	2019	2020	Cost difference	% difference
Midway Landfill* <i>(3 below ground design options: Full Excavation, Hybrid, Platform)</i>	\$1,366	\$1,844-\$2,424	+\$478 - \$1,058	+35 - 77%
S. 336th St Site	\$759	\$1,183	+\$424	+56%
S. 344th St. Site	\$802	\$1,167	+\$365	+46%

* 2019 Estimate at Midway Landfill was only completed for the Platform Option

OMF South Summary

In millions, 2019\$

	2019	2020	Chg vs. 2019
Cost estimate:	\$759-1,366	\$1,167-2,420	54% - 77%

What has changed since 2019?

-\$27 to +\$46 million for **right-of-way**.

\$224 to \$607 million for **construction/ scope** including larger buildings, more tracks and improved understanding of soil conditions at landfill, utilities and environmental work.

\$155M to \$407 million in corresponding increases to **soft costs** and **contingencies**.

Supporting Expansion of the Regional System



Existing in 2015



ST3 plan buildout

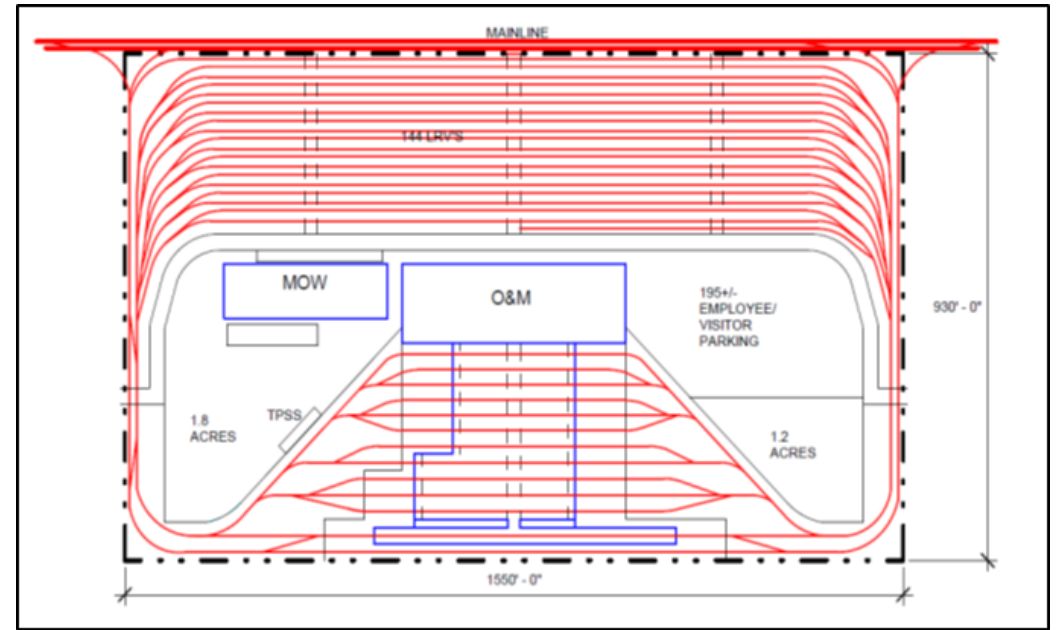
Advanced planning & design for OMF South

2018-2019 (<5% engineering)

- Used generic track template and cost allocations.
- Compared 24 sites to each other.

2020 (10% engineering)

- Designed three sites.
- Established detailed building programs.
- Geotechnical borings completed.
- Incorporated system-wide needs.
- Employees increased from ~300 to ~470.



template

Primary areas of cost increases since 2019

- **Building size (\$58M).**
- **Storm water drainage facilities (\$83-\$110M).**
- **Yard and connecting tracks (\$15-\$36M).**
- **Environmental mitigation (*Federal Way sites only*) (\$52-\$66M).**
- **Understanding of site preparation requirements improved (*Midway Landfill site only*) (\$82-\$398M).**

Building size

Increase driven by detailed space planning/ programming

Operations and Maintenance Facility, 36% sf increase, +\$31M

- Added training spaces, service and cleaning bays.
- Increased area to accommodate higher capacity vehicles.

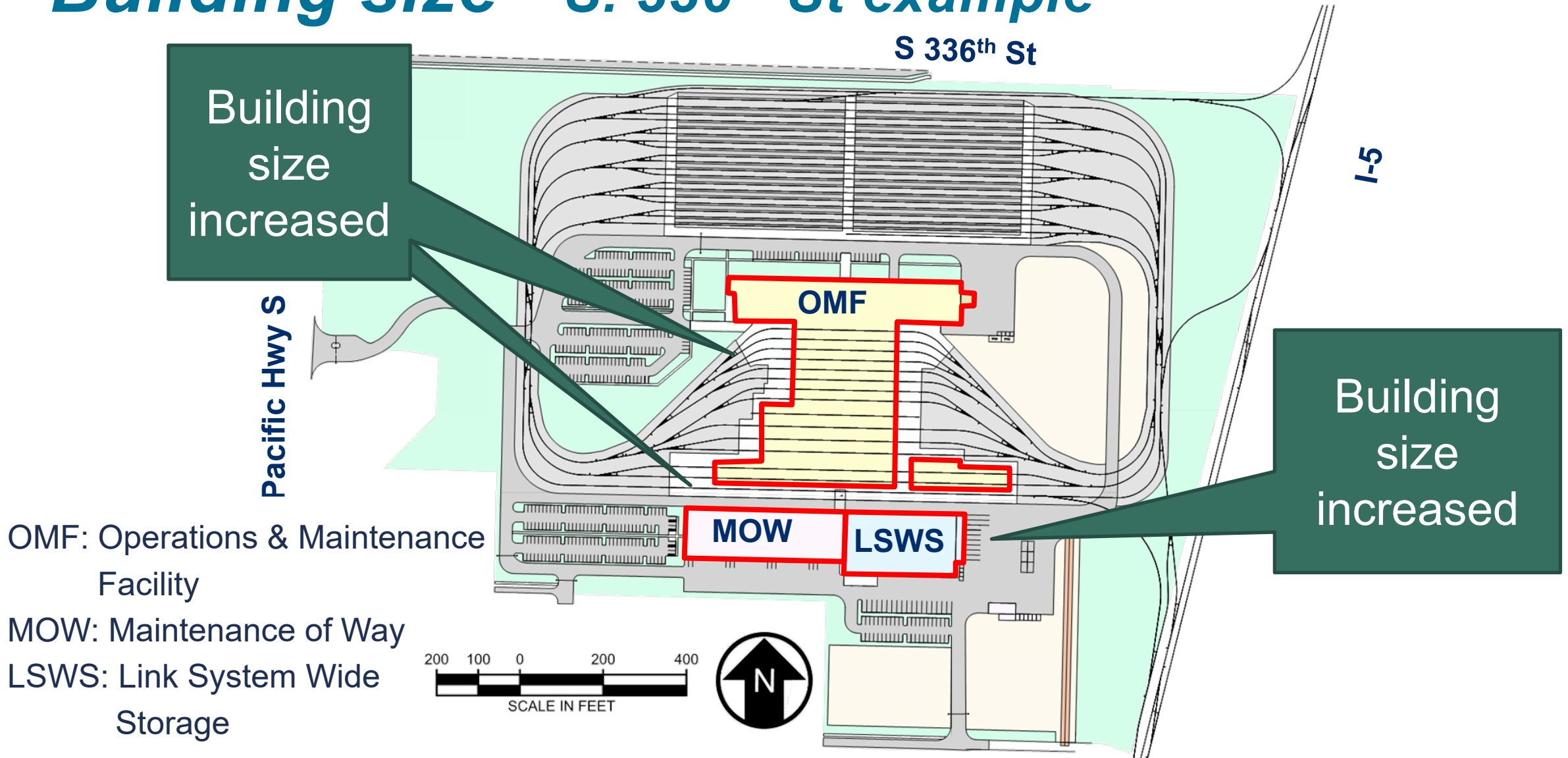
Maintenance of Way, 31% sf increase, +\$15M

- Added training, storage and shop space.
- Larger facility maintenance area.

Link System-Wide Storage, 35% sf increase, +\$12M

- Added centralized part storage.

Building size - S. 336th St example



Stormwater Drainage Facilities

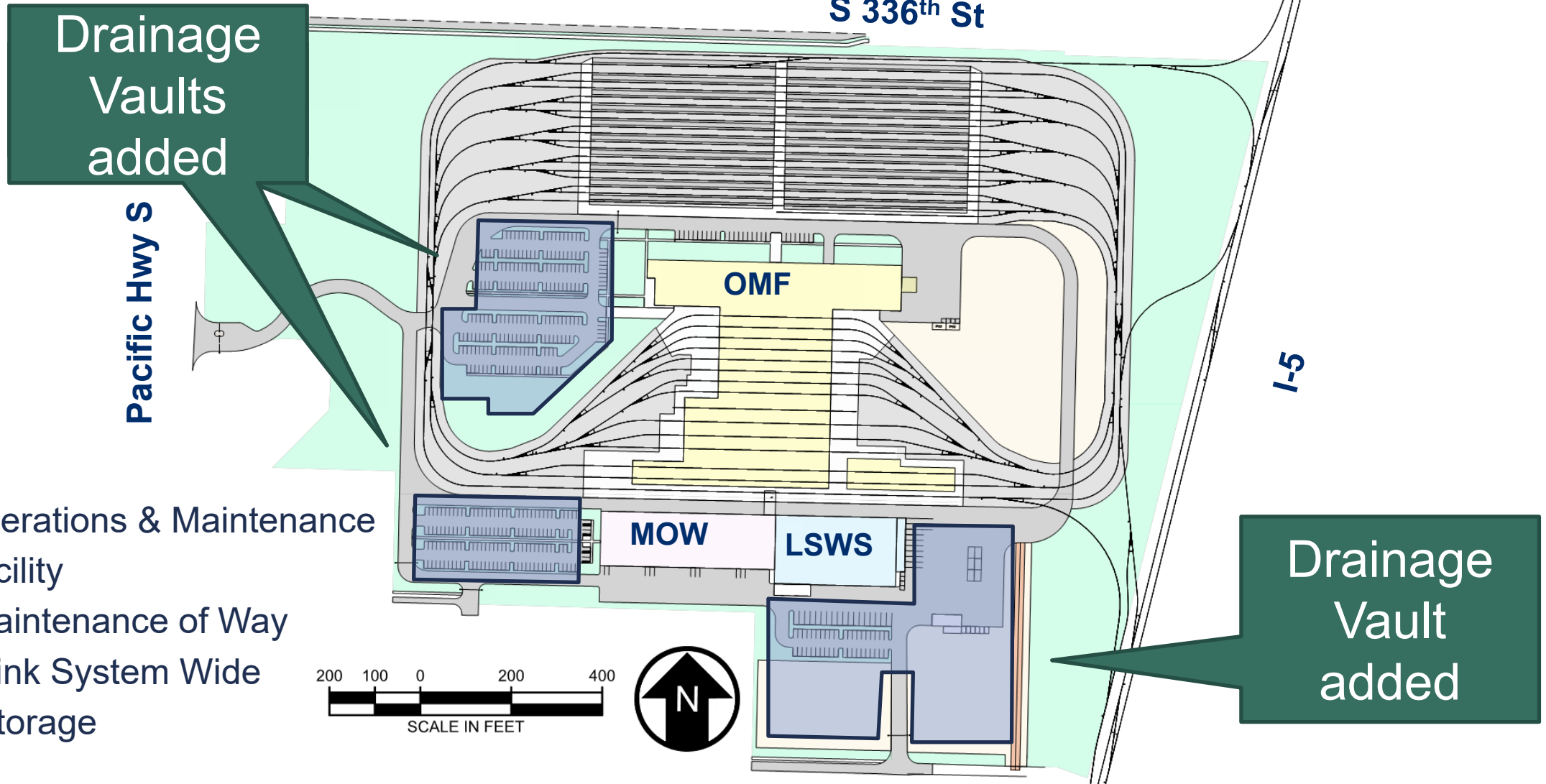
Increases driven by

- Drainage costs refined from a general utility allowance to site-specific design.
- Drainage vaults assumed rather than open ponds to minimize further increase to site footprint.

Midway Landfill: **+\$83 - 88M**

Federal Way Sites: **+\$97 - 110M**

Stormwater Drainage - S. 336th St example



OMF: Operations & Maintenance Facility

MOW: Maintenance of Way

LSWS: Link System Wide Storage

Yard and connecting tracks

Increase driven by

- Added maintenance and service tracks to support more and higher capacity LRVs.
- Longer/ more tracks and switches to improve site efficiency.
- Improved connection to mainline guideway design to minimize disruption to operations (Midway Landfill site only).

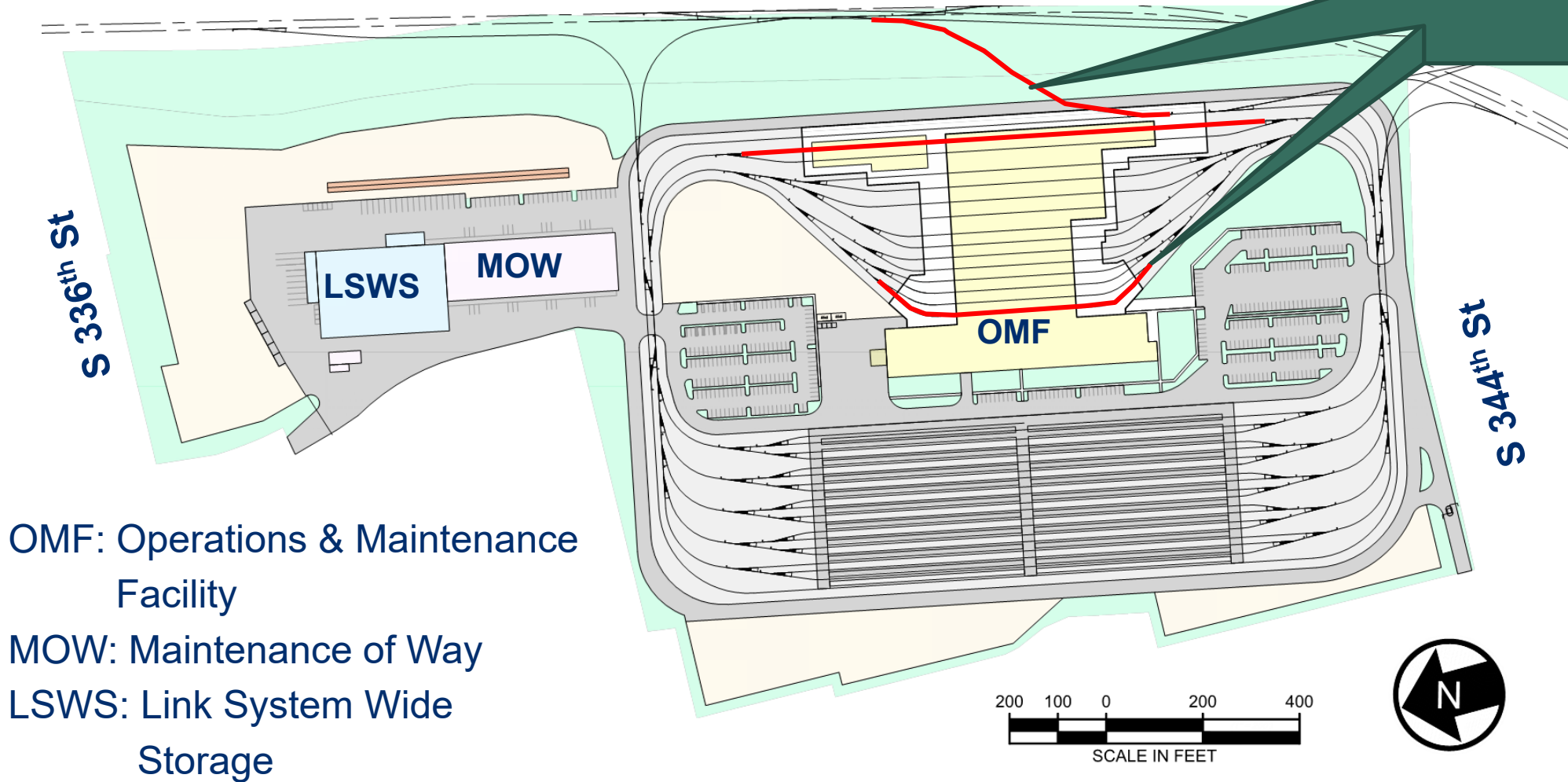
Midway Landfill Site: **+\$15M**

Federal Way Sites: **+\$31 - 36M**

Tracks – S. 344th St example

I-5

Added Track



OMF: Operations & Maintenance Facility

MOW: Maintenance of Way

LSWS: Link System Wide Storage

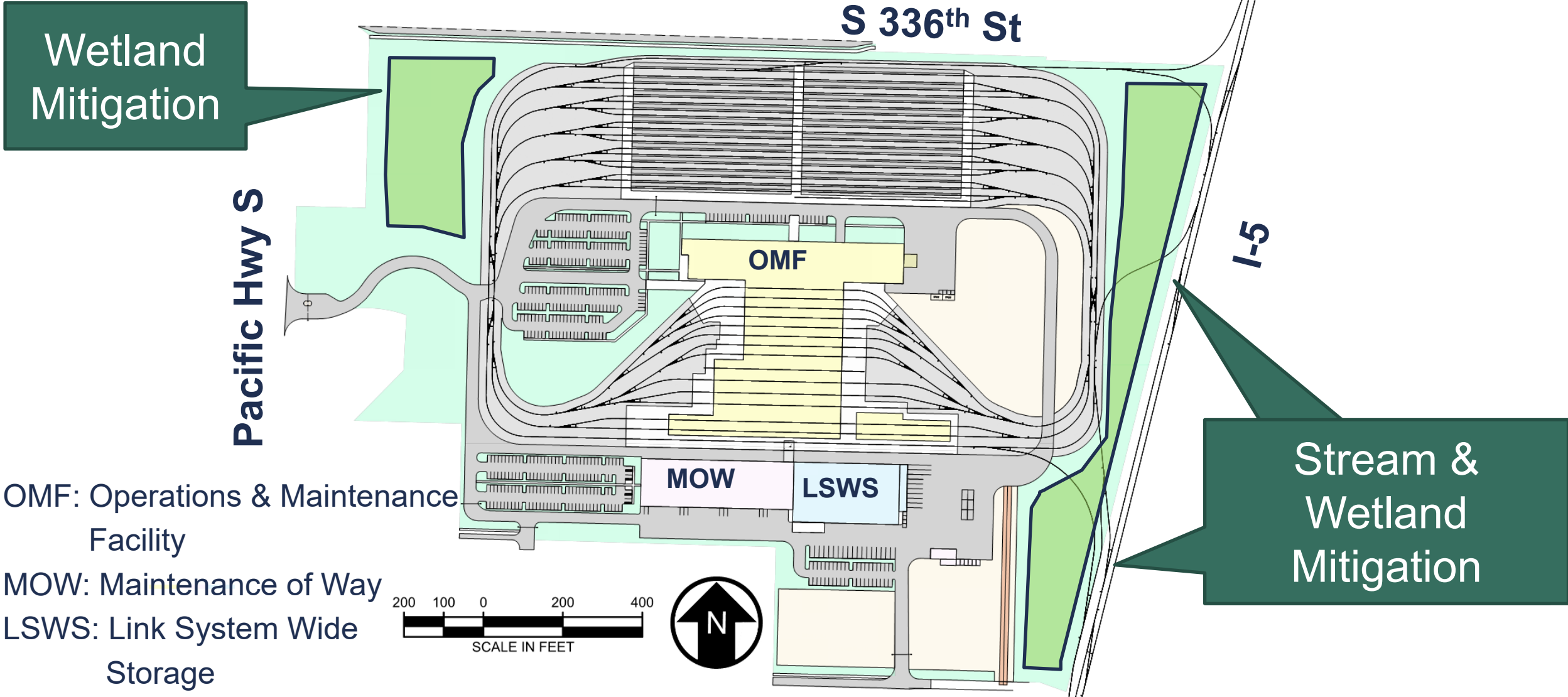
Environmental mitigation

Increase driven by

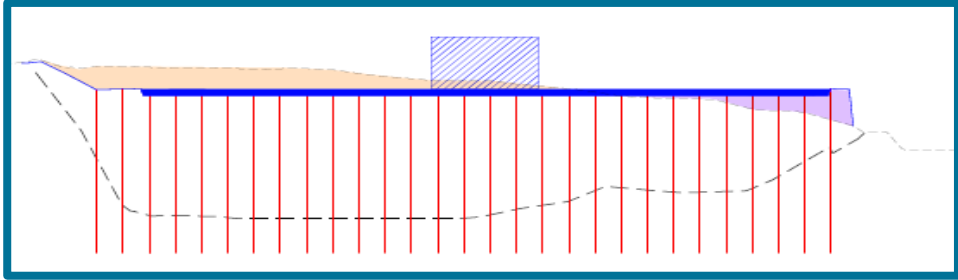
- Improved understanding of environmentally sensitive areas and mitigation requirements.
- Identification of stream and wetland impacts.

Federal Way Sites only: **+\$52 - 66M**

Environmental Mitigation – S. 336th St example

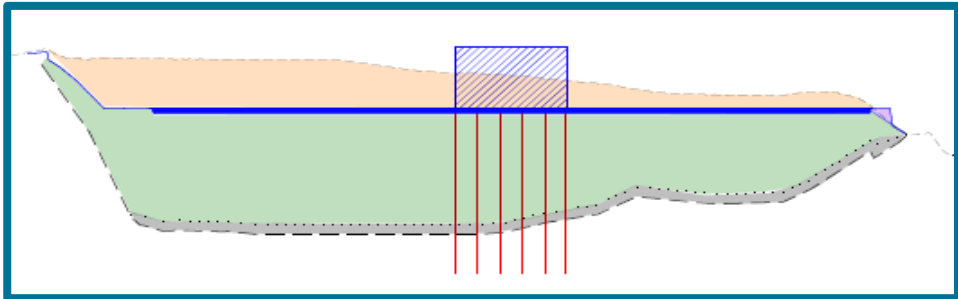


Landfill Site Preparation Options



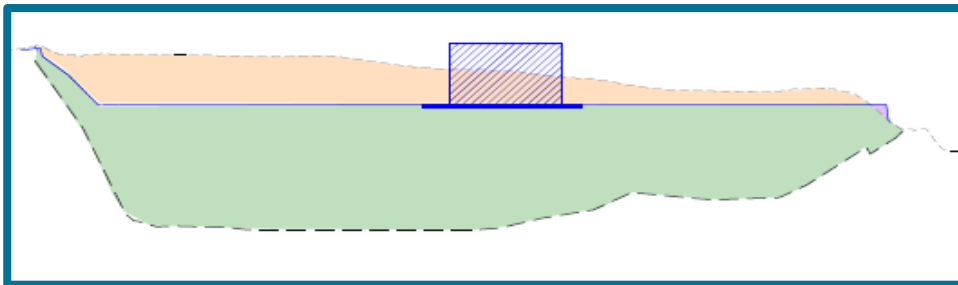
Platform option

- Buildings and tracks supported by 3.5-foot-thick concrete platform (~35 acres) on ~700 drilled shafts at 120 – 180 feet deep.



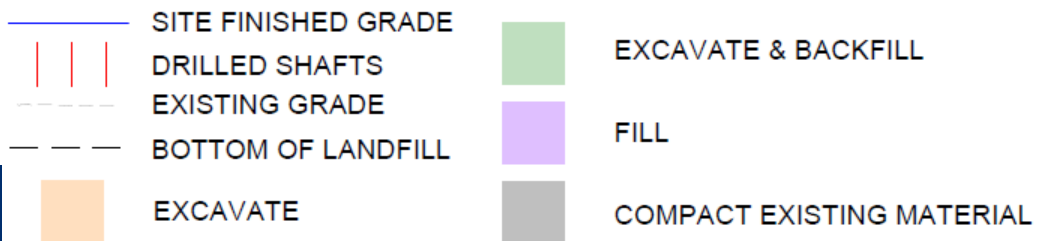
Hybrid option

- Partial excavation, tracks supported by a 1-foot-thick concrete slab over 3-foot-thick beam system (~30 acres), buildings supported on ~110 drilled shafts at ~140 feet deep.



Full Excavation option

- Complete excavation/ replacement with imported soil.



Site preparation requirements – Midway Landfill

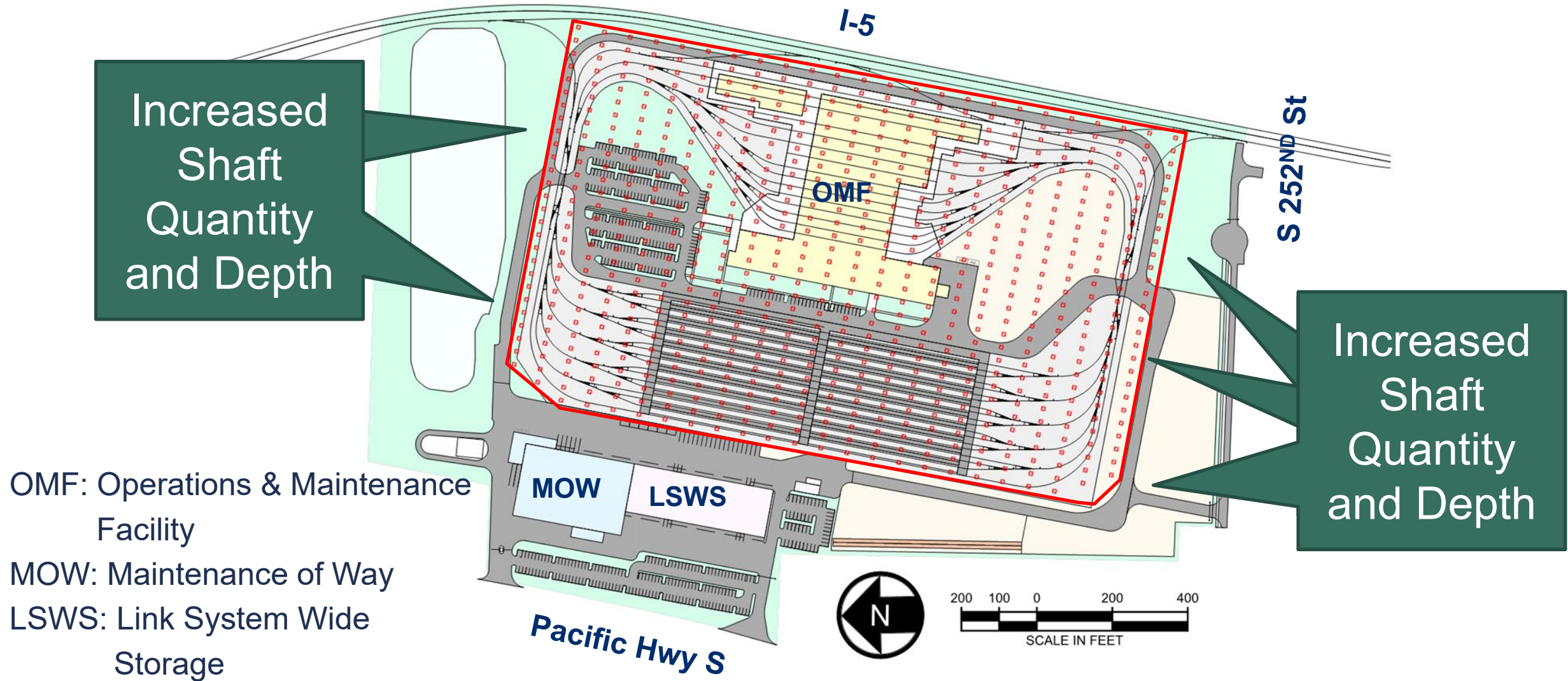
Worse than anticipated soil structure

Increase driven by

- Increased weight of structures and weaker soil identified by geotechnical borings, increased number and average depth of drilled shafts (*Platform option*). **+\$362M**
 - From 185 to 696 piles.
 - Drilled shafts avg. depth increase from 120' to 160'.
- More disposal of debris and imported soil required (Hybrid & Full Excavation options). **+\$351 - 417M**
- Landfill liner must be replaced. **+\$36 - 43M**



Drilled shafts – Midway Landfill platform option



OMFS: Next Steps

March 5

- Draft Environmental Impact Statement publication.
- 45-day comment period.

Summer/fall 2021

- Board identifies preferred alternative.

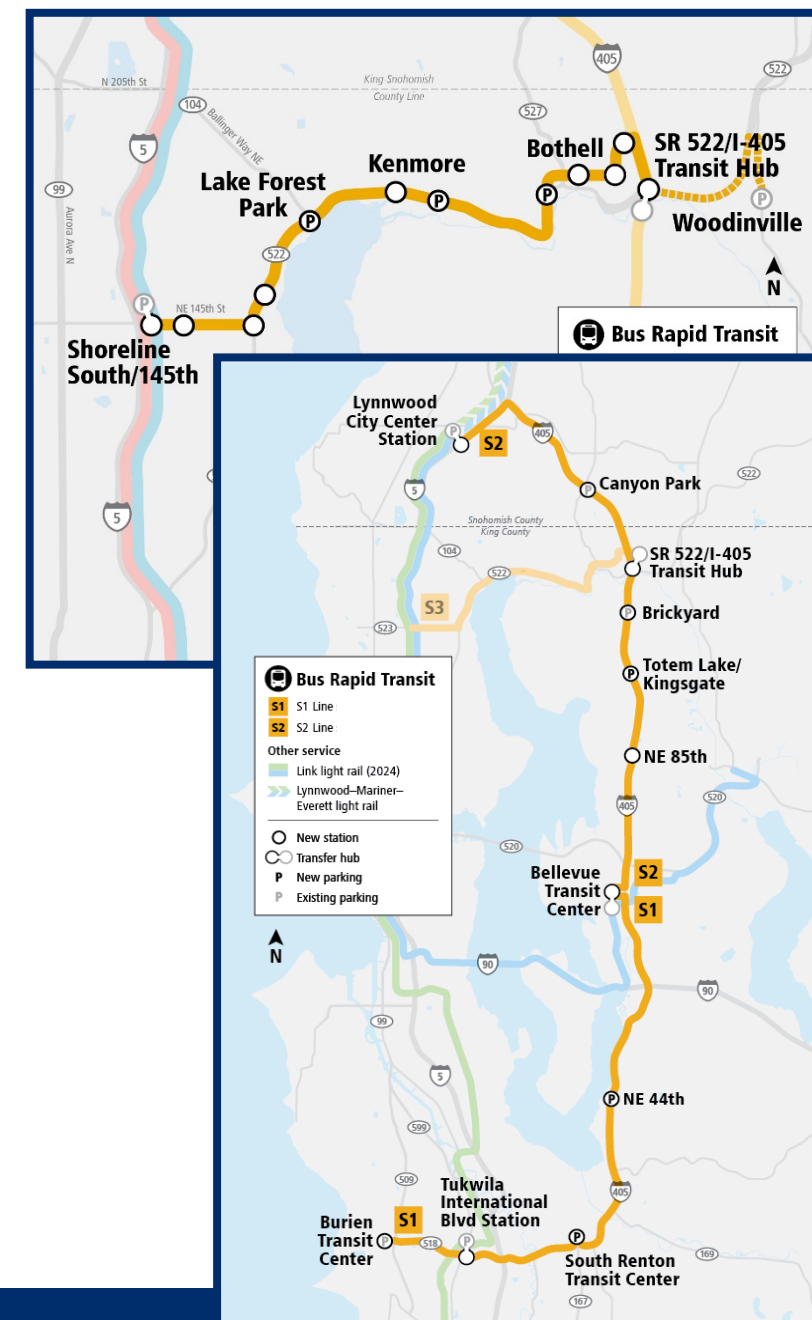
Bus Rapid Transit Program

Stride Bus Rapid Transit

I-405, SR 522 and NE 145th corridors

BRT Systems Elements of Success

- Transit speed, reliability and access improvements.
- BRT stations (signage, shelter, amenities).
- Bus Base North and new BRT fleet.
- Branding.
- Passenger information system.



Bus Rapid Transit: Cost Estimate Comparison

In millions, 2019\$

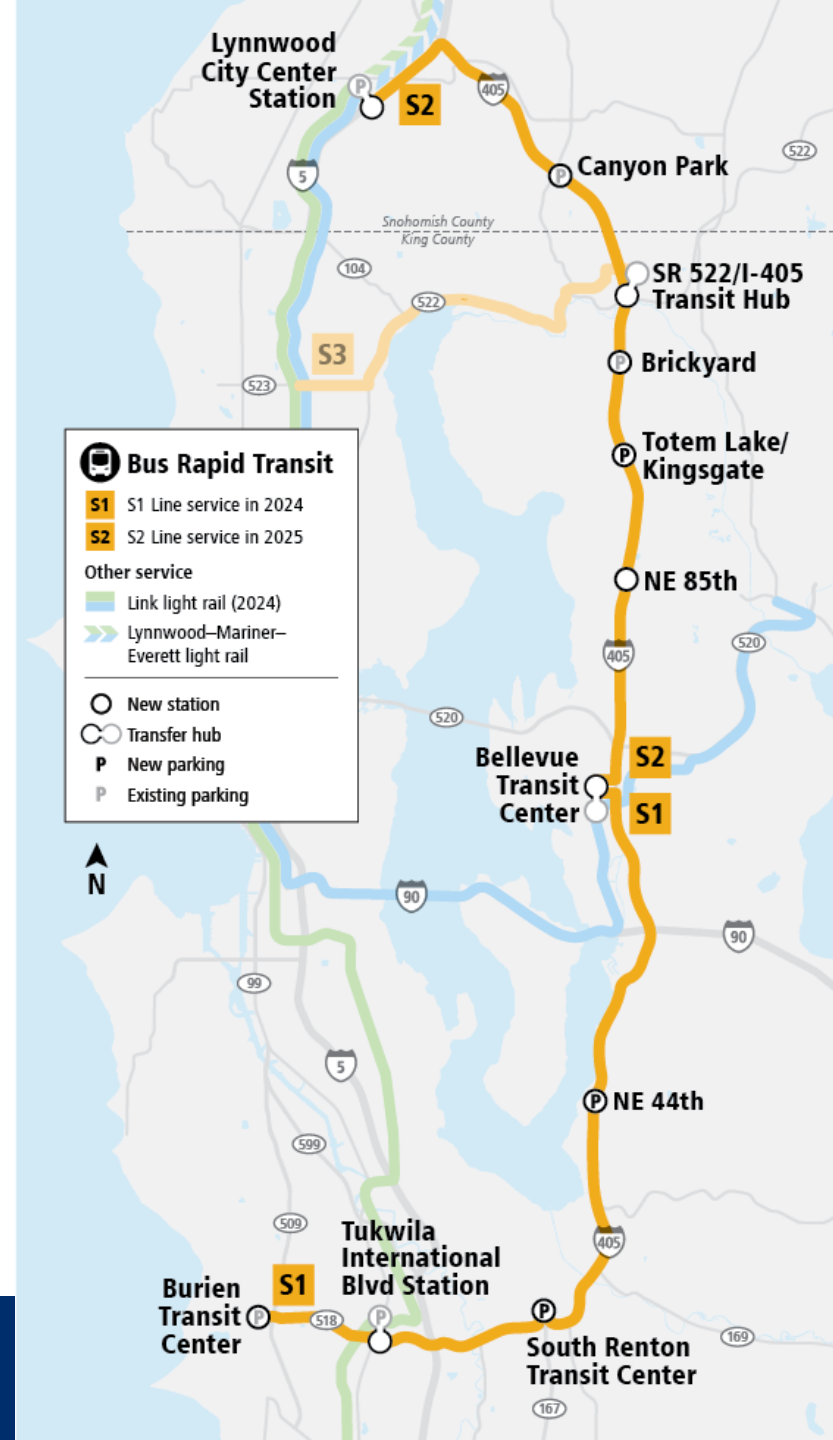
	2019	2020	% change
I-405 BRT (S1 & S2)	\$1,088	\$1,016	-7%
SR 522/NE 145 th (S3)	\$658	\$544	-17%
Bus Base North	\$208	\$238	+14%

I-405 Bus Rapid Transit

I-405 BRT Project

Project Overview: Lynnwood to Burien

- 37-mile corridor.
- 11 BRT stations across 8 cities.
- Three new/expanded parking facilities.
- One transit center.
- Connections to Link light rail in Lynnwood, Bellevue and Tukwila.
- Estimated 19,100 – 26,000 riders daily by 2042.
- Two distinct lines:
 - South, Burien to Bellevue (S1).
 - North, Bellevue to Lynnwood (S2).



I-405 BRT Summary

In millions, 2019\$

	2019	2020	Chg vs. 2019
Cost estimate:	\$1,088	\$1,016	-7%

What has changed since 2019?

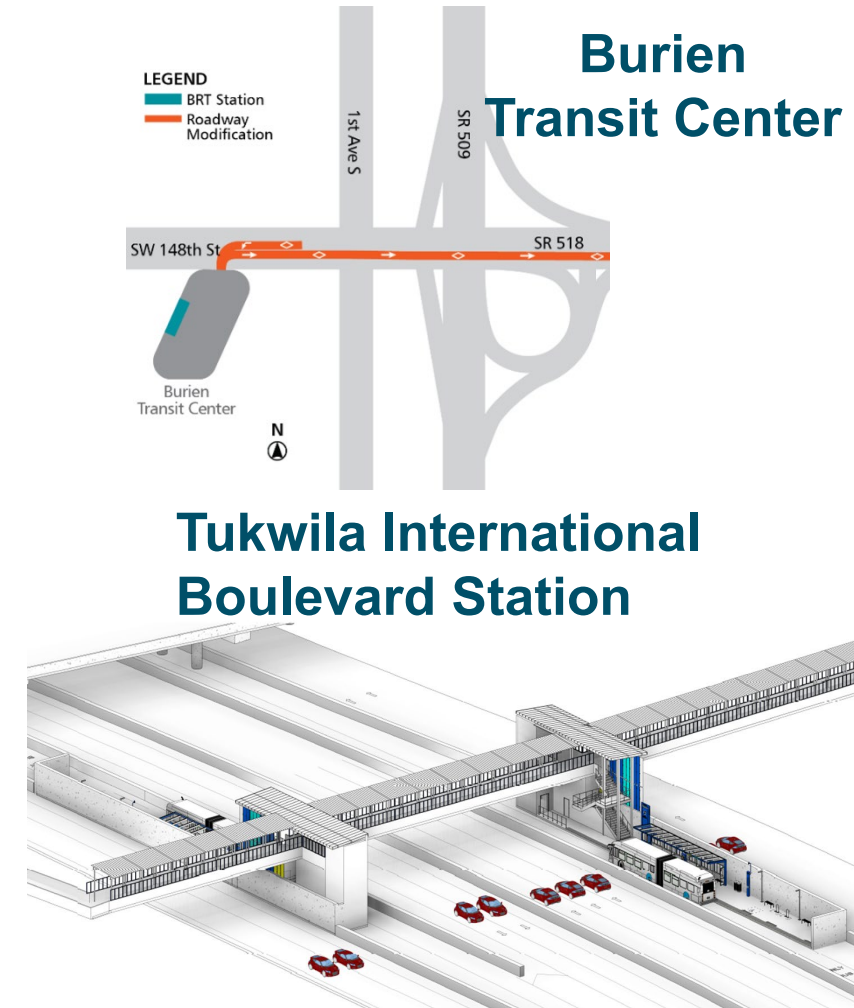
- Estimate has remained stable since ST3.
- Key design refinements - advanced design to 10%: **-\$98m**
- WSDOT NE 44th partnership: **-\$30m**
- Estimated reduction and redistribution of systems and vehicle costs: **-\$77m**
- I-405 North scope - move stations to inside Express Toll Lanes (ETLs): **+\$136m**

I-405 BRT – S1 Line

Refinements include:

- Burien Transit Center: Reduced roadway improvements and right of way needs.
- Tukwila: Smaller station footprint.
- I-405/SR 518 at I-5: widening eliminated.
- Access/arterial improvements to NE 85th Station.
- Minor refinements at other locations.

Total estimated cost decrease **-\$98m**

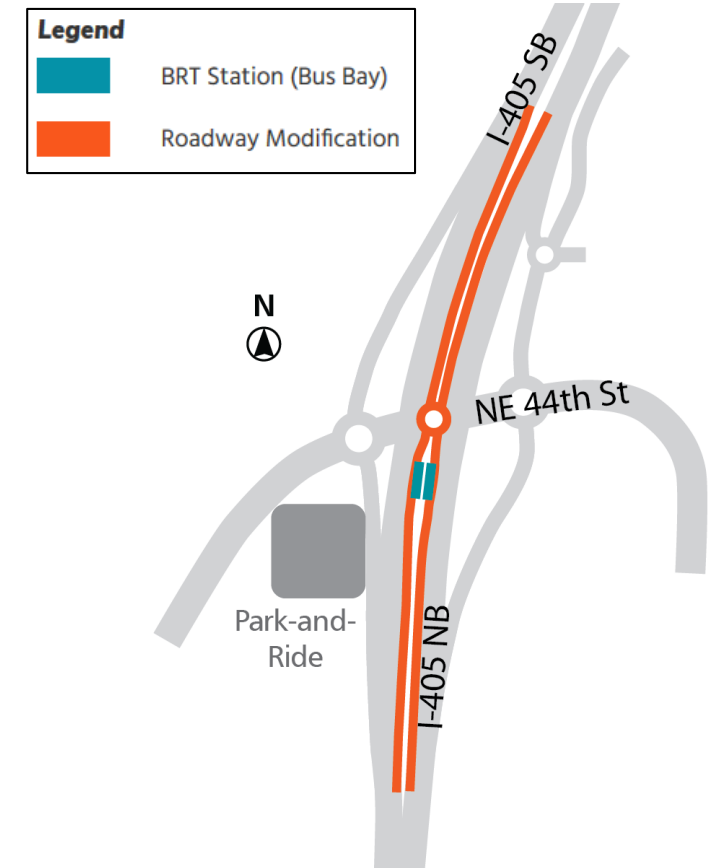


I-405 BRT: WSDOT Partnership at NE 44th

Changes since 2019:

- Fixed-cost agreement with WSDOT to construct infrastructure improvements
- Cost effective and efficient: Part of WSDOT's Renton to Bellevue Express Toll Lanes project
- Under construction

Total estimated cost decrease **-\$30m**



I-405 BRT: Systems and Vehicles Costs

Changes since 2019:

- Refined communications and information network requirements.
- Reassigned system and vehicle costs proportionally across BRT program.
- Previous estimate assigned all BRT program system and vehicle costs to I-405 BRT.

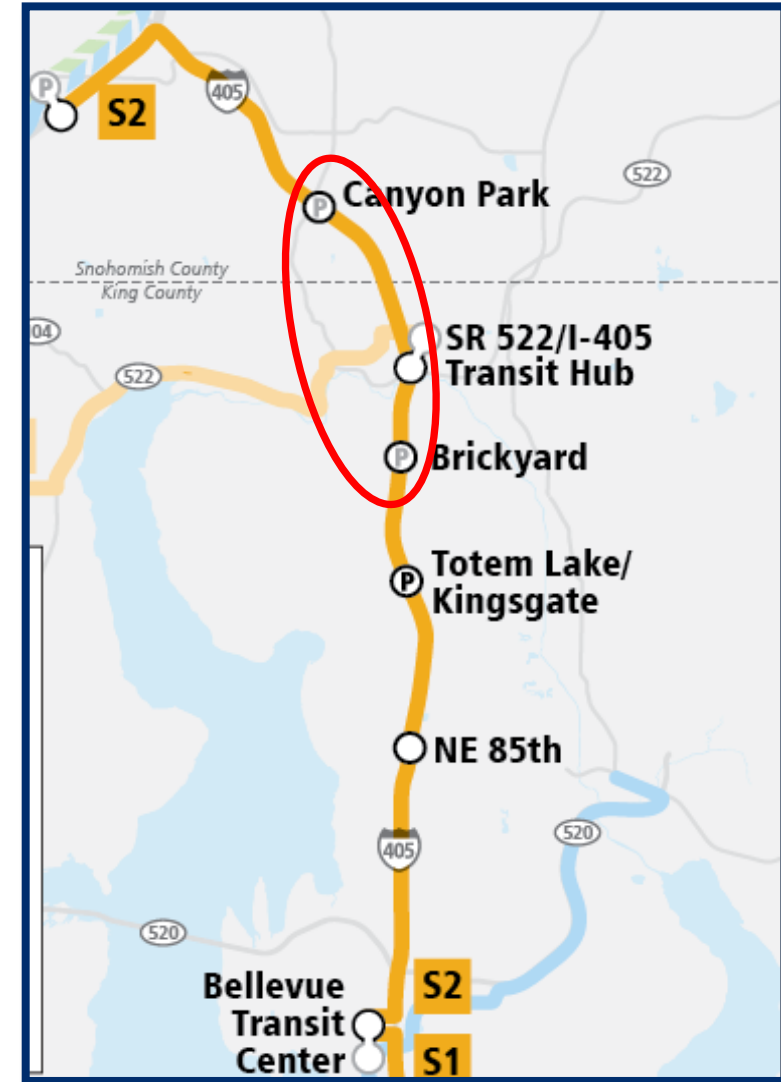
Total estimated cost decrease: **-\$77m**

I-405 BRT North – S2 Line

Changes since 2019:

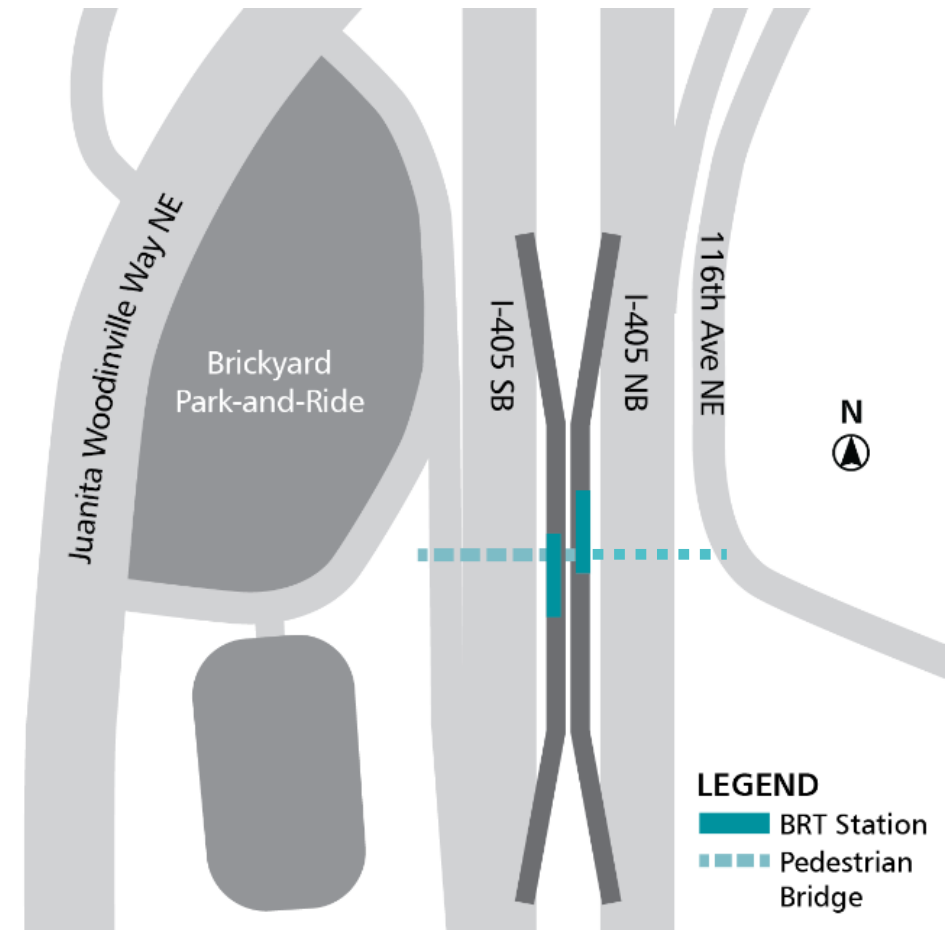
- Partnered with WSDOT Express Toll Lanes project.
- BRT stations moved to inside lanes, including Brickyard.
- Joint investments at direct access points:
 - Canyon Park
 - Bothell
- Greatly reduces travel time.

Total estimated cost increase : **+\$136m**



I-405 BRT: North – Brickyard Example

- Inline BRT station connected to the park-and-ride by a pedestrian bridge.
- Transit only.
- Station previously located on outside ramps.

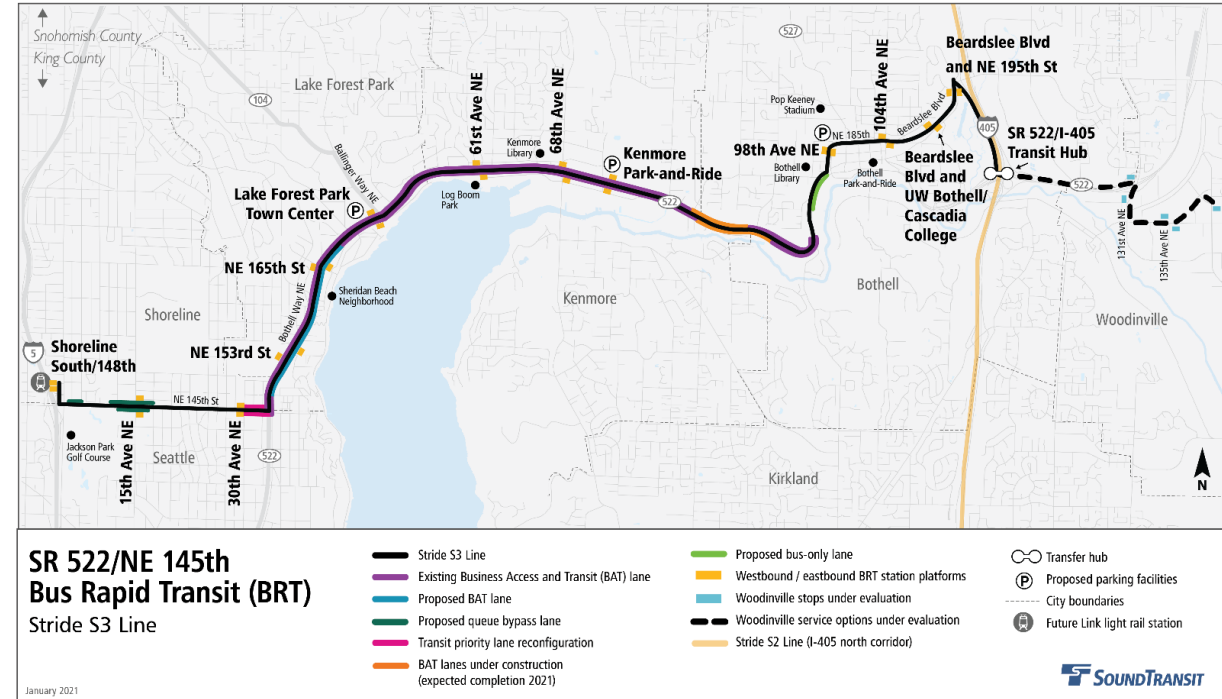


SR 522/145th St.
Bus Rapid Transit

SR 522/NE 145th corridor – S3 Line

Project Overview: Shoreline to Bothell

- 9-mile corridor.
- Three new/expanded parking facilities.
- Connection to Link light rail in Shoreline.
- Transfer to I-405 BRT in Bothell.
- 12 BRT station pairs across 4 cities.
- Separate Bothell-to-Woodinville service.



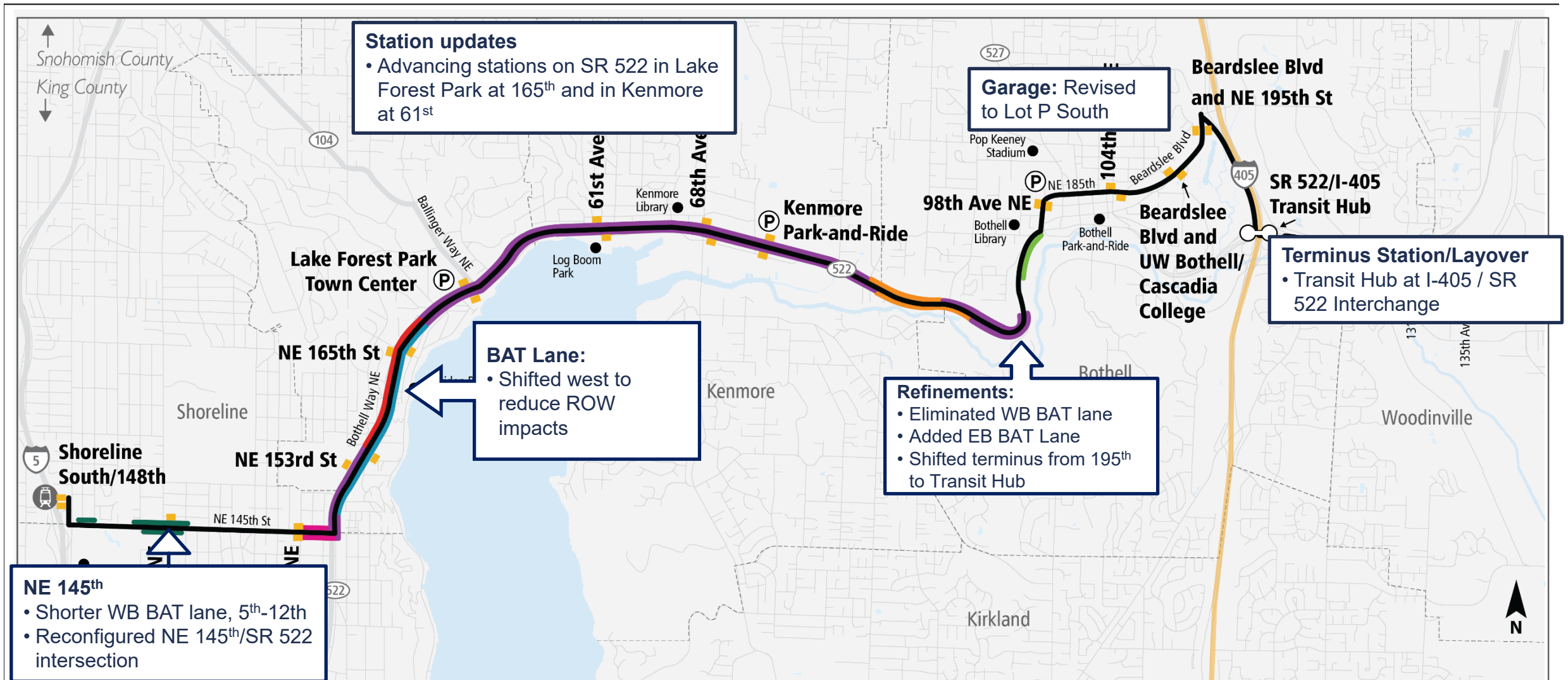
SR 522 Stride Summary

<i>In millions, 2019\$</i>	2019	2020	Chg vs. 2019
Cost estimate:	\$658	\$544	-17%

What has changed since 2019?

- Key design refinements - advanced design to 10%: **-\$130m**
- Redistribution of estimated systems and vehicle costs: **+\$14m**

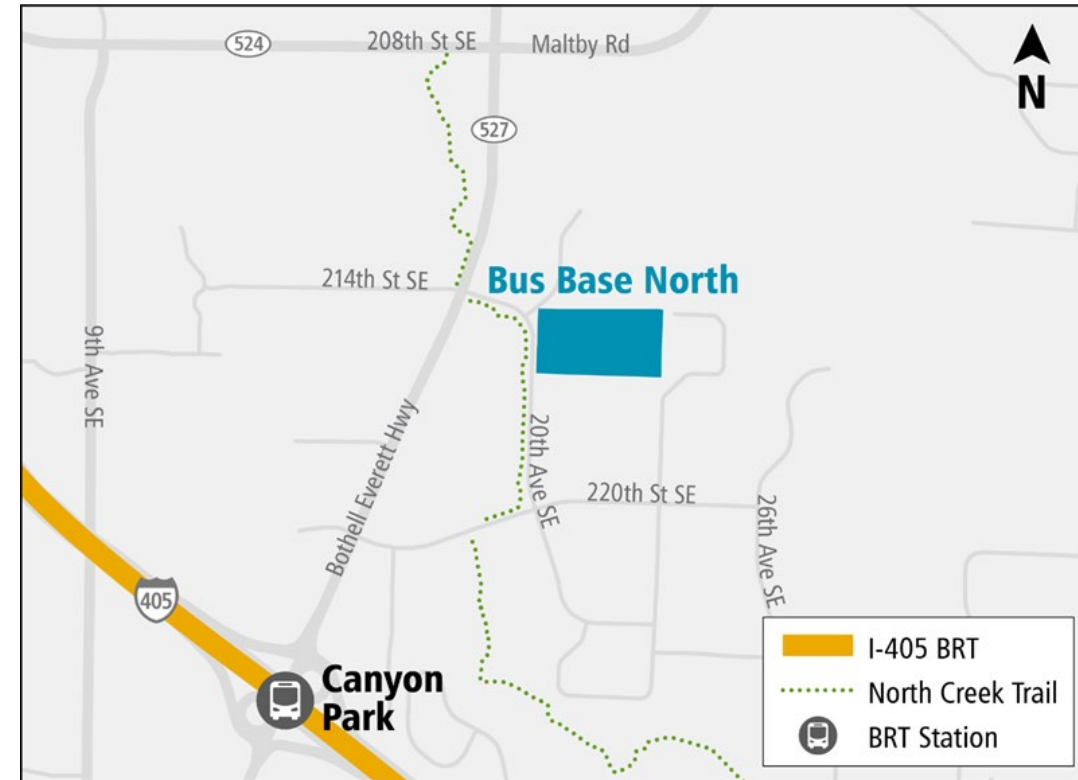
SR 522 BRT: Key Design Refinements



Bus Base North

Bus Base North

- 120 bus capacity (BRT and ST express vehicles)
- Maintenance and operations building, two floors
 - Operations control center (including systems)
 - Maintenance, cleaning, repairs
 - Employee parking on site
 - Planned to support electric fleet



BRT bus base

In millions, 2019\$

BRT bus base

2019
\$208

2020
\$238

Vs. 2019
+14%

What has changed since 2019?

- Assumption of systems costs. formerly in I-405 BRT estimate
- Higher property costs.



BRT Program: Next Steps

- SR 522: Finish environmental review process.
- Fall 2020 Board actions: General engineering consultant efforts underway.
- Limited construction continuing: NE 44th with WSDOT, Bothell BAT lanes.

Summary Observations

Summary observations

Challenges vary by project type and location

- Largest cost estimate increases where projects establish new corridors in rapidly developing urban areas.
 - Most notable for the ROW costs on West Seattle and Ballard.
 - In contrast, the BRT program largely utilizes existing ROW.
- **Scope choices greatly impact costs.**
 - OMF-S: Scope added for important operational considerations, increasing capital cost estimates.
 - BRT projects have flexibility to refine roadway improvements to be more targeted and cost-effective.

Summary observations (cont'd)

Some scope requirements only emerge as design advances

Between 2019 and 2020 projects advanced from planning estimates based on allowances to 10% design with site-specific conceptual engineering.

- Geotechnical drilling informed understanding of ground conditions and structural engineering requirements.
- Field surveys informed specific ecosystem impacts and mitigation.

Summary observations (cont'd)

Some scope requirements only emerge as design advances

Assumptions in early planning estimates need careful review

- ROW buffer approach did not capture needs on West Seattle and Ballard.
- Stormwater allowance proving to be too small on most projects.

Estimates will continue to be updated as design advances

- Value engineering and risk analysis occur as all projects advance, extra emphasis due to system expansion affordability gap.

Next steps

- Independent review will support further updates to cost assumptions and methodologies.
- Now is the time to identify these challenges when scope choices can still be made to contain cost growth.

Thank you.



 soundtransit.org/wsblink

