Toward More Reliable Link Service

System Resilience Status Update

Rider Experience and Operations Committee

12/5/24

Why we are here

o To summarize recent service interruptions, describe their known and unknown causes, and how we are addressing each issue.

o Discuss immediate, near-, and long-term workplans to improve resilience, reliability, safety, and passenger information for the Link system.

Update only, no Board action

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System overview

Sym.	Link Light Rail System component
	Light rail vehicles
	Tracks
	Communications
	Train control: signals
	Traction power substation (TPSS)
	Power from TPSS to overhead wire
	Stray and current from rail to TPSS train
	Pantograph
OCS	Overhead Catenary System (OCS)
	Backup power
	Alarms
	Fans

Traction Power Components

Tunnel Components

System overview

Link Control Center

TPSS

Climate

Communications

Power to trains

OCS

Signals

Fans   Alarms   *Backup power*

TPSS

Return and stray current

Tunnel

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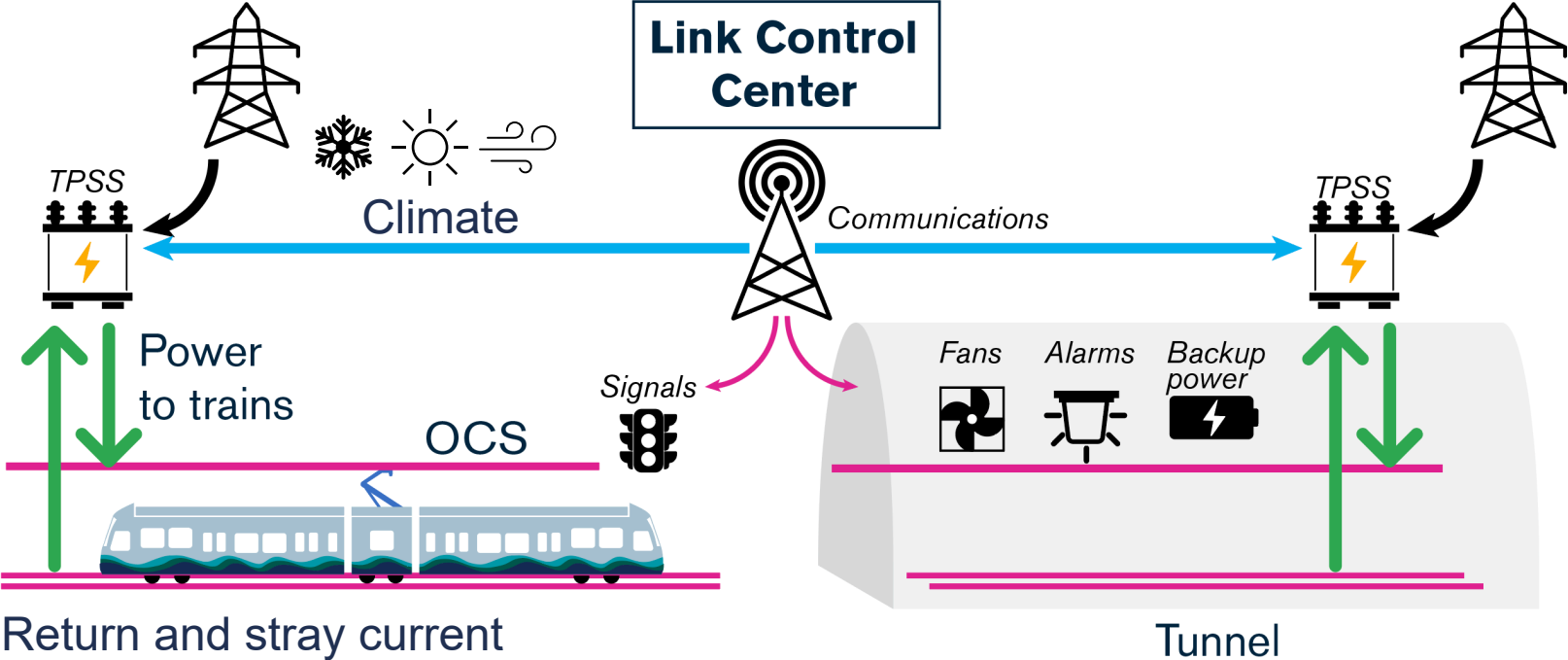
Workplan framework

Operating System

Passenger Support

Team 1	Team 2	Team 3	Team 4
LRV Reliability Improvements	Traction Power & Train Control Improvements	Comprehensive System Review	Outreach & Communication Improvements

Implement Immediate Repairs + Near-Term Improvements

Recommend Near- and Long-Term Improvements

Implement Immediate + Near-Term Improvements

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Workplan phases and timelines

	SYSTEM ASSESSMENT	**IMMEDIATE REPAIRS**	**NEAR-TERM & LONG-TERM SOLUTION PRIORITIZATION**	**NEAR-TERM & LONG-TERM SOLUTION IMPLEMENTATION**
When	*Now – Jan. 2025*	*Dec. 2024 – Mar. 2025*	*Jan. – Mar. 2025*	*Apr. 2025 – Jan. 2026*
Activities	• Maintenance Records Review • Site Inspections • Field Testing • System Modeling • Stakeholder Interviews • Design Requirements	• New and Existing Service Repair Order Prioritization • Update Maintenance Procedures • Maintenance Training	• Assess Cost, Risk, & Benefit of Proposed Solutions • Explore Industry Best Practices • Prioritize Solutions for Optimal Results	• Contractor Procurement • System Improvement Implementation • Software Update Implementation • Agency Requirements and Standards Updates
Outcomes	• Root Causes of Failures • Areas of Vulnerability • Immediate Repairs Recommendations	• Immediate Repairs • Enhanced Repair Response	• Implementation Workplan • Implementation Schedule	• Improved System Monitoring • Enhanced System Redundancy • Reduced Service Interruptions

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BOARD UPDATE ★

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Passenger support during service interruptions

How we inform passengers when interruptions occur

- *Passenger Information Coordinators (PICs)* located in Link Control Center for immediate release of information.

- *Passenger Information Management System (PIMS)* sends rider information directly to stations.

- *Rider Alerts* sent out via text and email.

- *Train Operators* provide announcements on vehicles.

- *Fare Ambassadors & Security* relocate to incident locations.

- *Emergency Staff Ambassadors* can be activated, if needed.

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What we know: YTD service interruptions

YTD Operating Hours: **6,500**

YTD Interruption Hours: **376**

Chart legend:
- ■ Number of Interruptions
- ■ Total Interruption Time (Hrs.)

Categories: Light Rail Vehicles, Train Control, Traction Power

Y-axis: 0, 50, 100, 150, 200, 250
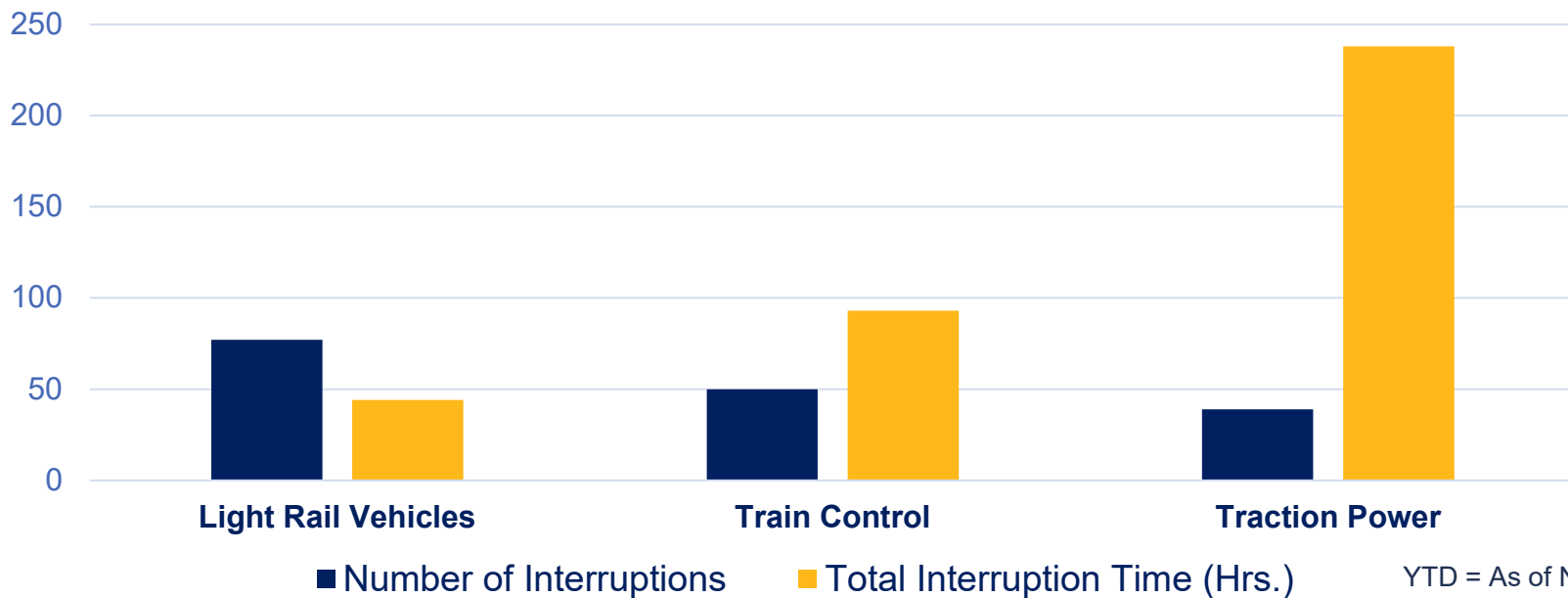
YTD = As of Nov. 15, 2024

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What we know: reasons for interruptions

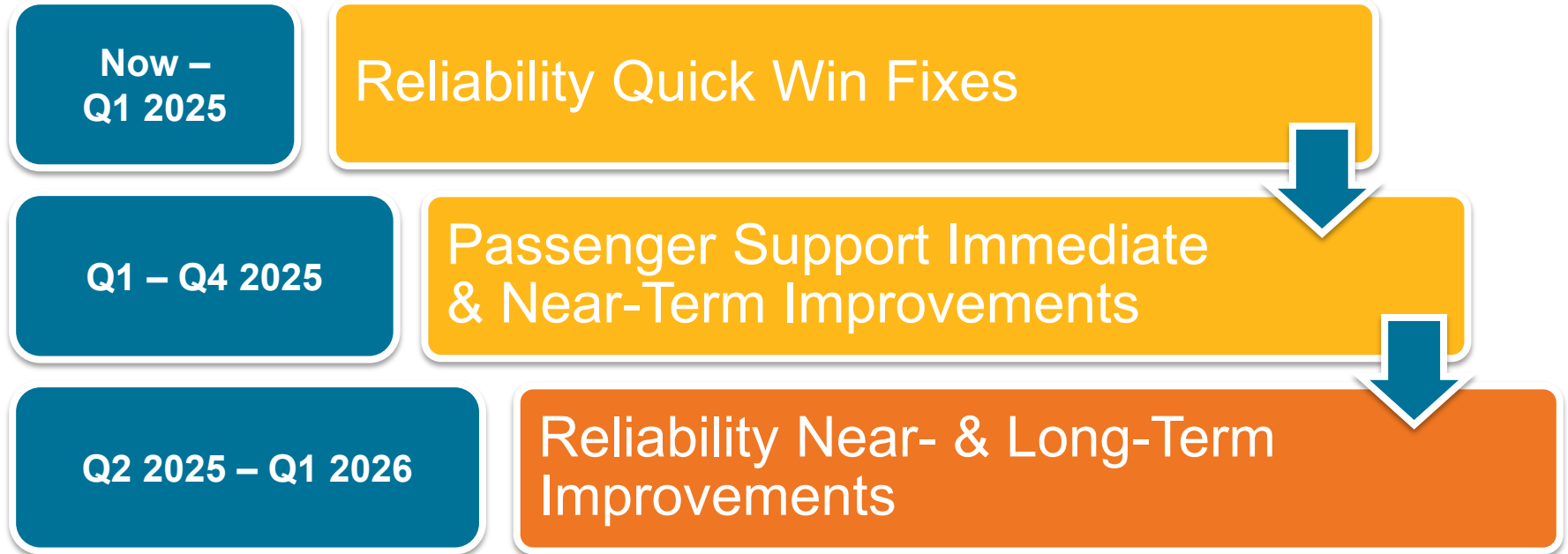| System Component	Reason(s) for interruptions
Siemens LRV Brake Systems	Valve and other leaks
	Valve control issues
	Hydraulic fluid contamination
Siemens LRV Communications Systems	Various reasons
Traction Power: Rail Return	Stray current levels
Traction Power: Overhead Catenary System (OCS)	OCS wire and train interface issues
Train Control: Signals	Faulty signals

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Immediate actions – quick win fixes

King County Metro will implement the following immediate fixes

- *Install signage* to alert operators to coast at Capitol Hill and University District stations in areas with high potential to affect the power system.

- *Inspect and adjust OCS wire tension* in the DSTT which will provide a smooth transition where wires cross.

- *Clean the rails* in the DSTT to reduce stray currents through the rail system.

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Summary

Sound Transit and King County working together to improve system resiliency and passenger experience

Now – Q1 2025	Reliability Quick Win Fixes
Q1 – Q4 2025	Passenger Support Immediate & Near-Term Improvements
Q2 2025 – Q1 2026	Reliability Near- & Long-Term Improvements

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Thank you.

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