

ST2 Light Rail Service and Passenger Experience

System Expansion Committee

10/12/23



Why we are here

What we've discussed so far

- June: Long-term light rail fleet & storage challenges

Today's agenda

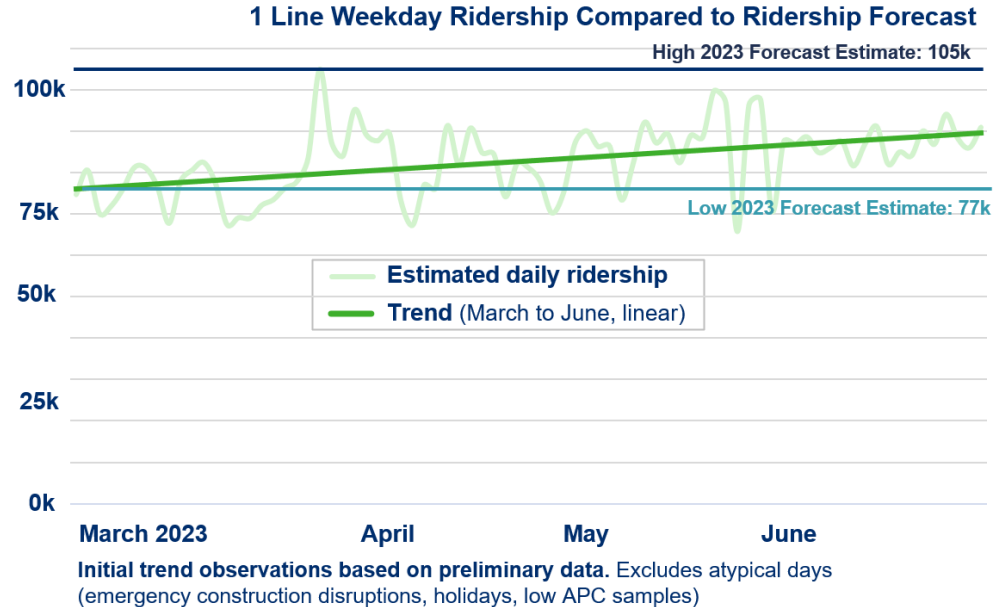
- Discuss service we can provide with available fleet as we complete the light rail system to Lynnwood, Redmond and Federal Way
- Discuss forecast crowding levels and present strategies to address
- Hear Board feedback about which to pursue
- Briefing only, no action required

June briefing recap

- Light rail fleet is capped at 214 LRVs until early 2030s when more fleet and base capacity become available
- There are not enough LRVs to support originally planned service levels as the ST2 extensions are completed
- We committed to come back with impacts and options for the Board to consider
- We committed to use the latest ridership estimates that account for post-pandemic changes in travel behavior

Updated ridership forecasts

- Ridership estimates updated in late 2022, as a range
 - High estimate: trends towards pre-pandemic demand and patterns
 - Low estimate: assumes of more working from home and recent changes in trip patterns continue
- Current Link ridership is trending toward high estimate
- There is day to day variability within the range



Key analysis questions

- What service levels can be operated as ST2 extensions open?
- What will passenger loading/crowding conditions look like?
 - PM peak hour, when highest demand and service levels occur
- If there are projected overloads, are there mitigation options that could provide more capacity and alleviate crowding?

How we think about crowding

- Link is designed as high capacity transit to efficiently carry large numbers of riders
- Service levels are designed & evaluated based on riders per LRV

One LRV carries up to **200** riders with about **74** seats and **~120** spaces for standing

Exact total varies based on how close riders stand, luggage, bikes, etc.



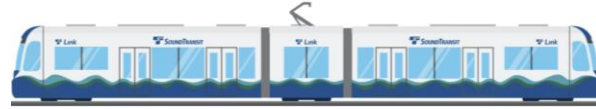
4 car train can carry about **800** riders.

Total capacity determined by number of LRVs per train.

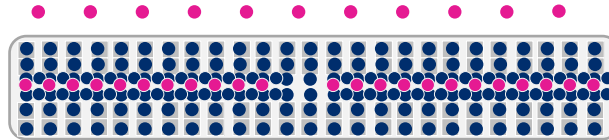
How we think about crowding

At a car-level

● = one rider

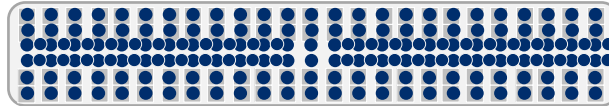


Very crowded, may not be room to board.



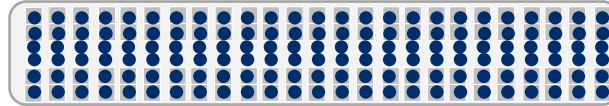
74 seats full + more than 120 riders standing

Challenges getting on and off.



74 seats full + 74 - 120 riders standing

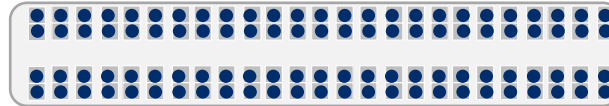
People standing, but you can still get on.



74 seats full + up to 74 riders standing

Board adopted crowding standard

Everyone has a seat.



Less than 74 seats full, few people standing

2024

1 Line Angle Lake to Lynnwood

2 Line Downtown Redmond to South Bellevue

2024

Peak service with available fleet

1 Lynnwood to Angle Lake

<i>Planned</i>	8 min	4 cars
<i>Now possible</i>	10 min	3-4 cars



<i>Planned</i> (Redmond Technology to Lynnwood)	8 min	4 cars
<i>Now possible</i> (Redmond Technology to South Bellevue)	10 min	2 cars

2024

Northbound 1 Line crowding*

Trains every 10 mins, 4 car trains

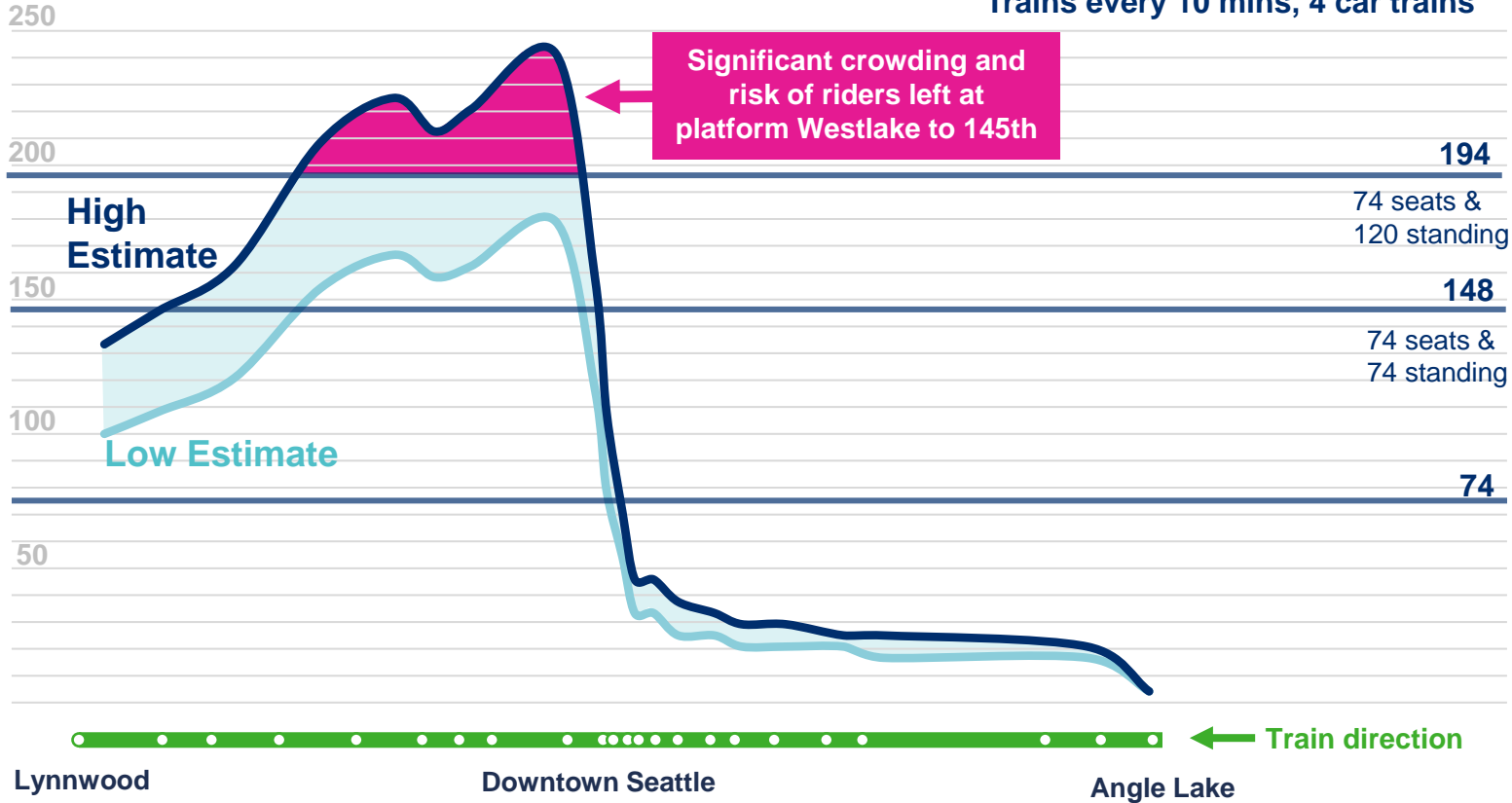
Very crowded, may not be room to board

Significant crowding and risk of riders left at platform Westlake to 145th

Challenges getting on and off

People standing but you can still get on

Everyone has a seat



2024

Southbound 1 Line crowding*

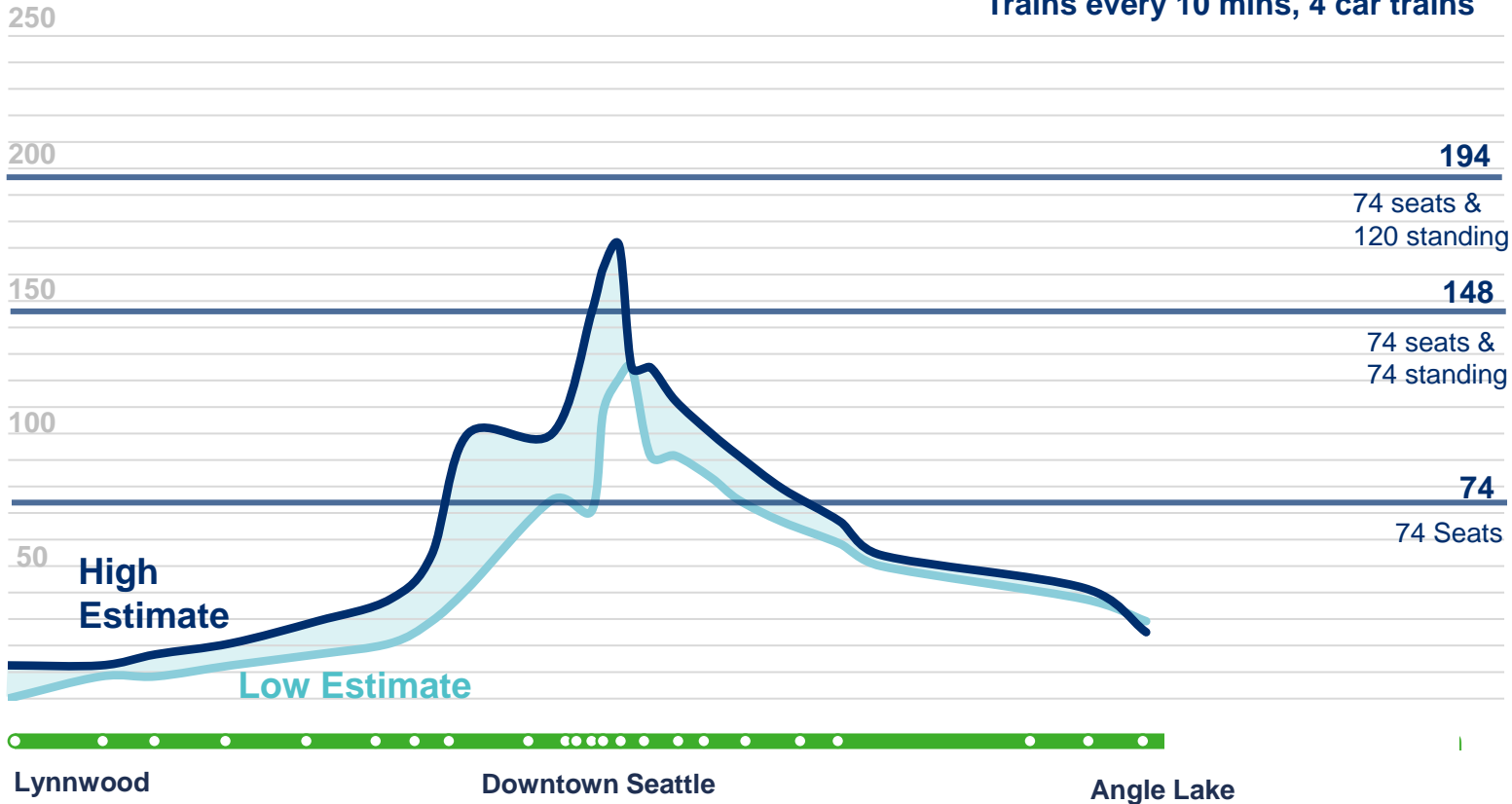
Trains every 10 mins, 4 car trains

Very crowded, may not be room to board

Challenges getting on and off

People standing but you can still get on

Everyone has a seat

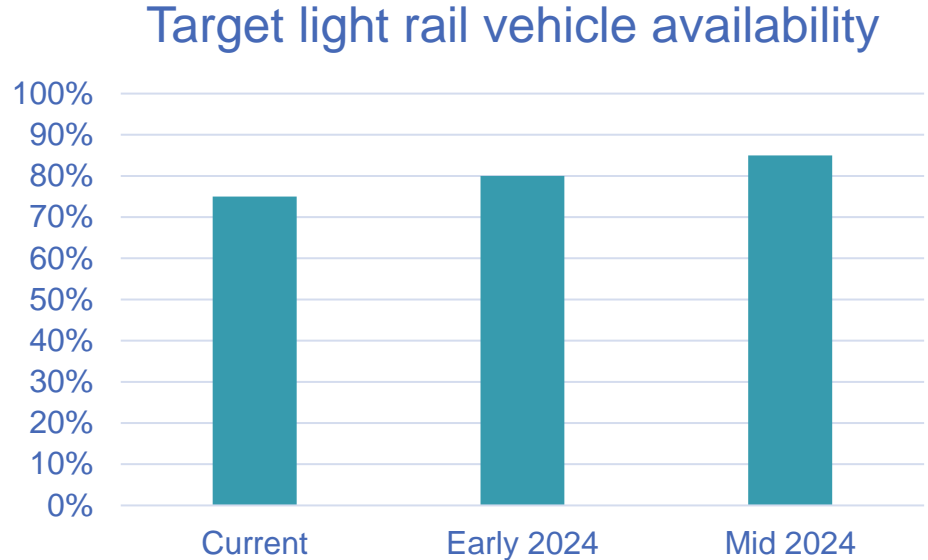


Mitigation Strategies for 2024

Strategy: Improve fleet availability

Continue to put more Series 2 LRVs into service

- Series 2 (Siemens) fleet availability below 85% standard
- Working to fix warranty and preventative maintenance issues
- Target 80% everyday availability by Q1 2024, 85% by Q3 2024, ahead of Lynnwood Link opening



Strategy: Augment Link with ST Express

- Temporarily postpone Lynnwood Link ST Express restructure
- Continue some service to downtown Seattle to provide additional capacity
- Range of options of how far north to operate parallel bus service
- Shorter route = more capacity, fewer direct destinations (Options 1-2)
- Longer route = more destination directly served, lower capacity (Options 3-4)
- **Further evaluation needed**



2026

1 Line Lynnwood to Federal Way

2 Line Downtown Redmond to Lynnwood

ST2 light rail extensions complete

2026

Peak service with available fleet

1 & 2

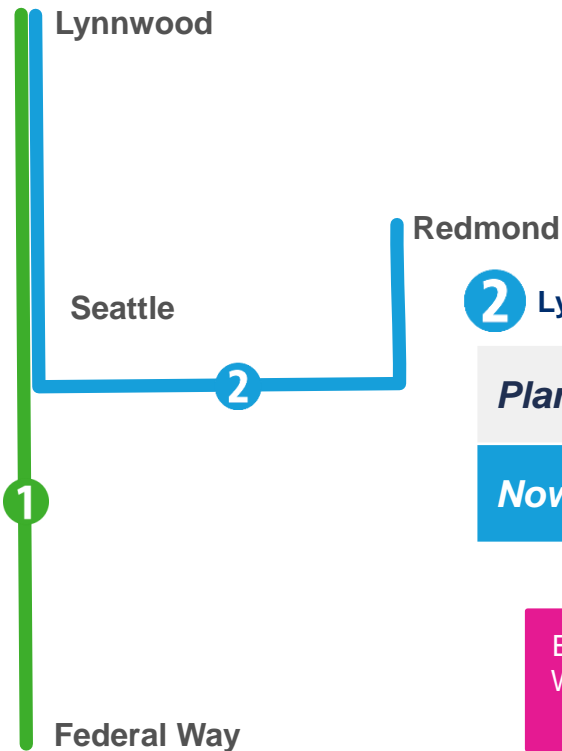
Combined service
Lynnwood to IDS

<i>Planned</i>	4 min	4 cars
<i>Now possible</i>	5 min	3-4 cars

1

Lynnwood to Federal Way

<i>Planned</i>	8 min	4 cars
<i>Now possible</i>	10 min	4 cars



2

Lynnwood to Downtown Redmond

<i>Planned</i>	8 min	4 cars
<i>Now possible</i>	10 min	3 cars

Extending 1 Line to Federal Way requires limiting 2 Line to 3 car trains

2026

Northbound 1 Line crowding*

① Trains every 10 mins, 4 car trains

② Trains every 10 mins, 3 car trains

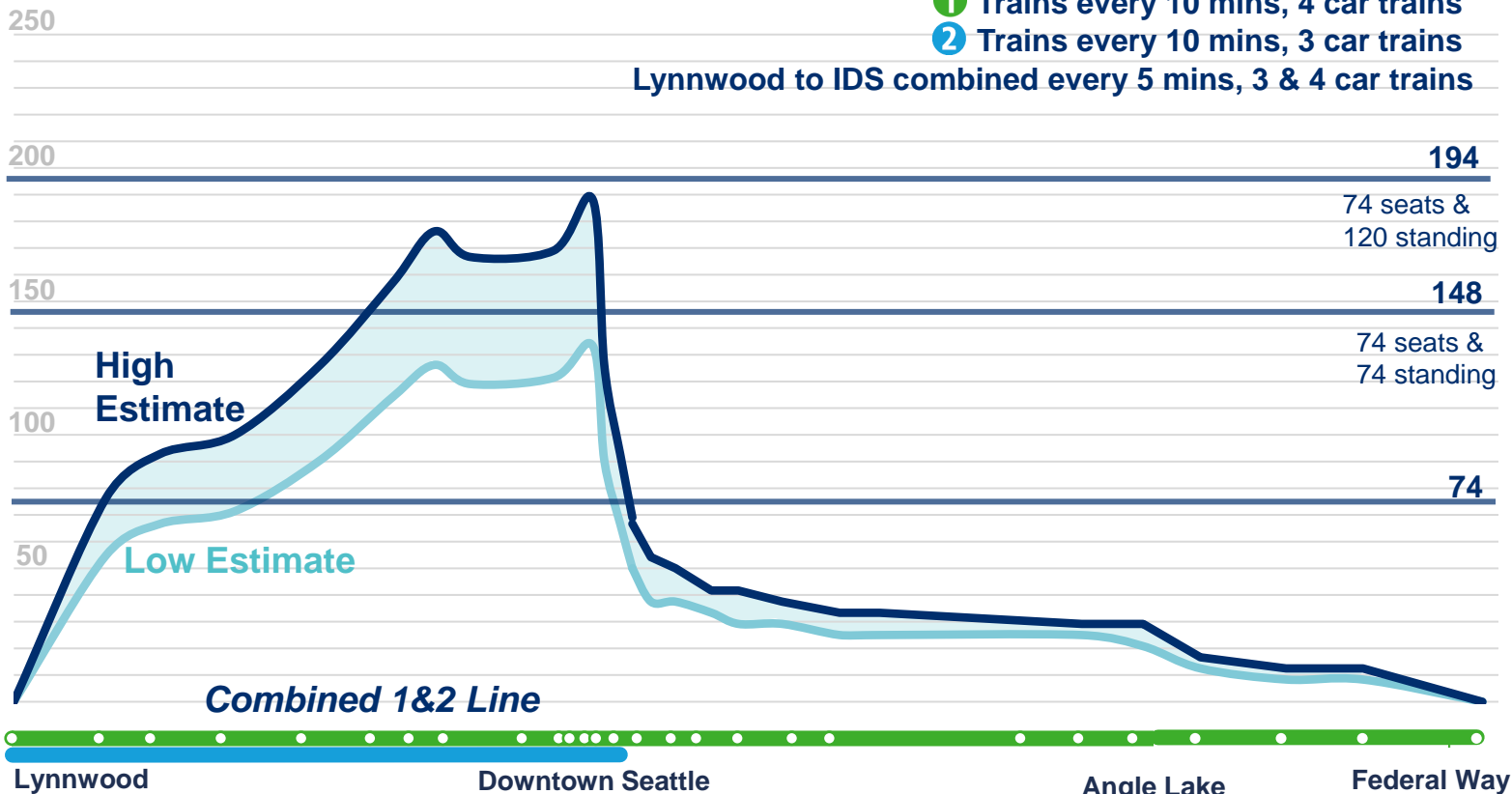
Lynnwood to IDS combined every 5 mins, 3 & 4 car trains

Very crowded, may not be room to board

Challenges getting on and off

People standing but you can still get on

Everyone has a seat



2026

Southbound 1 Line crowding*

① Trains every 10 mins, 4 car trains

② Trains every 10 mins, 3 car trains

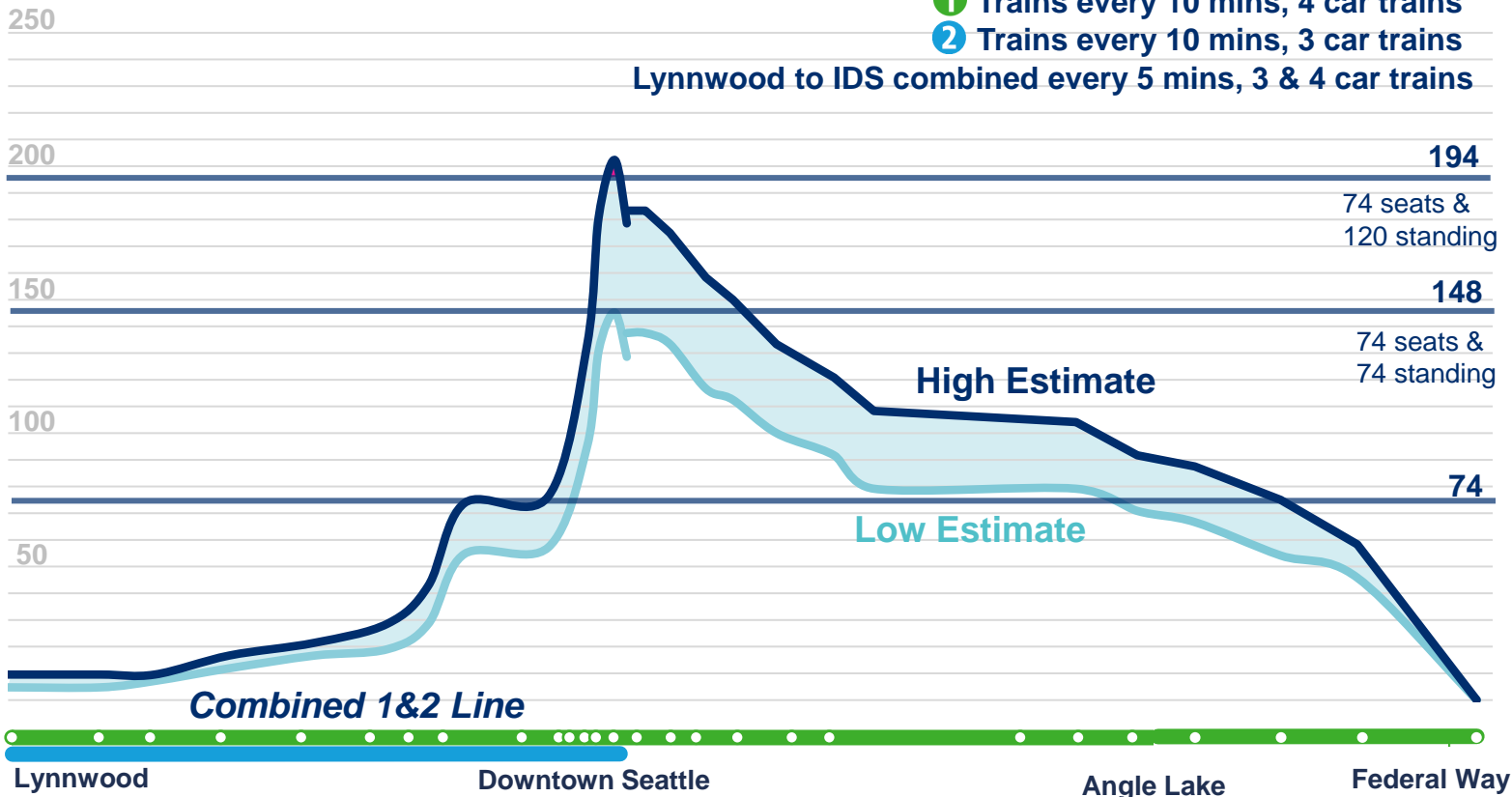
Lynnwood to IDS combined every 5 mins, 3 & 4 car trains

Very crowded, may not be room to board

Challenges getting on and off

People standing but you can still get on

Everyone has a seat



2026

Eastbound 2 Line crowding*

① Trains every 10 mins, 4 car trains

② Trains every 10 mins, 3 car trains

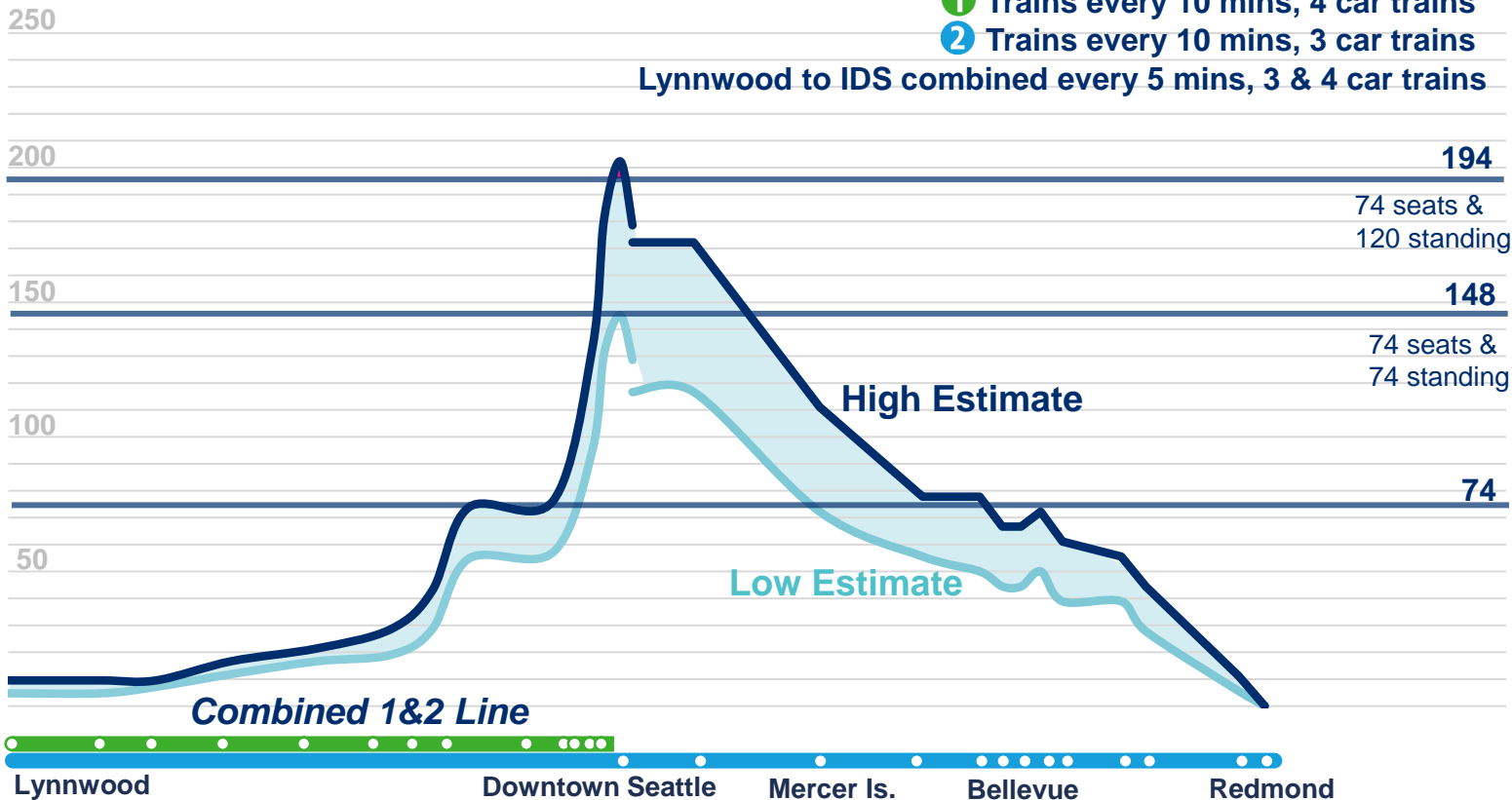
Lynnwood to IDS combined every 5 mins, 3 & 4 car trains

Very crowded, may not be room to board

Challenges getting on and off

People standing but you can still get on

Everyone has a seat



194

74 seats & 120 standing

148

74 seats & 74 standing

74

Combined 1&2 Line

Train direction →

Lynnwood

Downtown Seattle

Mercer Is.

Bellevue

Redmond

***Additional Mitigation
Strategies for 2026 and
Beyond***

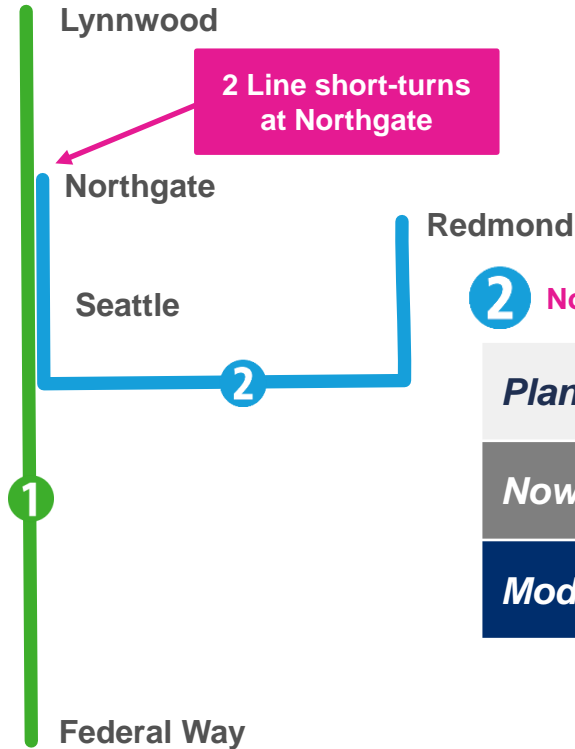
Strategy: Northgate peak turn-back service

1 & 2 Combined service Northgate to IDS

Planned	4 min	4 cars
Now possible	5 min	3-4 cars
Modified	5 min	4 cars

1 Lynnwood to Federal Way

Planned	8 min	4 cars
Now possible	10 min	4 cars
Modified	10 min	4 cars



2 Northgate to Downtown Redmond

Planned	8 min	4 cars
Now possible	10 min	3 cars
Modified	10 min	4 cars

Northgate turnback takeaways

Pros	Cons
Increases capacity by ~14% between Northgate and Chinatown International District by consistently providing 4-car trains on both the 1 & 2 Lines	Reduces peak service between Lynnwood & Northgate from 4 minutes to 8 minutes
Likely to address majority of average crowding above our standard, except for a short stretch in downtown Seattle	Train loads may be uneven as passengers pick their train, and some station platforms may get overcrowded
	Increases operational complexity and risk of system delays
	Requires additional operators to turn trains quickly
	Requires additional security officers to ensure passengers have disembarked short turning trains
	Eliminates use of Northgate pocket track for trains that need to come out of service

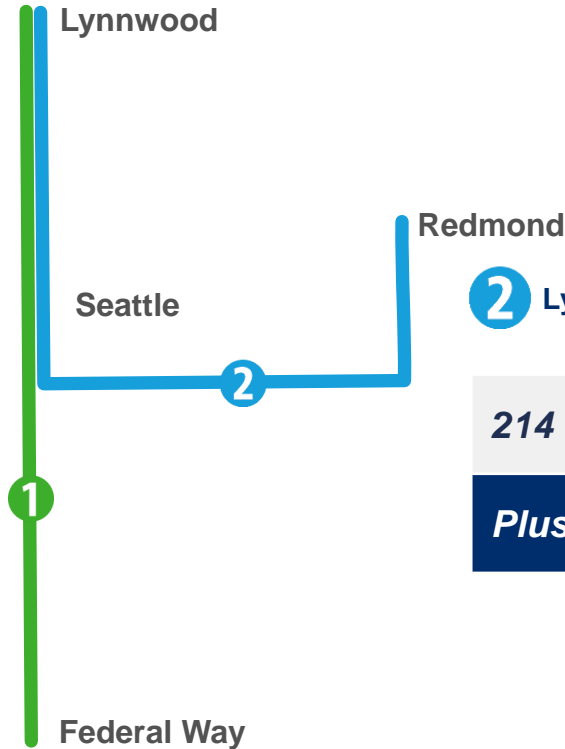
Strategy: Purchase 10 more Series 2 LRVs

1 & 2 Combined service
Lynnwood to IDS

214 LRV fleet	4-5 min	3-4 cars
Plus 10 LRV	4-5 min	3-4 cars

1 Lynnwood to Federal Way

214 LRV fleet	8-10 min	4 cars
Plus 10 LRV	8-10 min	4 cars



2 Lynnwood to Downtown Redmond

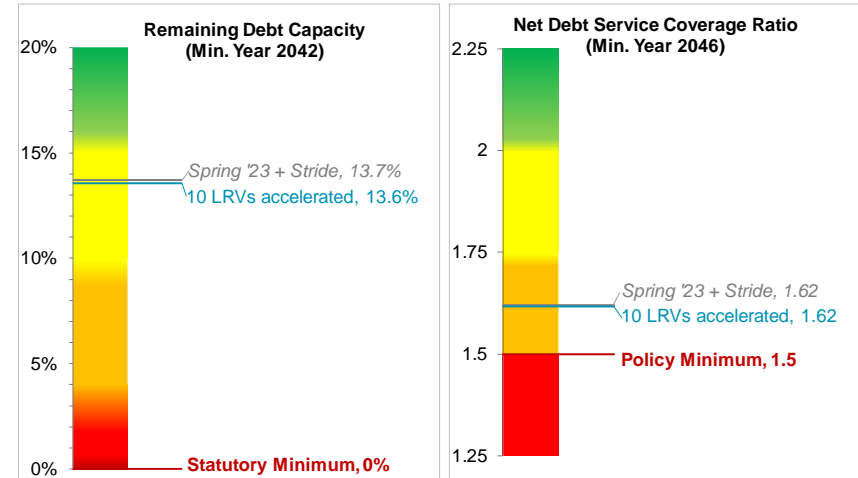
214 LRV fleet	8-10 min	3 cars
Plus 10 LRV	8-10 min	3-4 cars

More 4 car trains
on 2 Line

Added LRVs takeaways

Impact of 10 more Series 2 LRVs

- Accelerates 10 LRVs from Series 3 to Series 2
- Increases fleet to 224 until Series 3 LRVs are available in the early 2030s
- Supports more 4-car trains
- Storage options being assessed
- Assumes lower cost / LRV than Series 3
- Results in a small decrease in financial capacity and coverage due to earlier spending
- Grant funding possible, but not assumed



PRELIMINARY

Staff recommendations

DO

- Continue to improve fleet availability
- Consider buying 10 more Series 2 LRVs
- Analyze augmenting Link with ST Express capacity

DO NOT

- Modify service to turn back peak period 2-Line trains at Northgate

Board feedback?

Schedule & next steps

2023

- April: vehicle storage shortage & Lynnwood service
 - June: long-term light rail fleet & storage challenges
 - September: [briefing deferred to October]
 - October: ST2 light rail service & passenger experience
 - November: ST3 light rail service and passenger experience
-

2024

- February: improving ST3 passenger experience + program affordability considerations
- March: seek Board direction about service and capital priorities
- Following Board direction: update long-range service plan, agency financial plan, rail fleet management plan, annual program review

Thank you.



 soundtransit.org

