METRO CONNECTS

MORE SERVICE

MORE CHICES

ONE SYSTEM

King County
METRO

Long-Range Plan | 2016

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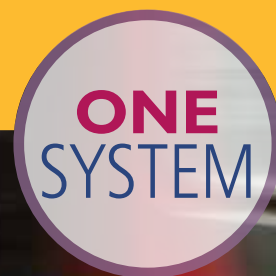
METRO**CONNECTS**

is King County Metro Transit's vision for bringing you more service, more choices, and one easy-to-use system over the next 25 years.

More service, more choices, one system

The opening of the Link light-rail stations at Capitol Hill and the University of Washington—with more frequent Metro bus service connecting more neighborhoods to high-capacity transit—is a tangible example of how we are creating an interconnected transportation system that gives more people more choices to get to more places on time.

It's a preview of the future of transportation in King County, and this long-range vision—METRO CONNECTS—is how we will get there.

This vision is intended to be our atlas as we create an integrated transportation system that connects people to opportunity, protects our environment, and knits together our growing cities.

Decades of innovation at Metro give us a strong foundation to build on, including the highly successful RapidRide lines, one of the greenest bus fleets in the United States, the ORCA card system that has made fare payment more efficient and convenient, and the nation's leading low-income fare program, ORCA LIFT.

The plan is shaped by input we received from passengers, King County cities, Sound Transit and other transportation agencies, businesses and other stakeholders—all working together to achieve a shared vision of better mobility in our region.

Together we will turn that vision into reality.

Dow Constantine

Dow Constantine
King County Executive

Executive Summary

METRO CONNECTS is a vision for bringing more and better transit service to King County over the next 25 years: Frequent, reliable and fast service—all day, every day. Connections to the places people want to go. One integrated system that's easy to use. Customer-friendly vehicles, drivers, stops, information and assistance. Safe and secure operations and facilities for our passengers, employees and communities.

People across King County helped shape this vision. In 2015 and 2016, Metro invited transit customers, bus drivers, King County cities, Sound Transit and other transportation agencies, businesses and more to join us in imagining our future public transportation system. Thousands of participants shared their needs, hopes, and ideas for getting around better.

They were responding to critical challenges facing our region, such as how to accommodate growth, promote social equity, connect people to Sound Transit's expanding Link light rail system, and protect our environment.

The inclusive process that led to our shared vision is a starting point for ongoing collaboration. METRO CONNECTS lays the groundwork for next steps by establishing joint expectations for future road, land-use, service, and technology improvements as well as policies that support the vision for future transit.

It also helps cities understand the service envisioned for their communities, and provides guidance on how they can play a vital role in creating the envisioned transit network through capital investments and transit-supportive development.

This executive summary provides an overview of the METRO CONNECTS vision. It is followed by three sections (Service Network, Service Quality Investments, Critical Service Supports) that describe what Metro plans to do and the types of investments needed to build the proposed future network; and a fourth section (Attaining the Vision) describing our METRO CONNECTS Development Program.

How did people weigh in?

1,500
Attended community open houses

9,700
Responded to our online survey

55K
Visited our website

75
Technical Advisory Committee participants

15
Meetings

25
Community Advisory Group members

9
Meetings

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The service network

METRO CONNECTS envisions a network that increases Metro service by 70 percent (2.5 million service hours) by 2040.

This network would shift Metro's emphasis from peak-period service to all-day mobility. It would include other public and provide transportation providers, interconnected to create one system that's easy to use. By offering many types of services, the network would respond to many different travel needs.

The service categories in METRO CONNECTS:

Frequent Service

"Show-up-and-go" service with speed and reliability improvements; starts early and runs late in the day.

- About 68 percent of Metro's total service hours would be invested in frequent service by 2040
- RapidRide would grow to 26 lines, including 13 new lines by 2025 and seven more by 2040, and existing lines would be upgraded
- 73 percent of King County residents would have access to frequent service

Express Service

Limited-stop service between regional centers, all day, both ways. Includes peak-only service.

- About 9 percent of Metro's total service hours would be invested in express service by 2040

Local and Flexible Service

Fixed-route buses and alternatives such as vanpools, Dial-A-Ride Transit, community shuttles, and real-time ridesharing.

- About 23 percent of Metro's total service hours would be invested in local service (fixed route and flexible alternatives) by 2040
- Local service would be improved, with a vision for 30-minute minimum rather than 60-minute
- Alternative service investments would increase

Fig. 1: Anticipated Service in Future Network
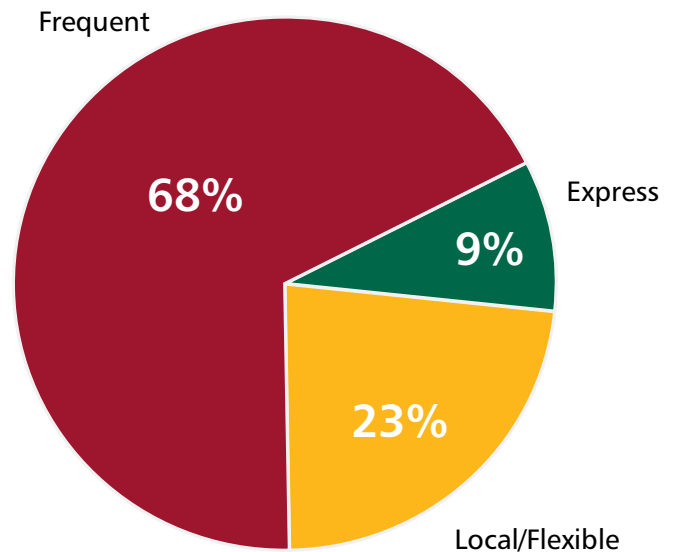
Metro's Alternative Services program would work with communities and other partners to identify needs and develop "tailored to fit" local transportation services. The needs of low-income and minority communities would be key considerations.

The vision outlines how to grow the total amount of service in local communities as we respond to their needs and to future demand with alternative service projects.

METRO CONNECTS would also increase the accessibility of the general public system, giving people with disabilities more options and reducing their reliance on Access paratransit. We envision innovative options that are more convenient for customers and reduce the cost of service.

We would better meet diverse customer needs by providing comfortable and easy-to-use service for all passengers, regardless of their physical abilities, languages spoken, and the mobility devices they use.

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Service quality investments

METRO CONNECTS would make an unprecedented level of capital investments to improve the quality of transit service. These investments would help buses move faster, improve real-time customer information, make passenger facilities better and more accessible, and improve parking access.

Types of investments:

Speed and reliability: Make corridor improvements to enhance bus speed and reliability and help ease regional transportation bottlenecks.

Innovation and technology: Make fare payment easier, pilot new vehicles, improve scheduling, and upgrade existing infrastructure. Metro would use technological innovations to offer customers new types of information and new ways to get it, enhance tools for using the system, and continue adopting greener fleet technologies to move toward zero emissions.

Passenger facilities: Create well-designed and safe transit hubs, including major stops, stations, and key transfer points, to support easy connections between services

By 2040, King County will have more than 30 transit hubs with more than 10,000 boardings a day. Metro would invest in:

- Passenger facilities.

- More bus stops and stations, including 1,000 new bus stops and upgrades to existing stops and 85 new and upgraded transit hubs.

- Enhanced amenities, safety, ease of navigation, and integration of services at passenger facilities to improve the quality of the passenger experience.

ℹ
For more information about proposed investments
Go to the Development Program section, starting on page 76

Access to transit:

- Invest in access improvements, parking, and in improvements for non-motorized travel modes. This would allow us to manage existing parking resources to increase access to the system and increase transit parking in the region by more than 13,000 spaces by 2040.

- Working with Sound Transit and other partners, focus parking investment in areas that do not have walkable access to frequent service and in target collection areas.

- In dense urban areas, focus on and encourage non-motorized access improvements partnering with cities to identify and fund non-motorized investments.

Managing demand:

- Invest in transportation demand management and include funding for TDM work in Metro projects to encourage individual choices that make our transportation system work more efficiently.

Transit Oriented Development (TOD):

- Support implementation of King County's TOD plan around major stations and hubs, coordinating early with jurisdictions to identify locations and promote compact, transit-supportive development.

Critical service supports
To build the fleet, operations and workforce needed to support the expanded and enhanced system, we would:

- Invest in new fleet, including about 625 new buses.

- Invest in new layover spaces, including off-street spaces, by about 50 percent.

- Invest in new bases and other facilities to support an expanded fleet, workforce and support functions.

- Adapt Metro's workforce to enable us to achieve our vision, provide robust training and development opportunities to build leadership, and emphasize diversity and inclusion in the workforce.

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Attaining the Vision

Metro would continue to collaborate with jurisdictions, transportation agencies, and the public as we move toward our shared vision. The METRO CONNECTS Development Program would coordinate internally and with jurisdictions to deliver the near-term service changes, complementary capital investments, and other program and policy work needed to support the METRO CONNECTS vision.

Each of the project areas in METRO CONNECTS would require more detailed analysis and consideration as we move toward project delivery. By considering both planning factors and available resources, the Development Program would provide opportunities to reconcile the needs identified in Metro's Annual System Evaluation with the METRO CONNECTS service network and vision.

Metro expects to begin work in 2017 on our first Development Program, for 2019 through 2024.

Financial: The costs for METRO CONNECTS are high-level planning estimates. Based on current revenue assumptions and planning-level assumptions regarding timing of investments, by 2025 just over 25 percent of the additional capital costs and more than 70 percent of the service hours called for in METRO CONNECTS could be funded.

By 2040, revenue currently forecasted could fund almost 30 percent of the additional capital costs and over 50 percent of the additional service hours called for in METRO CONNECTS.

The actual balance of service to capital expenditures will evolve throughout planning and budget development cycles. The King County Council will review and adopt the budget for METRO CONNECTS programs as part of the overall county budget.

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MORE
SERVICE

Buses come more often and take you farther, faster

26 RAPIDRIDE LINES

- Frequent service for 73 percent of King County residents.

- 26 new-generation RapidRide lines around the county, featuring state-of-the-art innovations.

ALL-DAY SERVICE

- A growing network of express buses, running every 15 to 30 minutes all day between areas where many people live and work.

LOCAL CHOICES

- More local service, including regular bus routes and creative new transportation options that meet community needs and connect people to the regional transit system.

FASTER TRAVEL

- Dramatic increase in investments that make transit as fast, reliable and efficient as possible, such as bus-only lanes.

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"The new RapidRide lines are well thought-out, traveling natural transportation corridors with good connections to Link and other RapidRide lines."

MORE
CHOICES

More choices for many needs

ON DEMAND

ANY MODE

- An evolving array of new service options like community vans that provide on-demand service, ridesharing apps, and partnerships with carsharing services.

- Projects to give you better, safer access to Metro service—new and improved sidewalks; trails and lanes for biking and walking; carpool and drop-off spaces; and parking for cars and bikes.

FROM OUR CUSTOMERS

"More types of service will make errands and short trips much easier."

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ONE
SYSTEM

One system that's easy to use

PARTNERS
- Coordination with transit agencies and cities to create one interconnected, efficient, easy-to-use transit system—including smooth transfers between Metro buses and Sound Transit's high-capacity rail service.

ACCESS
- Improvements that enable everyone to use public transportation—like new options for people with disabilities, better wayfinding signs, wider aisles and doors, and audio and tactile signs.

SUPPORT
- New types of service information and new ways to get it, first-rate customer assistance, and tools to simplify fare payment and speed up boarding.

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"An intermodal system will make moving off the bus to the rail car as direct as possible, with protection from inclement weather."

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Imagine what it could be like

A world-class transit system that gives you more frequent, reliable, and fast service all day, every day throughout King County. A system that offers innovative new travel options; clean, safe and customer-friendly vehicles and facilities; and information that makes transit work for you.

When you get up in the morning, your smart device or computer shows you the choices in your area: Take a local bus. Or request a community van ride to a transit center, where you can catch a frequent RapidRide or express bus. Either one will take you straight to the city where you work or to a Link station.

Another choice: go with someone who's driving to your destination and using an app to find people to share the ride. Or you could drive to the local park-and-ride; your smart device tells you there are 12 open parking spaces.

As you leave home, your device gives you even more information. Every seat is taken on the bus you had decided to take, but the one coming 10 minutes later has plenty of room. You decide to make a quick stop at the coffee shop and catch that next bus.

As you walk to the bus stop with your coffee, cyclists pass by on a new bike lane next to the sidewalk; some will put their bikes in the secure lockers at the stop and join you on the bus.

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The stop is well-lit, so you can see who's waiting under the large shelter. The mother who drops her children at day care every morning is there; the floor of the bus is even with the stop platform so she can roll the stroller on—and there's a place where she can stash it onboard. Wheelchair users like level boarding, too, as well as the easy mechanism for securing a wheelchair by themselves.

It doesn't take long for everyone to get on the bus—the passengers tapped their fare cards on the sidewalk kiosk or used mobile ticketing and boarded through all doors. The driver smiles and answers questions for a few riders.

Your bus gets you to your destination much faster than it used to. The road now has a bus-only lane and traffic signals that stay green when the bus approaches.

Usually you walk the last mile to work for exercise, but it's raining hard. You decide to take a transportation network car that's waiting near the transit center. The driver accepts your fare payment smartcard, so paying is quick and easy.

Compared to 25 years ago, your transit trip was much faster, easier, and full of options—and you know those choices are available to you all day, any day.

How METRO CONNECTS would help keep our region a great place to live

- **Support our growing population.**
  With one million more people and 850,000 more jobs expected in the Central Puget Sound Region by 2040, enhanced transit would help us all get around.[1]

- **Manage congestion so you get home faster.**
  We expect 24 percent of peak-period trips to be on transit by 2040, compared to 12 percent in 2015.

- **Save you money.**
  Today, an average drive-alone commute in King County costs $290 per month, not counting parking and tolls. A transit pass costs $117. Expanded transit would allow more people to save more money.

- **Create more opportunities for all.**
  One in four people in King County live at or near the poverty level. Metro could expand opportunities for people to prosper and thrive by offering frequent trips all day to jobs, education, and services. Innovations like our ORCA LIFT low-income fare could increase access.

- **Connect you to fast, high-capacity transit services.**
  As light rail and bus rapid transit (BRT) services expand, Metro can get people to stations for fast, frequent, and reliable trips to major destinations.

- **Protect our cherished environment.**
  Climate change threatens our environment, economy, health and safety. Transit is our best tool for reducing emissions from transportation.

- **Adopt new technologies that help you get around.**
  Metro would use emerging technologies to give you easier, greener and smarter travel options.

- **Get you where you want to go faster than today.**
  Figure 1 shows examples of how much farther you could go in 2040 than in 2015, traveling in the middle of the day.

1   Puget Sound Regional Council, Puget Sound Trends, www.psrc.org

300,000
FEWER CARS ON OUR ROADWAYS DAILY

$2,000
SAVINGS A YEAR BY COMMUTING ON TRANSIT

77% & 87%
OF MINORITY AND LOW-INCOME RESIDENTS NEAR FREQUENT TRANSIT SERVICE

1.7
MILLION METRIC TONS OF GREENHOUSE GAS EMISSIONS REDUCED ANNUALLY

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Fig. 2: Examples of How Far You Could Go at Midday in 15, 30, 45, or 60 Minutes

2015   2040

DOWNTOWN BALLARD

OVERLAKE TRANSIT CENTER

HIGHLINE COLLEGE
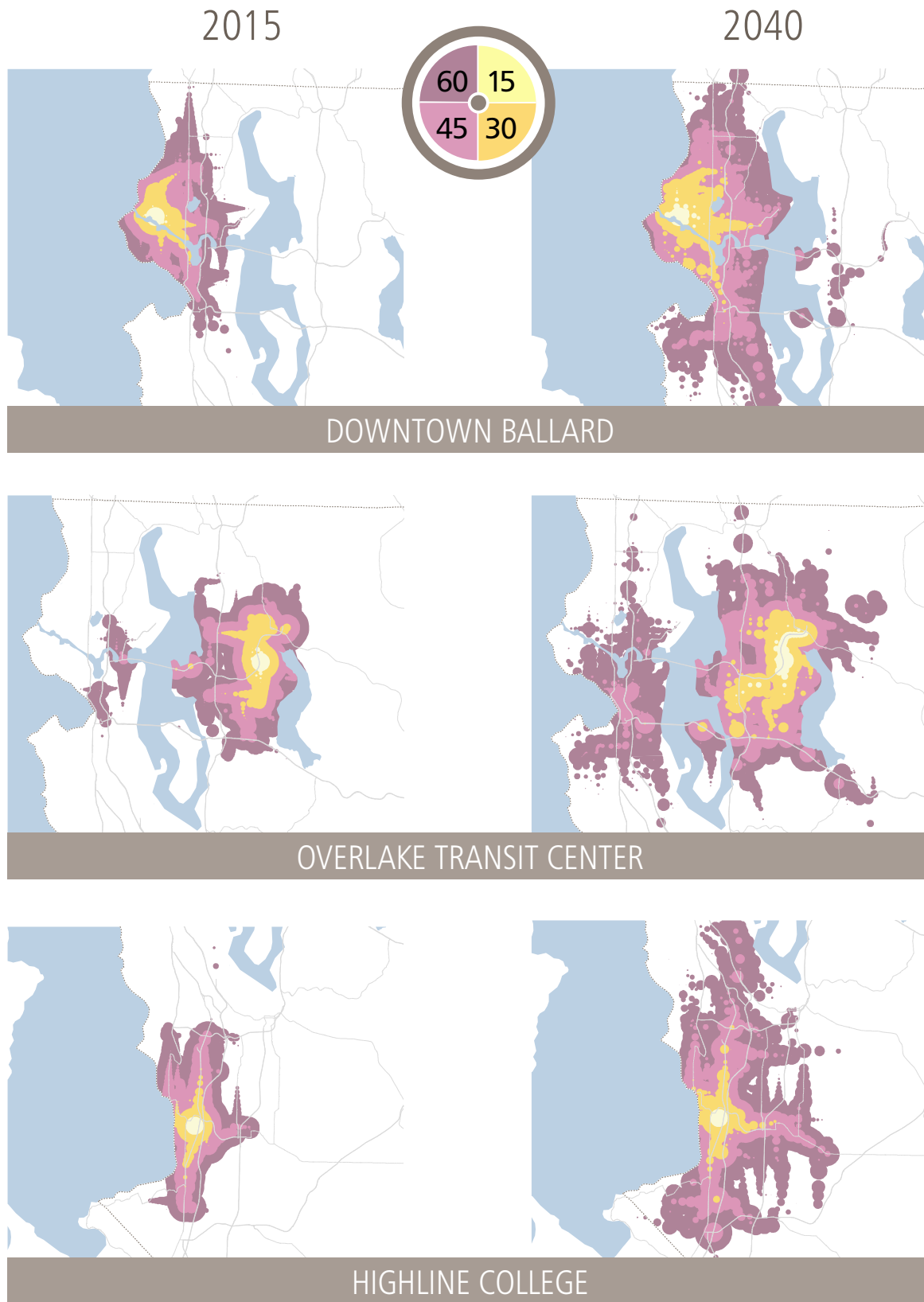
The travel sheds shown above include walking time, average amount of time waiting for the bus, travel time, and any transfer time between buses starting at noon.

The starting point for each example is:
- Downtown Ballard: 15th Ave NW and NW Market St
- Overlake Transit Center: NE 40th St and 156th Ave NE
- Highline College: S 240th St and Pacific Hwy S

Explore
METRO CONNECTS

Symbols used in this plan represent key King County and Metro policy goals as well as values expressed by the public that guided the development of METRO CONNECTS.

Safety
Keep transit service safe for our customers, employees, and communities.

Excellent Customer Service
Continually improve our customers' transit experience.

Sustainability
Protect the world we live in.

Equity and Social Justice
Help build social equity and opportunities for everyone in King County.

Partnerships
Collaborate with cities and agencies on transit improvements.

Innovation
Embrace and lead change.

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Chapter 1
What We're Proposing to Do

Chapter 2
How We Would Do It

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Transit terms and acronyms

Here are some words and acronyms you'll see in the next two chapters. Find a larger glossary in Appendix A, page A-2.

Business access and transit (BAT) lane: An outside lane reserved for buses and right-turning vehicles only.

Bus rapid transit (BRT): Bus service that operates more like rail, with frequent service most of the day; articulated buses; stops at half-mile intervals; operation in improved roadways, bus lanes or segregated right of way; shelters with real-time arrival signs and sidewalk fare readers.

Community Access Transportation (CAT): Transportation service for people with disabilities, provided by nonprofit agencies with support from Metro.

Intelligent Transportation Systems (ITS): Applications that provide innovative transportation services such as traffic management and "smart networks" that enable users to make well-informed travel decisions.

Peak-only express service: Bus service that does not operate in midday or on weekends, and runs mainly in one direction between residential areas and job centers.

Puget Sound Regional Council (PSRC): An organization of cities, transit agencies and other entities in King, Pierce, Snohomish and Kitsap counties that is responsible for policies and decisions about transportation, growth management and economic development.

Transportation network company (TNC): Connects paying passengers with drivers who provide transportation on their own non-commercial vehicles. Examples: Lyft, Uber.

Transit-oriented development (TOD): Mixed-use residential and commercial area designed to maximize access to and use of public transportation

Transportation demand management (TDM): Use of strategies to reduce travel demand—especially for single-occupant vehicles.

Want more information?

Visit www.kcmetrovision.org

- Public Engagement Report
- Supplemental Network Performance Report
- Concept Development Report

The Service Network: Frequent, Express, Local/Flexible

METRO CONNECTS envisions much more frequent and reliable transit service all day, every day. Metro would increase service by 70 percent over the next 25 years, dramatically expanding the number of places people could go and decreasing the time it takes to get there.[2]

Fig. 3: Service Profile

Number of Vehicles in Service by Time of Day

Existing   **METRO CONNECTS**

8am

noon

5pm

8pm

Vehicles   0   500   1,000   1,500
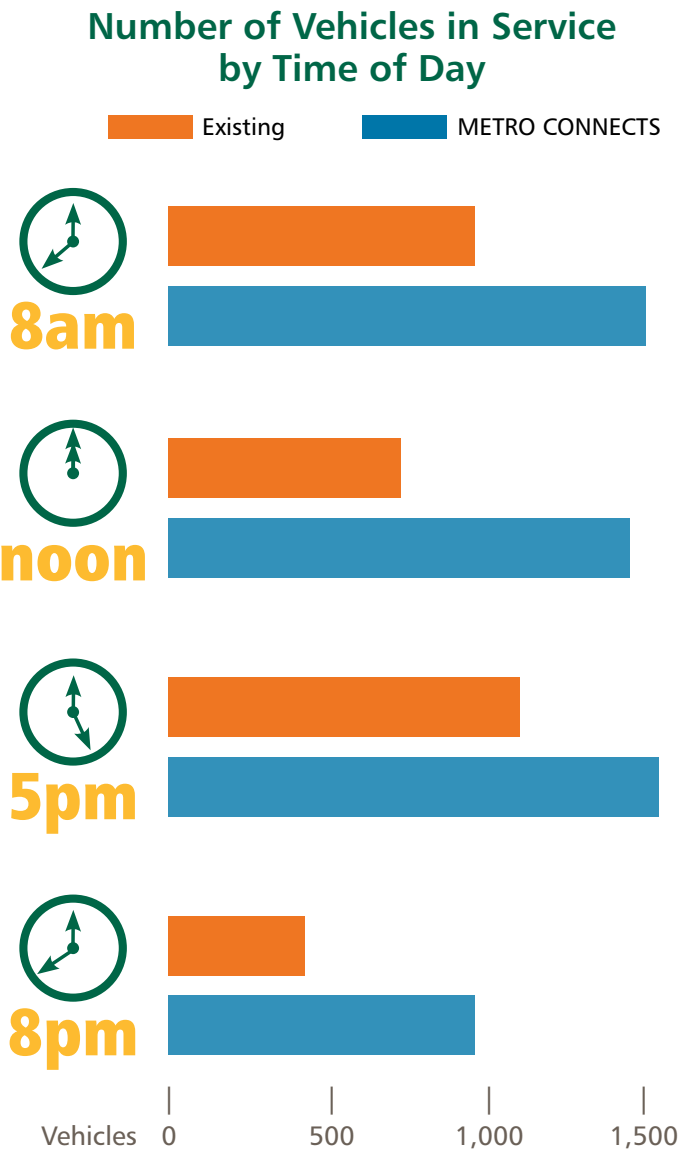
2   The Puget Sound Regional Council projects that our region will have 1 million more people and 850,000 more jobs by 2040, and Metro's annual service is envisioned to grow from 3.5 million hours to 6 million hours annually.

How the network would change

METRO CONNECTS would add 2.5 million new service hours to Metro's service network by 2040, on top of the 3.5 million hours of service Metro provided in 2015.

The enhanced system would:

- Connect people to Sound Transit's expanding regional rail system. The proposed service network includes Sound Transit's existing, planned, and proposed investments.

- Meet current transit needs identified in Metro's annual System Evaluation Report, and future transit needs identified in cities' growth plans.

- Expand funding for alternative services.

- Move Metro toward a service network that operates all day, from earlier in the morning to later at night.

Fig. 4: Summary of Service Categories in the METRO CONNECTS Network

DESCRIPTION

Frequent — "Show-up-and-go" service with speed and reliability improvements; starts early and runs late in the day.

Express — Limited-stop service between regional centers, all day, both ways. Includes peak-only service.

Local and Flexible* — Fixed-route buses and alternatives such as vanpools, Dial-A-Ride Transit, community shuttles, and real-time ridesharing.

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METRO CONNECTS service

The proposed METRO CONNECTS network includes three broad categories of service: frequent, all-day express, and local/flexible (see Figure 4).

Frequent and express are fixed-route services that operate on regular schedules and pathways. The majority of Metro services today are fixed-route.

Local services include both fixed-route and flexible services that are tailored to local needs and connect riders to other transit services. METRO CONNECTS envisions flexible services making up a growing share of Metro's suite of travel options.

The role of peak service

Metro currently operates some routes that run only when demand is the highest. These routes might have trips in the morning but little or no service at other times of day. While METRO CONNECTS would expand many express routes to provide all-day service, peak-only service would still be an important tool for serving growing markets.

FROM OUR CUSTOMERS

"The vision is great! It's ambitious, and at the same time presents a realistic approach to future transit opportunities for the community from both a social and economic viewpoint."

FREQUENCY	WHERE SUITED	STOP SPACING		HOURS OF SERVICE
5-15 MIN	Long corridors with many destinations densely spaced along the corridor.	**1/2** MILE — OR MORE FOR RAPIDRIDE	**1/4** MILE — TO 1/2 MILE FOR OTHER FREQUENT	**20** HRS/DAY — 5 a.m.–1 a.m. OR MORE TO MEET DEMAND
15-30 MIN — MOST TIMES OF DAY / **10-15** MIN — FREQUENT EXPRESS	Between centers of high demand, high travel speeds.	**1-2** MILES		**15** HRS/DAY — 5 a.m.–8 p.m.
30 MIN	Lower density or hard-to-serve areas.	**1/4** MILE — OR MORE		**18** HRS/DAY — 5 a.m.–11 p.m.

* METRO CONNECTS used a network of local fixed-route bus service to approximate the future locations and quantity of local service. However, this service may be developed in different ways according to local needs. Also, Metro's Alternative Services Program could be extended and expanded in the future.

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The Service Network, continued

Working together

Metro would closely coordinate service plans with cities and public transportation agencies to achieve the METRO CONNECTS vision.

Sound Transit would be a key partner. Their planned and proposed investments in King County would replace some Metro service, potentially enabling us to redeploy as many as 800,000 existing service hours,[3] or approximately 22 percent of our current system, to help build the future network. We would follow our Service Guidelines for restructuring, which include a detailed planning and community outreach process.

The 2016 University Link project shows how Metro can build on Sound Transit's investments. When Sound Transit extended Link from downtown Seattle to Capitol Hill and Husky Stadium, we changed bus routes to avoid duplication, create more frequent local service, and connect to light rail. Now Metro is providing frequent service to twice as many people in northeast Seattle.

Local jurisdictions are essential partners, too, both in developing projects and in pursuing transit-supportive growth and policies. Metro service is most productive and efficient in areas with dense development near transit, managed parking, paths for walking and biking, quality passenger facilities, and transit priority on roads. Some of these features are relatively low-cost, giving cities of all sizes opportunities to partner on the METRO CONNECTS vision.

Integrating transit

The evolution of the transit service network from 2015 to 2025 and 2040 is illustrated in figures 5, 6 and 7. Each of these maps shows the planned extent of the RapidRide, frequent, express, local, light rail, Sound Transit BRT, Sound Transit express, Sounder, streetcar and ferry services. Figure 8 shows examples of travel-time savings between major centers in the 2040 network. The system maps also illustrate the way Sound Transit and Metro services are planned to be integrated so they deliver the greatest mobility to King County residents.

3   Based on Metro's estimate of number of bus riders who would switch to Link as Sound Transit's light rail system is built out.

Fig. 5: 2015 Transit Service Network

Shoreline
Lake Forest Park
Kenmore
Bothell
Woodinville
Duvall
Kirkland
Redmond
Carnation
Yarrow Point
Hunts Point
Clyde Hill
Medina
Beaux Arts
Sammamish
Seattle
Bellevue
Mercer Island
Newcastle
Issaquah
Snoqualmie
North Bend
Burien
To West Seattle
To Downtown
Renton
Tukwila
SeaTac
Normandy Park
Vashon Island
Des Moines
Kent
Covington
Maple Valley
Federal Way
Auburn
Black Diamond
Algona
Pacific
Milton
Enumclaw

Downtown Seattle Inset

Denny Way
Boren Ave
3rd Ave
Madison St
I-5
S Jackson St

N

Miles
0   2   4

Legend:

RapidRide (red solid)	**Streetcar** (black dashed)
Frequent (pink/salmon solid)	**Ferry/Water Taxi** (light blue dashed)
Express* (green solid)	**Link Light Rail** (dark blue solid)
Peak Only* (green dashed)	**ST Express** (purple dashed)
Local/Flexible Services Area (yellow solid)	**ST Bus Rapid Transit*** (blue dashed)
Alternative Service (yellow shaded)	**Sounder** (black with tick marks)

*Peak only service is shown only on 2015 and 2025 maps. Express and ST Bus Rapid Transit service are shown only on 2025 and 2040 maps.

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Fig. 6: 2025 METRO CONNECTS Service Network

Shoreline
Lake Forest Park
Kenmore
Bothell
Woodinville
Duvall
Kirkland
Redmond
Yarrow Point
Hunts Point
Medina
Clyde Hill
Carnation
Seattle
Beaux Arts
Bellevue
Sammamish
Mercer Island
Newcastle
Issaquah
Snoqualmie
Burien
To West Seattle
To Downtown
Tukwila
Renton
North Bend
Vashon Island
Normandy Park
SeaTac
Des Moines
Kent
Covington
Maple Valley
Federal Way
Auburn
Black Diamond
Algona
Milton
Pacific
Enumclaw

Downtown Seattle Inset

Denny Way
Boren Ave
3rd Ave
Madison St
I-5
S Jackson St

N

Miles
0   2   4

▬ RapidRide		┈ Streetcar	
▬ Frequent		┄ Ferry/Water Taxi	
▬ Express*		▬ Link Light Rail	
┄ Peak Only*		┄ ST Express	
▬ Local/Flexible Services Area		┄ ST Bus Rapid Transit*	
		╫ Sounder	

Peak only service is shown only on 2015 and 2025 maps. Express and ST Bus Rapid Transit service are shown only on 2025 and 2040 maps.

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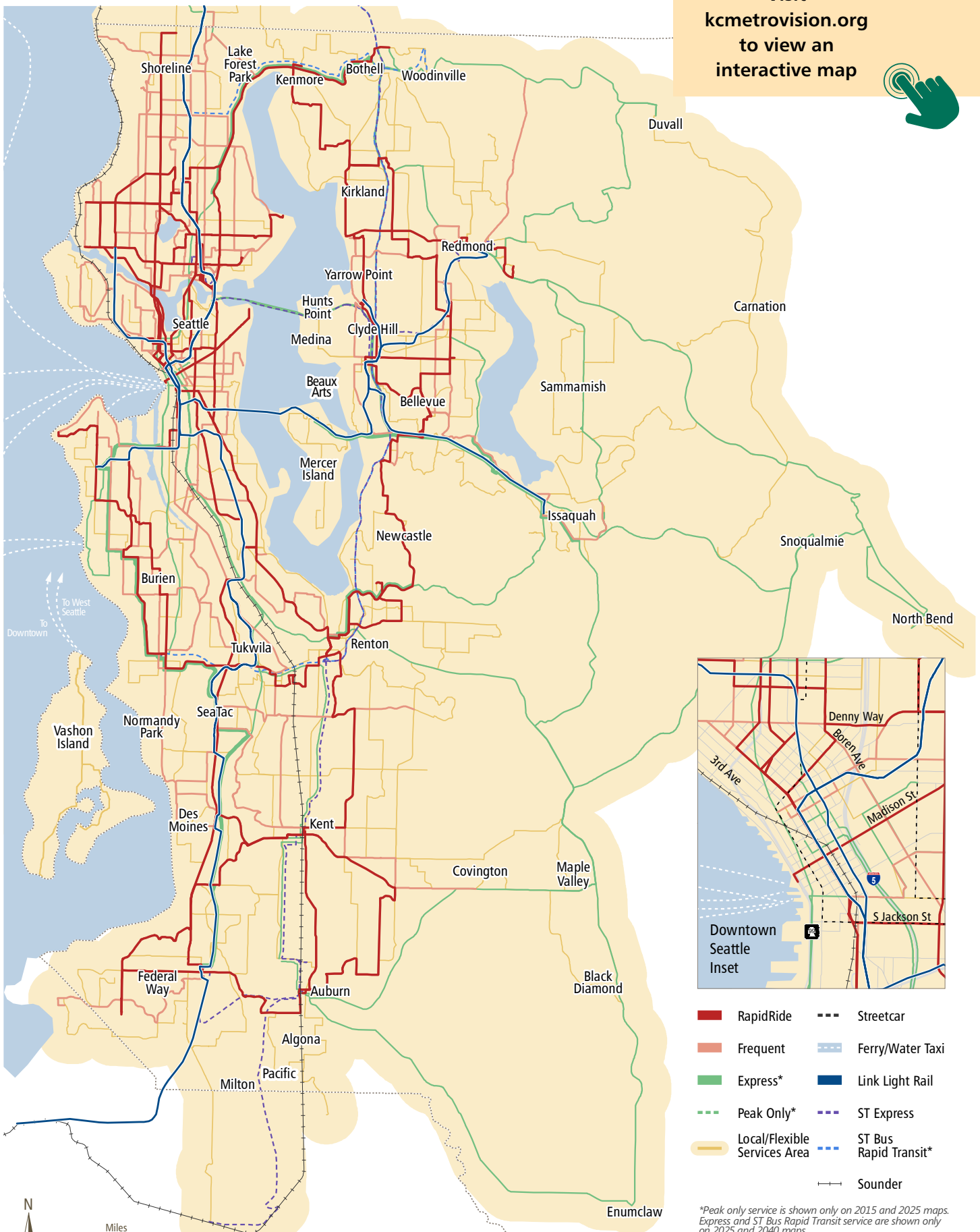
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Fig. 7: 2040 METRO CONNECTS Service Network

Visit
kcmetrovision.org
to view an
interactive map

Shoreline
Lake Forest Park
Kenmore
Bothell
Woodinville
Duvall
Kirkland
Redmond
Carnation
Yarrow Point
Hunts Point
Seattle
Medina
Clyde Hill
Beaux Arts
Sammamish
Bellevue
Mercer Island
Newcastle
Issaquah
Snoqualmie
Burien
North Bend
Tukwila
Renton
SeaTac
Normandy Park
Vashon Island
Des Moines
Kent
Covington
Maple Valley
Federal Way
Auburn
Black Diamond
Algona
Milton
Pacific
Enumclaw

To West Seattle
To Downtown

Downtown Seattle Inset

3rd Ave
Denny Way
Boren Ave
Madison St
S Jackson St

N

Miles
0   2   4

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Legend:
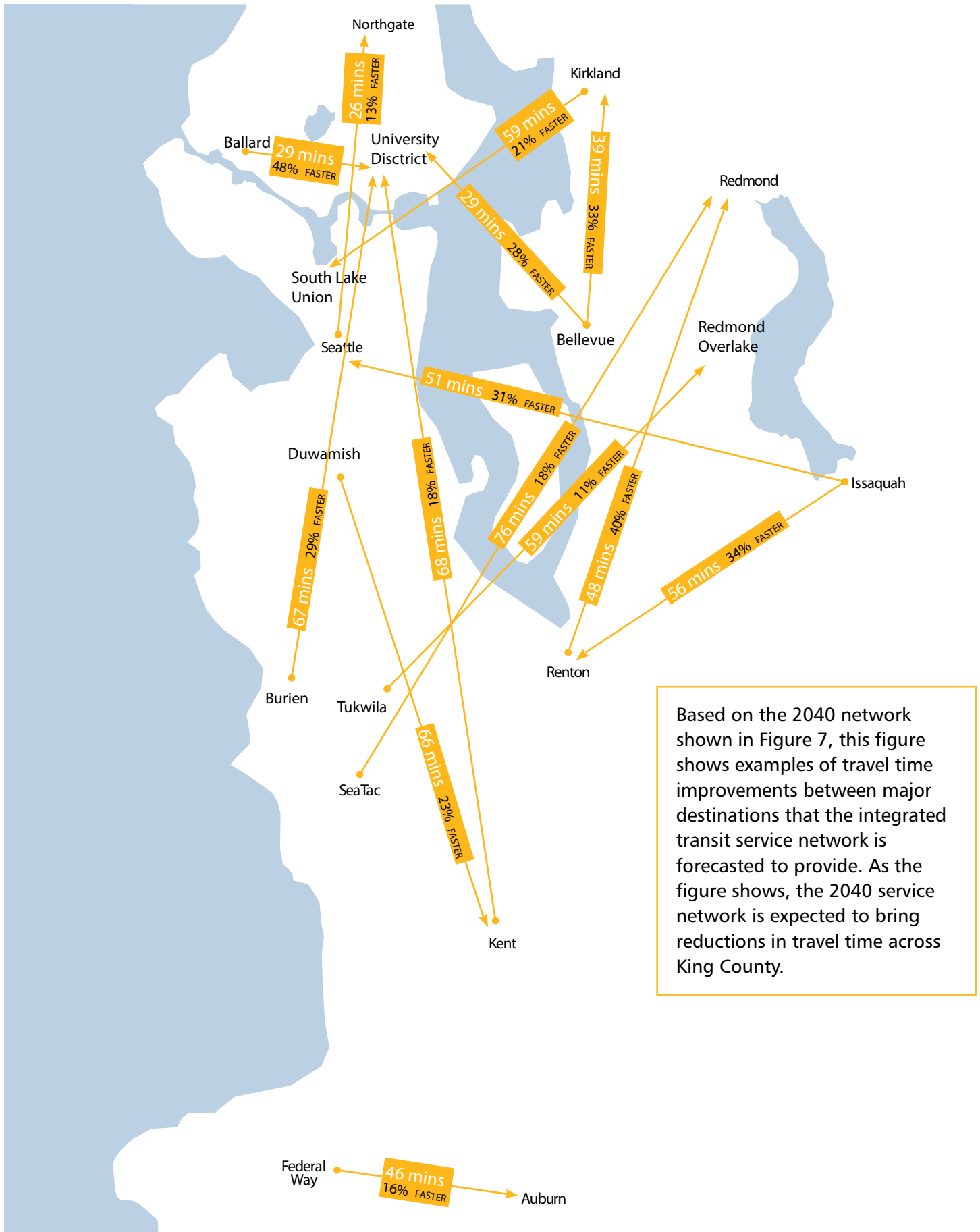
- RapidRide
- Frequent
- Express*
- Peak Only*
- Local/Flexible Services Area
- Streetcar
- Ferry/Water Taxi
- Link Light Rail
- ST Express
- ST Bus Rapid Transit*
- Sounder

*Peak only service is shown only on 2015 and 2025 maps.
Express and ST Bus Rapid Transit service are shown only
on 2025 and 2040 maps.
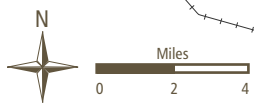
Fig. 8: 2040 METRO CONNECTS Service Network
Travel Time Savings Between Growth and Manufacturing/Industrial Centers

Northgate
26 mins 13% FASTER

Kirkland
59 mins 21% FASTER

Ballard
29 mins 48% FASTER

University Disctrict

39 mins 33% FASTER

29 mins 28% FASTER

Redmond

South Lake Union

Seattle

Redmond Overlake

Bellevue

51 mins 31% FASTER

Duwamish

18% FASTER

76 mins 18% FASTER

59 mins 11% FASTER

48 mins 40% FASTER

Issaquah

56 mins 34% FASTER

67 mins 29% FASTER

68 mins 18% FASTER

Renton

Burien

Tukwila

66 mins 23% FASTER

SeaTac

Kent

Based on the 2040 network shown in Figure 7, this figure shows examples of travel time improvements between major destinations that the integrated transit service network is forecasted to provide. As the figure shows, the 2040 service network is expected to bring reductions in travel time across King County.

Federal Way
46 mins 16% FASTER
Auburn

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Measuring progress

As METRO CONNECTS was developed, Metro worked with community members, elected officials, and other stakeholders to develop performance metrics for the 2040 service network. Figure 9 lists the key metrics in three areas: transit access, transit connections, and transit use and efficiency. Figure 9 also shows projected outcomes. As we implement METRO CONNECTS, we will track our progress toward these outcomes. Full methodology and performance projections can be found in Appendix A. Additional detail is available in the Supplemental Network Performance Report.

Fig. 9: METRO CONNECTS Performance Metrics and Projected 2040 Outcomes, with References to Appendix A Tables with Relevant Methodology

		2015*	2040*	CHANGE
Transit Access	**Proximity of households to transit stops** Percent of households within 1/2 mile of frequent service *(See Table A-3)*	43%	73%	▲70%
	Equity of access Percent of minority households with access to frequent service *(See Table A-3)*	61%	77%	▲26%
	Equity of access Percent of low-income households with access to frequent service *(See Table A-3)*	72%	87%	▲21%
	Proximity of jobs to transit stops Percent of jobs within 1/2 mile of frequent service *(See Table A-3)*	63%	87%	▲30%
	Access to transit: Percent of people biking and walking *(See Table A-4)*	74%	84%	▲14%
Transit Connections	**Connections to people** Number of people that an average King County resident could reach within a 30-minute transit trip (household to household) *(See Table A-5)*	37,000	86,000	2x
	Connections to jobs Number of jobs that an average King County resident could reach within a 30-minute transit commute *(See Table A-5)*	40,000	112,000	3x
	Connections to Link light rail Percent of people who can get to Link in 15 min by walking or bus *(See Table A-5)*	7%	32%	4.5x
Transit Use and Efficiency	**Ridership** Daily boardings *(See Table A-7)*	446,000	1,026,000	MORE THAN DOUBLES
	Mode share Percent of all trips taken on transit *(See Table A-7)*	7%	12%	▲71%
	Cost per boarding (Metro only) *(See Table A-7)*	$4.27	$3.95	▼7%
	Productivity: Boardings per hour (Metro only) *(See Table A-7)*	34.8	36.7	▲5%
	Emissions: Pounds CO_2 per mile (Metro only) *(See Table A-7)*	0.49	0.39	▼20%
	All-day service Ratio of trips off-peak compared to peak *(See Table A-7)*	41%	53%	▲30%

* 2015 metrics are based on actual performance; 2040 metrics are based on METRO CONNECTS modeling.
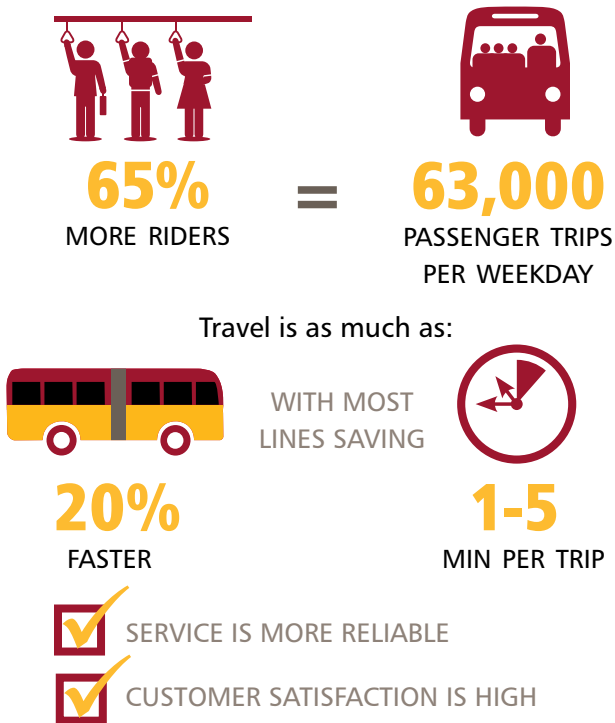
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Frequent Service

By 2040, 70 percent of King County residents will have access to frequent service.

We want to transform our transit system so you can walk out the door knowing that a bus will come soon and get you where you want to go. METRO CONNECTS proposes a major expansion of frequent service. We would finish the RapidRide alphabet by adding 20 new lines, and would upgrade all 26 lines to make service faster, more comfortable, and even easier to use.

Fig. 10: RapidRide

RapidRide has earned high marks

Compared to the bus routes they replaced, the RapidRide A to F lines combined carry about:

65%
MORE RIDERS

=

63,000
PASSENGER TRIPS PER WEEKDAY

Travel is as much as:

20%
FASTER

WITH MOST LINES SAVING

1-5
MIN PER TRIP

☑ SERVICE IS MORE RELIABLE

☑ CUSTOMER SATISFACTION IS HIGH

What would frequent service look like?

An extensive network of nearly 600 miles of frequent service would let riders travel farther, faster, and more conveniently than they can today to major county destinations.

Frequent service includes Metro's BRT, RapidRide, and routes that use regular buses and have some capital improvements to boost speed and reliability.

METRO CONNECTS defines frequent service as any route that comes at least every 10 minutes most of the day and at least every 15 minutes when demand is lower. Stops would be every half mile, though some non-RapidRide frequent service may stop as often as every quarter mile.

RapidRide would continue to provide top-quality service. Today, RapidRide buses arrive every 5 to 15 minutes from early morning until late in the evening. Stations at the busiest stops have broad shelters, real-time bus arrival signs, and ORCA readers that let card holders pay on the sidewalk and get on at any of the buses' three doors. Riders benefit from well-spaced stops, roadway improvements, on-board WiFi, and "intelligent transportation systems" that help the buses keep moving quickly.

The next generation of RapidRide would continually expand and improve on these features. METRO CONNECTS envisions RapidRide service with much more investment in speed and reliability improvements to achieve more-robust BRT. We would target operating 50 percent of RapidRide service in transit-only lanes, and would make additional improvements to reduce delays caused by major bottlenecks, traffic signals, boarding, and other sources. We would work closely with partner agencies to make the most of these investments.

ⓘ

For more information
See Appendix G, RapidRide Expansion Report, for information about how the RapidRide lines in METRO CONNECTS were selected.

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The enhanced RapidRide would also feature new passenger amenities such as information about how crowded the next bus is. Metro's Transit Control Center would actively manage buses to keep them from bunching up, and could add a bus if needed to reduce overcrowding.

The METRO CONNECTS 2040 RapidRide network is shown in Figure 11 on page 30; the complete 2040 frequent service network is shown in Figure 12 on page 31.

The METRO CONNECTS RapidRide network gives priority to corridors that meet these criteria:

- Have high ridership and unmet demand.

- Serve major regional destinations.

- Have transit pathways that are conducive to increasing travel speeds and transit priority treatments.

- Partners are willing to help with roadway improvements, permitting, or regulatory changes.

As we begin planning new RapidRide lines, Metro would work with cities and the public to determine where the lines would go, stop and station locations, and connecting service. For example, Metro has worked with the City of Seattle on corridor studies for BRT. In projects like this, both agencies can study and evaluate routing, integration with other services, multimodal connections, and other features. Public input would be a critical part of planning as projects move closer to final design. Metro's Service Guidelines provide direction for planning and outreach around major service changes.

What would it take?

- **Build toward a frequent service network.** Over time, increase frequent service hours by 115 percent over the 2015 level.

- **Expand and enhance RapidRide.** Building on the current A to F lines, start 13 new lines by 2025 and the remaining seven by 2040, and upgrade all existing lines to meet international BRT standards[4] of bronze or better.

- **With partners, invest in speed and reliability improvements in all existing and future RapidRide corridors.** Metro, Sound Transit, and local partners have already started to identify where major investments are needed to remove bottlenecks on corridors that have many riders and are slated for BRT service. Metro would assume primary responsibility for funding passenger facilities and roadway enhancements. Partners would assist with project planning, right-of-way acquisition and use, and transit-supportive land-use changes.

The cities of Shoreline and Seattle made investments in the E Line corridor that benefited transit riders and the community.

Shoreline invested in safer and easier access to stations, better flow of buses along the corridor, nighttime visibility and safety features, transit signal priority and business access and transit (BAT) lanes to keep buses moving, as well as streetscape amenities and stormwater management upgrades to stimulate economic development.

Seattle is contributing funding to increase E Line frequency and helped design and install BAT lanes, sidewalks, and a fiber optic system that supports signal priority, "next-bus" signs, and ORCA card readers.
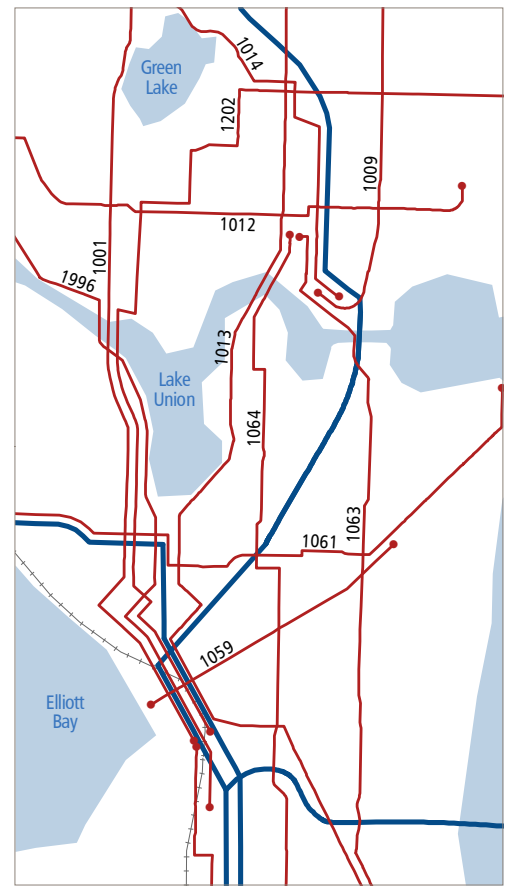
4 The Institute for Transportation & Development Policy has developed a widely used scorecard to certify BRT projects at gold, silver, bronze, or basic levels.
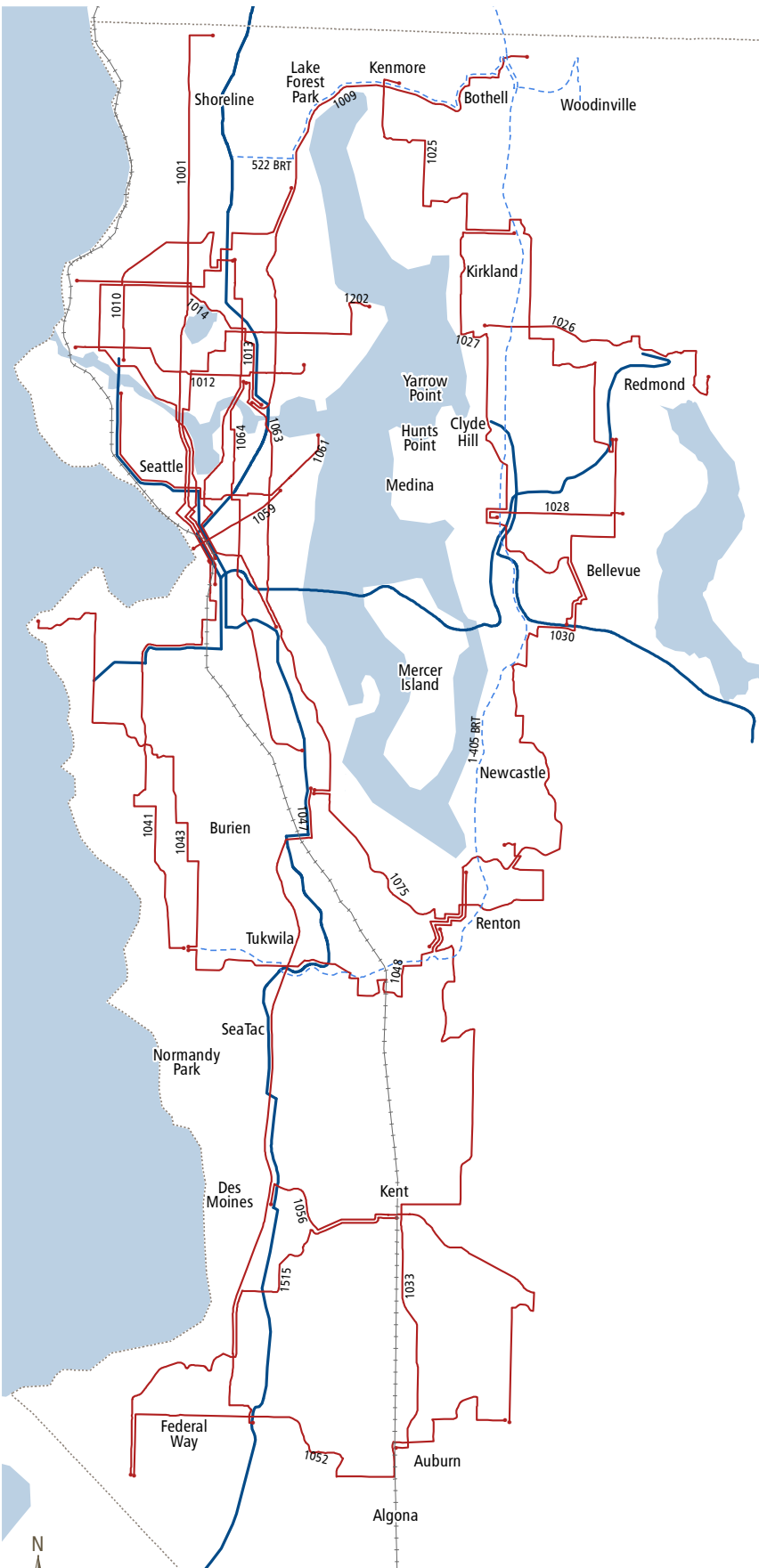
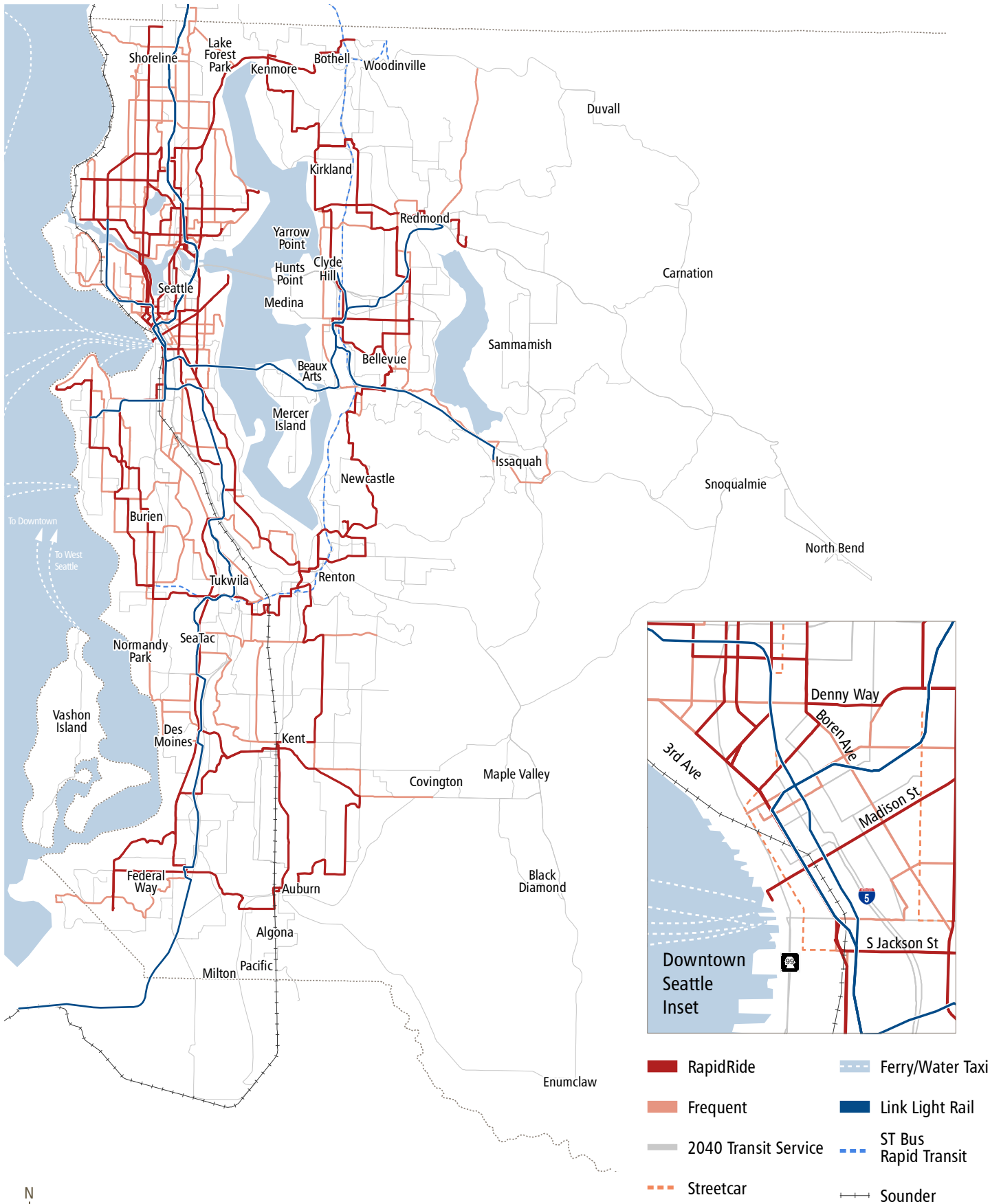| Route	Description
1001 (E Line)*	Shoreline - Downtown Seattle via SR 99
1009	Bothell - UW - Kenmore
1010 (D Line)	Fremont - Lake City - Northgate
1012	Ballard - Children's Hospital - Wallingford
1013	Northgate - Mount Baker - U. District
1014	Loyal Heights - U. District - Green Lake
1015	Northgate - Seattle CBD - Ballard
1025	Kenmore - Overlake - Totem Lake
1026	Campton - Kirkland - Redmond
1027	Totem Lake - Eastgate - Kirkland
1028 (B Line)	Crossroads - Bellevue - NE 8th St
1030	Overlake - Renton - Eastgate
1033	Renton - Auburn - Kent
1041	SODO - Burien - Delridge
1043 (C Line)	Alki - Burien - West Seattle
1047 (A Line)	Rainier Beach - Federal Way - SeaTac
1048 (F Line)	Renton - Burien - Tukwila
1052	Twin Lakes - Green River CC - Federal Way
1056	Highline CC - Green River CC - Kent
1059	Madison Valley - Seattle CBD - E Madison St
1061	Uptown - Madison Park - Capitol Hill
1063	U. District - Rainier Beach - Mount Baker
1064	U. District - Othello - Capitol Hill
1075	Renton Highlands - Rainier Beach - Renton
1202	Seattle CBD - Sand Point - Green Lake
1515	Kent - Twin Lakes - Star Lake

*For convenience, four-digit numbers are used to reference all 2040 routes. When implemented, all RapidRide lines would continue to be called letters rather than numbers.

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Legend: RapidRide — Link Light Rail — ST BRT — Sounder

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Fig. 12: METRO CONNECTS 2040 Frequent Network

Shoreline
Lake Forest Park
Kenmore
Bothell
Woodinville
Duvall
Kirkland
Redmond
Yarrow Point
Hunts Point
Clyde Hill
Carnation
Medina
Seattle
Sammamish
Beaux Arts
Bellevue
Mercer Island
Issaquah
Newcastle
Snoqualmie
To Downtown
To West Seattle
Burien
North Bend
Tukwila
Renton
SeaTac
Normandy Park
Vashon Island
Des Moines
Kent
Covington
Maple Valley
Black Diamond
Federal Way
Auburn
Algona
Enumclaw
Milton
Pacific

Downtown Seattle Inset

3rd Ave
Denny Way
Boren Ave
Madison St
I-5
S Jackson St
99

Legend

RapidRide	Ferry/Water Taxi
Frequent	Link Light Rail
2040 Transit Service	ST Bus Rapid Transit
Streetcar	Sounder

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Express Service

Faster express, limited stops, all day.

King County is growing, with more people and jobs in places like Bellevue, SeaTac, and Issaquah. Our service network must provide faster and easier trips between growth centers across the county.

METRO CONNECTS would build new all-day express routes with service every 15 minutes or better during peak periods and every 30 minutes during off-peak periods. Future express service would support a wide variety of work schedules, destinations, and trip purposes, giving riders more flexibility.
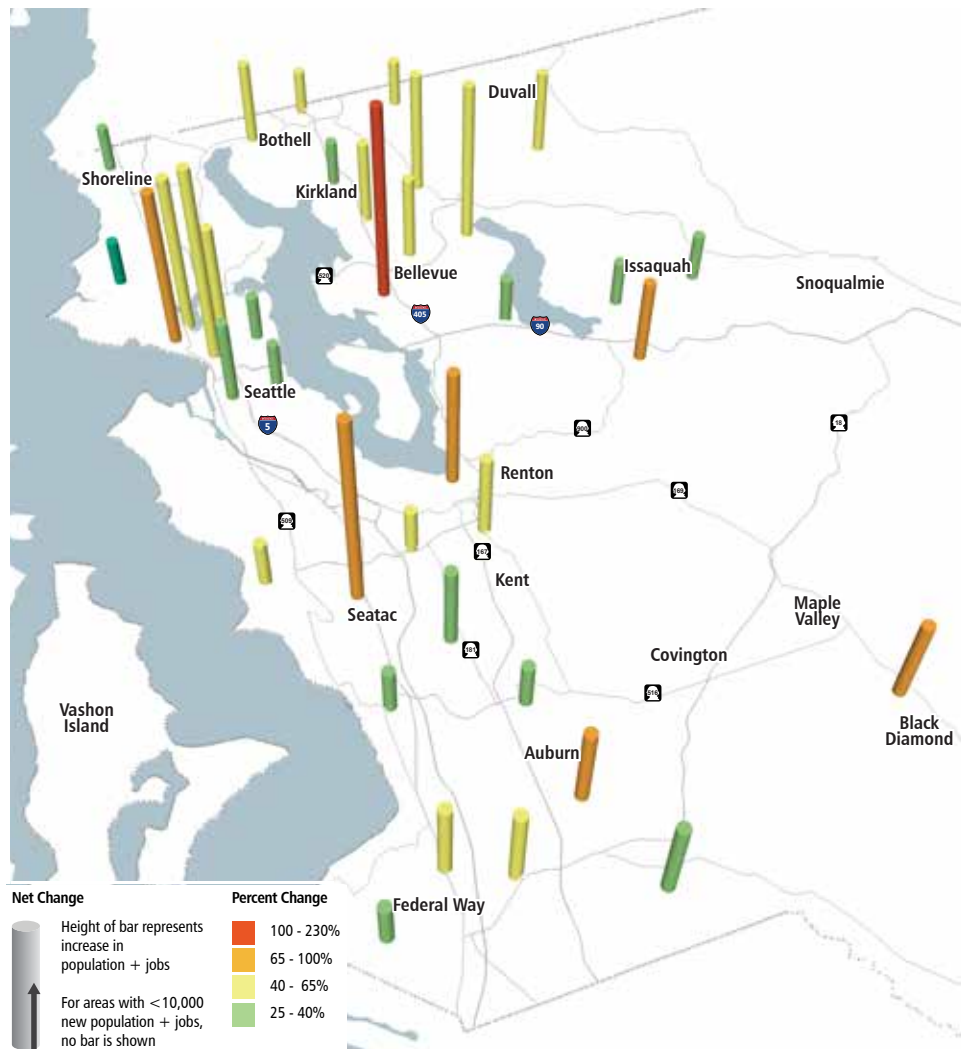
What would express service look like?

Today, many Metro express buses primarily serve traditional commuter markets, providing faster travel and more direct connections between established growth centers during peak times. As developing job and residential centers grow, our county will need fast, reliable, all-day service to support changing travel patterns.

Metro and Sound Transit worked together to develop a complementary network of express services connecting corridors that are important countywide.

As ridership increases, express service would be offered throughout the day, contributing to an increase in transit's share of all travel.

Fig. 13: Change in Population and Jobs Across King County by 2040

Net Change

Height of bar represents increase in population + jobs

For areas with <10,000 new population + jobs, no bar is shown

Percent Change
- 100 - 230%
- 65 - 100%
- 40 - 65%
- 25 - 40%

METRO CONNECTS assumes that future express buses would arrive every 15 minutes during peak periods and every 30 minutes during the off-peak, although some would be more frequent in high-demand corridors. Express stops would be spaced one to two miles apart, on average. Stops would be less frequent on highway segments and more frequent when serving local transportation hubs and stations.

Express buses would connect centers along major corridors and would also connect smaller suburban cities to regional growth centers and the larger transit system. The proposed express network would also be integrated with regional rail and bus rapid transit services.
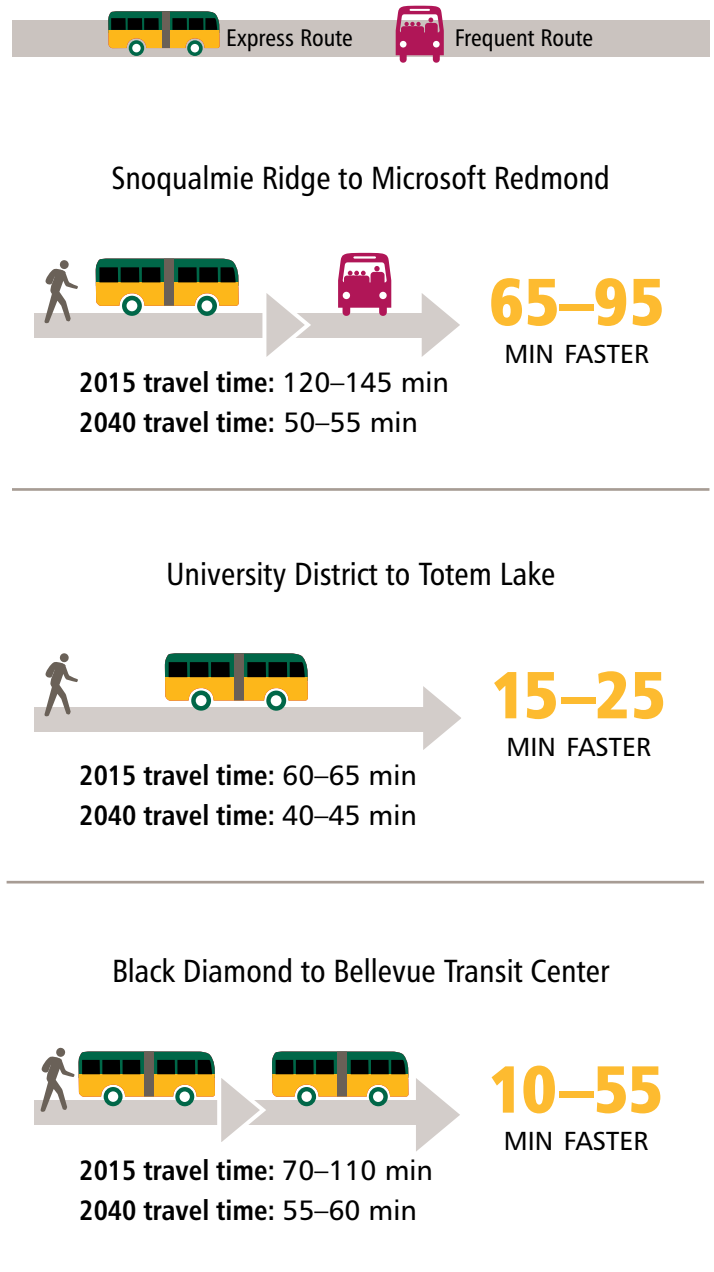
Combined with improvements that help buses move more quickly and reliably, express service would provide faster trips between transit centers and employment hubs as well as universities, community colleges and technical schools. Express service would expand access to transit by connecting to parking facilities.

Nearly 30 percent of residents and half of all jobs in King County would be within a half mile of express service.

Express service should meet the following criteria:

- Connect areas that have concentrated demand at both ends of the route.

- Connect centers not well served by other regional high-capacity services such as light rail and BRT.

- Operate primarily on highways or major arterials where express buses can maintain a target travel speed of more than 20 mph, or 45 mph on freeway portions.

- Provide significant and reliable travel-time savings over alternatives.

Fig. 14: Benefits of Express During AM Peak Travel Time

Express Route   Frequent Route

Snoqualmie Ridge to Microsoft Redmond

65–95 MIN FASTER

2015 travel time: 120–145 min
2040 travel time: 50–55 min

University District to Totem Lake

15–25 MIN FASTER

2015 travel time: 60–65 min
2040 travel time: 40–45 min

Black Diamond to Bellevue Transit Center

10–55 MIN FASTER

2015 travel time: 70–110 min
2040 travel time: 55–60 min

Travel times were estimated using METRO CONNECTS modeling, which assumed that express service would travel 45 mph on freeways and an average of 19 mph on arterials.

Express Service, continued

What would it take?

- **Expand express service** to new growth areas, lengthen spans of service, and increase frequency. Dedicate about 9 percent of Metro's total service hours to express service by 2040.

- **Partner to improve express travel speeds and reliability.** Make improvements on more than 100 miles of non-highway roads running express service. A partnership with the Washington State Department of Transportation (WSDOT) could help improve operations on highways. Partnerships with local jurisdictions could enhance the right-of-way available for express service or augment planned in-street transit priority improvements.

- **Coordinate express service** with Sound Transit and other transit providers. Sound Transit currently operates 720,000 hours of weekday regional express service annually in King, Pierce, and Snohomish counties. As Sound Transit expands light rail, some of its express service corridors will be replaced by Link.

As we developed METRO CONNECTS, Metro worked closely with Sound Transit, Pierce Transit, Community Transit and other agency partners to ensure that our service networks complement one another and connect regional centers quickly and reliably.
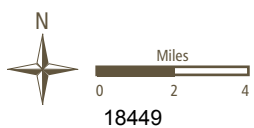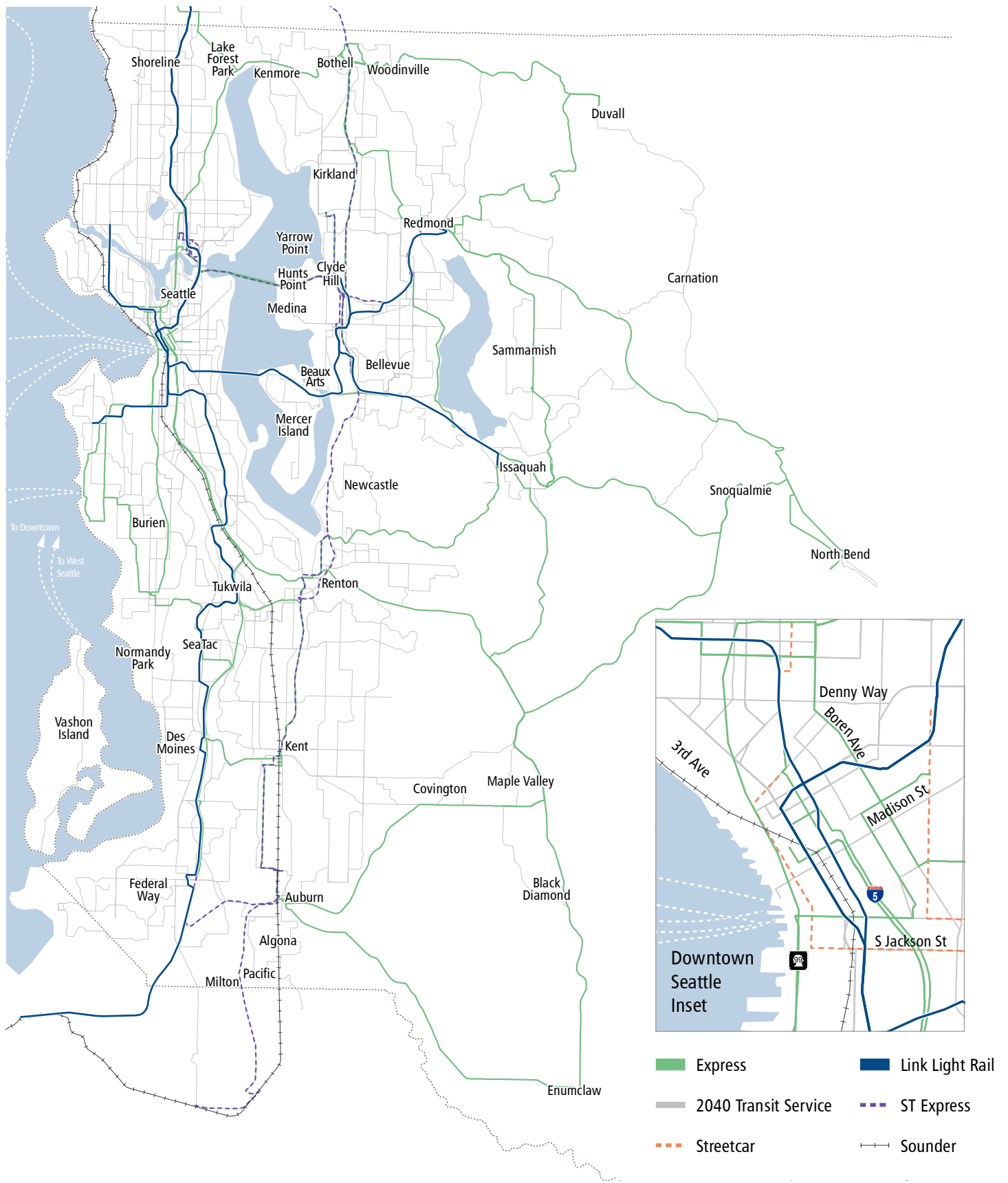
Our public outreach found strong interest in improving connections across county lines and among different service providers. We will continue to work with these transit agencies as they refine service plans for the future.

FROM OUR CUSTOMERS

"Express service all day would be awesome! If my kid got sick at school, I could get there fast and take him home."

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Fig. 15: METRO CONNECTS 2040 Express Service

Legend:
- Express (green)
- Link Light Rail (dark blue)
- 2040 Transit Service (gray)
- ST Express (purple dashed)
- Streetcar (orange dashed)
- Sounder (black with tick marks)

Downtown Seattle Inset labels: Denny Way, Boren Ave, Madison St, 3rd Ave, S Jackson St, I-5, 99

Map labels: Shoreline, Lake Forest Park, Kenmore, Bothell, Woodinville, Duvall, Kirkland, Redmond, Yarrow Point, Hunts Point, Clyde Hill, Medina, Carnation, Seattle, Beaux Arts, Bellevue, Sammamish, Mercer Island, Newcastle, Issaquah, Snoqualmie, North Bend, To Downtown, To West Seattle, Burien, Tukwila, Renton, SeaTac, Normandy Park, Vashon Island, Des Moines, Kent, Covington, Maple Valley, Black Diamond, Federal Way, Auburn, Algona, Pacific, Milton, Enumclaw

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Local and Flexible Service

Options for everyone, for every trip.

We know that a "one size fits all" approach to transportation doesn't work. Our customers have different transportation needs that may change for different days, times, or destinations.

We envision working with local communities to evaluate service solutions ranging from expanded fixed-route transit to more flexible approaches such as innovative ridesharing options, on-demand van service, and partnerships with other transportation providers for specific travel needs. Flexible alternatives would serve areas where traditional bus service doesn't work well, offer transportation options for people with disabilities, and help our congested roadways work better by managing demand.

What would local service look like?

Local service helps people get to destinations within their communities and connects them to the regional transit network. Today, most of Metro's local service is provided by 40- or 60-foot buses that operate on regular routes with fixed schedules. We also operate bus service with flexible routing, such as Dial-A-Ride Transit and community shuttles.

Complementing our bus service is a growing portfolio of more flexible options that may better fit local needs, such as community shuttles and vans, vanpools, and real-time ridesharing services that let users make the "last-mile" connection to home or work. Flexible service can provide more direct and dynamic connections than a fixed-route bus can in a low-density area.

METRO CONNECTS assumes that about 23 percent of Metro's total service hours would be dedicated to local service. Most of the hours would be used to expand local fixed-route service, with arrivals every 30 minutes most of the day.

We would also expand flexible and community-driven solutions. These could be implemented through our Alternative Services Program, which currently includes a four-year demonstration project testing innovative and community-driven transportation models.

Metro is thinking more creatively about how to offer new options and match local needs to service. An example is partnering with private providers like taxi cabs or transportation network companies (TNCs) that provide on-demand rides. Innovations in technology such as automated vehicles are changing the transportation landscape—and Metro is changing with it. We're actively working on new partnerships to better meet the needs of our customers in ways we never have before.

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We anticipate growing demand for alternative services, leading to needs for more service and more capital facilities to store and maintain vehicles.

As we work with communities to design transportation services to meet their unique needs, we would set priorities and parameters for integrating these services with our fixed-route bus network. Metro's Alternative Services Program would continue to use the Service Guidelines to inform project design, and would develop performance metrics specific to alternative services to better assess how well these services are performing. Alternative services would continue to play an important role in providing equitable access to transportation for all people in King County. Alternative service options would provide access to transit in places where fixed-route service is not the most cost-effective mode, and would help low-income and minority populations have greater access to transit service than the population as a whole.

What would it take?

- **Use community-based planning and partnerships to implement new services.** Metro's current alternative service projects have been successful in part because we collaborated with nonprofit organizations, jurisdictions, and community groups to identify needs and create unique services that meet them.

- **Pilot new and innovative services and technology applications.** Advances in real-time, on–demand transit may enable us to serve low-density areas more effectively, providing connections to local activity centers and to regional and local fixed-route transit. Changes in the way people get around could include ridesharing options, on-demand van service, use of automated vehicles, traffic management innovations, and other advances in technology yet to come. Private service providers may present partnership opportunities to fill gaps.

For more information

For a full description of Metro's current service types, see Appendix A, page A-9.

Metro has followed a community collaboration approach in a number of areas. When we deleted some poorly performing bus routes in the Snoqualmie Valley, Mercer Island and Burien, we worked with local residents to develop shuttle services that get residents to local destinations and to the larger transit network. Redmond and Mercer Island are trying a ridesharing app and website that connect people in real time, and in Duvall we're piloting a new community van concept. We're also working with Bothell, Woodinville, Kirkland, Kenmore, Vashon Island and southeast King County communities to bring similar services to those areas in early 2017.

Accessible Transportation Options

Better ways to meet diverse customer needs.

METRO CONNECTS would increase the accessibility of our general public services to all customers by providing 100 percent low-floor buses and 100 percent accessible stops, by redesigning vehicle interiors to better accommodate customers and what they bring on board (mobility aids, luggage, strollers), and by increasing auditory and tactile information throughout the system.

We would also improve our Access paratransit service for customers while striving to reduce per-trip costs. METRO CONNECTS proposes exploring new and innovative ways to deliver service.

What would accessible transportation look like?

Metro strives to provide comfortable and easy-to-use service for all passengers, regardless of physical abilities, languages spoken, and mobility or other devices they need to have with them.

Our paratransit program provides Access service along with travel training and other resources in order to give people with disabilities access to public transportation, as required by the Americans with Disabilities Act.

We also support services such as Community Access Transportation (CAT) and operate a fleet of 100 percent accessible vehicles. For people whose disabilities prevent them from using accessible, non-commuter, fixed-route bus service, paratransit service gives them a comparable alternative. Paratransit service is a specialized form of public transportation, not required or intended to meet all the transportation needs of people with disabilities.

METRO CONNECTS proposes improvements to enable more people to use Metro's general public services. About 30 percent of our current paratransit customers can use fixed-route transit for at least some of their trips. However, the other 70 percent can't use our existing bus services because of difficulties reaching the nearest stop or boarding and riding the bus.

METRO CONNECTS also includes strategies to reduce per-trip costs and improve mobility for customers. Our current accessible service options can be expensive to operate; the average cost of providing an Access trip is approximately $52, compared to about $4 for a fixed-route trip.[5] Accessible services can also be cumbersome or inconvenient for customers. Access service today requires that reservations be made one to three days ahead and offers a 30-minute pickup window, making the service difficult to use if travel needs are spontaneous or time is limited.

New technologies and transportation services open up opportunities to provide paratransit trips that are more convenient, have lower operating costs, and could complement or reduce demand for some of our existing paratransit services. For example, Metro could pilot on-demand trips.

5   For information about Metro's cost per boarding, see the Strategic Plan Progress Report at www.kingcounty.gov/metro/accountability

What would it take?

- **Use inclusive planning** to make general public services more accessible. Continue improving how Metro involves people with disabilities in our planning, to make sure we fully understand the challenges they face in getting around on transit. Recent innovations include passive restraints on our RapidRide coaches, "kneeling coaches" that make boarding easier, automated and visual stop announcements, low-floor coaches, and improvements in transit zones, where passengers get on and off.

- **Pilot and start new service models** to reduce costs and improve service quality. Potential approaches include same-day Access Transportation service and public-private partnerships to expand accessible taxis or TNCs in King County.

- **Make customer information and support available** to customers who have limited English proficiency or disabilities. Strategies include enhanced availability of interpretation services and translated materials, audible announcements on vehicles and at facilities, and tactile wayfinding options.

- **Partner to provide service.** Continue to partner with community organizations to provide cost-effective transportation for people with disabilities. We may build on our existing CAT program, which provides vans and support to community organizations that operate the service themselves. CAT service is less expensive to operate than Access service. At a cost of about $6.50 per boarding, if 100 people took a trip on CAT instead of Access, Metro could save $4,500 per day.

Speed and Reliability

Service you can count on.

METRO CONNECTS would deliver service you can rely on by making an unprecedented level of capital investments to improve transit speed and reliability. For each dollar spent on service, METRO CONNECTS would double our capital investment compared to 2015. This investment would pay off — for every dollar invested, Metro and our riders would save $2.[6] By keeping buses moving through congestion and on schedule, Metro could deliver even more service, and our customers would have an alternative to sitting in traffic.

Fast and reliable service is our customers' top priority.

Metro's Rider/Non-Rider Survey has found that less than half of our riders are happy with travel speeds, and the same for on-time performance.

As we developed METRO CONNECTS, we learned through our online survey, visioning events, and open houses that street improvements to improve speed and reliability were the top-rated transit improvements. New roadways for transit were the next-highest rated.

This proposed plan puts a new emphasis on these improvements and includes strategies to guide future investments.

What would speed and reliability look like?

This program creates features such as bus-only lanes and traffic signals that give priority to transit. Improvements like these would be critical to the success of our proposed network. By getting passengers to their destinations in less time and on schedule, they would attract new riders. By letting Metro schedule more time for moving people and reserve less time for getting delayed buses back on schedule, they would save operating dollars that could be used for new service.

Investments to improve speed and reliability are particularly important for frequent service. Transit service that operates in mixed traffic without transit priority features can quickly degrade, with buses spaced too close together or too far apart, slow travel time, and high operating costs. Buses run late and transfers can be difficult.

The most promising potential improvements focus on road congestion, traffic signals, and passenger stops that delay buses. The "Fares and Boarding" section of this document discusses ways we could reduce delay by making bus boarding easier and fare payment faster.

METRO CONNECTS proposes dedicating 45 percent of the capital budget for METRO CONNECTS to investments that improve transit speed and reliability.

For more information
Appendix C, page C-2, has a more detailed summary of the tools we can use to boost speed and reliability.

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6   Savings based on travel time impacts of similar investments as reported in Transit Capacity and Quality of Service Manuals (TCQSM edition 3) and Transit Cooperative Research Program reports (TCRP 65 and 118) multiplied by 2015 Metro operating costs and the PSRC's traveler value of time rate. The operating cost and traveler time savings were compared to the costs of the investments assuming a 30-year life span and a 3% discount rate.

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METRO CONNECTS proposes different levels of capital investment—major, moderate, or minor—to keep buses moving fast and reliably. Each level has a different mix of tools. While all of our service types would receive some investments, the highest levels of investment would be focused where service is most frequent and roadways are most congested. Service that is either less frequent or operates in less-congested areas, such as rural communities and fast-moving highways, would receive lower levels of investment.

Figure 16 shows the percentage of route miles for each service type that would receive major, moderate, minor, or no capital investment.

We would work with cities and other partners to decide on specific investments, ensuring that they are consistent with local plans.

Fig. 16: Capital Investment Levels
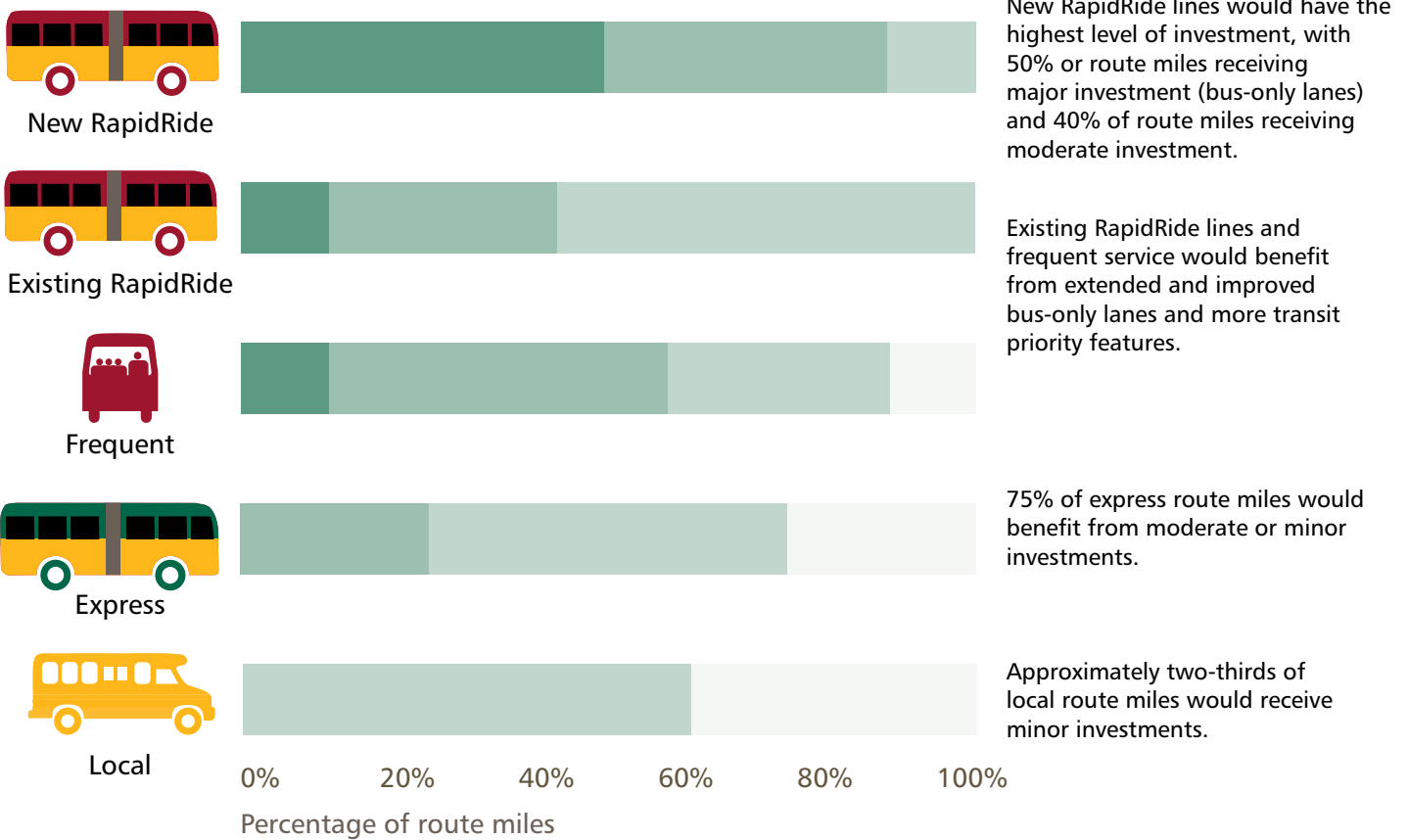
New RapidRide lines would have the highest level of investment, with 50% or route miles receiving major investment (bus-only lanes) and 40% of route miles receiving moderate investment.

New RapidRide

Existing RapidRide lines and frequent service would benefit from extended and improved bus-only lanes and more transit priority features.

Existing RapidRide

Frequent

75% of express route miles would benefit from moderate or minor investments.

Express

Approximately two-thirds of local route miles would receive minor investments.

Local

0% 20% 40% 60% 80% 100%

Percentage of route miles

Major investment	Moderate investment	Minor investment	No investment
Example features New bus-only lanes and transit signal priority	**Example features** Transit priority treatments such as queue jumps, transit signal priority, and bus bulbs	**Example features** Spot improvements at key locations	**Example features** No improvement
Target time savings 20%	**Target time savings** 10%	**Target time savings** 5%	**Target time savings** 0%

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What would it take?

- **Work with partners to invest in speed and reliability improvements.** To achieve our vision, Metro would need to invest $2 billion in improvements over the next 25 years. Those investments would have to be leveraged with additional partnership and grant funding to create a complete network of infrastructure that keeps transit riders moving.

  Metro would contribute toward improvements such as new bus-only lanes and transit priority features, upgraded signals and new transit signal priority, and rechannelized roadways. We would look to local jurisdictions for assistance in planning and securing transit-only right-of-way and in changing traffic management practices.

- **Study and fund operational changes** to reduce the amount of time buses are stopped in traffic or at stops, improving reliability. Strategies:

  - Increase staffing and technology to monitor and adjust service in real time to maintain spacing between buses and respond to service disruptions.

  - By 2040, manage all frequent service by headways (time intervals between buses) rather than schedules to improve service performance and efficiency.

  - Work with partners to improve incident response options that keep buses moving through delays, such as installation of temporary bus-only lanes.

- **Pursue improvements to make boarding faster and easier.** Read more about what we would do in the next section, "Boarding and Fares."

- **In partnerships with others, invest in large regional projects that would benefit transit, such as bridge or highway crossings.** We would maintain an inventory of candidate projects, including new transit pathways and service connections, major crossings (bridges, overpasses), and transit bottlenecks.

- **Build on our existing Intelligent Transportation Systems architecture** to support both the management of vehicles on the road to make our service faster and more reliable, and customer information tools that would make our system easier to use.

FROM OUR CUSTOMERS

"I like the idea of buses getting priority, so that taking the bus will take the same amount of time as driving."

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Boarding and Fares

Getting on the bus would be fast and easy.

We envision a comprehensive program to make paying fares and getting on and off the bus easier and faster—reducing trip times for everyone. Potential changes include simplified fares, new ways to pay fares, new ORCA partners with integrated payment, and new bus and stop designs.

Metro partnered with six other transit agencies in the Central Puget Sound Region to introduce the ORCA smart card fare payment system in 2009, and now we're preparing for the next generation of ORCA.

ORCA gives transit customers the advantages of faster fare payment and regional transfers. Transit agencies realize benefits such as faster boardings, more accurate ridership data, and improved revenue data and regional revenue reconciliation.

Vendor support for the current ORCA system will expire in 2021, and the ORCA agencies have begun planning for the next-generation fare collection system. Technology has changed significantly since the original ORCA system was designed, and the ORCA partners will be exploring opportunities to simplify fare payment for customers and speed up the fare collection process. Possible features include expanding mobile payment and simplifying the fare structure and product offerings.

What would boarding and fares look like?

The time a bus spends at stops to let passengers on and off can lengthen trip time and cause delays. Boarding can be slow and difficult for customers using wheelchairs, other mobility devices, strollers, or carts.

Fare payment takes time, as well. Boarding is slower when riders pay with cash rather than ORCA. Use of cash and paper transfers also elevates the risk of fare disputes and adds to Metro's operating costs.

To speed up boarding and make transit easier to use, Metro would pursue these strategies:

- Design fleet vehicles with low floors for easy boarding, especially for parents with strollers and riders who have disabilities.

- Procure vehicles with wider aisles and doors—including passenger-controlled rear doors—that make it faster and easier to get on and off.

- Provide safe and convenient securement areas for customers who use mobility devices.

- Install easier-to-use bike racks on vehicles.

- Speed up fare payment through fare simplification, all-door boarding, offboard fare collection at more stops, a "proof of payment" system that uses fare enforcement officers, and efforts to increase ORCA and other non-cash fare payment.

- Explore opportunities to enable customers to pay fares for all services used in a trip—such as parking, bikeshare and carshare providers, and TNCs—in real time with a single medium, such as a smartphone.

For more information
See the 2014 Transit Fares Report at www.kingcounty.gov/metro/accountability under the "Other" tab.

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Some of these strategies are being used or are possible today:

- Metro's RapidRide system lets passengers at stations pay their fares offboard and get on the bus through any door; fare enforcement officers may check for proof of payment. While installing on-street fare payment infrastructure at all of Metro's 8,000 bus stops would be cost-prohibitive, we would evaluate ways to expand this approach—particularly where many passengers board. New technology could allow mobile payment at less-expensive onboard readers.

- Several Metro programs contribute to steadily increasing use of ORCA. The ORCA Passport business account program has greatly expanded the number of ORCA riders. In 2015, ORCA business accounts represented 30 percent of Metro's boardings.

- Metro's ORCA LIFT program, introduced in 2015, offers a reduced-fare card for riders who meet the income qualifications. It provides cost savings to participants and reduces cash fare payment on buses.

Technological developments could further expand options. However, Metro's complex fare structure, including surcharges for peak and two-zone travel, limits the possibilities. Simplification of our fare structure could open up opportunities while making our fares easier for customers to understand. Fare policy changes would require a comprehensive review of Metro's fare structure and approval by the King County Council.

Future changes to transit stops and stations in downtown Seattle could be identified through the Center City Mobility planning process.

Through a partnership with King County Public Health and other human service agencies, 30,000 customers had registered for ORCA LIFT by mid-2016. Metro will continue promoting and expanding this program.

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Strategies like these will help Metro keep moving toward no cash payment on buses, though we would continue to provide fare products that customers could purchase with cash elsewhere.

What would it take?

- **Move toward all-door boarding** to make bus trips faster and enable Metro to provide more service with the same resources.

  - Change Metro's fare structure to move toward a system without cash payment on the bus, as many other agencies are doing.

  - Work with ORCA partners to develop the next-generation ORCA system, making ORCA fare payment more convenient for customers by allowing them to use their mobile devices and credit cards for fare payment.

  - Make major investments in onboard and offboard fare collection equipment, and budget for more fare enforcement personnel.

  - Expand alternative payment methods and provide new fare purchase sites.

- **Make boarding easier and faster for all.** Improve boarding for wheelchairs through passive restraint systems, for bicycles through easier-to-use racks, and for strollers and baggage through vehicle design.

- **Work with partners on projects and policies that make boarding easier.**

Fig. 17: All-door boarding

All-door boarding saves time at bus stops

1.5 SECONDS PER BOARDING

38% LESS TIME AT THE STOP
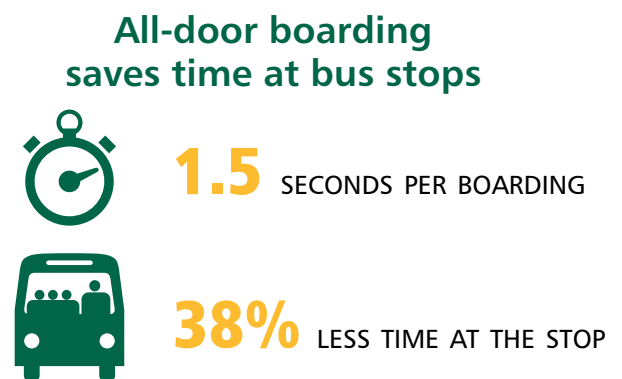
Based on a San Francisco Municipal Transportation Agency study of the benefits of all-door boarding.

Innovation and Technology

New and creative solutions that work for our customers.

Rapidly advancing technologies are changing the ways people travel. METRO CONNECTS envisions Metro investing in, incorporating and encouraging technological innovation, continually evaluating "business as usual" and creating new ways to serve customers better. We plan to use new smartphone apps, trip planning resources, and real-time information to improve our customers' experience and develop new service solutions. Behind the scenes, we would embrace technologies that help us operate more efficiently.

What would innovation and technology look like?

Metro has always been an innovator—from our vanpool program, to our groundbreaking employer pass program, to the use of private on-demand service providers in our expanded Emergency Ride Home program. METRO CONNECTS builds on that track record with an emphasis on testing and adopting new features, services, and products to make our service better and easier for customers to use.

Innovative approaches to transit access could include further testing of real-time, on-demand rideshare service models. Metro's Real-Time Rideshare pilot in SE Redmond/Willows Road is a first step, and we are seeking funding to evaluate other models.

Technology will improve customers' access to park-and-rides. One potential service is an app that gives you directions to the nearest park-and-ride with currently available space and lets you reserve a parking spot. Smart bicycle parking facilities could support similar functions for bike commuters.

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We might partner with a software developer to create a fare system that lets users pay for transit, parking, bikeshare, carshare, and TNC service through one easy system.

Investments in new smartphone apps, trip-planning resources, and real-time information could enable our customers to get better information about the best travel options and how to use them. See the next section, "Customer Communications," for details.

Advancing technology could also help Metro become a more informed and proactive agency. We could collect new and more-accurate data about operations and improve our performance reporting, increasing our accountability to the public.

We could also use technology to improve operations. For example, security systems on buses, combined with better mobile technology that our Transit Service Quality department could access in real time, could help Metro respond to incidents. Real-time information about crowding could help us manage vehicles on the road. Continual improvement in the collection of data about bus ridership and on-time performance could help us evaluate service and find opportunities for improvement.

What would it take?

- **Expand investment in integrated research and development.** Test and implement new services, products and practices enabled by emerging technologies that improve our customer service, help us operate more efficiently, and move us toward Metro's strategic plan goals.

- **Better integrate data into planning and customer service.** Create systems that better manage the information we give customers and the feedback we receive from them, and improve internal data collection and reporting.

- **Nurture a culture that welcomes and adapts quickly to new ideas, technologies, and ways of working.** Although we would update METRO CONNECTS regularly, we must prepare for unanticipated opportunities by developing flexible policies and nimble processes that can adapt to change. We would foster a culture that supports creative thinking and innovation through cross-disciplinary working teams, regular performance assessments, and other avenues.
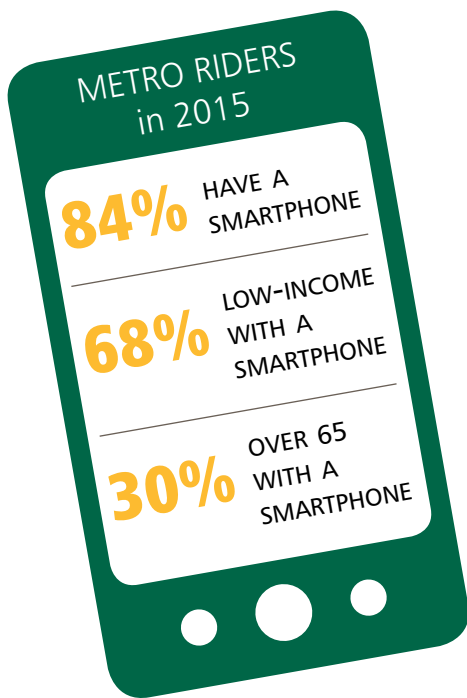
Innovation could help us move toward Metro's strategic goals, including equity and social justice, sustainability, and safety. We would develop robust internal systems for continually exploring and implementing new ideas or approaches to these important aspects of our work.

Customer Communications

Information when and where you need it.

We envision a transit system that is rich with information, making it easy for customers to know their travel options and how to get around. METRO CONNECTS proposes new types of customer information, new ways to get it, and resources to make sure people know how our services can work for them.

METRO RIDERS in 2015

84% HAVE A SMARTPHONE

68% LOW-INCOME WITH A SMARTPHONE

30% OVER 65 WITH A SMARTPHONE

What would our customer communications look like?

Today, Metro customers can get information and assistance with travel options, schedules, service disruptions and more from a range of sources—our website, trip planning app, Customer Information Office, email/text alerts, social media, marketing and promotion programs, and others. Metro drivers play a major role in customer communications as they interact with passengers.

METRO CONNECTS builds on these resources by emphasizing:

- New types of information and ways to share it with customers.

- Continued emphasis on customer service training and support systems that enable our operators to provide the best service possible.

- A suite of tools that make navigating the transit system easy, including wayfinding signs, announcements, promotional materials, and interactive options for questions and comments.

Emerging technologies could enable us to deliver enhanced information or new communication platforms. Imagine if customers' smartphones could let them know before they even left home that a traffic accident had blocked their bus, told them how full the next bus was, or showed the availability of a bikeshare service or spaces at a park-and-ride.

Fig. 18: Sample Best Practices for Customer Information

(left, middle) Paris has explored bus shelters designed as multi-purpose public spaces that include fare vending, neighborhood information, coffee or food for purchase, electrical outlets, integrated bikeshare stations, and more. (Photo source: Human Transit, humantransit.org)

(right) On-board screens can provide information about connecting service, transit alerts, and other information. (Photo source: Redeye Chicago, redeyeChicago.com)

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METRO CONNECTS proposes to make this information-rich future a reality as customer service solutions continually evolve. For example, software-based passenger counters could be installed at relatively low cost on Metro's entire fleet, enabling real-time tracking of the number of people on a bus.

Not everyone has a smartphone or computer, so it would be important to pursue technology-driven tools that help everyone. Dynamic, up-to-the minute information could be displayed at bus stops and transit centers and on buses. This could include nearby transportation options to make last-mile connections, such as real-time bikeshare, carshare, or TNC services.

New tools might offer other types of information, such as upcoming events at a venue the bus was passing. Metro customer service agents could provide personalized assistance through new communication channels. Marketing efforts could better target desired audiences to increase awareness of new and improved services and customer tools.

Metro has partnered with other transit agencies to create trip-planning tools like our mobile Trip Planner app. We would continue to support open-source platforms and third-party developers by giving them clean and accurate transit data for their travel products and services. As new transit information and shared-mobility products are developed, we would work with our private sector partners to ensure they are integrated with Metro products and services.

What would it take?

- **Provide real-time information about current conditions and nearby transportation options** such as available park-and-ride spaces, bike parking, bikeshares, carshares, and transportation network companies.

- **Ensure that advancements in customer information improve accessibility for people with disabilities.** Help all customers use the transit system safely and easily with accessible customer interfaces and improvements in audio, tactile and electronic communications.

- **Equip transit hubs and vehicles with customer tools that provide static and real-time information** on local transportation connections, bus and train arrival times, and more.

- **Gather and manage information to improve our service.** Work on information systems that collect data related to performance, customer information and feedback, and other areas, and integrate it into our performance management and planning processes.

- **Make data available to third-party developers,** as we did for the One Bus Away app.

Passenger Facilities

Safe and well-designed stops, stations, and hubs.

METRO CONNECTS would create well-designed stops and stations—and improve existing facilities—to help keep riders safe and secure, give them better service information, and make transfers easy. We would make improvements at 85 existing and new transit centers and at more than 4,500 bus stops. The improvements would emphasize enhanced safety, new types of customer amenities, and integration between transit providers and other travel modes.

What would passenger facilities look like?

As of 2015, Metro owned and maintained more than 8,000 bus stops, shelters, RapidRide stations, and transit centers. With METRO CONNECTS' proposed expansion of transit service and integration with Sound Transit, the number of Metro-owned stops would increase by approximately 10 percent, and for many trips the fastest option would include a transfer between bus and rail or between buses. Sound Transit's planned and proposed investments would add many more light rail stations.

Not only would there be more stops, stations and transit centers, the number of people using them would increase. The activity at many stops would change, with more riders transferring among buses and rail.

As facilities are built or rejuvenated to accommodate more passengers, they would be designed for easy connections from all available modes—bus, light rail, train, ferry, streetcar, biking, walking, etc.

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Facility design principles

METRO CONNECTS envisions top-notch facilities that would give customers a high-quality transit experience.

Facilities would be in the right locations. While following our general guidelines for stop spacing, we would consider topography, safety, lighting, and the presence of sidewalks when deciding where to place stops. Street crossings would be highly visible, well-lit, and located to minimize vehicle/pedestrian conflicts.

Bus loading zones would be close to light rail stations so people transferring would have short walks.

Wayfinding and transit information would be easy to see and understand, and would clearly direct passengers through transfer areas. Consistent signage across all major transfer points would help riders easily navigate Metro's and Sound Transit's systems.

Stops, stations, and pathways would be accessible to all customers, regardless of age or ability. They would have ample space for passenger loading and circulation.

Shelters and waiting areas would include lighting, security features, and protection from rain and wind. Facility designs that limit opportunities for criminal activity would help passengers feel safe and comfortable while waiting for a bus or train.

Transit centers could be spaces for residential, commercial, and community activities, creating a friendly and welcoming atmosphere for transit customers.

Combining many uses at transit centers could also make efficient use of available land, help reduce car trips, and integrate transit with neighborhoods and businesses.

Metro evaluated the future need for transfer locations in the proposed 2040 service network. Figure 19 shows the proposed major transit centers, including Link and some BRT stations. The 85 new or improved transit hubs include:

- All existing, planned, and proposed Sound Transit light rail stations.

- All Metro stops projected to have more than 2,500 daily boardings.

- Other key transfer points and hubs.

Metro and Sound Transit would continue working together to provide passenger facilities that are appropriately sized for the anticipated passenger and bus volumes at light rail stations.

What would it take?

- **Build an extensive system of well-designed and safe passenger stops, stations, and transit centers.** METRO CONNECTS proposes 1,000 additional stops and stations, including 85 new and upgraded transit hubs, by 2040. We would make sure transit facilities are comfortable and easy to use by keeping design guidelines up to date.

- **Work with partners to design facilities that make connections from other modes easy and comfortable.** We would coordinate extensively with Sound Transit early in the design process for light rail and BRT facilities, ensuring that their design makes it easy to transfer between buses and light rail. Minutes spent walking between bus stops and the light rail platform could quickly erode the travel time benefits of the faster service proposed in METRO CONNECTS.

Metro would incorporate principles of universal design, accessibility, social equity, sustainability, and public engagement into the design process.

Coordination between transit agencies and cities would ensure that facility locations are consistent with land-use plans and that their design helps integrate different transportation services. Private, governmental or nonprofit property owners could be partners in transit facility development, helping reduce the costs of land acquisition, construction, and permitting.

Today, only four major transit hubs systemwide have 10,000 or more daily boardings. All four are in downtown Seattle. Westlake Station has the most boardings—28,000 per day.

In 2040, as many as 30 hubs across the county could have more than 10,000 boardings. Smaller stops and stations around the county would also see more riders.

FROM OUR CUSTOMERS

"I've realized from using RapidRide how nice it is to have all the bells and whistles at bus stops."

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Fig. 19: METRO CONNECTS Anticipated Transit Center Boardings – 2040 Network

Map labels (geographic): Shoreline, Lake Forest Park, Kenmore, Bothell, Woodinville, Duvall, 145th Street, Northgate, Roosevelt, Kirkland, Redmond, Carnation, 15th & Market, Brooklyn, UW Stadium, Yarrow Point, Hunts Point, Clyde Hill, Overlake, Seattle, Capitol Hill, Medina, Bellevue, Sammamish, Westlake, University Street, Pioneer Square, International District, East Main, Bellevue, Beaux Arts, SODO, Mercer Island, Newcastle, Issaquah, Snoqualmie, Burien, Tukwila, North Bend, Tukwila International Boulevard, Renton, SeaTac, SeaTac, Normandy Park, Vashon Island, Des Moines, Kent, Kent, Covington, Maple Valley, Black Diamond, To Downtown, To West Seattle, Federal Way, Federal Way, Auburn, Auburn, Algona, Pacific, Milton, Enumclaw

Downtown Seattle Inset labels: Capitol Hill, Denny Way, Boren Ave, 3rd Ave, Westlake, Madison St, University Street, Pioneer Square, International District, S Jackson St, Downtown Seattle Inset

Average Daily Boardings 2040 Network

< 2,000	10,000 - 20,000
2,000 - 5,000	20,000 - 30,000
5,000 - 10,000	> 30,000

2040 Transit Service — Link Light Rail
Frequent — Sounder
Streetcar — Ferry/Water Taxi

N

Miles
0   2   4

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Access to Transit

Safe and abundant options for getting to our service.

We want our customers to have safe, comfortable, and easy access to transit. METRO CONNECTS would develop a portfolio of projects and strategies for improving your walk, bike ride, or drive to or from bus stops and stations.

Including investments by Sound Transit, METRO CONNECTS would expand parking for transit riders in King County by 60 percent and invest equally in improvements for bicyclists and pedestrians. Travel options such as carsharing, bikesharing, taxis, on-demand providers like Uber or Lyft, and public and private shuttles would also help riders reach transit service.

What would access improvements look like?

A person's decision to drive, ride, walk or bike to transit can be affected by how close they are to a stop, the frequency of service provided there, and the availability of parking, sidewalks, bike lanes, lighting, and other safety and security features.

With the expansion of transit service envisioned in METRO CONNECTS, by 2040 84 percent of customers would get to the bus by walking or biking compared with 78 percent in 2015.[7]

The METRO CONNECTS planning process evaluated ways to improve access to future transit service. We identified four transit access zones where different strategies might be effective. These zones are based on the expected future density of jobs and population and on proposed transit service.

Figure 20 summarizes the zones and types of investments we envision. The estimated number of new stalls is illustrative. The final siting of new stalls would be based on access to the service network— particularly frequent and express service—and on local considerations such as transit demand, traffic impacts, land use and congestion. Figure 21 shows the zones.
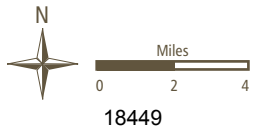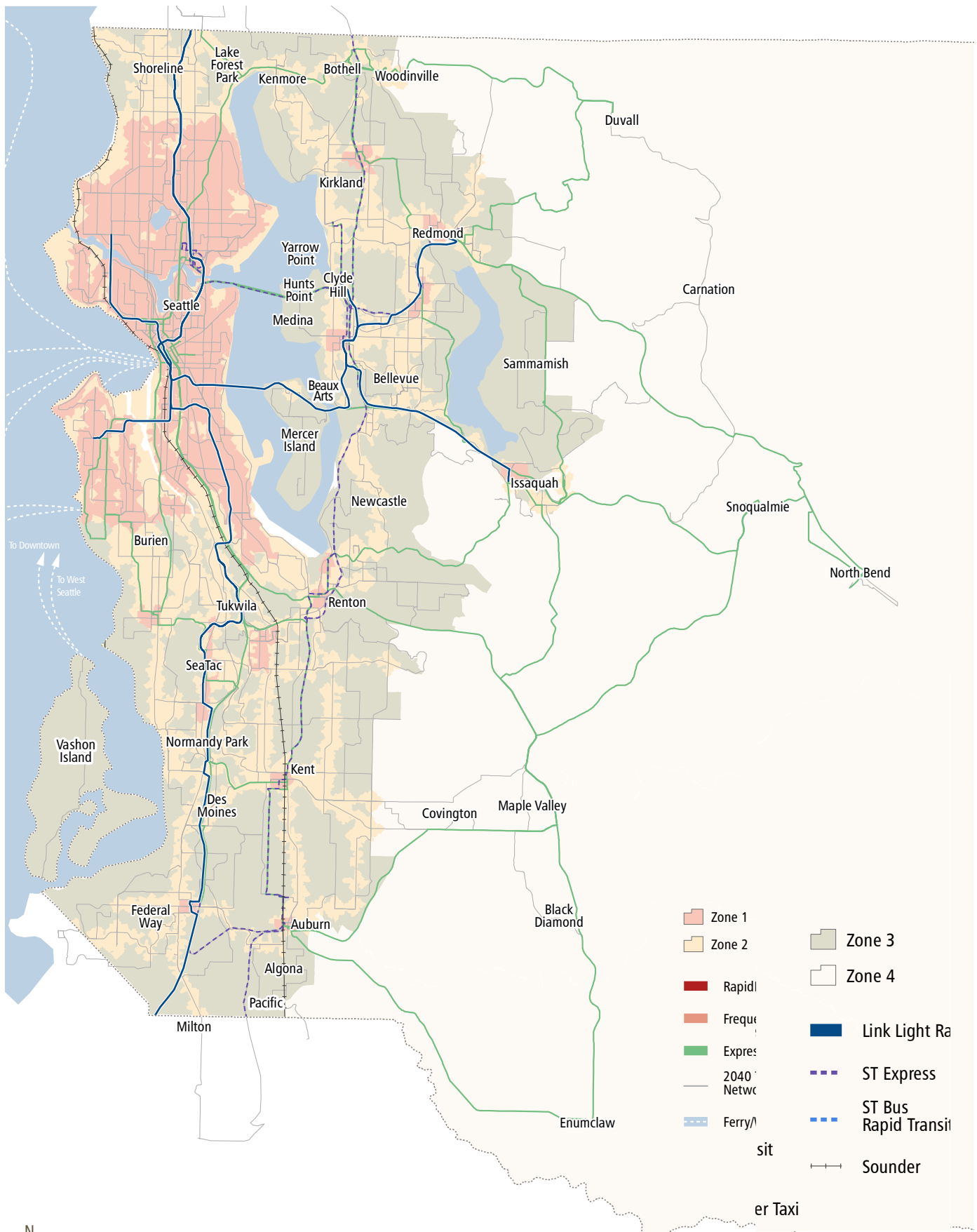
Figure 22, on page 56, illustrates the relationship between park-and-ride expansion and the future light rail, BRT and express network.

7 Outputs from model that does not incorporate updated transit mode choice from the most recent PSRC Household Travel Survey.

Fig. 20: Transit Access Zones Description

ZONE 1	ZONE 2	ZONE 3	ZONE 4
High-density areas served by a grid of frequent service, such as downtown areas.	Medium-density areas that are within walking distance of at least one frequent service.	Lower-density areas within walking distance of less frequent local or express service.	Lowest-density areas with limited or no walk access to transit.
Improvements Focus on bicycle and pedestrian facilities, little or no expansion of Metro parking.	**Improvements** Strong emphasis on more bicycle and pedestrian facilities, little or no expansion of parking.	**Improvements** Moderate emphasis on bicycle and pedestrian facilities and some parking investments.	**Improvements** Limited investment in bicycle and pedestrian facilities, emphasis on increasing transit parking.
Future bike/walk share 96%	**Future bike/walk share** 82%	**Future bike/walk share** 50%	**Future bike/walk share** 16%
Current stalls used: 3,920	Current stalls used: 6,780 Estimated new stalls serving people in Zone 2 by 2040: 4,000	Current stalls used: 7,300 Estimated new stalls serving people in Zone 3 by 2040: 8,510	Current stalls used: 1,600 Estimated new stalls serving people in Zone 4 by 2040: 1,110

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Fig. 21: Transit Access Zones

Shoreline
Lake Forest Park
Kenmore
Bothell
Woodinville
Duvall
Kirkland
Redmond
Yarrow Point
Hunts Point
Clyde Hill
Carnation
Seattle
Medina
Sammamish
Beaux Arts
Bellevue
Mercer Island
Newcastle
Issaquah
Snoqualmie
Burien
To Downtown
To West Seattle
Tukwila
Renton
North Bend
SeaTac
Vashon Island
Normandy Park
Kent
Covington
Maple Valley
Des Moines
Black Diamond
Federal Way
Auburn
Algona
Pacific
Enumclaw
Milton

Zone 1
Zone 2
Zone 3
Zone 4

Rapid
Freque
Expres
2040 Netwo
Ferry/

Link Light Ra
ST Express
ST Bus Rapid Transit
Sounder

sit
er Taxi

N

Miles
0   2   4
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Fig. 22: Planned and Proposed Park-and-Ride Investments by Corridor

This map shows the location of envisioned park-and-ride investments by major corridor and agency. These investments include both currently planned park-and-ride expansion and expansion that is proposed as part of Sound Transit 3 and METRO CONNECTS.

SR 522 — 900

I-5 NORTH — 1,330

SR 520 — 2,080

I-405 — 1,830

I-90 — 1,980

SR 167 and SR 169 — 1,550

I-5 South — 3,950

13,620

Number of proposed stalls to be added by King County Metro

Total number of planned and proposed stalls

Number of planned and proposed stalls to be added by Sound Transit

Current use on "non-major" corridors not shown on this map is approximately 1,550. Current use is based on Metro's travel demand model.

Park-and-Ride Location

Express Bus (2040 Service)

Link Light Rail

Park-and-Ride Corridors (colored by corridor)

Ferry/Water Taxi

Highway

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Analysis of motorless modes—walking and biking

King County needs more sidewalks, trails, and bicycle lanes as well as storage facilities to improve bike and pedestrian access to transit. The Puget Sound Regional Council's Transportation 2040 plan describes the region's bicycle and pedestrian needs, and King County is planning for regional trail expansion and improved connections to transit.

Metro and Sound Transit's Non-motorized Connectivity Study evaluated where projects supporting motorless travel could increase transit ridership. Based on this analysis and an investment level similar to that for parking, METRO CONNECTS could fund bicycle and pedestrian access improvements to transit stops across King County in partnership with local jurisdictions' bicycle and pedestrian plans.

To select potential improvements, Metro would identify areas with high potential ridership, giving priority to projects in access zones one and two. Metro would also identify a methodology to estimate the demand for bicycle parking.

We would coordinate with cities, which have plans and requirements for construction of sidewalks, trails and bicycle facilities. Cities can play a critical role in providing sidewalks and trails that connect residents to public transportation.

As the Redmond Transit Center was developed, Metro worked with the City of Redmond and King County Natural Resources and Parks to provide dedicated bike lanes and sidewalks connecting to the Redmond Central Connector Trail to the south and the Sammamish River Trail to the west.

Growing demand for trails and transit

King County has 300 miles of multi-use trails used for some 10 million bicycle and pedestrian trips annually—including a large and growing number of commute trips. The trails network presents opportunities to combine cycling or walking with the fast, frequent transit service envisioned in METRO CONNECTS.

Potential trail routes such as the SR-520 Trail across Lake Washington, the extension of the Mountains to Sound Trail east of Bellevue, the extensive Eastside Rail Corridor/Cross Kirkland Connector trails, and the Lake to Sound Trail from Lake Washington in Renton to Puget Sound in Des Moines would enhance regional mobility.

Our vision is to provide safe and comfortable bicycle and pedestrian connections at park-and-rides, major transit centers, and trails as well as secure bicycle parking.

Parking analysis

Park-and-rides provide auto access to transit, and by concentrating rider demand they allow Metro to serve low-density areas more efficiently.

Metro provides service to 130 park-and-rides across the county that have a combined total of more than 25,000 parking spaces. Metro and other transportation agencies own or lease these facilities.

Use of park-and-rides is growing, and many are frequently full or nearly full.

To identify where expansion of parking is most critical, we analyzed the transit access zones, shown in Figure 21 on page 55, and Sound Transit's plans to expand parking. Sound Transit has proposed building more than 10,300 parking stalls in King County as it expands the regional transit system through 2040.

Metro analyzed the number of additional stalls that would be needed in each zone in the future, taking into account dramatically expanded bike and walk access to transit in medium- and high-density zones. The analysis identified where riders who would rely on park-and-rides would live and work. However, the analysis recognized that people might travel to a different area for parking. People in Zone 4 who do not have good walk access to transit would likely drive to Zone 2 or 3 if a park-and-ride is available there.

The analysis suggested the strategies listed on page 59 for transit parking.

- **High- and medium-density zones (1 and 2):** No new parking capacity would be needed for people from high-density zones; limited parking expansion for people from medium-density zones.

- **Low-density zones (3):** Some expansion of transit parking for people from low-density zones.

- **Lowest-density zones (4):** Parking is expected to continue providing an important means of access for people from low-density zones where there isn't good walk access to transit.

Using this analysis, METRO CONNECTS envisions the addition of more than 13,500 new parking spaces to support anticipated future ridership. These parking spaces are recommended by corridor.

Approximately two-thirds of the suggested future expansion is accounted for by Sound Transit's proposed projects. If METRO CONNECTS is fully implemented, Metro would consider partnering to provide approximately 3,300 additional parking stalls. Figure 23 shows both existing park-and-ride stalls used by zone and the proportion of riders from each zone that use park-and-rides, and the number of new stalls that would be added to target people from each zone. For example, 8,510 new stalls would be needed to accommodate the projected future riders from Zone 3. The location of those stalls would be determined based on the service network—particularly access to frequent and express service—and on local considerations such as transit demand, traffic impacts, land use and congestion.

*Fig. 23: Existing Conditions: Park-and-Ride Access Mode Share and
METRO CONNECTS Future Conditions: Estimated Park-and-Ride New Capacity*

Transit Access Zone	Park-and-Ride Stalls Used	Proportion of Transit Riders who use Park-and-Rides	Estimated Metro and Sound Transit Planned or Proposed New Park-and-Ride Stalls Provided by 2040	Estimated Proportion of 2040 Transit Riders who use Park-and-Rides
Zone 1	3,920	8%	0	4%*
Zone 2	6,780	41%	4,000	33%*
Zone 3	7,300	64%	8,510	56%
Zone 4	1,600	84%	1,110	84%
Total	19,600	NA	13,620*	NA

*These proportions could be higher if transit riders in these areas use the new Sound Transit lots.
**3,300 from Metro; 10,320 from Sound Transit.

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Our parking strategies would be prioritized as follows:

Manage parking supply:

- Increase efficiency, for example by promoting carpools and real-time ridesharing or marketing underutilized lots.

- Implement permits and payment for parking, making it easier for customers to find spaces.

- Improve bicycle and pedestrian access to park-and-rides, for example through better bicycle parking facilities and walkways.

Increase parking supply using relatively low-cost solutions:

- Restripe existing lots to create more spaces.

- Lease more lots, especially in the short term, before we could expand frequent service as proposed or build permanent park-and-rides.

- Use multifamily and commercial lots, which often have parking space available when transit parking is in high demand.

- Add on-street parking, working with cities to minimize impacts.

Build new parking facilities:

Compared to investments in expanding and enhancing service, construction of parking is more expensive for the ridership it generates. This will be a lower priority strategy.

As we consider future park-and-rides, we would coordinate with affected jurisdictions and consider costs and needs, local partnerships, the service network, and other options for accessing transit.

ⓘ

For more information

See Appendix D for more detail on access to transit, including estimates of parking by corridor.

What we've heard about access to transit

As we conducted outreach for this plan, Metro consistently heard from city staff and elected officials about the need for more parking options at major transit centers and park-and-rides. We also learned from our 2014 Rider/Non-Rider Survey that only 34 percent of customers are satisfied with park-and-ride availability.

The online survey conducted in summer 2015 supports the transit access zone approach because it found that priorities varied across the county. For example, parking was more important to Eastside respondents then those from other areas. Parking was the lowest priority for low-income respondents.

METRO CONNECTS proposes to expand all access options according to local priorities.

What would it take?

- **Make near-term improvements to parking access and information.** Continue monitoring park-and-rides and pursuing strategies to make the best use of existing resources—including using technology to provide real-time information to customers about parking availability and options for reserving a space.

- **Develop partnerships to improve access to transit.** Work with local cities, King County's Department of Natural Resources and Parks, and other partners to create high-quality trail connections, sidewalks, and bicycle facilities at bus stops and transit centers. Partners could help identify, design, permit, and build access improvements; assist in leased-lot negotiations; and contribute financially. Metro could provide funding to jurisdictions through grants or other mechanisms and help develop grant proposals.

Managing Demand

Attracting new riders and helping our transportation system work better.

Beyond increasing and improving service, METRO CONNECTS would grow ridership and reduce the use of single occupant vehicles by investing in transportation demand management (TDM).

Metro's TDM program encourages individual choices that make our transportation system work more effectively. Since the number of roadway miles in King County will stay about the same between now and 2040,[7] this program would be critical to maximizing the efficiency of our existing roads and reducing greenhouse gas emissions.

What would our TDM program look like?

TDM refers to activities that help people use the transportation system more efficiently.

TDM spreads transit demand across travel modes and times of day. One demand management strategy is to provide access to efficient travel options such as carpooling, biking, or riding the bus.

How people use the transportation system can significantly affect the need for new transportation investments and can support system preservation and maintenance. TDM activities help get the most out of transportation infrastructure and services by making lower-cost, more-efficient transportation options easier to use and more readily available.

Metro's TDM program would continue to use outreach, education, incentives and new products and partnerships to reduce barriers to using transit, maximize the value of our transit investments, and help our transportation system work better.

Our program covers a variety of transportation modes and tools (see page 61). We would also develop new methods using emerging technology and transportation pricing as well as improvements to walking and bicycling pathways to transit.

What would it take?

- **Research and develop new tools.** Build Metro's capacity for research and development of new TDM tools by budgeting for TDM in Metro projects and by continuing to develop new TDM partnerships.

- **Support local and regional land-use decisions that benefit transit and other alternatives to driving alone.** We would also advocate for national, state, and local policies and funds that support alternatives to driving alone and help create walkable communities.

- **Partner to put TDM solutions to work.** Seek commitments and partnerships with cities, transit agencies, WSDOT, employers, the private sector, and others.

.   7 PSRC Transportation 2040 Update Report, 2014, p. 76.

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Community-based social marketing

Community-based social marketing programs encourage participants to reduce drive-alone trips by offering customized travel information and resources and a short-term ORCA card loaded with unlimited rides, as well as support and communication.

Best suited for: Construction mitigation, new service or service changes, excess capacity.

Examples: Metro's In Motion programs in Capitol Hill, Ravenna, and I-405 communities.

Shared mobility options

These are services like bike, car, and ride sharing that are integrated with transit and provide first- and last-mile connections to transit.

Best suited for: Urban areas with enough density to support private investment, overcrowded park-and-rides, and fixed-route service that can be improved with complementary first- and last-mile connections.

Examples: Bikeshare, Car2Go, ReachNow, UberHop, UberPool, LyftLine, iCarpool.

Parking management

These are strategies that encourage the provision of right-sized new parking and ensure efficient use of existing parking. Transit agency coordination with public and private partners can develop context-sensitive policy and management programs.

Best suited for: Congested urban areas, developing suburban areas with new transit investments, overcrowded park-and-rides.

Examples: Shared parking demonstration with Capitol Hill housing; King County Right Size parking project.

Flexible service

Development of flexible transit services that are tailored to communities and user needs, including Metro's Alternative Services Program.

Best suited for: Lower density areas.

Examples: Duvall community van and Mercer Island TripPool.

Emergency ride home programs

If people are reluctant to try new public transportation options because they're concerned about being able to get home in a crisis, emergency ride home (ERH) programs can eliminate this perceived barrier. ERH programs can be enhanced by incorporating transportation network companies like Uber and Lyft.

Best suited for: Employers, residents, last-mile connections, new programs.

Examples: Real-time ridesharing programs can include ERH benefits for participants who can't get a rideshare home.

Pass programs

Transit pass programs offer administrative and cost advantages to organizations that want to provide a transit subsidy to part or all of their populations. Metro can grow transit/HOV ridership and reach new markets.

Best suited for: Businesses, individuals, schools, colleges, and universities.

Examples: The ORCA pass program for businesses (Choice and Passport). businesses.

Telework

Workplace strategies like telework, co-working, compressed work week, and alternate scheduling can help companies increase employee productivity, improve business continuity, and contribute to environmental sustainability.

Best suited for: Employers.

Example: WorkSmart program.

Transit-Oriented Development

Creating housing, services and jobs near transit.

METRO CONNECTS proposes that Metro take an active role with our partners in building and promoting more compact development near frequent transit service, giving residents more travel options even as the region grows, increasing affordable housing, and boosting ridership.

FROM OUR CUSTOMERS

"The more that is put into strengthening transit, the more it benefits the community as a whole—users of transit and otherwise."

What would our TOD program look like?

Transit-oriented development (TOD) is a private or public/private real estate development of a mixed-use community or neighborhood within walking distance to a transit center. Typical TOD features include:

- High-density development within a convenient 10-minute walk to a transit stop or station.
- Mixed-use development that includes schools, shopping, and various housing types, including affordable housing.
- Street amenities related to safe travel and access for walking and biking.
- Street grid, connectivity and traffic calming features to maintain safe vehicle speeds.
- Parking management to optimize the land devoted to parking and increase efficiency of use.
- Thoughtfully integrated street trees and lighting.

Generally, TOD includes multi-story residential uses, often with mixed commercial and office space. Compact density justifies frequent transit service, which in turn enhances opportunities and market demand for additional similar development, stimulating an active streetscape and commercial activity with a quality pedestrian scale.

The South Kirkland Park-and-Ride

The South Kirkland Park-and-Ride, completed in 2014, is King County's eighth TOD project. It includes:

- A new transit center
- A garage with 530 parking stalls and a surface lot with 323 stalls
- 184 market-rate and 58 affordable housing units with easy access to transit in an opportunity-rich location. Twelve units are for homeless families.

The project received Built Green 4 Star, Evergreen Sustainable Development Standard, and King County Sustainable Infrastructure Score Card certifications.

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What would it take?

- **Build a Metro TOD work plan.** Metro would conduct a comprehensive inventory of county-owned property and identify existing opportunities and potential new projects.

- **Work with partners to plan for transit-oriented development.** These facilities require a high degree of coordination with cities to ensure they are consistent with land-use plans. Partnerships with cities could help reduce the costs of land acquisition, construction, and permitting.

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Fleet

Cutting-edge vehicles designed for customer comfort and safety as well as efficient and green operations.

Metro would need to expand its fleet of buses, vans, and support vehicles to provide the higher levels of service envisioned in METRO CONNECTS. We estimate that we would need about 625 additional buses by 2040. With these additional buses, and the replacement of our existing fleet of about 1,400 vehicles, METRO CONNECTS envisions a Metro fleet of entirely zero-emissions, low-floor vehicles.

What would the Metro fleet look like?

As of 2015, Metro's fleet had about 1,400 fuel-efficient buses, including hybrid diesel-electric and clean-diesel coaches, electric trolleys, and several battery buses. Our fleet also includes paratransit and DART vehicles, Vanpool vans, and electric cars for the Metropool commute program. A large additional "non-revenue" fleet used to support service has tow trucks, supervisor vans, maintenance trucks, and more.

METRO CONNECTS would require expansion throughout the fleet, including 625 new buses by 2040. Replacement vehicles would also be needed as current vehicles reach the end of their useful lives—usually after 12 to 15 years of service.

Compared to the current network, more of the new service proposed in METRO CONNECTS would be in non-peak hours, when we use fewer buses. This means buses would be used more efficiently in the future network, operating for more hours a day. As a result, we could purchase relatively fewer buses compared to the increase in service hours.

METRO CONNECTS also envisions moderate expansion of our electric trolley bus network, which in 2015 carried about 20 percent of Metro riders. METRO CONNECTS proposes that Metro would invest strategically in the trolley network, focusing first on places where a relatively small expansion of wire could allow new service concepts to operate successfully. These include places that have frequent service, common overhead wires with existing trolley bus routes, steep hills, and dense urban service areas.

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Smart design

As we purchase new fleet vehicles, we would continually improve their design with the ease, comfort, and safety of customers and operators in mind. We would ensure that vehicles support fair treatment and access for everyone we serve. We would continue to emphasize features that make bus boarding speedy and easy and that keep maintenance costs down.

We would also proactively include systems that support developing technology. Bus real-time intelligence systems provide immediate access to useful information about operations and conditions, and could support features like these:

- Real-time information for customers about the availability of seats, bike storage space, and space for wheelchairs or other mobility aids.

- Telematics—vehicle systems that use telecommunications to send, receive, and store computer-based engine data—for proactive identification of mechanical problems.

- Surveillance video that uses license plate readers and object recognition to identify vehicles parked in bus-only lanes.

- On-board environmental monitors for weather conditions and air pollution.

- Traffic control that goes beyond transit signal priority, such as remote activation of pedestrian crossing buttons at intersections to encourage patrons not to jaywalk to catch the bus.

- Secondary uses of a vehicle, such as an emergency communications hub or power generator.

- Safety features including audible signals to pedestrians.

ⓘ
For more information
See Appendix F for more detail on the topics in the Critical Services Supports section.

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Fleet, continued

Going green

Metro is committed to having the greenest fleet possible. Our agency was a national leader in adopting diesel-electric hybrid bus technology, and we are replacing our aged trolley bus fleet with zero-emission trolley buses that can use battery power to travel short distances off-wire. We're moving toward a fleet of all hybrid or electric coaches, and we're preparing for rapidly evolving electric vehicle technology to keep our fleet on the cutting edge of environmental improvements and to move toward a zero-emissions fleet.

The King County Strategic Climate Action Plan (SCAP) calls for a 10 percent reduction in normalized energy use in Metro operations by 2020, compared to a 2014 baseline. Metro is already making progress toward this target.

The SCAP also calls for a 10 percent increase in alternative fuel use across King County fleet fuel purchases. Alternative fuel sources include electricity, biofuels, compressed natural gas, liquefied natural gas, hybrid, plug-in hybrid, battery drive, or propane.

Metro is already beginning to evaluate how we can achieve our vision of a zero-emissions fleet. Initial recommendations will be developed in 2017, and we will continue to study emerging and cutting-edge technologies.

2020 SCAP Targets

10% ▼ REDUCTION IN ENERGY USE BELOW 2014 RATES

10% ▲ INCREASE IN ALTERNATIVE FUEL USE

Metro Targets

100% HYBRID OR ELECTRIC BY 2018

What would it take?

- **Procure state-of-the-art vehicles** to support expanded service and replace vehicles at the end of their useful lives.

- **Use fleet design criteria that focus on customer and driver needs.**

- **Support and expand the trolley network by:**
  - Filling gaps in the network to allow flexibility.
  - Working with partners to extend wire to new streets so routes could be converted to trolley bus service.
  - Keep the trolley system infrastructure in a state of good repair through regular maintenance and planned replacement cycles.

- **Meet SCAP targets by moving toward a zero-emissions fleet.**

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Layover Areas

Critical for reliable service and for our drivers.

Layover sites—where buses rest between trips—are critical for getting buses to the right place at the right time and for giving our drivers safe places for breaks. METRO CONNECTS envisions that by 2040, we would need to increase layover spaces by 50 percent. As development competes for layover space on streets, Metro would make significant investments in new, off-street facilities. While more costly, these facilities would provide long-term stability and benefits for riders and bus operators.

What would future layover areas look like?

Layover is time built into bus schedules between a bus's arrival at the end of a route and its departure for the next trip. Layovers provide break time for operators, help buses get back on schedule if the preceding trip was late, and allow buses to depart at regular, predictable intervals. Layover areas are located throughout the county, either on-street or off-street, such as at a transit center.

The location of layover sites has a huge financial impact on Metro operations; service costs more when we have to drive empty buses long distances to reach layover spaces. Well-located layover areas—close to the start and end of routes—give us increased scheduling flexibility, reduce the amount of time buses travel to the beginning or end of routes, and can have a positive impact on reliability. Layover areas must have clean, safe and well-lit facilities for bus operators.

On-street layovers spaces are where buses park along curbs in regular street right-of-way. Metro partners closely with the jurisdictions we serve to secure layover space. We site on-street layovers where they will not interfere with traffic, and strive to minimize impacts on adjacent properties. However, property development or changes often result in pressure to reduce or move layover sites. This pressure can be particularly acute in dense urban areas, where development pressure is intense but where layover space is most needed because of the large amount of transit service starting and ending at major destinations. Many areas are seeing increasing competition for limited curb space.

In 2015, Metro's layover sites accommodated approximately 530 buses. Transit service network changes envisioned in METRO CONNECTS would affect both the number of layover spaces needed and their location.

We estimate that 270 additional layover spaces would be needed to accommodate the 2040 network—approximately 50 percent more than in 2015. This increase reflects our expectation that some current on-street layover spaces would no longer be available in the future because of development. Many of these spaces would be needed in dense urban areas, including downtown Seattle. We would need to update and renegotiate many current layover agreements, develop new ones, and invest in off-street layover facilities.

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What would it take?

- **Ensure that adequate layover areas are provided and explore innovative options for layover development.** Consistent with plans for additional park-and-rides and transit-oriented developments in METRO CONNECTS, Metro would identify opportunities to incorporate layover space into other types of projects.

- **Work with jurisdictions to site on-street layover** areas or build off-street layovers where we expect to have a long-term need, such as in downtown Seattle. We would work with property owners and builders to incorporate layover areas that have rider facilities as part of new development. Transit-oriented development projects are great opportunities for these types of partnerships.

- **Continue partnerships with other agencies to secure layover space.** Moving away from on-street layover sometimes benefits local cities, but would require more costly investments in off-street layover facilities. We would build on our successful joint agreements with Sound Transit, Community Transit, and Pierce Transit at facilities in Tukwila and Auburn. King County Housing Authority is another potential partner.

Metro is working with the Seattle Department of Transportation on an off-street layover study to identify opportunities for a new facility in the north downtown/South Lake Union area. Similar work would have to be done in other cities to identify potential development locations as early as possible. Partnerships with private developers could help reduce the costs to public agencies and provide other benefits by incorporating other uses into a project.

Operations and System Preservation

Bus bases, support facilities, and maintenance to keep our system running smoothly and safely.

A major component of the investment called for in METRO CONNECTS would go toward building and maintaining the infrastructure Metro needs to expand, improve, and operate service.

Metro has already made significant investments in infrastructure to support service on the streets. Maintenance of our bus bases, other support facilities, and structures for customers such as bus shelters, transit centers, and park-and-rides is critical to the delivery of quality service. Because Metro's capital infrastructure is aging, the need for investment continues to grow. Maintaining a state of good repair would help to prevent larger costs for deferred maintenance down the line and ensure that our customers enjoy a world-class transit system.

Maintaining the transit fleet and facilities in a state of good repair helps Metro avoid the high costs of deferred maintenance, qualify for federal funding, and deliver safe, reliable, and comfortable customer service.

What would bases and support facilities look like?

Long before a Metro bus arrives at a stop, many hands prepare it for the trip. Mechanics do maintenance or repairs. Employees clean and fuel the bus and may post "rider alerts" about upcoming service changes. Drivers check in and learn about events that might affect transit service that day. Activities like these are performed at our seven bus bases and other facilities, and METRO CONNECTS proposes infrastructure to support the service proposed for the future.

Bus bases

Metro's seven bus bases support an average of 200 buses each, and have both operations and maintenance facilities. Metro is currently near capacity at existing bases, limiting our ability to add more vehicles to the fleet.

To support the proposed service network, we would need two or three additional bases for our expanded fleet and non-revenue vehicles. Bases are major facilities that require extensive work to site and plan.

The exact facilities required would depend on many factors, such as the sizes of buses needed, their propulsion technologies, and partnerships with other transit providers. Bases would be sited and designed according to these criteria:

- **Sustainability.** King County's Green Building and Sustainable Development Ordinance sets building requirements to reduce waste and increase operational efficiency.
- **Location.** The location of bases near the start and end points of service provides significant operational benefits by limiting the distance vehicles travel without passengers. Locating facilities near transit service also lets bus operators take transit to work.
- **Partnerships.** Metro has agreements with Sound Transit to share bus base capacity, helping both agencies operate efficiently.

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- **Change.** Bases and other facilities should accommodate changes in fleet and propulsion technology—including electric trolley, battery and hybrid buses.

- **Operational success.** Bases should be located and designed for efficient and effective operations and maintenance to occur, and should provide working space for employees.

- **Employee parking.** Bases must provide adequate space for employees to park on-site.

Metro is continuously exploring ways to maximize the use of facilities and reduce costs. An example: parking some North Base buses near downtown Seattle during the day rather than driving empty buses back to the base. Metro would continue to pursue innovative use of existing facilities, such as using park-and-rides for overnight bus parking.

Support facilities

Beyond the bases, we would have to expand and accommodate a variety of facilities and functions if Metro service grows as proposed in this plan.

Vanpool distribution base. Metro currently manages the largest publicly owned vanpool program in the county. This fleet is expected to increase by more than 2,000 vans by 2026. To support the continued growth of the vanpool program, METRO CONNECTS calls for another vanpool distribution base.

Operations support. More people would be needed to manage and support the operation of a growing transit system.

The Transit Control Center (TCC) is the nerve center for Metro's bus operations. The TCC staff monitors and manages the movement of buses while they are in service. They also coordinate radio contact with all bus drivers on the road, supervisors in the field, emergency responders, and other groups that support bus operations, helping manage problems and occasional emergencies.

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Operations and Preservation, continued

Today, the TCC actively manages RapidRide lines to keep buses well-spaced along their corridors and minimize "bunching." As RapidRide expands and new technology emerges to help manage the transit system, the TCC would evolve, providing real-time headway management of all frequent service by 2040.

The TCC must have specialized equipment and dedicated space to do its work.

Metro Transit Police would need a headquarters that accommodates a larger police force for a larger system.

Service Quality staff and field supervisors need space to accommodate staff members when they are not in the field.

Classrooms and test areas for driving buses would be needed to train operators and keep their skills fresh.

On the road, bus operators need adequate restroom facilities and places to rest between trips.

Maintenance and power distribution. The number of bus stops, shelters, and park-and-rides would grow as METRO CONNECTS is implemented. Expanded RapidRide service would mean a need for enhanced shelters and signs at stops. Expanded use of technology would lead to more sign maintenance, radio maintenance, battery charging and more.

The employees who build, repair, clean and maintain these structures must have adequate space and equipment to do their work, located as close as possible to major service areas.

Administrative support. Metro needs office space for customer service, planning, engineering, marketing, information technology, and other functions that support the overall transit system. As service expands, some of these functions would grow, particularly as new capital projects are planned and built. Revenue-processing requires secure physical space for processing cash and fare media that riders pay with every day.

Safety and security

Safety is Metro's foremost goal, and METRO CONNECTS identifies infrastructure and resources needed to make our system safe for our customers and our employees.

- **Build systems that support the safety of customers and employees.** Metro would need to expand capacity for the Metro Transit Police, fare enforcement officers, security monitoring centers, subcontracted security personnel, and equipment storage. Safety onboard buses and at stops and stations, transit centers, and park-and-rides would remain a priority in facility design and in staffing. We would seek opportunities to include security cameras, additional lighting, emergency call boxes, or other security measures at transit facilities or add fare enforcement officers.

- **Provide resources for the Metro Transit Police.** As the transit system grows and urban centers expand, the need for security to protect transit users would grow. Although security needs and approaches continue to evolve, we know that we would need more personnel, vehicles, technology and equipment as well as more space for facilities.

- **Support security and enforcement around transit priority facilities.** Bus-only lanes, busways, high-occupancy vehicle lanes, and roadway features that keep buses moving require enforcement to be effective.

- **Partner to ensure security at shared facilities, including expanded Link stations.** Metro would continue working with partners to ensure that shared facilities are safe and secure for riders and employees.

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Intelligent Transportation Systems (ITS)

Emerging technologies that interconnect travelers, vehicles, management centers and the roadway—called Intelligent Transportation Systems (ITS)—will transform the way we travel.

Metro has been a leader in using ITS. A wireless communications network on our RapidRide corridors enables buses to request priority treatment at traffic signals, lets passengers pay their fares before boarding, and delivers "next bus" information to electronic signs at stations.

We'll build on this architecture to deliver such improvements systemwide, connecting the management of transit and other transportation modes to make our service faster, more reliable, and easier to use. Many of Metro's concepts for using ITS are mentioned throughout this plan, including:

- **Intelligent buses** that report the availability of seats, bike racks, and space for mobility devices; engine diagnostics; have weather and pollution information; and also communicate with the road network and other vehicles.

- **Integration of public and private travel options** such as bus, rail, carshare, bikeshare, and TNCs like Uber and Lyft into a single trip-planning and payment system.

- **Integration of transportation management centers** operated by Metro, WSDOT, the City of Seattle, and others.

- **Improve and share raw transit data** among our regional partners to better understand our customers' needs. We would build on recent initiatives such as the Metro/Sound Transit Integration effort and the Five Agency downtown Seattle effort to share data.

- **Other future technologies** such as automated buses and active safety systems.

With the ongoing extension of Link, Metro is continuing to restructure our route network around the rail system as well as multi-modal connections and new travel options. As this service network evolves, service integration will become ever more critical. We would need better tools to analyze ridership, productivity, on-time performance, traffic congestion, roadway volumes, corridor performance, and other aspects of operations in a more regional and collaborative manner. The region's transit agencies could become better aligned by sharing more data and analysis.

Metro won't be able to fully understand our own riders' needs and travel patterns without knowing where and how they transfer to other services and modes. We would need agreements with the ORCA partners to obtain regional data and conduct integrated service planning.

What would it take?

- **I**nvestment in operations and system preservation such as:

  - Building base capacity for up to 650 new vehicles, along with a new vanpool distribution base, Access fleet base, and other support facilities.

  - Expanding safety and security infrastructure to keep customers and employees safe.

  - Continuing to lead in the testing, development, and procurement of information technology assets that are vitally important to providing excellent customer service over the long term.

Metro's Workforce

Preparing to deliver more and better service.

To attain the METRO CONNECTS vision, we would have to substantially grow our workforce. We would need employees with highly specialized skills who can adapt to change as we adopt innovative vehicle and communications technologies. We would maintain our commitment to building a diverse workforce and giving all employees equitable access to development opportunities.

Above all, we would make sure employees have what they need to provide the highest level of customer service and safety.

What would our workforce look like?

As of 2015, Metro had more than 4,600 full and part-time employees. These include about 1,700 full-time and 900 part-time bus operators. Other Metro employees plan service, purchase and maintain buses, build and keep up customer facilities, respond to events affecting service, safety and security, and in many other ways support the successful daily operation of the Metro system.

Efforts to attract and retain a quality workforce would include robust employee training and development programs—especially important as we currently face a high retirement rate among supervisors and managers.

As the changes envisioned in METRO CONNECTS unfold, effective internal communications would be critical for building a common understanding and commitment to transforming the Metro system.

We would also maintain a focus on productive labor-management relationships with the unions that represent a majority of the workforce.

What would it take?

- **Continuously improve safety—Metro's highest priority.** Enhance employee safety through steps like improving layover facilities and reducing onboard cash fare payment to minimize conflicts with passengers. Promote passenger safety through operator training, onboard safety and security features in new vehicles, and use of emerging technologies.

- **Promote diversity and inclusion in the workforce.** Metro, ATU Local 587 and PTE Local 17 have teamed up on the Partnership to Achieve Comprehensive Equity (PACE) initiative. PACE is striving to create an environment for positive change, improved communication among all employees, and a workforce that reflects, respects and embraces diversity as a shared core value of our service to the public.

- **Respond to a high retirement rate by training a new wave of employees and leaders.** Offer robust training and development programs and stay competitive with the private sector for hiring and retaining the next generation of Metro employees. For example, Metro could work with technical institutes and colleges to recruit and train employees and develop leaders for jobs in maintenance, operations, and administration.

- **Keep employee skills up to date with changing technology and innovation in the transit industry.** For example, as our fleet modernizes, both operators and maintenance workers will need updated training and new skills.

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What drivers had to say

Metro drivers experience first-hand the factors that affect their ability to transport passengers safely and on time. They also hear from our customers about the quality of service.

As we developed METRO CONNECTS, we asked our drivers for their ideas about the future of Metro's service and how to achieve our vision. Some of the key themes we heard and incorporated into the plan are:

- Time transfers to make the system reliable and useful.
- Reduce overcrowding on buses.
- Improve fare payment:
  - Eliminate paper transfers.
  - Improve fare payment technology, including options for more offboard fare collection and elimination of onboard cash payments.
  - Have consistent fare structures among the region's transit agencies.
  - Add fare enforcement officers.

- Strengthen safety and security for riders and drivers, including cameras on all buses.
- Make speed and reliability improvements throughout the system.
- Improve customer information at stops, on buses, and via mobile devices.
- Provide more night service.
- Keep the walking distance to stops and between transfer points short.

How we would attain the vision

Metro can't achieve the METRO CONNECTS vision all at once, and we can't do it alone.

Collaboration, partnerships, and incremental change over time will be the keys to getting there.

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Consistent with the way we developed METRO CONNECTS, Metro would continue to collaborate with jurisdictions,transportation agencies, and the public as we move toward our shared vision.

METRO CONNECTS is a living document that we expect to update every six years, incorporating intermediate changes that occur on the ground and in local plans. This iterative process will contribute to an enduring consensus about the future of transit and will help cities realize their visions for the future as well.

In addition to updating the METRO CONNECTS vision, we would develop a rolling six-to-eight year Development Program that would focus on internal coordination and collaboration with local jurisdictions to make sure we are on track to attain our vision. This program is intended to better prepare us to support the existing legislative processes for service changes and capital investments.

The Development Program would set us on a course to know what is coming up and to better communicate what will be in upcoming biennial (two-year) budgets, helping us further define the resources needed.

The program would also help Metro align transit service expansion with changes in local community development and plans, keeping our service relevant in the places where people want to use public transportation. The next page has more information about the Development Program.

We would engage the public in shaping major service changes before they are adopted by the King County Council. The capital program would be subject to budget review and approval by the King County Council.

The interplay between METRO CONNECTS, the Development Program, Metro's Service Guidelines, local land use and comprehensive plans, and the service change process is shown in Figure 24, on page 81.

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METRO CONNECTS Development Program

To make the METRO CONNECTS vision a reality, Metro would develop a rolling six-year Development Program in collaboration with riders, community members, cities, and transportation stakeholders.

King County would use the METRO CONNECTS Development Program to coordinate internally and with jurisdictions to deliver the near-term service changes, complementary capital investments, and other program and policy work needed to support the METRO CONNECTS vision. Decisions to make changes to the transit network would be made through our existing service change process, which includes extensive public engagement prior to the King County Council's adoption of service change ordinances. The needs identified in the program would inform and be informed by our biennial budgets.

Each of the project areas in METRO CONNECTS would require more detailed analysis and consideration as we move toward project delivery. For example, the Development Program would help Metro coordinate construction of a new bus-only lane where a RapidRide alignment has been planned, or begin early conversations with Sound Transit around transit hubs where we know passenger volumes will grow.

In some cases, the Development Program will suggest the need for new research, feasibility analysis, or other study of topics like enhanced data collection systems, new customer information tools, fare integration opportunities, or application of emerging technology.

By breaking the METRO CONNECTS vision down into smaller, achievable pieces, we could ensure that the needed system infrastructure, land use, service, policies, and programs are coordinated and scaled appropriately. We would form partnerships early and often to make sure transportation infrastructure is in place as transit expands.

This program would be informed by Metro's Service Guidelines, which help us evaluate, design, and modify transit services to meet changing needs and deliver high-quality service. The guidelines are based on three principles: productivity, geographic value, and social equity.

The Development Program would evaluate concepts such as RapidRide alignments and express pathways, providing a solid basis for community engagement when we begin a service change proposal.

Decisions regarding service allocation would be shaped by the following factors:

- Existing service hours on Metro routes in the project area.

- The estimated service-hour need identified in METRO CONNECTS and in Metro's annual System Evaluation Report, including hours needed to create new RapidRide lines.

- Partnership contributions such as financial or in-kind contributions and transit-supportive policy changes.

- Distribution of service across all areas of the county.

- Presence of communities with large minority and low-income populations.

By considering both planning factors and available resources, the Development Program would provide opportunities to reconcile the needs identified in Metro's annual System Evaluation Report with the METRO CONNECTS service network and vision. Metro expects to begin work in 2017 on our first Development Program, to help inform the 2019–2020 budget.

Development Program, continued

What guides the METRO CONNECTS Development Program? (relationship of plans)

The implementation of METRO CONNECTS will be guided by various King County and Metro policies, refined and discussed with regional partners, and carried out through existing methods for changing service and capital projects, described in more detail below. Metro's planning documents can be separated into those that provide overarching policy, those that are direct inputs to the Development Program, and existing methods for making service and capital changes to the Metro system that will move us toward the vision laid out in METRO CONNECTS.

The planning documents below are a description of existing Metro policy. Other guiding policy documents include the King County Strategic Plan, the Fund Management Policies for Public Transportation and Countywide Financial Policies, the King County Strategic Climate Action Plan, and the King County Equity and Social Justice Strategic Plan.

Overarching policy

- The **Strategic Plan for Public Transportation** describes Metro's goals, strategies and objectives concerning safety, equitable access, economic vitality, environmental sustainability, service excellence, financial stewardship, public engagement, and workforce quality.

- The **Service Guidelines**, which are used to evaluate, design, and modify transit services to meet changing needs and to deliver efficient, high-quality service.

Inputs to the METRO CONNECTS Development Program

This new initiative provides the forum for discussions—both internal and with jurisdiction partners—about the factors that influence our service and capital decisions. Participants will share their ideas and priorities, which will inform the development of Metro's budgets going forward.

Metro will share information with regional partners about the following:

- **METRO CONNECTS**, which establishes a long-term vision for how we will serve the mobility needs of the county that is consistent with our policies. It defines service concepts and types of capital investments (including in areas of the county with Service Guideline needs) or that would be necessary to support long-term changes to the transit network.

- The **Service Guidelines**, which include the tools for guiding near-term service decisions such as restructuring service, planning alternative service, and working with partners.

- The **System Evaluation Report**, which will present the results of the Service Guidelines assessment and the performance and progress of the Alternative Services program. The Service Guidelines assessment identifies where the county's greatest transit needs are, based on four investment priorities: routes that are crowded, routes that are unreliable, routes that do not have enough service, and highly productive routes.

Cities' and transportation agencies will bring information to the forum about:

- **Local and regional plans** and known projects that will have impacts on the transportation network, such as land-use changes, roadway improvements, and Link extensions, that Metro should respond to.

- **Local priorities** for transit service whether based on the existing Service Guidelines needs or on the METRO CONNECTS vision.

Budget and next steps

Input from regional partners would inform the development of Metro's budget and a six to eight-year service and capital program. The budget would be adopted by the King County Council as part of King County's biennial budget.

Metro would work with communities and partner agencies to plan and implement service changes; plan and construct capital projects to support transit service; and plan and implement other programs and initiatives that support the METRO CONNECTS vision.

Reporting

In addition to reporting on the Service Guidelines assessment and the performance of the Alternative Services Program, Metro's annual System Evaluation Report would report on progress toward the METRO CONNECTS vision.

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Fig. 24: Plans that Guide the METRO CONNECTS Development Program

King County Strategic Plan
- Policies and strategies
- Performance measures

Metro Strategic Plan
- Policies and strategies
- Performance measures

Local and Regional Plans
Development forecasts and transit needs

Short-range System Management

Service Guidelines
- Service design guidelines
- Performance analysis metrics

Long-range Network Development

METRO CONNECTS
- 2025 and 2040 vision for Metro's future
- 2025 and 2040 service networks
- Capital investment
- Innovation and critical service supports
- Updates every six years

Development Program
Identify scope and schedule for planning, capital, and service changes

Updated on a rolling basis

Annual System Evaluation Report
- Service Guidelines evaluation
- Alternative Service Performance and Progress Report
- METRO CONNECTS Progress Report

Biennial Budget

Service Change Process
Plan and implement service change and restructure packages

Capital Projects
Plan and construct capital projects

Programs and Initiatives
Plan and implement programs and initiatives

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Financial Overview

METRO CONNECTS is consistent with forecasts of future transit needs and PSRC's long-range transportation plan.

The costs for METRO CONNECTS are high-level planning estimates expressed in year-of-expenditure dollars (YOE$), which include inflation. These costs are subject to change as investments are further defined and sequenced. Due to the effect of inflation and the ongoing cost of service once implemented, the timing of investments can have a significant impact on the total costs.

Metro's primary revenue source is sales tax. Sales tax is volatile, and future economic events will affect the amount of revenue actually available for the program. The sales tax growth rates used to construct the METRO CONNECTS program were reviewed by King County's Office of Economic and Financial Analysis (OEFA) for the period of 2026–2040. The revenue estimate for 2017 through 2025 came directly from forecasts developed by OEFA and approved by the King County Forecast Council. With these assumptions about revenue growth, the cost of attaining the METRO CONNECTS vision will exceed our existing revenue sources.

Figures 25 and 26 illustrate the incremental capital costs and service additions identified in METRO CONNECTS between now and 2025 and also through 2040. These figures show the current estimate of what could be funded with currently forecasted existing revenue sources—sales tax, farebox revenue, federal and state grants, and others.

Based on current revenue assumptions and planning-level assumptions regarding timing of investments, by 2025 just over 25 percent of the additional capital costs and more than 70 percent of the service hours called for in METRO CONNECTS could be funded. By 2040, existing revenue forecasts could fund almost 30 percent of the additional capital costs and over 50 percent of the additional service hours called for in METRO CONNECTS. The actual balance of service to capital expenditures will evolve through the Development Program and budget development cycles. Without the capital investments, riders would not experience all the benefits, and the service would be less efficient. Therefore, METRO CONNECTS assumes capital investments would be made as service is implemented.

One of the key purposes of the METRO CONNECTS Development Program would be to schedule service and capital projects, further refine their costs, and determine what steps would have to be taken to fill any funding gaps. Partnerships with cities, transportation agencies, businesses and others would be an important part of closing revenue gaps.

Legend: ■ Sustainable funding   ■ METRO CONNECTS total

Fig. 25: METRO CONNECTS Incremental Capital Costs and What Could be Funded with Forecasted Revenues*

2025
1.4 | 4 | 5.4 total

2040
3.2 | 7.8 | 11 total

$0 $4 $8 $12
billions
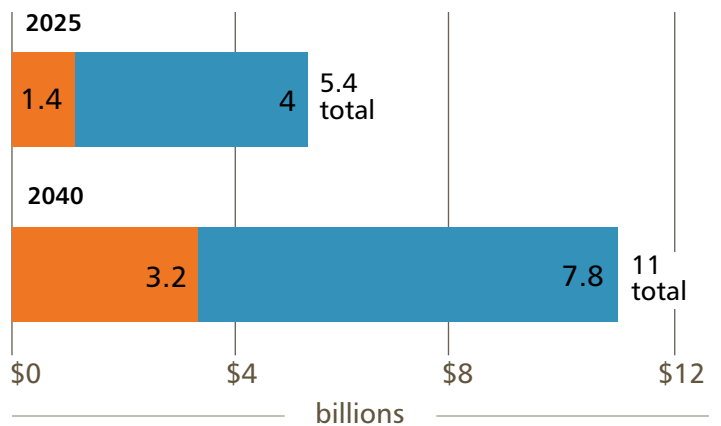
Fig. 26: METRO CONNECTS Incremental Service Adds and What Could be Funded with Forecasted Revenues*

2025
620 | 240 | 860 total

2040
1,270 | 1,230 | 2,500 total

0   1,000   2,000   3,000
annual service hours (thousands)
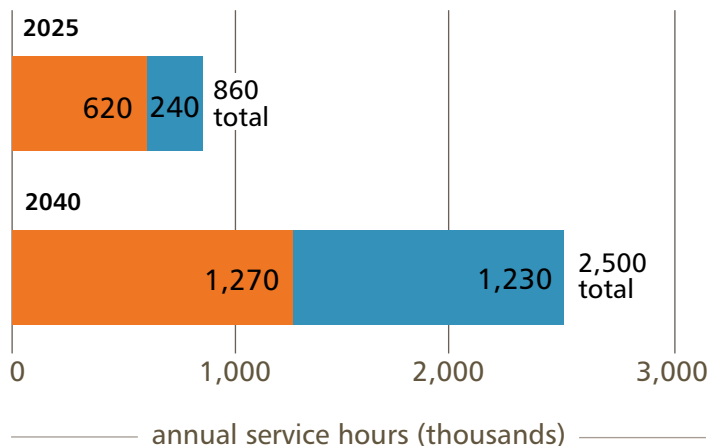
* Based on July 2016 Economic and Revenue Forecasts for King County. Assumes grant revenues, fare revenues, and local and partnership funding. The Sustainable funding does not include approximately 270,000 hours currently funded through Move Seattle.

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Working Together:
What it Would Take to Form Partnerships

The METRO CONNECTS vision would fundamentally change the way transit serves King County, and we would need to work together as a region to fully implement it. Achieving the vision depends on investments that enable transit to serve more people, in more places, in more ways.

The METRO CONNECTS investment estimates were based on planning assumptions. Actual projects, costs, funding, and partnership contributions would be determined through the METRO CONNECTS Development Program.

Metro has traditionally partnered with jurisdictions and agencies on specific projects or investments, such as RapidRide, transit signal priority, and speed and reliability investments. The METRO CONNECTS Development Program would expand partnerships to improve transit. While Metro intends to make substantial investments toward our vision, full implementation of METRO CONNECTS would require investments from our partners as well. We would collaborate to refine needs and costs and to identify partnership opportunities in areas such as land-use zoning, traffic operations, transportation infrastructure and policies, and grant coordination as well as new and innovative kinds of partnerships.

Examples of what the partnerships could do:

- Improve and emphasize transit-supportive land-use policies around the county.

- Expand and improve infrastructure for RapidRide, other frequent routes, and all-day express service, to keep them running fast and on time.

- Support innovations in customer service and operations by adopting programs and tools to improve the quality, quantity, and analysis of the data we share with the region.

- Scale up Metro's capacity to deliver the capital and service improvements envisioned in METRO CONNECTS by engaging in proactive and opportunistic planning with regional partners.

- Build safe and comfortable passenger facilities that accommodate many more people, make transfers among services easy, and meet jurisdictions' needs.

- Help support an increase in bus service by more than 70 percent by 2040.

- Improve access to transit by increasing park-and-ride capacity, bicycle and pedestrian paths, and secure bicycle parking facilities at major transit hubs around King County.

We recognize that there is inherent risk in pursuing this bold vision. The scale and collaborative nature of METRO CONNECTS would require internal and external changes. Part of the work of the Development Program would be to identify key areas of risk and develop strategies to successfully navigate challenges. Metro would work with both large and small cities to help meet their needs and move partnership projects forward together.

Our estimated capital investment is based on planning assumptions. Table B-2 in Appendix B highlights the assumed partnership contributions, and detailed descriptions of these assumptions are located in Appendices B through F. Actual costs would be determined through the METRO CONNECTS Development Program.

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Service Investments

In 2015 Metro spent $600 million on service operations. By 2040, an additional $460 million annually (in 2015 dollars), would enable Metro to implement the METRO CONNECTS service improvements, bringing frequent service to within a half mile of 70 percent of the county's population and expanding flexible transit options.

Currently, Metro's primary sources of revenue are sales tax, fares, property tax, and federal and state grants. Forecasted growth in existing revenue streams of taxes, fares, grants, and other service partnership funding would cover some of the proposed METRO CONNECTS service investments. To fund the remaining investment, King County would look to additional federal, state, and local funding options and partnerships.

State of good repair

Metro's first commitment is to support the existing system by keeping current assets (bus bases, maintenance facilities, revenue and non-revenue vehicles, trolley wire, substations, etc.) in good working condition. We will continue to plan for required maintenance on the existing system as part of our biennial budgeting process. As we have done in the past, Metro will look for federal, state, regional and grant funds to ensure we can meet our obligation to maintain and repair existing assets. The cost for maintaining current assets is not shown in Figure 27.

As METRO CONNECTS adds to current capital facilities and infrastructure, Metro's maintenance and repair costs are projected to increase. Those costs are shown as "State of Good Repair (New)" in Figure 27.

Capital Investments

METRO CONNECTS would require a substantial expansion of capital investments to create optimal transit travel conditions to keep buses moving and on time. Significant investments would also be necessary in passenger facilities to support the new service network. Metro would also invest in technology and supporting infrastructure to create the enhanced customer experience we envision. These capital investments would support the productivity gains associated with the METRO CONNECTS network. Without these investments, service would be slower, our operating costs would be higher for the same level of service, transit would be less productive, and it would be more difficult to meet regional mode share and ridership goals.

We estimate that between 2017 and 2040, Metro would need to invest approximately $11 billion in year-of-expenditure dollars on capital projects. Figure 27 illustrates how the additional capital investments would be distributed among the major capital elements.

As with the service investments, and as shown in Figure 26, forecasted growth in existing revenue streams of taxes, fares, grants, and other funding would cover some of the proposed METRO CONNECTS capital investments. To fund the remaining investment, King County would look to additional federal, state, and local funding options and rely on partnerships with jurisdictions within the county.

Fig. 27: Incremental Capital Investments 2018–2040

11% New Fleet
1% State of Good Repair (New)
4% Technology
4% New Layover
3% Other Facilities
6% New Bases
6% Transit Centers
9% Stops and Stations

33% Corridor Improvement
12% Major Regional Projects
5% Non-Motorized Access
6% Park-and-Rides

- Speed and Reliability
- Access to Transit
- Passenger Facilities
- Critical Service Supports
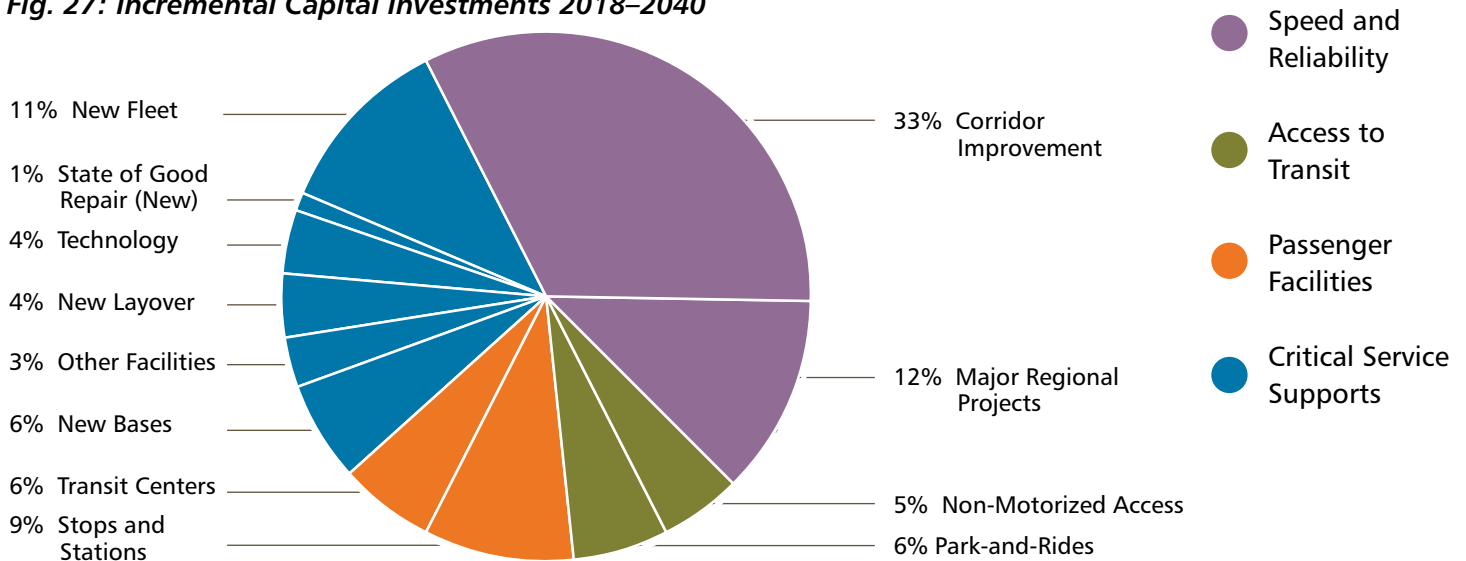
First Steps

As a first step toward the long-term vision, METRO CONNECTS describes an enhanced service network that would be developed by 2025—roughly when all known and funded Sound Transit 2 projects would be complete. This interim network would be the basis for further planning to fully achieve the 2040 vision. Figure 6, on page 24, is a map of the 2025 network.

METRO CONNECTS envisions that by 2025, Metro would:

- **Make the service investments identified in the annual Service Guidelines analysis.** The latest analysis identified the need for hundreds of thousands of additional service hours to better meet transit demand across King County in a socially equitable and geographically fair way. By increasing Metro's service to meet current demand, we would begin building the METRO CONNECTS service network and service levels.

- **Restructure around Link light rail expansion.** Sound Transit is planning to complete approved extensions of Link to the north, east and south by 2025. These extensions would provide an opportunity to review the entire transit network and build toward the METRO CONNECTS service network and service levels.

- **Build new RapidRide lines in coordination with the City of Seattle and other partners.** Expanded and enhanced RapidRide is the centerpiece of the METRO CONNECTS frequent network, which would integrate with our region's high-capacity transit network to connect our urban centers.

  METRO CONNECTS calls for the creation of 13 RapidRide lines across King County by 2025, and a total of 26 by 2040. Some of these are already funded in partnership with the City of Seattle by the Move Seattle levy. If METRO CONNECTS is implemented, these corridors would be accompanied by capital investments to improve speed and reliability as well as passenger amenities.

- **Expand the capacity of Metro's transit support systems.** To meet our region's growing demand for transit, Metro needs expanded capacity for buses—not only the vehicles but also the infrastructure to support them. In the near term, Metro anticipates buying additional fleet vehicles, considering expansion of bus base capacity, and hiring bus operators and other personnel.

- **Help riders get more and better access to the transit system.** In conjunction with other transit agencies and cities, Metro would continue efforts to improve options for transit riders to get to bus stops and high-capacity transit stations. Options would include parking improvements that allow us to use existing resources more efficiently, manage demand, and increase supply. We would also continue to work with local jurisdictions to improve bicycle and pedestrian facilities to make it easier to access transit.

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King County METRO

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en español, sírvase llamar al
206-263-9988 o envíe un mensaje
de correo electrónico a
community.relations@kingcounty.gov

METRO CONNECTS Technical Appendices

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Appendix A.   Service Network

Service Terms Glossary

Alternative services: Transportation services tailored to meet specific community needs. Metro plans and provides these services with partner support throughout King County. Often, the served community lacks the infrastructure, density or land rights to support traditional, fixed-route bus service. Metro's alternative services include: VanPool, VanShare, Community Access Transportation (CAT), Dial-a-Ride Transit (DART), Community Shuttles, Community Hub and Flexible Rideshare. (See definitions of these services below.)

Bus Bulb: Bus bulbs are curb extensions that align the bus stop with the parking lane, allowing buses to stop and board passengers without ever leaving the travel lane. Bus bulbs help buses move faster and more reliably by decreasing the amount of time lost when merging in and out of traffic.

Carpool: Commuters travelling similar routes can connect on the Metro Rideshare website and share rides in personal vehicles.

Community Access Transportation (CAT): A program that complements paratransit (ACCESS) service by filling service gaps in partnership with nonprofit agencies, such as those serving seniors or people with disabilities.

Custom Bus: A program that serves King County commuters and students who travel to locations not well served by fixed-route transit.

Community Hub: A transportation center that Metro and a community partner provides, that gives people access to various transportation resources according to community need. Examples of these resources include community vans, bikes and information.

Community Shuttle: A route that Metro provides through a community partnership; these shuttles can have flexible service areas if it meets the community needs.

Community Van: A pilot program being developed by Metro and participating cities to provide their community members with shared rides to local destinations.

Dial-A-Ride Transit (DART): Scheduled transit routes in which individual trips may deviate from the fixed route to pick up or drop off a passenger closer to their origin or destination. DART routes may only deviate into pre-specified "DART areas." All current DART routes include a fixed route portion in which passengers can access service from regular bus stops.

Downtown Seattle Circulator: A free downtown circulator bus, provided by the City of Seattle, that stops at 7 locations in downtown Seattle. Two buses drive a fixed route, stopping at each stop every 30 minutes.

Fixed-Route Service: Scheduled transit routes in which trips are required to follow the same routing on every trip.

Flexible Rideshare: An on-demand carpool program using mobile and web-based applications to match up drivers with passengers who want to share a ride. Riders pay a small fare through a mobile app, and drivers earn a per-mile fee.

Hyde Shuttles: Originally created from an endowment from Lillian Hyde, Hyde Shuttles transport seniors and people with disabilities to hot meal programs, medical appointments, senior centers, grocery stores, and other local destinations via van service.

Intelligent transportation systems (ITS): Data collection and sharing technology that allows for more flexible and integrated transit systems. These systems provide real time data regarding transit arrival and seat availability, transit arrivals at stoplights, and integrate a variety of travel options in trip planning.

Manufacturing/Industrial Centers: Areas designated by the Puget Sound Regional Council to serve as an organizing framework for the Freight and Goods component of the region's Metropolitan Transportation System and serve as the primary concentrations of industrial and manufacturing related jobs. The areas have the potential to generate sufficient market demand to make the centers successful.

Metropool: All-electric, zero-emission, rideshare commuting.

Paratransit (ACCESS) service: Van-operated service that has no fixed route or schedule, providing trips to customers who have difficulty using Metro's fixed-route or DART service. Passengers must apply and be found eligible to use Access service in advance of making a trip.

Park-and-Ride: A facility where transit passengers may park their automobile and catch a bus, vanpool or carpool to reach their final destination. Park-and-ride lots are built, owned and maintained by a number of different agencies; some are leased by Metro.

Peak-Only Service: Transit service that operates only during peak travel periods (within 5–9a.m. and 3–7p.m. weekdays), primarily in one direction. Peak-only service typically brings riders from residential areas to job centers.

RapidRide: Routes that travel long distances with infrequent stops. Service is provided every 10 minutes, at least, during the busiest morning and evening travel hours. Fifteen minute service is available during off-peak periods.

Real-Time Rideshare: On-the-fly carpooling that makes use of a mobile application to find designated meeting places to match up drivers with passengers who want to rideshare.

Regional Growth Center: Areas designated by the Puget Sound Regional Council to serve as an organizing framework for a regional multimodal transportation system and provide focal points for regional investments in urban services and amenities. The areas have the potential to generate sufficient market demand to make the centers successful.

RideShare: Sharing personal vehicles or vehicles provided by Metro reducing the number of people driving alone.

SchoolPool: A program that serves King County commuters and students who travel to locations not well served by fixed-route transit.

Snoqualmie Valley Transportation: Metro provides scheduling and technical support to Snoqualmie Valley Transportation to provide shuttle service in the Snoqualmie Valley as part of Metro's Alternative Services program.

Transit Control Center (TCC): A transit communication center that responds to operator and service supervisor on-street requests, monitors tunnel security and operating systems, provides

immediate response in security situations and emergencies, and coordinates with county, city, state, and federal emergency management agencies.

Transit-oriented development (TOD): A private or public/private real estate development project that creates, expands, maintains or preserves a mixed-use community or neighborhood within walking distance of a transit center.

Transportation demand management (TDM): Strategies to shift travel from single occupancy vehicles to other modes, or to shift auto trips out of peak periods. Demand management strategies include providing transit alternatives and levying tolls.

Transportation Network Company (TNC): Connects paying passengers with drivers who provide transportation in their own non-commercial vehicles. All parties connect to the service via website and mobile app. Examples: Lyft, Uber.

Taxi Scrip: Certificates to pay for half of the regular price of a taxi service. Taxi service is scheduled with a taxi company and paid using the certificates and personal funds. The Metro program provides up to seven books of taxi scrip per month to low-income King County residents who have a disability, or who are ages 65 and over.

TripPool: Volunteer drivers use King County Metro commuter vans to share trips with other riders to the nearest Park & Ride.

University of Washington Shuttles: Metro provides scheduling and technical support to University of Washington's Dial-a-Ride service, which provides rides to students, staff, faculty, and visitors with mobility limitations.

VanPool: Groups of five or more commuters share a ride to work, using a Metro-supplied van.

VanShare: Groups of five or more commuters share the ride to or from a public transit link or transit hub.

Water Taxi: Boat service running between West Seattle and Downtown Seattle and between Vashon Island and Downtown Seattle.

Service Network Design

Coordination with Other Agencies

The process to develop the service network for METRO CONNECTS began with dialogue with King County jurisdictions. A Technical Advisory Committee (TAC) comprising staff representatives from King County cities was established to provide a forum for input from jurisdictions, respond to inquiries, and facilitate communication among cities regarding their transit needs. City staff were asked to describe existing transit needs and identify areas for future growth, as outlined in their comprehensive plans. Because many Cities were in the process of updating their comprehensive plans during the service network development process, Metro also requested that Cities describe any changes between existing and updated plans. Representatives from Community Transit, Pierce Transit, and Sound Transit were also consulted to ensure the METRO CONNECTS 2040 service network was coordinated with their future service networks. Integration with the Washington State Ferries system and the King County Water Taxi system is also part of the METRO CONNECTS 2040 service network.

The Puget Sound Regional Council (PSRC) land use forecasts for population and employment within King County in 2040 provided the foundation for development of the METRO CONNECTS 2040 service network.[1] These distributions are based upon the comprehensive plans of King County jurisdictions, which identify the type and location for future growth within their respective boundaries. The data within these plans are consolidated by PSRC to forecast how and where growth will occur countywide. These forecasts identify varying concentrations of growth throughout King County, which were used by Metro as one factor for locating different types of transit service throughout the service network. The forecasts were used to measure potential proximity and access to the METRO CONNECTS 2040 service network for households and jobs.

Metro coordinated especially closely with Sound Transit during the service network development process. Sound Transit currently provides high-capacity transit service in King County in the form of light rail (Link), commuter rail (Sounder), and express bus (ST Express). Sound Transit has proposed to expand their high-capacity transit service in accordance with their adopted long range plan. The next phase of proposed improvements, known as the ST3 System Plan, would include an expansion of Link light rail, additional Sounder service, changes to ST Express service, as well as capital projects such as new park-and-rides.

The ST3 System Plan was developed at the same time as the METRO CONNECTS 2040 service network. Staff from both agencies coordinated to identify opportunities for service integration with existing and planned service for all transit modes and to minimize unnecessary duplication. The METRO CONNECTS plan incorporates all existing, planned, and proposed Sound Transit investments.

Funding for implementation of the ST3 System Plan must be approved by voters. This measure will be submitted for voter approval in November 2016. If approved, the improvements identified in the ST3 System Plan are anticipated to be completed by 2041. If the ST3 measure is not approved, the METRO CONNECTS 2025 service network would largely represent Metro's vision for transit service without ST3. Although several ST3 projects are assumed in the METRO CONNECTS 2025 network, these projects have relatively minimal impacts on Metro bus service. METRO CONNECTS will be updated every six years, at which point the 25-year vision will be updated with the latest available information regarding regional transit investments.

Different levels of bus service are proposed throughout King County in varying concentrations based upon a combination of future land uses and densities, identified community needs, and future available infrastructure.

Service Network Overview

The METRO CONNECTS 2040 service network would grow Metro service from a 2015 year base of 3.5 million hours a year to approximately 6 million hours by 2040, an increase of 2.5 million hours. This assumption was based on the need forecasted by the PSRC Vision 2040 plan.

The METRO CONNECTS 2040 service network comprises three types of bus service: frequent service, including RapidRide bus rapid transit service (BRT); express service; and local service. Within the category of local service, the METRO CONNECTS vision anticipates the provision of

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[1] Land Use Vision Version 1, PSRC, 2015

flexible services in areas where fixed-route bus service is not productive or not the most useful service option. Because of the highly specialized nature of flexible services, how and where these services will be provided in the future is not known at this time, but will be identified through implementation and public outreach processes.

The METRO CONNECTS service network identifies the type of service that should be provided on corridors in the future. Because this is a vision, the exact level of service in different corridors and service design will be included in implementation planning, as described in the Development Program discussion in the METRO CONNECTS plan. Peak service will still be needed where, for example, it provides a significant travel time advantage, but METRO CONNECTS does not provide this level of detail in service designs for 2025 and 2040.

The METRO CONNECTS 2040 service network was developed through an extensive analysis process[2] and public outreach process[3]. Based on the findings of both technical and outreach work, the final service network included in METRO CONNECTS places a strong emphasis on frequent service, which makes up 68 percent of the total service network hours. Local service is 23 percent and express service is 9 percent of the 2040 service hours. The distribution of fixed-route transit service by total hours in the METRO CONNECTS 2040 service network is shown in Figure A-1. Operational characteristics for each service type are described in Table A-1. Each of these fixed-route service types are described in the following section, as are other types of service Metro provides such as Access paratransit.

Figure A-1   Distribution of Fixed-Route Service Types

Legend: ■ Frequent Service   ■ Local Serivce (Includes Alternative Services)   ■ Express Service (includes peak-only)

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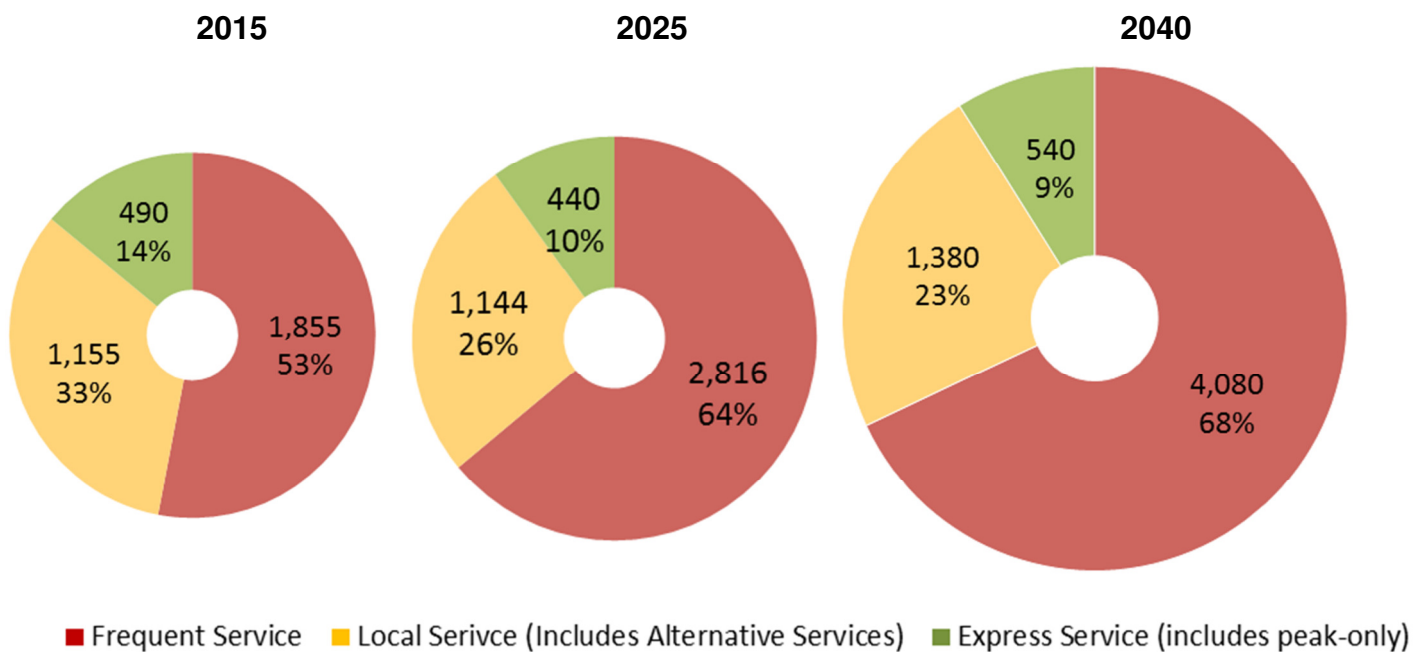
[2] More information on technical analysis used in development of the service network can be found in Supplemental Network Performance Report, available online at www.metro.kingcounty.gov.
[3] More information on the public outreach conducted to inform development of the service network can be found in the METRO CONNECTS Public Engagement Report.

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Table A-1 Operational Characteristics of Service Types

Service Category	Average headway (minutes)				Operation inputs daily	
	Peak	Off-Peak	Night	Average Speed	Service Hours	Average Stop Spacing
Frequent Service	5-15	5-15	15	16	20	½ mile
Express Service*	15	30	30	22	15	1-2 miles
Local Service**	30	30	60	12	18	¼ mile

*Some express service may operate on frequent headways where demand warrants. Express service also includes peak-only service as shown in the 2015 and 2025 service network.

**Note that local service operational characteristics apply only to fixed-route service. Flexible services will be designed to meet community needs and may have a wide variety of operational designs.

Detailed Description of Service Types

Frequent Service

Frequent service is defined as service with a frequency of every five to 15 minutes during weekdays, with a minimum frequency of every 15 minutes on weekends. In areas of highest demand, frequent service headways could be as low as every five minutes or better. Frequent service is most efficient and effective in corridors with dense residential and commercial uses serving multiple trip types throughout the day. Frequent routes are generally oriented along a grid street network, with stops along the route spaced one-quarter to a half-mile apart. In addition to bus service, frequent service also includes Link light rail service. Frequent routes that serve light rail stations may operate at similar headways to light rail, allowing buses to "meet every train," and minimize the wait time associated with transfers between bus and rail. Extensive integration of frequent service and Link light rail service provides a comprehensive network throughout the densest areas that are forecast to be in King County.

Studies of rider behavior associated with frequent transit service show that riders are willing to walk farther to frequent and reliable service.[4] The frequency also minimizes or eliminates the need for a schedule. This allows riders to "show up and go" when they have access to frequent service. In addition, because high frequency minimizes the wait time for transfers, riders can more easily take advantage of the entire transit network.

Because key features of frequent service are speed and reliability, capital improvements that complement these features the best are those that facilitate fast service along corridors (transit signal priority, bus bulbs that allow for in-line stops) and keep buses out of congestion (dedicated transit lanes, business access and transit [BAT] lanes). Speed and reliability improvements are further discussed in Appendix C. Off-board fare collection and low-floor buses would further reduce overall travel times by reducing the amount of time buses spend at stops. The combined service and capital investments envisioned for the future would result in an improved quality of frequent service, including faster operational speeds and longer spans of service. Additional passenger amenities, such as real time bus arrival signs, would help to inform riders about travel options and improve customer experience.

The current service network includes very little service that operates in accordance with the future vision for frequent service. Outside of RapidRide, only a few routes currently in operation have midday service with headways less than 15 minutes. Additionally, there are very few routes that operate on roadways with the type of speed and reliability investments envisioned in 2025 and 2040.

RapidRide

RapidRide is the name for Metro Transit's Bus Rapid Transit (BRT) service. RapidRide service operates at least every 10 minutes during the busiest morning and evening travel hours and every 15-minutes during off-peak periods. Service is provided seven days a week, including late nights and early mornings.

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[4] "Defining Transit Areas of Influence", American Public Transportation Association, 2007; "TCRP Report 95. Transit Oriented Development: Traveler Response to Transportation System Changes", Transportation Research Board, 2007.

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Many aspects of RapidRide service are designed to make trips fast. RapidRide buses are designed to speed boarding and deboarding with:

- Low-floor buses with three doors so that riders can get on and off quickly

- Passive wheelchair restraint system that allows users to roll into place without assistance from the driver

- ORCA card readers at stations that allow riders with ORCA cards to pay before they board and get on the bus at any door

RapidRide lines are located on roadways with infrastructure improvements that help keep buses moving, even along congested corridors. Continuous fiber-optic connections running along the length of a route allow for the use of transit signal priority that helps synchronize traffic lights with an approaching RapidRide bus. See Appendix C for additional information about speed and reliability improvements for transit.

RapidRide buses and stations provide customer information to help make the trip easier for riders. Inside the bus, the next stop is displayed on illuminated overhead signs and automatically announced. RapidRide stations have electronic signs that indicate how many minutes it will be until the next bus arrives, as well as large maps showing all the stops and destinations along a route. The RapidRide system currently has six lines (Lines A to F). Started in 2010, the RapidRide program has been very successful. Ridership on these lines combined has grown over 50 percent above the bus routes they replaced. They account for 14 percent of Metro Transit's total ridership.

The 2040 service network includes a significant expansion of the RapidRide network. By 2025, METRO CONNECTS envisions RapidRide service in place along 13 new corridors. These corridors represent a combination of high ridership route segments that provide more direct connections between popular destinations and centers throughout the region. They represent an initial effort to establish an interconnected and frequent RapidRide network between urban centers and transit hubs within King County and the greater Puget Sound Region. Funding for capital improvements and service investments along seven of these routes will be provided, in part, by the City of Seattle as part of the Levy to Move Seattle and the City of Seattle 2014 service funding measure.

METRO CONNECTS envisions that by 2040 service on seven additional routes will be provided. With 20 new lines and an estimated total of 300 miles of service, the enhanced and expanded RapidRide network would "complete the alphabet," resulting in an extensive system of fast, frequent, and reliable services throughout the county. Additional information about the METRO CONNECTS envisioned expansion of the RapidRide system can be found in the King County Metro Transit Future RapidRide Expansion report (Appendix G).

Metro works closely with communities to identify the best locations for stations and plans for infrastructure investments. Levels of congestion, "bottlenecks", and other factors that impact transit speed and reliability would influence decisions about the type of future infrastructure improvements. Any roadway widening would be planned in close coordination with cities. Stations would be placed where most riders gather, within easy walking distance along the corridor. Passenger facilities would be located along the corridors at all stops.

In addition to expanding the RapidRide network, METRO CONNECTS calls for upgrades to existing RapidRide lines such as:

- Off-board fare payment, including ticket vending machines as well as ORCA card readers, at all stops and stations.

- Raised platforms that allow for level boarding without use of a ramp

- Additional bus-only right-of-way and/or BAT lanes, including center-lane running buses (this may require buses with left-side doors)

- Greater stop spacing (a half-mile to a mile), with underlying local service allowing longer stop spacing and faster travel.

- Passenger information, such as real time arrival signs and route information, at all stops and stations

Express Service

Express service connects large population and employment centers with all-day, limited stop service. It is generally provided along major corridors such as state highways or major urban arterials, allowing for a wide network of fast and reliable connections between places with concentrations of jobs and people. This network primarily serves riders that travel longer distances. Service generally has 15 minute headways or better during the peak periods[5] and 30-minute off-peak headways during weekdays. Express service will operate during weekends in general, however service frequency and span could be reduced in areas of lower weekend travel demand. On the highest demand corridors, express services may operate at the same headways as frequent service, providing a "frequent express" service in these areas. Stops along the route are spaced 1 to 2 miles apart along corridors, with more closely spaced stops in areas with a high density of destinations and boarding activity. In the METRO CONNECTS service network, express service is identified along several major corridors where light rail service is not planned. Approximately 9 percent of total service hours in the METRO CONNECTS 2040 service network are anticipated to be express service.

Express service is often associated with transit trips taken during the peak commuting periods in the morning and evening. Because of this, existing peak-only service is grouped together within the Express service category. Our long term vision, however, is an all-day network of express service allows riders to take advantage of this service outside of traditional commuting periods. Commuting patterns have changed over the past few years, as more employees work flexible schedules or telecommute, and the region has seen the peak periods get longer. Additionally, not all riders work or need to utilize transit during traditional peak periods. Students can also use an all-day express network to reach universities, community colleges, and technical schools throughout the county.

Sound Transit currently provides express transit service along major corridors in King County. Light rail service will be provided along many of these corridors (I-5, I-90) as part of the ST2 and proposed ST3 system expansions. The express service included as part of the METRO CONNECTS 2040 service network includes future service to be provided by Metro and Sound Transit. Development of the envisioned express service network was highly coordinated with Sound Transit to minimize duplication along corridors and expand the reach of this service category. Express service would be provided along corridors or between markets where it could provide a shorter travel time than light rail or where an excessive number of transfers is needed to access destinations.

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[5] The morning peak period is currently defined as 5:00 am to 9:00 am. The evening peak period is currently defined as 3:00 pm to 7:00 pm.

Local Service & Flexible Service

Local service includes fixed-route service, as well as more flexible services such as vanpools or those services operated by Metro's Alternative Services program. For fixed-route service, local is defined as service with a frequency of every 30 to 60 minutes during weekdays, with increased frequency during the peak periods. In general, local service during weekends will have reduced frequency and span compared to weekday service; however areas of higher demand could operate at weekday service levels. Stops along the route are spaced one-quarter to a half-mile mile apart. With more corridors served and closely spaced stops, the walk distance to access transit is shorter where this service is present. It often provides more point-to-point connections and is slower than other categories of service due to the greater number of stops and less direct routing between destinations.

Local service of either fixed-route or flexible design is planned for neighborhoods with lower density, that are difficult to serve or where other categories of service are not productive. Local service provides first- and last-mile connections to frequent and express service, providing riders with a connection with the larger transit network, including the light rail system. Because of the lower frequency of local service, riders may need to plan their trips to minimize waiting time. Approximately 23 percent of total service hours in the METRO CONNECTS 2040 service network are anticipated to be local service. This allocation of local service hours includes alternative transportation services (described in the following section).

Local service would benefit from capital investments that improve transit speed and reliability or the ability for riders to access the system. However, local service often does not travel in highly congested areas that are the focus of these types of investments. The primary intent of local service is to expand access to the service. Investments that improve the ability for pedestrians and bicyclists to access the system would be the greatest complement to this category of service. Non-motorized access improvements are further discussed in Appendix D.

Alternative Services

Alternative services are a broad range of transportation services provided by Metro or as a partnership between Metro and an outside entity. The purpose of the alternative services program is to expand the transit options for people throughout the county beyond fixed-route service. Alternative services allow for flexibility in providing transportation services, innovation in piloting new ways for people to travel, greater partnerships with the private sector, and highly customized services for a given geographic area, need, or user group. One of the primary functions of the program is to bring transit to parts of King County that do not have the density or land use patterns to support traditional fixed-route bus service. In these areas, alternative services may be a better and more cost-effective way to provide for community transportation needs.

Metro collaborates with stakeholders to design the appropriate services and partners with communities to market them.

Alternative services currently provided by Metro include the following:

- Rideshare (VanPool/Vanshare, MetroPool)
- Dial-a-Ride (DART) Transit
- Custom Bus
- Community Shuttle
- Taxi Scrip

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Service Integration with the Private Sector Findings

There are opportunities for Metro to integrate with private companies and businesses to help provide new services in the county. Integration with other alternative service providers could help Metro take advantage of other efficient strategies and, in particular, provide improved first/last mile connections to transit in areas that are difficult to serve. This section summarizes a high level analysis of the potential challenges and opportunities around integration with private providers.

Transportation Network Companies (TNCs), such as Uber or Lyft, are a growing part of the transportation industry. TNCs provide prearranged transportation services for compensation using an online-enabled application or platform to connect drivers with passengers. TNC drivers use their personal vehicles to provide this service. This type of "shared mobility" can serve as a complement to transit by providing first- and last-mile services in areas that are not efficiently served by transit. TNCs allow a person to easily obtain point-to-point rides through smartphone interfaces with integrated payment systems.

While much of the growth of TNC services has been centered on trips that have one origin and one destination, the companies have recently deployed UberPool and LyftLine to combine multiple trips into one vehicle. The term "Transportation Network Company" was defined by the California Public Utilities Commission in 2013 to describe the wide array of companies and organizations that "provide prearranged transportation services for compensation using an online-enabled application or platform to connect drivers using their personal vehicles with passengers."

Microtransit, which is privately operated, has a high degree of flexibility in their scheduling and operating practices. Similar to TNCs, microtransit can provide service in less dense areas for which fixed-route transit is not the most efficient. Partnerships with TNC and microtransit agencies can be an effective way to expand Metro Transit's service. In many cases, microtransit mirrors the operations of public transit agencies along select routes. Current microtransit providers include, Bridj, Loup, Chariot, and others. The service provided falls somewhere between automobile ride-sharing and full-scale transit service by providing on-demand service between fixed points in vehicles capable of holding 12 to 20 people.

Metro is currently integrating with a bikeshare company, called Pronto! Cycle Share in Seattle, which provides stations in the University District, South Lake Union, Capitol Hill, Uptown, Downtown, and Pioneer Square. Pronto! encourages bicycling as a means of access to transit hubs. Bikeshare also provides alternative ways to link to transit in all types of geographic areas. Future expansion of bikeshare to other areas in Seattle and King County, potentially including Redmond, Bellevue, Kirkland, and Issaquah, could provide new first/last mile connections to transit service.

TNCs and bikeshare are both alternative service programs that could supplement and/or complement Metro's fixed-route service.

Table A-2 highlights the opportunities and challenges associated with TNC partnerships.

Table A-2   Advantages and Disadvantages of TNCs

Opportunities/complement	Challenges/substitute
• TNCs can serve as the first/last mile connection in high-frequency corridors to serve those riders not within the walkshed	• Private operators may have to compete for curb/stop space with current public transit right-of-way. TNCs may compete by offering more one-seat ride connections as opposed to a transfer-based frequency network
• Integration of trip planning and payment systems allows for fares to apply between TNCs and transit	• TNCs may operate primarily along the most cost-efficient (highest productivity) public transit routes, thereby decreasing farebox recovery
• TNCs may provide interim capacity on overcrowded corridors until other funding or resources can be allocated	• "Ridepooling" through options such as Lyftline and Uberpool may continue to adapt towards fixed-route service, competing with transit in both price, convenience, and travel time along the major corridors
• By providing the flexibility and mobility of a personal vehicle, TNCs may reduce automobile ownership, resulting in more overall transit use	• Data sharing between TNCs and public transit may not be consistent with the TNC business model
• TNCs may supplement infrequent late night public transit service to help reduce drunk driving incidents	• Potential accessibility concerns if areas become reliant solely on TNC-provided services * Potential regulatory conflicts between public transit and TNCs
• Overall, TNCs may provide a range of cost, convenience, and travel time options, with public transit offering lower-cost mainline service	• Workforce and safety issues can be challenging with TNCs.

Paratransit

In accordance with ADA requirements, Metro provides paratransit service for persons whose disabilities prevent them from using accessible, non-commuter, fixed-route bus service. Paratransit service provides next-day shared rides within three-quarters of a mile on either side of non-commuter fixed-route bus service during the time and on the days those routes are operating.

In 2015, almost 995,000 ADA paratransit trips were provided by Metro's Access services. Access transportation ridership has experienced an average reduction rate of 3 percent since 2012, with a 6 percent reduction from 2014 to 2015. However, demands on ADA paratransit are expected to increase in the future with an aging and growing King County population.

Access service is the most expensive service Metro operates on a per-trip basis. The 2015 average cost per paratransit trip was approximately $52, compared to $4.27 per fixed-route trips.

Approximately 29 percent of current paratransit customers are able to use fixed-route transit for at least some of their trips. However, they are often prevented from using the bus because of difficulties reaching the nearest bus stop and boarding the buses (e.g., non-kneeling buses). A lack of sidewalks to transit stops, stops where a wheelchair lift or ramp cannot be deployed, and other infrastructure deficiencies can restrict the use of fixed-route service. The process to qualify for and use paratransit service presents impediments to users that are not associated with fixed-route transit service and the need for scheduling prohibits spontaneous, unplanned transit use.

Metro seeks to improve the accessibility of its vehicles and facilities to enhance the customer experience for people with disabilities. Improving the accessibility of the transit system also benefits many riders not specifically protected by the ADA, including parents with small children and the elderly. Vehicles and facilities that allow for easy boarding and exiting by people with disabilities create a faster and more pleasant ride for all passengers.

Service Network Performance Evaluation

During the METRO CONNECTS development process draft performance metrics were presented to the TAC, the Community Advisory Group, and the Regional Transit Committee for review and comment and were amended in response to the feedback received. Once finalized, the performance metrics were used to compare the performance of the original conceptual networks and inform the correct balance of services. These metrics were also used to evaluate the final METRO CONNECTS plan and to assess how well the plan distributed transit benefits across King County.

These metrics were based upon the goals, objectives and strategies outline in the King County Metro Strategic plan for Public Transportation. The measures were developed to ensure that METRO CONNETS made progress on as many priorities as possible. The performance metrics were assigned to three broad categories: 1) Transit Access, 2) Transit Connections, and 3) Transit Use and Efficiency. To get a better understanding of how the network performance across the whole county, most measures were also reported out at the quadrant level. See Figure A-2 for a map of the quadrants.

Each of these evaluation categories and the methodology are described in the following sections.

Figure A-2   **King County Quadrants**
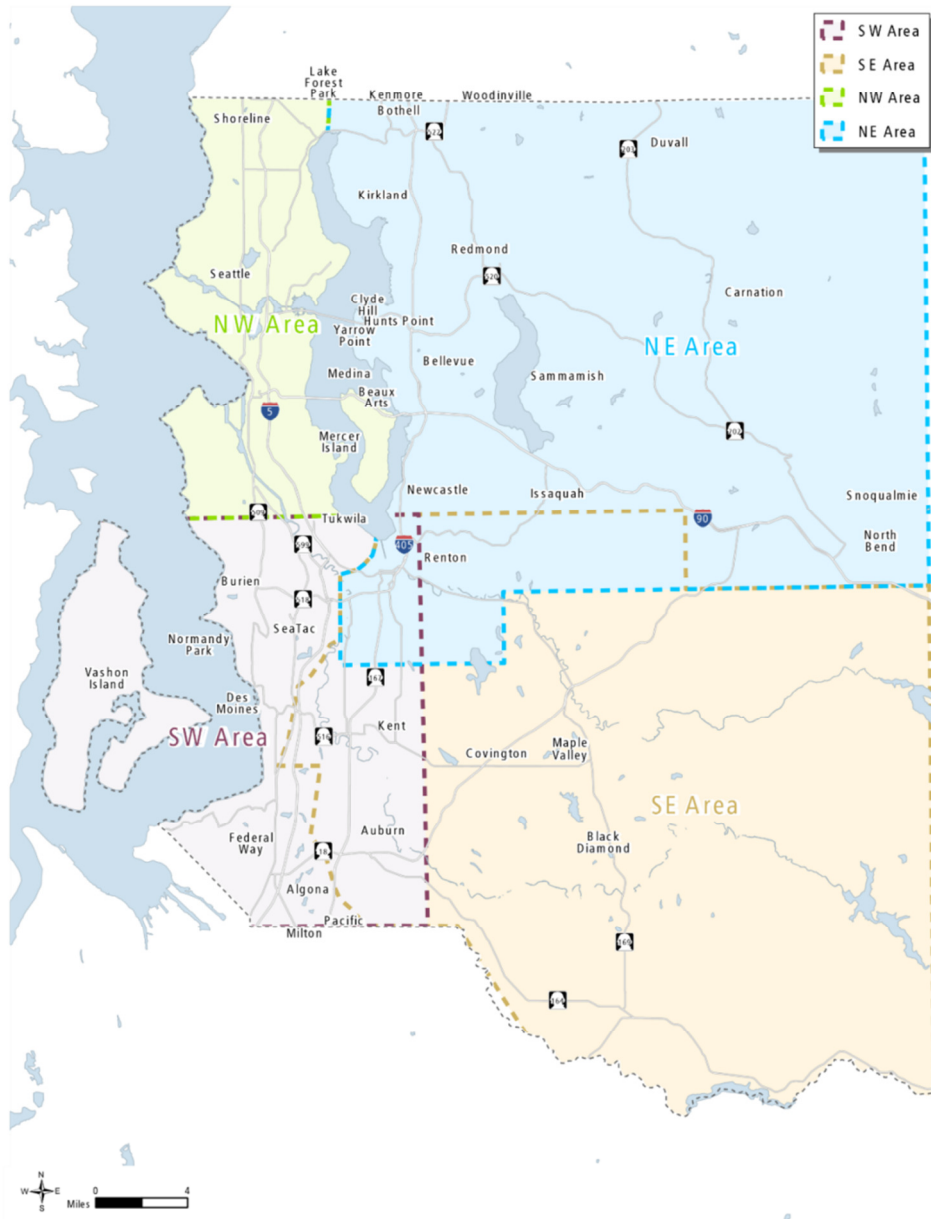
Transit Access

Transit access measures proximity to transit by different service types. These measures are important because they help us understand what percent of King County residents live close to which type of service and what percent of the county's population could potentially reach the different service types within a 5 to 10 minute walk. This is an important high level measure of the extent of the transit network.

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The analysis of access to different types of services was based on access definitions shown in Table A-3. The distance used varies by service type, as research has shown that transit customers are willing to walk further to services that are fast, frequent, and reliable.[6]

Table A-4 describes methodology for each transit access performance metric.

Table A-3 *Definition of access for different service types*

Proximity Category	Includes*					
	Metro Frequent	Metro Express	Metro Local	ST Link Light Rail	ST Express bus	ST BRT
Frequent service	½ mile to stops			½ mile to stops		½ mile to stops
Express service		½ mile to stops		½ mile to stops	½ mile to stops	½ mile to stops
All service	½ mile to stops	½ mile to stops	¼ mile to stops	½ mile to stops	½ mile to stops	½ mile to stops

* ¼ mile is equivalent to a 5 minute walk. ½ mile is equivalent to a 10 minute walk.

Table A-4 *Transit access performance metrics*

What it measures	Performance metrics
How close are transit stops to where people live	Population within: • ½ mile walk (~10 minutes) from transit stops with service every 15 minutes or better, including Link light rail stations, or ½ mile walk (~10 minutes) from transit stops with limited stop service or ¼ mile walk (~5 minutes) from any transit stop, including all Link stations • ½-mile walk (~10 minutes) from frequent transit stops (<15minute service, all day) and Link stations • ½-mile walk (~10 minutes) from express transit stop and Link light rail stations
How close are transit stops to where people work	Jobs within: • ½ mile walk (~10 minutes) from transit stops with service every 15 minutes or better, including Link light rail stations, or ½ mile walk (~10 minutes) from transit stops with limited stop service or ¼ mile walk (~5 minutes) from any transit stop, including all Link stations • ½-mile walk (~10 minutes) from frequent transit stops (<15minute service, all day) and Link stations • ½-mile walk (~10 minutes) from express transit stop and Link stations
How close are transit stops to where low-income and minority populations, persons age 65 and older, and persons with disabilities live*	Percentage of households in minority, low-income, and persons-with-disabilities census tracts within: • ½ mile walk (~10 minutes) from transit stops with service every 15 minutes or better, including Link light rail stations, or ½ mile walk (~10 minutes) from transit stops with limited stop service or ¼ mile walk (~5 minutes) from any transit stop, including all Link stations • ½-mile walk (~10 minutes) from frequent transit stops (<15minute service, all day) and Link stations • ½-mile walk (~10 minutes) from express transit stop and Link stations
How people access transit stops (car, walking, bicycle, etc.)	• Percentage of people accessing transit by non-motorized modes at peak hour.

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[6] Defining Transit Areas of Influence, American Public Transportation Association, 2007; TCRP Report 95. Transit Oriented Development: Traveler Response to Transportation System Changes, Transportation Research Board, 2007

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Transit Connections Metrics

METRO CONNECTS expands on the accessibility performance measures integrated into the 2015 Update of the Strategic Plan for Public Transportation. The Transit Connections metrics are used to evaluate the ability for riders to access jobs, education, people, and the regional transit system using the proposed METRO CONNECTS service network. The purpose of this analysis is to demonstrate how well the service network connects people to the opportunities around them. The Transit Connections calculations included estimated travel time to reach the transit stop, initial wait time, and transfer wait time (if applicable) averaged over the peak and midday periods. The general methodology is described in this section, although additional detail can be found in the Supplemental Network Performance Report.

Metro analyzed both the average number of jobs and the average number of residents that an individual could reach within 30 minutes on transit. The greater the number of jobs an individual could access within 30 minutes the more likely that individual's job is within that transit travel shed, and the more likely that individual could find employment within that transit travel shed. The greater the number of residents that an individual could reach within 30 minutes on transit the more likely that individual's friends and support network would be within that transit travel shed. In other words the more residents and jobs that are within an individual's transit travel shed, the better transit connects that individual to the rich opportunities available across King County.

This analysis was done at traffic analysis zone level (TAZ) to better understand where residents could reach employment centers and which employment centers were well connected to the residents of King County. Metro also summarized this by quadrants and countywide.

Metro evaluated integration with Link light rail by measuring the percentage of the population that would be able to access light rail within a 30 minute bus trip, a 15 minute bus trip, and a 10 minute (half-mile) walk using the existing service network as well as the METRO CONNECTS 2040 service network. Bus travel time calculations included estimated travel time to reach the transit stop, initial wait time, and transfer wait time (if applicable) averaged over the peak and midday periods.

In addition, a similar accessibility analysis was performed to determine the percentage of the population with at least 30,000 jobs or other households totaling 30,000 other people within a 30-minute transit trip. The 30,000 threshold was chosen because it represents an upper bound of the average job accessibility within the Seattle area. This analysis was performed for each quadrant as well as countywide.

Table A-5 shows the performance measures used to evaluate transit connections.

Table A-5   Transit Connections Performance Metrics

What it measures	Performance metrics
Population with 30-minute access to jobs and school via transit	• Population within a 30-minute transit commute • Jobs within a 30-minute transit commute
Integration with Light Rail	• Proximity to light rail stations Within 30 minutes via bus • Proximity to light rail stations Within 15 minutes via bus • Proximity to light rail stations Within a 10 minute (1/2 mile) Walkshed

Transit Use and Efficiency Measures

In addition to the Transit Access and Transit Connection performance metrics, Metro worked with stakeholders to develop Use and Efficiency performance metrics. These metrics were used to evaluate how often people would use the future transit network. Metro developed four broad categories of transit use and efficiency metrics: ridership, mode share, economic and environmental efficiency measures and variation of transit throughout the day. Below we have described each measure.

Total ridership measures the number of boardings in King County on any transit service. This is a useful measure to help understand how much people are using transit services. A growth in ridership shows that more people are getting on and off the transit service provided. Assuming population growth, and no decline in service, transit ridership should grow as more people are in the area to use transit.

Transit mode share measures the percent of all trips in the county that were done on transit. An increase in transit mode share means that transit is attracting a larger share of the travel market. This also means that transit ridership will grow faster than it would as a result of population and employment growth alone.

There are six economic and environmental efficiency measures to ensure that we are making progress in all areas of efficiency. For these calculations, the existing cost per hour associated with operating the various types of buses was used as a baseline. A mix of coach types was assumed, including 30-foot coaches, 40-foot diesel/hybrid and trolley coaches, and 60-foot diesel/hybrid coaches, RapidRide coaches, and trolleys. The operating cost per hour varies between fleet types based on differences in fuel efficiency, higher maintenance and fuel costs for larger coaches, and variations in parts and component costs. The 2015 budget costs for various coaches are shown in Table A-6.

Table A-6   2015 Budget Costs for Coach Operations

Vehicle Type	Hourly operation rate (fully allocated)
30'	$138.09
40' Diesel/Hybrid	$141.66
60' Diesel	$168.42
60' Diesel/Hybrid	$160.82
60' RapidRide	$160.91
40' Trolley	$145.09
60' Trolley	$171.32
DART	$127.26

Local and express service was assumed to operate with 40-foot diesel/hybrid coaches and 60-foot hybrid coaches, respectively. Frequent service includes the use of 60-foot trolley buses and 60-foot hybrid coaches, and reflects the current mix of approximately 20 percent trolley buses and 60-foot hybrid coaches on corridors with frequent service. The assumed baseline operating costs per hour were[7]:

- Frequent Service: $163

- Express Service: $161

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[7] Costs were kept in 2015 constant-dollar terms to facilitate a convenient comparison to current operating costs.

- Local Service: $142

The economic efficiency measures were calculated as follows:

1. Operating Cost/Boarding compares the operating costs to how many people are using transit. The lower this number is, the more financially efficient the system is.

2. Operating cost per hour blends the hourly costs associated with the different service types to get an aggregate cost per hour. This was calculated as follows: ((Frequent service hours X $163) + (Express service hours X $161) + (Local service hours X $142))/Daily revenue hours

3. Boardings/Hour measures the number of people getting on a bus for every hour of service. This measure should have a positive correlation with operating cost/boarding but it is a direct measurement of service efficiency.

4. British Thermal Units (BTU)/Passenger Mile compares the energy efficiency of service provision. By measuring BTU you can compare the relative efficiency of gas and electric powered service. The lower the BTU/Passenger Mile, the greater the environmental impact transit will have. This should also have a positive correlation with boardings/hour.

5. Green House Gas Emissions (GHG)/Passenger Mile compares the number of pounds of GHG emitted for each passenger mile. By reducing the GHG/passenger mile transit can have a greater environmental impact. For this plan we did not explicitly measure the impact of switching to an electric fleet. This measurement assumes the use of hybrids and coaches with existing technology. This also will have a positive correlation with boardings/hour.

6. The variation of transit service throughout the day was evaluated to provide an understanding of the availability of service at peak and non-peak times. For this metric, the amount of service provided at 9 pm was compared to the amount provided at 6 pm. Figure A-4 shows the countywide distribution of service hours throughout the day for the existing and METRO CONNECTS 2040 service networks.

Table A-7 shows the transit use and efficiency and performance measures included in the METRO CONNECTS analysis.

Table A-7   Transit Use and Efficiency Performance Metrics

What it measures	Performance metrics
Total transit ridership by bus and rail	• Total ridership and ridership increase by bus and rail • Ridership across screenlines
Percent of trips by transit	• Percentage of all trips made on transit all-day • Percentage of all trips made on transit peak-only
Economic and environmental efficiency measures	• Operating cost/boarding • Boardings/hour • Operating cost/hour • British Thermal Unit (BTU)/passenger mile • Greenhouse gas emissions—gross and emissions/ passenger mile
Variation of transit service throughout the day	• Ratio of trips provided in the 9 pm hour compared to the trips provided in the 6 pm hour • Distribution of transit service hours throughout daily service period

In addition to the performance metrics, Metro used two methods to evaluate travel times and competitiveness with driving for the METRO CONNECTS 2040 service network. The findings of this

analysis and full description of methodology can be found in the Supplemental Network Performance Report, available online.

Methodology

Several assumptions apply throughout the analysis:

- Where comparisons to the existing network service or performance are made in this appendix, they are based on the spring 2015 configuration and operation of the network with no modifications.

- The METRO CONNECTS 2040 service network assumes that service would grow by 3.5 million annual service hours, a 70 percent increase over 2015. The METRO CONNECTS 2025 service network assumes service would grow to 4.4 million service hours annually, a 25 percent increase compared to 2015.

- Metro performed a limited analysis of the METRO CONNECTS 2025 service network, which illustrates how the service network would grow and change over time. Where applicable, those results are included in the summary below.

- The PSRC projected distributions were used to for analysis of 2040 households and jobs. Because the future distribution of different demographic populations is unknown, the 2013 American Community Survey Data were used as a proxy for the future distribution of low-income populations, minority populations, persons age 65 and older, and persons with disabilities.

- Quadrant-level analysis is based on the geographies shown in Figure A-2.

Service Network Performance Results and Baseline

Tables A-8, A-9, A-10, A-11 and A-12 show baseline 2015 figures and findings from the performance analysis for each evaluation category. These tables illustrate not only how METRO CONNECTS will result in improvements in countywide, but how those benefits accrue across the four different quadrants of the county. See the METRO CONNECTS Supplemental Network Performance Report for additional findings including midday performance; select measures by PSRC designated centers and Colleges and Universities as well as maps.

Table A-8   Transit Access Total Population and Employment

What it measures	Performance Metric	Region	2015	2025	2040	% Change
How close are transit stops to where people live	**Frequent** Percent of Population with frequent service access	NE Area	20%	35%	42%	110%
		NW Area	66%	84%	88%	33%
		SW Area	26%	55%	68%	162%
		SE Area	7%	36%	38%	443%
		Countywide	**43%**	**64%**	**73%**	**70%**
	Express Percent of Population with express service access	NE Area	13%	21%	20%	54%
		NW Area	23%	30%	35%	52%
		SW Area	11%	22%	20%	82%
		SE Area	6%	19%	13%	117%
		Countywide	**15%**	**25%**	**28%**	**87%**
	All Percent of Population with all service access	NE Area	55%	60%	67%	22%
		NW Area	85%	90%	91%	7%
		SW Area	66%	80%	89%	35%
		SE Area	47%	61%	61%	30%
		Countywide	**69%**	**76%**	**81%**	**17%**
How close are transit stops to where people work	**Frequent** Percent of jobs with frequent service access	NE Area	45%	60%	69%	53%
		NW Area	78%	88%	91%	17%
		SW Area	44%	60%	70%	59%
		SE Area	29%	50%	53%	83%
		Countywide	**63%**	**78%**	**87%**	**38%**
	Express Percent of jobs with express service access	NE Area	26%	36%	46%	77%
		NW Area	40%	52%	66%	65%
		SW Area	16%	27%	32%	100%
		SE Area	11%	25%	28%	155%
		Countywide	**38%**	**42%**	**54%**	**42%**
	All Percent of jobs with all service access	NE Area	75%	78%	85%	13%
		NW Area	89%	94%	93%	4%
		SW Area	70%	77%	86%	23%
		SE Area	56%	67%	71%	27%
		Countywide	**82%**	**84%**	**90%**	**10%**

Table A-9   Transit Access Minority and Low Income Populations

What it measures	Performance Metric	Region	2015	2025	2040	% Change
How close are transit stops to where low income persons live*	**Frequent** Percent of low-income population with frequent service access	NE Area	46%	49%	56%	22%
		NW Area	97%	100%	100%	3%
		SW Area	47%	60%	77%	64%
		SE Area	28%	53%	55%	96%
		Countywide	**72%**	**79%**	**87%**	**21%**
	Express Percent of low-income population with express service access	NE Area	20%	35%	21%	5%
		NW Area	39%	45%	48%	23%
		SW Area	11%	23%	14%	27%
		SE Area	7%	24%	12%	71%
		Countywide	**26%**	**35%**	**32%**	**23%**
	All Percent of low-income population with all service access	NE Area	69%	77%	80%	16%
		NW Area	100%	100%	100%	0%
		SW Area	75%	88%	95%	27%
		SE Area	63%	77%	75%	19%
		Countywide	**88%**	**90%**	**93%**	**6%**
How close are transit stops to where minority populations live*	**Frequent** Percent of households in minority census tracts with frequent service access	NE Area	39%	44%	50%	28%
		NW Area	93%	98%	100%	8%
		SW Area	40%	59%	74%	85%
		SE Area	19%	48%	50%	163%
		Countywide	**61%**	**70%**	**77%**	**26%**
	Express Percent of households in minority census tracts with express service access	NE Area	15%	28%	16%	7%
		NW Area	28%	35%	39%	39%
		SW Area	9%	21%	12%	33%
		SE Area	5%	28%	9%	80%
		Countywide	**18%**	**28%**	**24%**	**33%**
	All Percent of households in minority census tracts with all service access	NE Area	64%	72%	77%	20%
		NW Area	97%	100%	100%	3%
		SW Area	69%	84%	92%	33%
		SE Area	57%	76%	73%	28%
		Countywide	**79%**	**82%**	**87%**	**10%**

* The proximity analysis for low income, and minority population along with persons age 65 and older and persons with disabilities is based on current distributions as there are no forecasts of where these populations will in the future.

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Table A-10   Transit Access Disability and Senior Populations

What it measures	Performance Metric	Region	2015	2025	2040	% Change
How close are transit stops to where people with disabilities live*	**Frequent** Percent of people with disabilities with frequent service access	NE Area	42%	44%	51%	21%
		NW Area	83%	87%	89%	7%
		SW Area	38%	52%	70%	84%
		SE Area	18%	40%	42%	133%
		Countywide	**55%**	**62%**	**70%**	**27%**
	Express Percent of people with disabilities with express service access	NE Area	16%	30%	17%	6%
		NW Area	25%	37%	34%	36%
		SW Area	11%	25%	14%	27%
		SE Area	6%	25%	12%	100%
		Countywide	**17%**	**29%**	**23%**	**35%**
	All Percent of people with disabilities with all service access	NE Area	64%	74%	77%	20%
		NW Area	90%	95%	95%	6%
		SW Area	66%	83%	91%	38%
		SE Area	49%	67%	64%	31%
		Countywide	**72%**	**76%**	**79%**	**10%**
How close are transit stops to where people over 65 live*	**Frequent** Percent of people over 65 with frequent service access	NE Area	46%	42%	50%	9%
		NW Area	77%	84%	87%	13%
		SW Area	35%	53%	72%	106%
		SE Area	15%	39%	40%	167%
		Countywide	**56%**	**62%**	**70%**	**25%**
	Express Percent of people over 65 with express service access	NE Area	19%	28%	20%	5%
		NW Area	20%	33%	28%	40%
		SW Area	12%	29%	15%	25%
		SE Area	6%	26%	11%	83%
		Countywide	**17%**	**28%**	**22%**	**29%**
	All Percent of people over 65 with all service access	NE Area	68%	75%	80%	18%
		NW Area	89%	94%	94%	6%
		SW Area	69%	86%	93%	35%
		SE Area	50%	66%	63%	26%
		Countywide	**76%**	**78%**	**81%**	**7%**
How people access transit stops (car, walking, bicycle etc.)	Percent of people accessing transit by non-motorized modes at peak hours	NE Area	71%	N/A	81%	14%
		NW Area	88%	N/A	94%	7%
		SW Area	70%	N/A	85%	21%
		SE Area	68%	N/A	83%	22%
		Countywide	**74%**	**N/A**	**84%**	**14%**

* The proximity analysis for Low income, and minority population along with persons age 65 and older and persons with disabilities is based on current distributions as there are no forecasts of where these populations will in the future.

Table A-11   Transit Connections

What it measures	Performance Metric	Region	2015	2025	2040	% Change
Populations with 30-minute access to jobs and school via transit	Population within a 30-minute transit commute peak only for the average resident	NE Area	12,000	16,000	26,000	117%
		NW Area	78,000	123,000	177,000	127%
		SW Area	16,000	18,000	27,000	69%
		SE Area	12,000	17,000	22,000	83%
		Countywide	**37,000**	**60,000**	**86,000**	**132%**
	Jobs within a 30-minute transit commute peak only for the average resident	NE Area	11,000	21,000	38,000	245%
		NW Area	92,000	161,000	236,000	157%
		SW Area	8,000	11,000	19,000	138%
		SE Area	5,000	9,000	13,000	160%
		Countywide	**40,000**	**75,000**	**112,000**	**180%**
Integration with Light Rail	Proximity to light rail stations within 30 minutes via bus	Countywide	18%	N/A	64%	256%
	Proximity to light rail stations within 15 minutes via bus	Countywide	3%	N/A	32%	967%
	Proximity to light rail stations within a 10 minute (1/2 mile walkshed)	Countywide	7%	N/A	14%	100%

Table A-12   Transit Use and Efficiency

What it measures	Performance metrics	Region	2015	2025	2040	% Change
Total transit ridership	Total daily transit ridership	NE Area	109,000	189,000	251,000	130%
		NW Area	272,000	428,000	568,000	109%
		SW Area	90,000	175,000	270,000	200%
		SE Area	50,000	101,000	139,000	178%
		Countywide	**446,000**	**746,000**	**1,026,000**	**130%**
Mode Share: Percent of all travel made by transit	All-Day transit mode share	NE Area	5%	7%	8%	60%
		NW Area	10%	14%	16%	60%
		SW Area	5%	9%	11%	120%
		SE Area	4%	6%	7%	75%
		Countywide	**7%**	**11%**	**12%**	**71%**
	Peak-Only Transit Mode Share	NE Area	14%	20%	21%	50%
		NW Area	25%	33%	35%	40%
		SW Area	12%	19%	26%	117%
		SE Area	10%	16%	23%	130%
		Countywide	**14%**	**20%**	**23%**	**64%**
Economic and environmental efficiency measures	Operating cost/boarding	Countywide	$4.27	N/A	$3.95	-7%
	Boardings/ hour	Countywide	34.8	N/A	36.7	5%
	BTU/ passenger-mile	Countywide	3,261	N/A	2,610	-20%
	GHG/ passenger mile	Countywide	0.49	N/A	0.39	-20%
Variation of transit throughout the day	Ratio of trips provided in the 9 pm hour to trips provided in the 6 pm hour	NE Area	37%	N/A	51%	38%
		NW Area	50%	N/A	56%	12%
		SW Area	30%	N/A	49%	63%
		SE Area	39%	N/A	53%	36%
		Countywide	**41%**	**N/A**	**53%**	**29%**

Figure A-3   Change in Ratio of Night Service to Peak Service

Change in Ratio of Night to PM Service

25%	100%	> 200%
50%	200%	
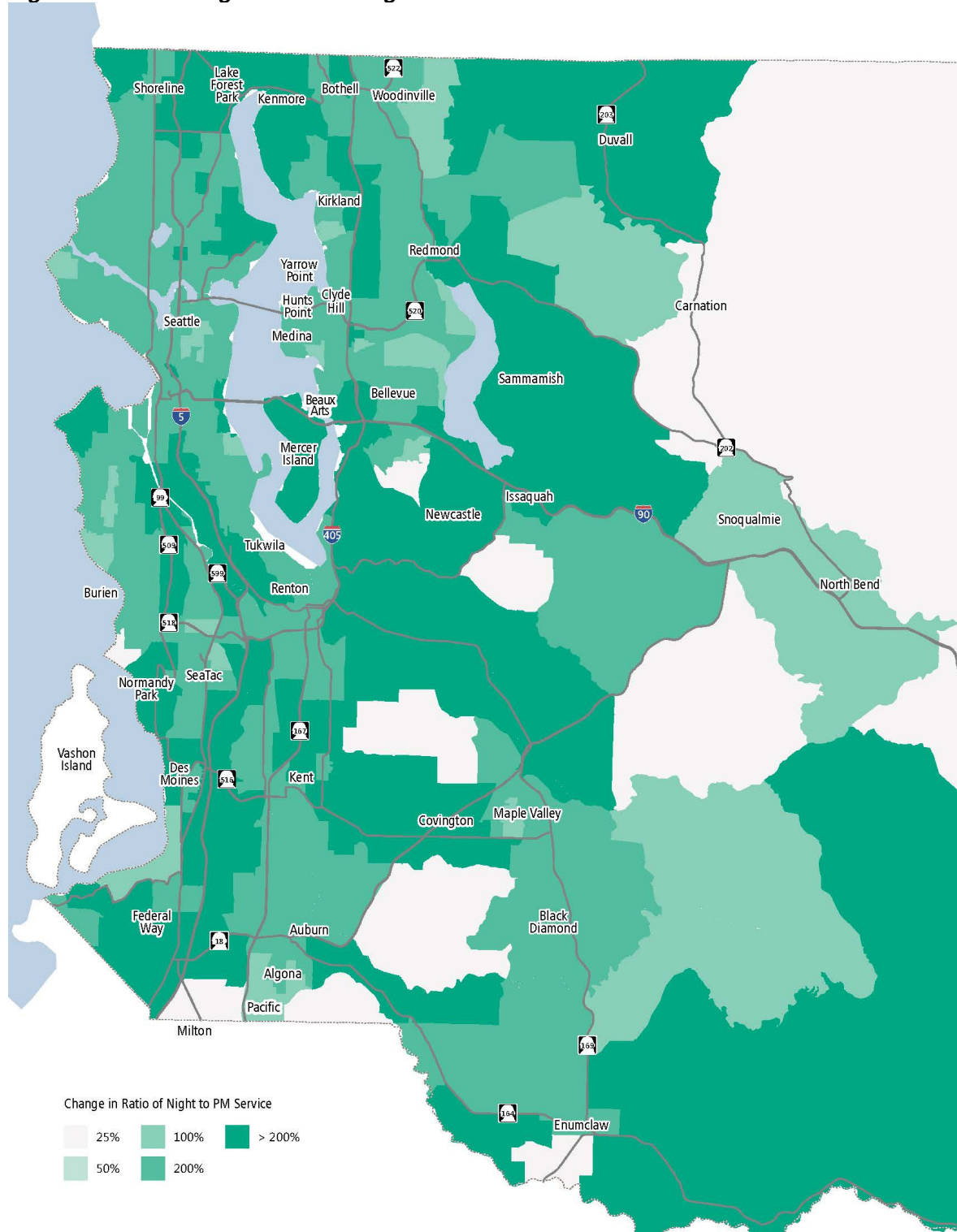
Figure A-4   Variation in Transit Service Hours by Time of Day: Existing and METRO CONNECTS 2040 Service Networks
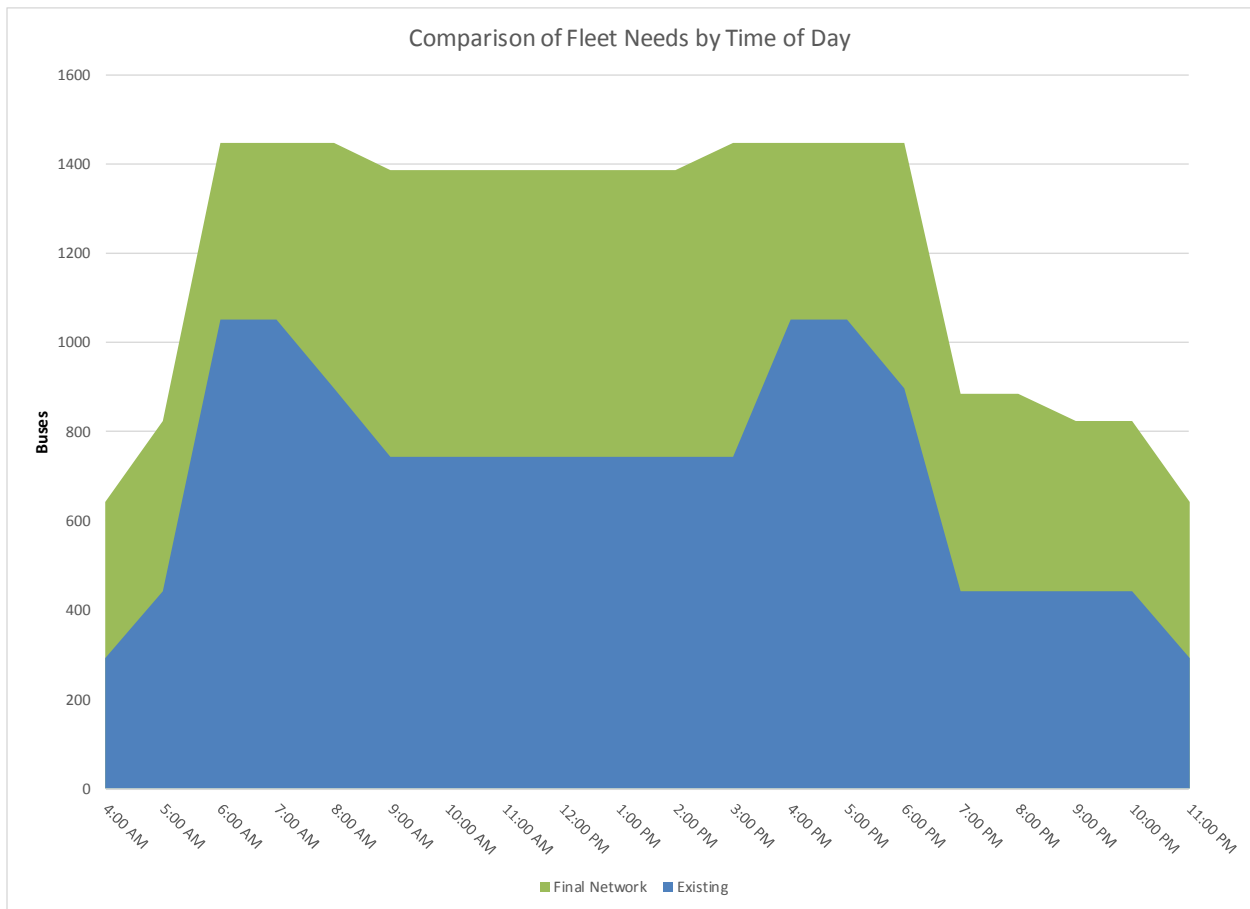
Travel Time Matrices

Table A-13 to Table A-16 show the modeled transit travel times between all Regional Growth and Manufacturing and Industrial Centers (RGCs and MICs) for the year 2040. Travel times are averages for the peak period and include walk time, average wait time and transfer time. Origin and destination points are based on TAZ centroids within each RGC. While the minimum time between each point may be less, the average takes into account the frequency of service.

Table A-13   Peak Period Current Travel Time Averages between Regional Growth Centers and Manufacturing/Industrial Centers (MIC)

	Seattle Northgate	Seattle University Community	Seattle South Lake Union	Seattle Uptown	Seattle First Hill/Capitol Hill	Seattle Downtown	Tukwila	Federal Way	Kirkland Totem Lake	SeaTac	Burien	Auburn	Bellevue	Kent	Redmond-Overlake	Redmond Downtown	Renton	Issaquah	Ballard-Interbay	Duwamish	North Tukwila	Kent MIC
Seattle Northgate		45	54	50	48	42	93	100+	84	92	91	100+	67	91	78	80	87	75	48	82	96	96
Seattle University Community	45		43	52	38	44	89	92	61	87	95	85	46	86	50	57	66	70	50	84	96	94
Seattle South Lake Union	39	42		19	25	17	65	76	69	68	65	73	58	66	52	64	61	70	36	55	75	77
Seattle Uptown	45	51	19		30	17	65	74	74	64	61	74	57	66	63	67	60	60	31	52	73	80
Seattle First Hill/Capitol Hill	41	35	27	33		21	67	79	64	69	71	79	48	71	54	58	65	60	49	59	80	83
Seattle Downtown	30	33	19	17	21		54	75	65	53	59	65	42	50	48	51	47	65	30	40	59	63
Tukwila	83	80	65	62	67	58		70	100+	29	35	68	66	57	100+	100+	40	100+	77	65	56	55
Federal Way	89	92	79	74	78	75	66		100+	53	84	55	89	68	100+	100+	72	100+	86	94	100+	77
Kirkland Totem Lake	82	68	75	83	78	69	100+	100+		84	100+	100+	39	88	60	62	68	77	97	97	100+	100+
SeaTac	85	87	75	72	76	60	29	53	100+		39	75	53	48	90	89	36	100+	88	73	64	50
Burien	94	95	85	81	87	70	34	79	100+	44		87	79	74	100+	100+	52	100+	96	76	67	73
Auburn	91	85	80	80	83	76	68	59	100+	75	91		100+	53	100+	100+	54	100+	100+	95	100+	63
Bellevue	60	40	59	57	54	52	69	100+	59	56	75	100+		67	47	46	37	66	69	84	96	85
Kent	89	83	80	79	86	64	54	69	89	42	72	41	67		76	89	40	100+	93	86	88	34
Redmond-Overlake	69	50	53	69	63	54	94	100+	58	83	100+	100+	47	81		36	67	87	78	92	100+	92
Redmond Downtown	81	58	70	78	70	64	94	100+	56	83	100+	100+	50	81	36		88	85	85	95	100+	92
Renton	78	66	70	66	74	56	41	79	72	36	48	54	37	37	62	80		82	83	69	71	49
Issaquah	75	70	70	60	60	74	100+	100+	77	100+	100+	100+	72	100+	79	80	85		97	100+	100+	100+
Ballard-Interbay	49	56	37	31	47	31	80	93	86	83	90	100+	70	84	82	80	75	93		67	86	93
Duwamish	70	79	61	56	65	45	62	87	96	67	62	92	83	85	94	94	71	100+	70		59	87
North Tukwila	85	92	77	75	79	59	52	87	100+	55	69	93	89	86	100+	100+	63	100+	88	64		82
Kent MIC	100+	100+	94	89	96	74	45	82	100+	47	63	62	85	34	97	100+	49	100+	98	85	77	

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Table A-14   Peak Period Forecast 2040 Travel Time Averages between Regional Growth Centers and Manufacturing/Industrial Centers (MIC): METRO CONNECTS 2040 Service Network

	Seattle Northgate	Seattle University Community	Seattle South Lake Union	Seattle Uptown	Seattle First Hill/Capitol Hill	Seattle Downtown	Tukwila	Federal Way	Kirkland Totem Lake	SeaTac	Burien	Auburn	Bellevue	Kent	Redmond-Overlake	Redmond Downtown	Renton	Issaquah	Ballard-Interbay	Duwamish	North Tukwila	Kent MIC
Seattle Northgate		17	31	33	23	25	76	87	58	73	76	73	42	67	56	58	66	67	38	58	78	83
Seattle University Community	17		19	23	14	16	71	85	47	66	67	70	20	64	38	39	58	63	26	49	69	79
Seattle South Lake Union	33	21		11	16	14	62	76	67	59	55	65	30	58	37	42	54	54	27	47	65	74
Seattle Uptown	35	24	11		16	10	57	71	70	62	60	65	33	58	45	47	49	54	22	44	61	74
Seattle First Hill/Capitol Hill	24	14	17	16		12	66	79	64	63	61	63	39	58	50	52	54	51	31	44	61	74
Seattle Downtown	26	16	15	10	12		52	65	63	53	56	54	32	48	46	48	44	53	23	38	56	64
Tukwila	76	69	64	61	63	55		48	78	28	33	63	59	54	76	78	39	92	74	60	53	53
Federal Way	87	80	76	72	76	66	49		100+	38	62	46	76	51	95	100+	60	100+	84	67	70	64
Kirkland Totem Lake	61	45	59	63	61	60	76	100+		72	100+	100+	39	84	57	59	59	70	76	76	100+	100+
SeaTac	73	65	63	57	61	51	26	43	76		37	61	51	43	74	78	34	100+	69	61	52	43
Burien	75	67	55	54	63	51	32	61	88	42		83	69	71	91	93	48	100+	82	62	62	69
Auburn	91	82	76	75	78	72	64	47	100+	67	87		82	50	95	100+	49	97	100+	87	85	60
Bellevue	44	29	31	34	38	33	58	79	39	54	69	80		63	32	35	38	56	53	59	75	76
Kent	82	68	62	62	69	58	54	48	87	40	68	38	61		77	81	38	76	85	75	67	30
Redmond-Overlake	54	40	42	46	52	46	75	100+	55	69	90	90	29	73		15	51	53	62	70	83	86
Redmond Downtown	56	42	44	49	55	48	77	100+	42	71	85	85	31	75	15		52	56	60	68	83	86
Renton	67	57	55	52	53	46	38	62	59	35	49	49	35	37	49	48		55	65	67	60	48
Issaquah	64	61	51	52	50	51	91	100+	68	100+	100+	100+	56	77	66	63	56		79	100+	100+	100+
Ballard-Interbay	39	29	27	23	34	24	72	81	80	74	85	70	55	65	62	62	69	87		58	73	87
Duwamish	58	49	47	44	44	38	59	66	83	63	59	73	59	66	71	69	68	86	59		57	83
North Tukwila	77	68	66	62	62	55	52	59	95	54	62	81	77	72	85	87	62	100+	75	58		77
Kent MIC	82	73	67	66	69	62	44	63	90	48	63	53	72	31	84	85	44	100+	95	82	74	

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Table A-15   Midday Period Current Travel Time Averages between Regional Growth Centers and Manufacturing/Industrial Centers (MIC)

	Seattle Northgate	Seattle University Community	Seattle South Lake Union	Seattle Uptown	Seattle First Hill/Capitol Hill	Seattle Downtown	Tukwila	Federal Way	Kirkland Totem Lake	SeaTac	Burien	Auburn	Bellevue	Kent	Redmond-Overlake	Redmond Downtown	Renton	Issaquah	Ballard-Interbay	Duwamish	North Tukwila	Kent MIC
Seattle Northgate		45	56	51	55	44	98	100+	89	96	100+	100+	79	100+	100+	85	88	75	49	89	96	100+
Seattle University Community	45		44	53	39	45	93	97	65	92	100+	100+	50	87	58	60	82	70	52	92	100+	100+
Seattle South Lake Union	44	43		19	25	18	73	80	87	71	83	81	59	91	60	67	65	70	37	63	79	80
Seattle Uptown	46	54	19		31	18	66	80	83	67	82	81	60	92	68	70	65	68	32	62	78	81
Seattle First Hill/Capitol Hill	45	36	28	35		23	79	86	65	70	89	81	50	86	71	58	68	60	51	65	82	87
Seattle Downtown	30	35	19	17	22		57	75	68	60	71	68	44	70	57	54	48	69	31	47	62	68
Tukwila	87	86	76	68	72	61		74	100+	30	37	77	69	60	100+	100+	48	100+	80	75	59	58
Federal Way	97	100+	83	75	85	75	73		100+	62	89	63	100+	81	100+	100+	85	100+	95	100+	100+	91
Kirkland Totem Lake	88	71	79	87	82	72	100+	100+		89	100+	100+	41	92	63	65	72	92	100+	100+	100+	100+
SeaTac	100+	100+	78	79	78	63	30	58	100+		41	79	54	50	94	100+	38	100+	91	79	65	53
Burien	100+	100+	86	87	94	73	36	92	100+	46		100+	80	78	100+	100+	52	100+	98	81	76	77
Auburn	100+	100+	100+	100+	100+	96	71	64	100+	75	96		100+	53	100+	100+	71	100+	100+	100+	100+	63
Bellevue	74	49	62	60	58	55	72	100+	62	59	81	100+		100+	49	61	39	67	72	88	100+	100+
Kent	100+	91	87	90	93	73	57	73	90	42	76	50	100+		77	94	47	100+	100+	92	89	36
Redmond-Overlake	80	60	56	72	66	57	100+	100+	61	89	100+	100+	49	87		42	75	92	82	97	100+	100+
Redmond Downtown	85	65	73	82	71	67	100+	100+	62	100+	100+	100+	66	100+	38		92	90	86	100+	100+	100+
Renton	80	77	73	69	78	58	43	83	84	38	50	55	39	38	64	100+		100+	87	73	72	51
Issaquah	75	70	70	60	60	78	100+	100+	100+	100+	100+	100+	76	100+	90	95	92		100+	100+	100+	100+
Ballard-Interbay	52	59	39	32	50	33	82	100+	90	85	100+	100+	72	98	92	84	82	100+		72	88	95
Duwamish	78	81	68	66	69	51	69	100+	100+	72	82	100+	88	93	100+	99	72	100+	80		66	87
North Tukwila	95	95	84	84	85	65	60	100+	100+	62	76	100+	97	92	100+	100+	83	100+	94	69		86
Kent MIC	100+	100+	98	93	100+	77	45	87	100+	54	66	70	100+	37	100+	100+	56	100+	100+	89	78	

Table A-16   Midday Period 2040 Travel Time Averages between Regional Growth Centers and Manufacturing/Industrial Centers (MIC): METRO CONNECTS 2040 Service Network

	Seattle Northgate	Seattle University Community	Seattle South Lake Union	Seattle Uptown	Seattle First Hill/Capitol Hill	Seattle Downtown	Tukwila	Federal Way	Kirkland Totem Lake	SeaTac	Burien	Auburn	Bellevue	Kent	Redmond-Overlake	Redmond Downtown	Renton	Issaquah	Ballard-Interbay	Duwamish	North Tukwila	Kent MIC
Seattle Northgate		17	34	34	23	25	83	100+	58	80	83	73	50	67	56	61	76	67	37	59	78	83
Seattle University Community	17		23	25	14	16	79	90	51	75	72	70	29	64	40	49	78	66	26	50	70	79
Seattle South Lake Union	38	25		11	20	14	69	81	83	66	67	65	43	58	49	56	64	65	28	48	67	75
Seattle Uptown	39	26	12		19	10	59	71	79	66	68	65	41	58	52	55	50	64	23	45	63	75
Seattle First Hill/Capitol Hill	24	14	18	17		12	75	82	64	68	69	63	39	58	50	52	54	56	32	45	61	75
Seattle Downtown	26	16	17	10	12		55	67	63	57	64	54	32	48	46	48	46	56	23	39	56	65
Tukwila	83	76	72	66	68	59		48	82	31	34	66	68	57	76	80	46	100+	74	60	53	53
Federal Way	93	86	82	74	81	70	49		100+	38	62	46	76	51	100+	100+	60	100+	84	73	70	65
Kirkland Totem Lake	61	45	68	68	61	60	76	100+		72	100+	100+	39	84	57	59	59	70	78	78	100+	100+
SeaTac	77	70	68	59	65	53	27	43	77		37	66	51	43	74	78	35	100+	69	61	54	43
Burien	79	72	59	58	67	59	32	61	88	42		84	69	71	91	93	48	100+	82	61	62	69
Auburn	100+	100+	100+	100+	100+	92	67	47	100+	75	91		100+	54	100+	100+	68	97	100+	88	86	47
Bellevue	47	34	41	39	39	34	59	79	39	54	69	80		63	32	35	39	56	50	60	75	76
Kent	100+	76	77	73	80	69	56	48	89	40	69	38	64		77	82	45	79	87	76	72	30
Redmond-Overlake	55	40	50	49	52	46	75	100+	55	69	100+	100+	29	73		15	51	53	62	70	84	86
Redmond Downtown	63	49	60	56	55	51	80	100+	44	73	87	100+	31	75	15		55	56	62	68	84	86
Renton	67	57	63	56	55	49	41	62	59	35	49	55	37	39	49	48		57	66	67	62	48
Issaquah	66	63	59	58	53	56	100+	100+	68	100+	100+	100+	56	80	66	63	58		80	100+	100+	100+
Ballard-Interbay	40	29	28	23	34	24	75	100+	80	78	100+	73	54	70	63	67	81	100+		60	76	87
Duwamish	60	50	47	45	45	38	59	72	85	65	60	73	61	68	73	71	72	90	61		60	86
North Tukwila	79	70	66	62	63	56	52	60	100+	55	62	83	77	76	90	88	79	100+	77	61		79
Kent MIC	100+	84	79	75	81	71	46	65	93	51	64	53	80	31	84	89	47	100+	95	84	75	

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Complete Route Lists

Table A-17and Table A-18 identify the routes included in the METRO CONNECTS 2025 and 2040 service network, respectively. All alignments are in draft form. Final routes and their alignments are subject to more detailed planning and public outreach processes.

Table A-17   2025 METRO CONNECTS Route List

2025 Route	To/From/via	Comparable existing routes	Service Type
A Line	SeaTac - Federal Way - Des Moines	A Line	RapidRide
C Line	SLU - Westwood - West Seattle	C Line	RapidRide
D Line	Crown Hill - Seattle CBD - Ballard	D Line	RapidRide
E Line	Aurora Village - Seattle CBD - SR-99	E Line	RapidRide
F Line	Renton - Burien - Tukwila	F Line	RapidRide
40	Northgate TC - Ballard - Seattle CBD via Leary Av NW	40	RapidRide
120	Burien TC - Westwood Village - Seattle CBD	120	RapidRide
1009	Bothell - UW - Lake City	372	RapidRide
1012	Ballard - Children's Hospital - Wallingford	44	RapidRide
1013	Northgate - Mount Baker - Seattle CBD	63, 67, 70	RapidRide
1027	Totem Lake - Eastgate - Kirkland	255, 271	RapidRide
1028	Crossroads - Bellevue - NE 8th St	B South	RapidRide
1030	Overlake - Renton - Newcastle	240, 245	RapidRide
1033	Renton - Auburn - Kent	169, 180	RapidRide
1052	Twin Lakes - Green River CC - Federal Way	181	RapidRide
1056	Highline CC - Green River CC - Kent	164, 166	RapidRide
1059	Madison Valley - Seattle CBD - E Madison St	11, 12	RapidRide
1063	University District - Rainier Beach - Mount Baker	7s, 48	RapidRide
1071	University District - Mount Baker - Seattle CBD	7n	RapidRide
5	Shoreline CC - Seattle CBD	5	Frequent
21	Arbor Heights - Westwood Village - Seattle CBD	21	Frequent
150	Kent Station - Southcenter - Seattle CBD	150	Frequent
1002	Richmond Beach - UW - 15th Ave NE	373	Frequent
1010	Ballard - Lake City - Northgate	D Line, 45, 75	Frequent
1014	Loyal Heights - University District - Green Lake	45	Frequent
1515	Kent - Twin Lakes - Star Lakes	183, 901	Frequent
1019	Shoreline - UW - Lake City	65	Frequent
1025	Kenmore - Overlake - Totem Lake	244	Frequent
1026	Southeast Redmond - Kirkland - NE 85th St	248	Frequent
1037	Kirkland - Eastgate - Overlake	221, 245	Frequent
1061	Uptown - Madison Park - Capitol Hill	8, 11	Frequent
1064	University District - Othello - Beacon Hill	36, 49	Frequent
1068	DT Seattle - Madrona Park - E Union St	2	Frequent
1074	Uptown - Rainier Beach - Yesler Terrace	106, 8	Frequent
1075	Renton Highlands - Rainier Beach - Renton	105, 106	Frequent
1202	Sand Point - Seattle CBD - Green Lake	62	Frequent
1213	Seattle CBD - Volunteer Park - Capitol Hill	10	Frequent
1214	Queen Anne - Mount Baker - Seattle CBD	3, 4	Frequent
1215	Kenmore - Shoreline - North City	331	Frequent
1220	SPU - Seattle CBD - Queen Anne	13	Frequent

2025 Route	To/From/via	Comparable existing routes	Service Type
1505	SPU - Madrona - Seattle CBD	3, 4	Frequent
1514	Covington - SeaTac - Kent	180, 168	Frequent
1994	University District - Northgate - Greenlake	26, 32, 62, 67	Frequent
1995	Shoreline - Roosevelt -Haller Lake	26, 346	Frequent
1996	University District - Northgate - Lake City	75	Frequent
1997	Shoreline - Lake City - Haller Lake	41, 345	Frequent
1999	Redmond - Eastgate - Overlake	B-Line	Frequent
15	Blue Ridge - Ballard - Seattle CBD	15	Peak Only Express
17	Sunset Hill - Ballard - Seattle CBD	17	Peak Only Express
18	North Beach - Ballard - Seattle CBD	18	Peak Only Express
37	Alaska Junction - Alki - Seattle CBD	37	Peak Only Express
55	Admiral District - Alaska Junction - Seattle CBD	55	Peak Only Express
56	Alki - Seattle CBD	56	Peak Only Express
57	Alaska Junction - Seattle CBD	57	Peak Only Express
102	Fairwood - Renton TC - Seattle CBD	102	Peak Only Express
116	Fauntleroy Ferry - Seattle CBD	116	Peak Only Express
118	Tahlequah - Vashon	118	Peak Only Express
119	Dockton - Seattle CBD via ferry	119	Peak Only Express
121	Highline CC -Burien TC - Seattle CBD via 1st Av S	121	Peak Only Express
122	Highline CC -Burien TC - Seattle CBD via Des Moines Memorial Dr S	122	Peak Only Express
123	Burien - Seattle CBD	123	Peak Only Express
143	Black Diamond - Renton TC - Seattle CBD	143	Peak Only Express
2012	North Bend - Mercer Island Station - Issaquah Highlands	208	Express
2022	Issaquah - Renton Village - Renton TC	(-)	Express
2204	Duvall - Bothell - Cottage Lake	232, 931	Express
2206	Redmond - Mercer Island Station - Issaquah Highlands	216, 269	Express
2207	Federal Way TC - Seattle CBD - S 272nd St	177	Express
2402	Seattle CBD - Auburn - SR 167	(-)	Express
2515	Woodinville - First Hill - South Lake Union	309	Express
2516	Kirkland - Lower Queen Anne - UW/South Lake Union	540, 255	Express
2998	University District - Woodinville - I-405	311	Express
22	Arbor Heights - Westwood Village - Alaska Junction	22	Local
24	Magnolia - Seattle CBD	24	Local
28	Whittier Heights - Ballard - Seattle CBD via Leary Av NW	28	Local
31	University District - Fremont - Magnolia	31	Local
32	University District - Fremont - Seattle Center	32	Local
33	Discovery Park - Seattle CBD	33	Local
50	Alki - Columbia City - Othello Station	50	Local
60	International District - Westwood Village - Beacon Hill	60	Local
101	Renton TC - Seattle CBD	101	Local
107	Renton TC - Rainier Beach	107	Local
111	Lake Kathleen - Seattle CBD	111	Local
124	Tukwila - Georgetown - Seattle CBD	124	Local
125	Westwood Village - Seattle CBD	125	Local
128	Southcenter - Westwood Village - Admiral District	128	Local
131	Burien TC - Highland Park - Seattle CBD	131	Local
132	Burien TC - South Park - Seattle CBD	132	Local

2025 Route	To/From/via	Comparable existing routes	Service Type
182	NE Tacoma - Federal Way TC	182	Local
224	Duvall - Redmond TC	224	Local
630	Mercer Island - Downtown Seattle	630	Local
631	Gregory Heights - Burien TC	631	Local
773	Seacrest Marina - West Seattle Junction	773	Local
775	Seacrest Marina - Alki	775	Local
907	Enumclaw - Renton TC	907	Local
915	Enumclaw - Auburn Station	915	Local
930	Bothell - Redmond Town Center - Willows Rd	930	Local
3006	Shoreline - Mountlake Terrace - Echo Lake	331	Local
3007	Aurora Village - Northgate - Meridian Ave N	346	Local
3028	Queen Anne - Capitol Hill - South Lake Union	(-)	Local
3033	Eastlake - Mount Baker - First Hill/Leschi	(-)	Local
3047	Mercer Island - S Mercer Island - Island Crest Way	204	Local
3054	Kent - Tukwila - Southcenter Pkwy	180	Local
3055	East Hill/Meridian - Seatac Airport - Kent	906	Local
3060	Black Diamond - Kent Station - Maple Valley	168	Local
3061	Green River CC - Renton Highlands - 132nd Ave SE	169	Local
3064	Federal Way TC - Kent/Des Moines Station - Military Road S	183	Local
3067	Twin Lakes - Federal Way TC - Mirror Lake	187	Local
3068	Auburn Station - Sunset Park - Stuck	180	Local
3069	Auburn Station - Angle Lake Station - Des Moines	(-)	Local
3073	Renton - Newcastle - NE 44th St BRT Station	(-)	Local
3080	Factoria - Bellevue TC - Bellevue College/Crossroads	226	Local
3085	Tibbetts Valley Park - Issaquah High School - Mt Olympus Dr SW	271	Local
3090	Woodinville - Redmond - SR 202	(-)	Local
3091	Overlake - Cottage Lake - Redmond	931, 248	Local
3092	Overlake - S Kirkland P&R - Highland Park	249	Local
3096	Overlake - Eastgate - Crossroads	221	Local
3101	Bellevue TC - UW - Medina	271	Local
3103	Eastgate - Clyde Hill - Bellevue TC	246	Local
3112	UW Bothell - Kirkland - Juanita	238, 236	Local
3114	Redmond Town Center - Kenmore - Totem Lake	234, 244	Local
3116	Eastgate - Bothell - Totem Lake	(-)	Local
3122	Laurelhurst - Seattle CBD - Eastlake	47, 25	Local
3123	University District - Seattle CBD - Boyer Ave E	10	Local
3162	Green River CC - Renton TC - Kent East Hill	164, 169	Local
3168	Pacific - Auburn Station - Algona	917	Local
3183	Issaquah Highlands - Eastgate - Cougar Hills	271	Local
3205	Aurora Village - Northgate - Jackson Park	347	Local
3208	Roosevelt - University District - Sand Point	75	Local
3213	Woodinville - Kirkland - Totem Lake	255	Local
3214	Mercer Island Station - Mercer Island High School - West Mercer Elementary	(-)	Local
3220	North Bend - Duvall - Carnation	629	Local
3221	Kent Station - The Landing - 84th Ave S/Lind Ave SW	(-)	Local
3403	Federal Way TC - Star Lake Station - S 288th St	183	Local
3988	Twin Lakes - Federal Way TC - Celebration Park	903	Local

2025 Route	To/From/via	Comparable existing routes	Service Type
3989	Factoria - Kirkland - Bellevue TC	234, 234, 240	Local
3990	Kent/Des Moines Station - Burien TC - Normandy Park	166	Local
3991	Fairwood - Kent/Des Moines Station - Seatac Airport	(-)	Local
3992	Issaquah Highlands - Eastgate - West Lake Sammamish Pkwy	271	Local
3996	Rainier Beach - Mount Baker - Genesee	50	Local
3997	Madison Valley - Beacon Hill - Central District	8	Local
3998	Renton TC - Seatac Airport - Tukwila Station	156, F-Line	Local

Table A-18   2040 METRO CONNECTS Route List

2040 Route	To/From/Via	Comparable existing routes	Service Type
1001	Shoreline – Downtown Seattle via SR 99	E	RapidRide
1009	Bothell - UW - Kenmore	372	RapidRide
1010	Ballard - Lake City - Northgate	D Line, 45, 75	RapidRide
1012	Ballard - Children's Hospital - Wallingford	44	RapidRide
1013	Northgate - Mount Baker - U. District	7n ,67, 70	RapidRide
1014	Loyal Heights - U. District - Green Lake	45	RapidRide
1025	Kenmore - Overlake - Totem Lake	234, 235	RapidRide
1026	Southeast Redmond - Kirkland - NE 85th St	248	RapidRide
1027	Totem Lake - Eastgate - Kirkland	255, 271	RapidRide
1028	Crossroads - Bellevue - NE 8th St	B South	RapidRide
1030	Overlake - Renton - Eastgate	240, 245	RapidRide
1033	Renton - Auburn - Kent	169, 180	RapidRide
1041	SODO - Burien - Delridge	120	RapidRide
1043	Alki - Burien - West Seattle	128, 131	RapidRide
1047	Rainier Beach - Federal Way - SeaTac	A, 124	RapidRide
1048	Renton - Burien - Tukwila	F	RapidRide
1052	Twin Lakes - Green River CC - Federal Way	181	RapidRide
1056	Highline CC - Green River CC - Kent	164, 166	RapidRide
1059	Madison Valley - Seattle CBD - E Madison St	11, 12	RapidRide
1061	Interbay - Madison Park - Capitol Hill	8, 11	RapidRide
1063	U. District - Rainier Beach - Mount Baker	7s, 48	RapidRide
1064	U. District - Othello - Capitol Hill	36, 49	RapidRide
1075	Renton Highlands - Rainier Beach - Renton	105, 106	RapidRide
1202	Seattle CBD - Sand Point - Green Lake	62	RapidRide
1515	Kent - Twin Lakes - Star Lakes	183, 901	RapidRide
1993	Northgate TC - Ballard - Seattle CBD via Leary Av NW	40	RapidRide
1002	Richmond Beach - UW - 15th Ave NE	373	Frequent
1005	Seattle CBD - Shoreline CC - Fremont	5	Frequent
1006	Loyal Heights - Northgate - Ballard	(-)	Frequent
1007	Shoreline CC - UW - Lake City	75	Frequent
1018	Laurelhurst - Magnolia - Wallingford	31	Frequent
1019	U. District - Shoreline - Lake City	65	Frequent
1031	Issaquah Highlands - Eastgate - West Lake Sammamish Pkwy	271	Frequent
1037	Kirkland - Eastgate - Overlake	221, 245	Frequent
1039	Rainier Valley - Westwood - Georgetown	60	Frequent
1040	West Seattle - Burien - White Center	128	Frequent
1042	Alki - Tukwila - White Center	125	Frequent
1046	Fairwood - Des Moines - SeaTac	156, 906	Frequent
1049	Kent - Rainier Beach - Tukwila	150	Frequent
1068	Madrona - Seattle CBD - Capitol Hill	2	Frequent
1074	Rainier Beach - Uptown - First Hill	38	Frequent
1083	Beacon Hill - Burien - Georgetown	60, 132	Frequent
1085	Burien - Des Moines - Normandy Park	166	Frequent
1088	Seattle CBD - Renton - Georgetown	124	Frequent
1213	Seattle SBD - Volunteer Park - Capitol Hill	10	Frequent
1214	Queen Anne - Mount Baker - Seattle CBD	3, 4, 14	Frequent

| 2040 Route	To/From/Via	Comparable existing routes	Service Type
1215	Kenmore - Shoreline CC - North City	331	Frequent
1220	SPU - Seattle CBD - Queen Anne	3, 4	Frequent
1501	Factoria - Kirkland - Bellevue TC	234, 234, 240	Frequent
1505	SPU - Madrona - Seattle CBD	3, 4	Frequent
1511	Redmond - Cottage Lake - Avondale	232, 931	Frequent
1512	Jackson Park - Magnolia - Ballard	28, 24	Frequent
1513	NE Tacoma - Federal Way - Twin Lakes	903	Frequent
1514	Covington - SeaTac - Kent	180, 168	Frequent
1994	University District - Northgate - Greenlake	26, 32, 62, 67	Frequent
1997	Madison Valley - Beacon Hill - Central District	8	Frequent
1998	Mountlake Terrace - Northgate - Shoreline	346	Frequent
1999	Redmond - Eastgate - Overlake	B-Line	Frequent
2003	Westwood Village - South Lake Union - Alaska Junction	116	Express
2012	North Bend - Mercer Island Station - Issaquah Highlands	208	Express
2016	Burien TC - First Hill - International District	121, 122, 123	Express
2020	Snoqualmie - Auburn Station - Maple Valley	(-)	Express
2021	Kent Station - Alaska Junction - Burien TC	180	Express
2022	Issaquah - Renton Village - Renton TC	(-)	Express
2028	Enumclaw - Auburn Station - SR164	915	Express
2203	Duvall - Redmond - Redmond Ridge	224	Express
2204	Duvall - Bothell - Cottage Lake	232, 931	Express
2205	North Bend - Redmond - Fall City	(-)	Express
2206	Redmond - Mercer Island Station - Issaquah Highlands	216, 269	Express
2207	Federal Way TC - Seattle CBD - S 272nd St	177	Express
2402	Seattle CBD - Auburn - SR 167	(-)	Express
2515	Woodinville - First Hill - South Lake Union	309	Express
2516	Totem Lake - Lower Queen Anne - UW/South Lake Union	540, 255	Express
2518	Edmonds - Redmond - Lake Forest Park	342	Express
2614	Renton - Lower Queen Anne - Uptown	143	Express
2615	Enumclaw - Renton Village - Maple Valley	907	Express
2998	University District - Woodinville - I-405	311	Express
2999	Maple Valley - Overlake - Issaquah	(-)	Express
3006	Shoreline - Mountlake Terrace - Echo Lake	331	Local
3007	Aurora Village - Northgate - Meridian Ave N	346	Local
3025	Magnolia - South Lake Union - 28th Ave W	31, 33, 24	Local
3028	Queen Anne - Capitol Hill - South Lake Union	(-)	Local
3033	Eastlake - Mount Baker - First Hill/Leschi	(-)	Local
3034	Alki - Mount Baker - SODO	50	Local
3040	Burien TC - SODO - SR99	131	Local
3047	Mercer Island - S Mercer Island - Island Crest Way	204	Local
3050	Highline CC - Burien - Des Moines Memorial Dr	631, 166	Local
3053	Normandy Park - Rainier Beach - Tukwila Int'l Blvd Station	156	Local
3054	Kent - Tukwila - Southcenter Pkwy	180	Local
3055	East Hill/Meridian - Seatac Airport - Kent	906	Local
3060	Black Diamond - Kent Station - Maple Valley	168	Local
3061	Green River CC - Renton Highlands - 132nd Ave SE	169	Local
3062	Black Diamond - Kent Station - Wilderness Village	168, 907	Local

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2040 Route	To/From/Via	Comparable existing routes	Service Type
3064	Twin Lakes - Des Moines - Federal Way TC	183	Local
3067	Twin Lakes - Federal Way TC - Mirror Lake	187	Local
3068	Auburn Station - Sunset Park - Stuck	180	Local
3069	Auburn Station - Angle Lake Station - Des Moines	(-)	Local
3073	Fairwood - Newcastle - Renton TC	(-)	Local
3080	Factoria - Bellevue TC - Bellevue College/Crossroads	226	Local
3085	Tibbetts Valley Park - Issaquah High School - Mt Olympus Dr SW	271	Local
3090	Sammamish - Woodinville - Redmond	(-)	Local
3091	Overlake - Cottage Lake - Redmond	931, 248	Local
3092	Overlake - S Kirkland P&R - Highland Park	249	Local
3096	Overlake - Eastgate - Crossroads	221	Local
3099	Federal Way TC - Kent Station - Lakeland North	(-)	Local
3101	Beaux Arts Village - UW - Bellevue TC	271	Local
3103	Eastgate - Clyde Hill - Bellevue TC	246	Local
3104	Capitol Hill - Discovery Park - South Lake Union	19, 24	Local
3112	UW Bothell - Kirkland - Juanita	238, 236	Local
3114	Bear Creek P&R - Kenmore - Totem Lake	234, 244	Local
3116	Eastgate - Kenmore - Snyders Corner	(-)	Local
3122	Laurelhurst - Seattle CBD - Eastlake	47, 25	Local
3123	University District - Seattle CBD - Boyer Ave E	10	Local
3162	Green River CC - Renton TC - Kent East Hill	164, 169	Local
3164	Seattle Children's South - Federal Way TC - Lake Geneva	(-)	Local
3168	Pacific - Auburn Station - Algona	917	Local
3183	Issaquah Highlands - Eastgate - Cougar Hills	271	Local
3184	Sammamish - Cougar Mountain - Issaquah Highlands	(-)	Local
3185	Preston - Issaquah - Fall City	(-)	Local
3205	Aurora Village - Northgate - Jackson Park	347	Local
3208	Roosevelt - University District - Sand Point	75	Local
3213	Woodinville - Kirkland - Totem Lake	255	Local
3214	Mercer Island Station - Mercer Island High School - West Mercer Elementary	(-)	Local
3216	Bothell - Kingsgate - 132nd Ave NE	236, 238	Local
3218	Tukwila Int'l Blvd Station - Kennydale - Renton TC	(-)	Local
3220	North Bend - Duvall - Carnation	629	Local
3221	Kent Station - The Landing - 84th Ave S/Lind Ave SW	(-)	Local
3224	Woodinville - Kenmore - UW Bothell	931	Local
3225	Issaquah Highlands - Redmond - Sammamish	269	Local
3230	Kenmore - Mountlake Terrace - Brier	(-)	Local
3400	Rainier Beach - Alaska Junction - Georgetown	36, 131	Local
3401	Tukwila Int'l Blvd Station - SODO - Georgetown	124	Local
3403	Federal Way TC - Kent/Des Moines Station - Military Rd S / Pacific Hwy S	183	Local
3405	S Vashon - N Vashon - Valley Center	118	Local
3406	Dockton - N Vashon - Ellisport	119	Local
3994	Carnation - Redmond - NE Redmond Fall City Rd	(-)	Local
3995	Puyallup - Federal Way TC - Edgewood	402	Local
3996	Rainier Beach - Mount Baker - Genesee	50	Local
3998	Renton TC - Seatac Airport - Tukwila Station	156, F-Line	Local
3999	East Renton Highlands - Rainier Beach - Renton TC	105	Local

Appendix B.   Capital Costing Methodology

Introduction

In conjunction with the expansion of transit service envisioned in METRO CONNECTS, approximately $11 billion in incremental capital investments would be needed to ensure adequate roadway facilities, storage and maintenance facilities, and passenger facilities are in place to support the METRO CONNECTS 2040 transit service network for King County Metro Transit (Metro). The capital costs in these appendices are reported in Year of Expenditure Dollars (YOE $). This takes into consideration the effect of inflation and creates a better benchmark when comparing actual costs to planned costs. The breakdown of costs by investment type is shown in Figure B-1.

Figure B-1 Allocation of proposed $11 Billion in Capital Investment 2018-2040
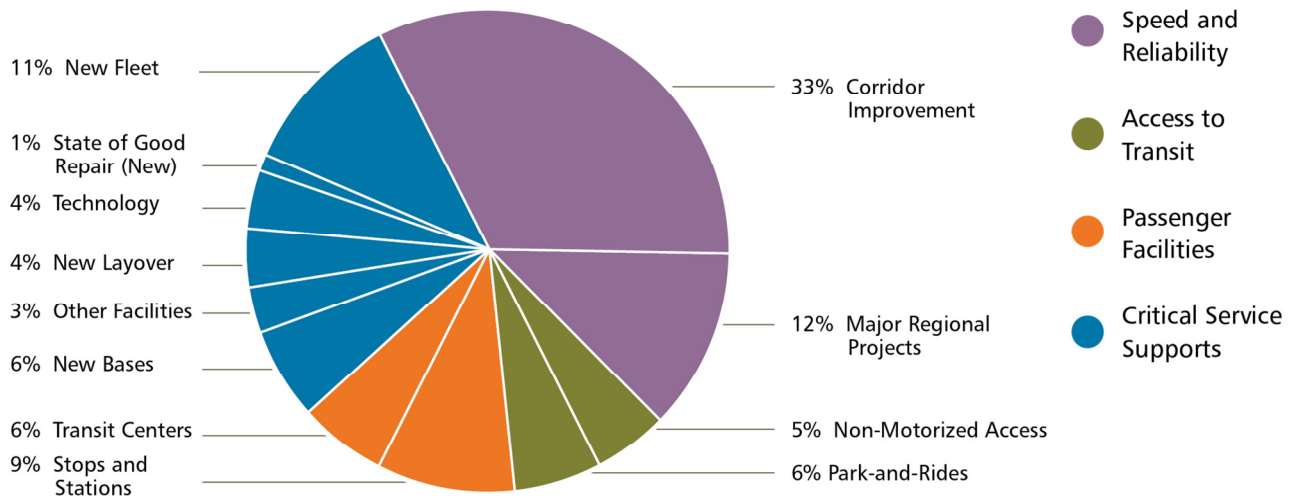
METRO CONNECTS provides a vision for the future of public transit in the region. In estimating costs, standard costing methodologies have been used. While estimates have been used to describe the potential financial requirements, implementation planning is required before there are detailed project lists and service assumptions to fully inform a financial plan. The type and size of investments described here and along with associated costs are intended to provide jurisdictions and stakeholders a sense of scale for the program needed to optimize transit service. Costs should be viewed as order of magnitude estimates.

METRO CONNECTS represents a 25-year vision for Metro's future. METRO CONNECTS envisions expanding the transit system incrementally through 2040, in collaboration with local governments. The precise timeline for investment will be affected by local development, changes to the street network, and the buildout of Sound Transit's regional transit network. Attaining the vision requires investment beyond Metro's existing funding sources and Metro will continue to update financial projections, support regional solutions, and develop detailed planning. METRO CONNECTS will be regularly updated to reflect changes over time, including detailing service expansions and capital investments as more information is known.

The successful operation of fast and reliable service, passenger facilities that allow for safe, comfortable, and efficient transfers, and the ability to access transit and for customers to move seamlessly throughout the region are all dependent upon building a network of capital facilities. Some of the major capital investments, such as construction of new bases and the acquisition of vehicles, will be made primarily by Metro. Other investments,

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particularly those that require the acquisition of right-of-way and modifications to roadways, require a high degree of coordination and financial partnerships with jurisdictions, other transit agencies, Washington State Department of Transportation (WSDOT), and other potential partners. This appendix describes the type of needed capital facilities and outlines the current assumptions for locations, quantities, and costs associated with these investments. The cost estimating assumptions, unit cost determination, and typical elements for each type of improvement are also detailed. The assumptions made regarding partnerships are meant to be broad for planning purposes and are not project specific. The exact partnership contribution will be determined by the ultimate system design, financial need, policy considerations, and available resources.

Because all costs shown in these appendices are in year of expenditure dollars (YOE $) the timing of investments does have an impact on the cost estimates. The appendices that follow detail the capital costs shown in Figure B-1.

Costing Approach

The cost estimates are rough order of magnitude amounts. Because METRO CONNECTS is a high level vision that does not yet have all potential projects identified, Metro has included resources for unidentified investments within each category (roughly 10 percent of the estimated costs). As Development Programs are developed, Metro will develop specific project lists and refine cost estimates further. Additional capital investments that support the service network envisioned in METRO CONNECTS could be developed by partner agencies and/or local jurisdictions, either independently or in partnership with Metro.

Estimates include elements such as planning, design and construction costs, labor, soft costs, and other related project costs as well as project contingency. The planning, design and construction costs were developed using historical total project costs, and either a bid-based methodology, or industry standards methodology.

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Partnership Contributions

To deliver the service network envisioned in METRO CONNECTS, additional investment by partnering transit providers, state and local agencies, and local jurisdictions would be needed. Investment would be required for speed and reliability improvements such as revised signal timing, bus bulbs, removing parking and providing dedicated transit lanes; passenger facility improvements such as sidewalks and non-motorized features; and assistance with permitting and right-of- way acquisitions.

In developing METRO CONNECTS, we made high-level assumptions about potential partnership contributions so we could estimate what Metro's costs might be if METRO CONNECTS were implemented. These assumptions were not intended to suggest any policy about partners' contribution levels, they are intended to serve as examples. Our experience implementing RapidRide suggests that the details of any specific project may vary substantially. We will work through the Development Program to refine partnership contribution levels.

Table B-1 shows our broad assumptions for local financial contributions and partnerships; these are for planning purposes and are not project-specific. The exact contribution will be determined by the identified investment, financial need, policy considerations, and available resources. As we move toward implementation, we will continue working with our partners to find appropriate resources, whether those are local funds, grants, or Metro resources, to advance transit throughout King County.

Table B-1   Assumed Partnership Contributions

Category	Contributions (%)	Amount
Speed and Reliability		
Frequent, Express, Local	10%	$50 M
Frequent (RapidRide)	10%	$18 M
RapidRide (Speed & Reliability Component)	10%	$77 M
Frequent (RapidRide) ROW	80%	$1,766 M
Major Regional Projects	80%	$1,010 M
Total		**$2,922 M**
Passenger Facilities		
Shelters (High Transfers)	20%	$46 M
Off-street Transit Centers	20%	$138 M
On-street Transit Centers	20%	$3 M
Total		**$187 M**
Critical Service Supports		
New Trolley Wire	50%	$30 M
Total		**$30 M**
Total		**$3,139 M**

Our broad-brush assumption is that the highest level of partner contribution would be for speed and reliability investments—specifically, for right-of-way acquisition or on major regional projects where Metro would not be a lead agency. In both cases METRO CONNECTS assumes an 80 percent partner contribution. We would work with partners to refine the actual level.

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METRO CONNECTS assumes that RapidRide service will be supported with exclusive right-of-way for up to 12.5 percent of new RapidRide lane miles. To develop a conservative, high-level budget, METRO CONNECTS assumed this exclusive right-of-way would require widening and the acquisition of new property. Metro assumed a much higher level of local contribution for RapidRide right-of-way needs for these reasons:

- Jurisdictions would likely maintain ownership and maintenance of any new right-of-way.

- In some cases, transit or BAT lanes could be created by reprioritizing right-of-way.

- Historically, Metro has not purchased right-of-way as part of our RapidRide program.

Major regional projects across the county could substantially reduce travel time for transit riders and other travelers. These projects typically involve freeway or state highway interchanges/overpasses. METRO CONNECTS envisions Metro playing a larger role in helping to realize these projects. This commitment is shown by assuming Metro could contribute 20 percent of the total costs for regional projects where Metro is not a lead agency but transit would benefit.

METRO CONNECTS also assumes a 10 percent partner contribution on speed and reliability improvements on corridors providing frequent (including RapidRide), express, and local services. Metro would also rely on local jurisdictions to partner with transit providers to build transit centers and other passenger amenities that meet the needs of both agencies.

The envisioned METRO CONNECTS 2040 service net- work relies on a significantly higher level of bus-to-bus and bus-to-rail transfers than the existing network has. METRO CONNECTS assumes a 20 percent partner contribution to shelters at transfer locations and new transit centers. With the anticipated increase in activity, the location and design of transfer centers—both on- street and off-street—would become more important to create an efficient and effective transit network and a comfortable, safe, and easy-to-navigate environment for passengers.

Trolley wire supports quiet, electric transit. METRO CONNECTS assumes some expansion of the trolley wire network, but given the local benefits and nature of the wire, METRO CONNECTS assumes a 50 percent partner contribution for new trolley wire.

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Appendix C.   Speed and Reliability

For purposes of costing, speed and reliability investments have been categorized into two types: Corridor Improvements and Major Regional Projects. Together, these speed and reliability investments make up 45 percent of the capital investment identified to support the METRO CONNECTS vision.

Figure C-1   **Speed and Reliability Portion of Capital Costs**
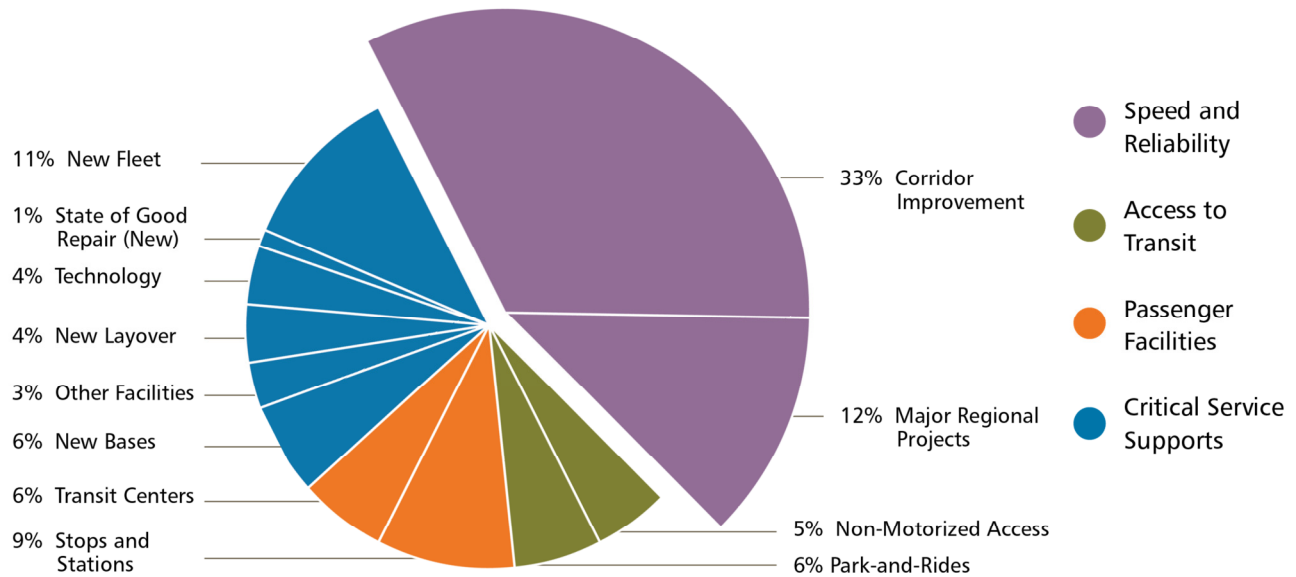
Corridor Improvements

Speed and Reliability Toolbox

Metro has a long history of effectively making the "right" speed and reliability investment to improve bus operations along a corridor. This toolbox of improvements, along with the benefit that can be expected from the different improvements, is shown in Table C-1.

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Table C-1   Speed and Reliability Toolbox

Treatment	Description	Potential benefit
Queue jumps that let buses stopped at intersections get a head start	Buses are given a short lane at signalized intersections, often shared with right-turning vehicles in order to bypass queues of general traffic. Buses get an exclusive green light before other traffic so that they travel through the intersection ahead of general traffic.	Example: Queue jump signal at W Mercer Street & Third Avenue reduced travel times through the intersection by 21 seconds.[8] TCRP* reports reductions in travel time of 5% to 15%.[9]
Bus-only/Business Access Transit (BAT) lanes	By widening the roadway or dedicating an existing lane, buses are given a lane exclusive to transit use. Dedicated lanes may allow for right-turning vehicles to access local business and side streets. They may be used during peak periods only or all day.	Example: BAT lanes along with new signal timings on Aurora Avenue N resulted in a 14% to 19% reduction in median travel times.[10]
Transit signal priority (TSP)	Through active communication with traffic management/control systems, buses are given early or extended green times at intersections to reduce delay and significantly improve travel times.	Example: The sum of average intersection delays were reduced by 1 to 1.6 minutes after TSP was implemented on the RapidRide E Line corridor.[11]
Bus bulbs or curb extensions that let buses pick up and drop off passengers without pulling over	Curb extensions extend the existing sidewalk into the curb lane (typically a parking lane) to allow buses to serve a stop within the travel lane. This treatment allows buses to avoid moving into the curb lane, which typically incurs delay as buses attempt to re-enter traffic.	TCRP Report 165 reports that implementation of bus bulbs along a transit corridor in San Francisco lead to a 7% increase in bus speeds.[12] Other benefits include shorter intersection crossing distances for pedestrians and an increase in overall sidewalk width.
Turn restrictions at certain times of day to improve traffic flow	Heavy traffic volumes on transit corridors can be mitigated by restricting movements onto congested corridors to buses only. Restrictions can be all day or during peak periods only.	Improves access to bus lanes and bus stops. Resulting transit- only turning movements also set up the possibility for queue jumps.
On-street parking management	As an alternative to bus bulbs, parking may be managed along bus routes to mitigate delay when buses must re-enter traffic. Parking may be restricted for several hundred feet after a bus zone all day or during peak periods. This creates an extended travel lane for buses, allowing them to gradually merge back into traffic.	Improvements to travel times are similar to bus bulbs and curb extensions, and bus operations are made possible or improved at tight turns.
Spacing stops so the bus travels more quickly to stops where most people get on and off	Closely spaced bus stops with low ridership may be removed or combined into new stops. Reducing the number of stops along a corridor improves speeds in two ways: First, by reducing the time spent decelerating, accelerating and serving a stop. Second, with fewer stops, buses are better able to take advantage of traffic signal progression.	Studies estimate a time savings of 10 seconds per stop removed. A study by TriMet showed a 5.7% reduction in travel time when the distance between stops is increased by an average of 6%.[13]

* Transportation Cooperative Research Program

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[8] "Evaluation Summary of W Mercer Street and 3rd Avenue W Signal Queue Jump", King County Metro, 2014.

[9] "Transit Cooperative Research Program Report 165: Transit Capacity and Quality of Service Manual Transit," 3rd Edition, Transportation Research Board, 2013.

[10] "Rapid Ride E Line, Before and After Travel Time Studies", King County Metro, 2014.

[11] Ibid.

[12] "Transit Cooperative Research Program Report 165: Transit Capacity and Quality of Service Manual Transit," 3rd Edition, Transportation Research Board, 2013.

[13] "Transportation Research Record: Journal of the Transportation Research Board, No. 1971", Transportation Research Board of the National Academies, 2006.

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Corridor Improvement Evaluation Methodology

Metro developed a tiered series of investments for speed and reliability improvements. The range of investment levels in speed and reliability improvements are defined by corridor as High, Medium, Low, and no Investment. These are the classifications used in the METRO CONNECTS document. For costing purposes, the High category was further refined by the amount of right-of-way that would be needed to provide exclusive transit lanes on portions of a corridor. The High levels of investment focus heavily on providing transit lanes, assuming exclusive business access transit (BAT) lanes or BRT, and transit signal priority (TSP) throughout corridors. Right-of-way acquisition was assumed for some of the High levels of investment to allow for roadway widening. The Medium level of investment provides transit priority, queue jumps, signal modifications, and bus bulbs. The Low level of investment focuses on spot improvements at key locations. Improvements to existing RapidRide corridors were also assumed, including investments at the High, Medium, and Low levels. Table C-2 shows the percentage of lane miles for each service type that would receive different levels of capital investment.

All these investments would be made in close coordination with local jurisdictional partners. In particular, METRO CONNECTS relies heavily on local jurisdiction to make necessary right of way decisions and acquisitions, although METRO CONNECTS does propose some resources to support critical right-of-way acquisition.

Table C-2   *Levels of Speed and Reliability Investment by Service Type*

Service	High (ROW + Roadway)	High (Roadway)	High (Channelization)	Medium	Low	None	Total
Local	0	0	0	0	40%	60%	100%
Express	0	0	0	25%	50%	25%	100%
Frequent	0	0	10%	50%	30%	10%	100%
Existing RapidRide	0	10%	0	30%	60%	0	100%
New RapidRide	12.5%	12.5%	25%	40%	10%	0	100%

Metro calculated the need for future speed and reliability improvements based upon the METRO CONNECTS 2040 service network using the following methodology:

- Calculated total centerline miles for each service category
- Prepared per mile costs for various categories of investment (High x 3, Medium, Low)
- Developed a proportionate distribution for level of investment
- Applied costs and proportions to mileage

It is important to note that Metro did not evaluate individual corridors for a specific level of investment, but instead used proportional investment levels across the corridor types to determine investment. Because local jurisdictions have ownership and/or management of the right-of-way, coordination would be needed to ensure that the speed and reliability improvements implemented on identified corridors are consistent with their transportation infrastructure plans. It is anticipated that Metro would contribute partial funding to these projects in partnership with local agencies.

Corridor Improvement Costing Assumptions

This portion of the program captures a level of investment to promote transit speed and reliability along frequent, express, and local corridors. These investments were determined on a per centerline mile basis and in accordance with the identified level of investment per corridor: High, Medium, or Low. When calculating the costs, only the highest-level of investment was assumed where there were overlapping corridors. For example, if a roadway included both a RapidRide and Express route, then the highest level of investment (associated with the RapidRide

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line) was used to estimate the cost. In the example, the medium level of investment identified for the Express route was not included in estimated the cost as it would result in double-counting the corridor investment.

Project costs for the High, Medium, and Low investment corridors were developed based on Metro's historical bid information. The High investment corridor was further defined by the degree to which right-of-way was assumed to be acquired. For frequent and new RapidRide corridors, the associated civil work and ROW costs were broken out and defined independently from the speed and reliability investment.

Typical elements for High, Medium, and Low levels of investment are shown in Table C-3.

Table C-3   Typical Elements for Speed and Reliability Corridor Investments

Investment Level	Features
High Investment – Great amount of right-of-way necessary	Exclusive right-of-way (24 feet of widening) Rebuild sidewalks Illumination New signals Stormwater Site preparation/Civil work Widen roadway for bus lanes
High Investment – Lesser amount of right-of-way necessary	Same as above, except: Exclusive right-of-way (12 feet of widening)
High Investment – No right-of-way necessary	No widening required (use existing lanes) 75 percent roadway rechannelization Up to 6 transit signal priority per mile Up to 2 queue jumps per mile Up to 6 signal modifications per mile Up to 1 bus bulb per mile
Medium Investment	No widening required 25 percent roadway rechannelization Up to 3 transit signal priority per mile Up to 1 queue jump per mile Up to 2 signal modifications per mile Up to 6 signal synchronizations per mile Up to 0.5 bus bulb per mile
Low Investment	No widening required 10 percent roadway rechannelization Up to 4 signal synchronizations per mile Up to 1 queue jump per mile Up to 2 signal modifications per mile

Major Regional Projects

In addition to corridor level speed and reliability improvements, there are a number of major regional projects that could provide a benefit to transit service, and in some cases, a benefit to general purpose traffic. For purposes of this plan, major regional projects constitute large, multi-jurisdictional projects that are currently being planned in key, specific locations in which a targeted improvement would increase transit speed and reliability. For METRO CONNECTS, Metro has identified several of these types of projects exist today and which could alleviate existing congestion problems and benefit transit by providing cross-city connections, address overcapacity roadways and bottlenecks, and/or improve access to the regional network. METRO CONNECTS envisions Metro playing a larger role in facilitating the delivery of major regional projects that would benefit transit service and proposes more than

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$230 million dollars towards these projects in King County, although the largest portion of the costs would come from others.

Speed and Reliability Cost Estimates

Table C-4 shows the estimated costs for the speed and reliability improvements included in METRO CONNECTS.

Table C-4   ***Speed and Reliability Estimated Costs***

| Speed and Reliability Improvements – Corridor Level of Investment	Unit	Total Units	Estimated Metro Cost (in millions YOE $)
Frequent (existing RapidRide)*	Per mile	45	$151
Frequent (RapidRide) – Speed and reliability Component Only*	Per mile	220	$629
Frequent (RapidRide) – Right-of-way and associated civil*	Per mile	55	$403
Frequent (non-RapidRide)*	Per mile	245	$281
Express*	Per mile	125	$67
Local*	Per mile	445	$64
Major Regional Projects	---	---	$231
Unidentified Investments	---	---	**$180**
		Total	**$2,005**

* Metro assumes these investments would be developed in partnership with local jurisdictions, state agencies, and/or other transit providers. In particular Metro would rely heavily on local jurisdictions to make right-of-way decisions and acquisitions.

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Appendix D.   Access to Transit

METRO CONNECTS defines transit access zones, which are described in the full plan, to identify specific types of improvements for different areas of the county. Pedestrian, bicycle, and auto access to transit are all important to support a robust and diverse transit network. The METRO CONNECTS vision includes investments that promote access to transit by all modes. Due to a significant capital investment and stakeholder interest in this topic, the full plan document goes into significant detail on how access to transit was evaluated in METRO CONNECTS.

As shown in Figure D-1, METRO CONNECTS proposes significant investments in both non-motorized and auto access to transit. Access to transit investments make up 11 percent of the METRO CONNECTS capital investment.

Figure D-1   ***Access to Transit Portion of Capital Costs***
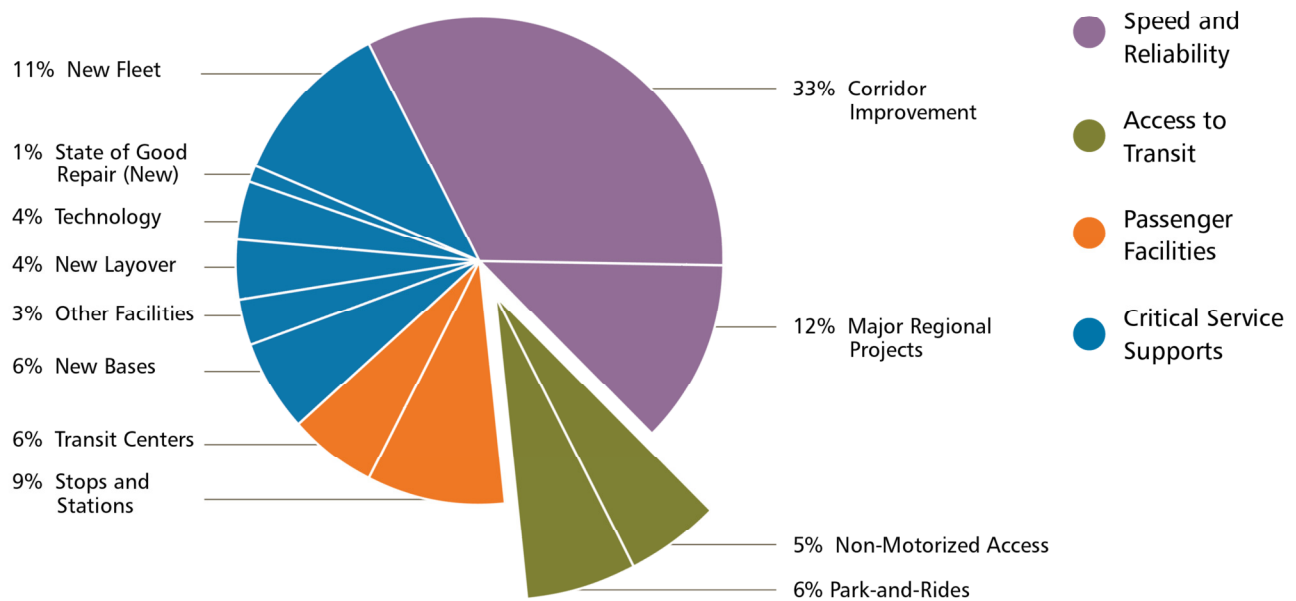
Bicycle and Pedestrian Improvements

In the METRO CONNECTS 2040 network, 73% of all King County residents and 87% of all county businesses would be within a half-mile of a frequent transit route. With more people within walking or bicycling distance to transit in the future, Metro would work with local jurisdictions to fund and implement non-motorized transit access improvements that provide customers with safe and easy to use pathways to transit.

The total need, countywide, to complete the non-motorized (sidewalk and bicycling) network far exceeds the resources of any single organization or jurisdiction. In Metro's Non-motorized Connectivity Study[14] non-motorized access improvement projects that were within one mile of approximately 500 major transit bus stops were identified

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[14] "2014. Non-motorized Connectivity Study", King County Metro and Sound Transit, 2014. Available at: http://metro.kingcounty.gov/programs-projects/nmcs/.

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by local jurisdictions. This study determined that an investment of about $1.8 billion would be needed to complete the non-motorized access projects associated with all 500 of the major stops (equaling about $3.2 million per stop) and that $450 million would be needed to improve access to transit at the top 25 percent of the bus stops with the worst connectivity. This analysis provides a sense of scale for the need associated with non-motorized improvements.

Considering that there are more than 8,000 transit stops across the county, comprehensive non-motorized access would far outstrip Metro's available resources. METRO CONNECTS proposes to work with jurisdictions to partially fund such improvements.

METRO CONNECTS includes potential funding for non-motorized investment which is intended to leverage funding from local jurisdictions and grants.

Additional non-motorized investments that support the service network envisioned in METRO CONNECTS could be developed by partner agencies and/or local jurisdictions, either independently or in partnership with Metro. At this time, locations have not been identified or prioritized. For cost estimating purposes, a representative investment, roughly equivalent to the proposed investment in park and ride facilities has been used. Note because these costs are in year of expenditure dollars, the differences in total costs between tables D-5 and D-6 are due to the different assumptions in the timing of the park-and-ride and non-motorized investments. The total non-motorized costs are smaller than the Park-and-Ride investments because they are assumed to occur earlier in the program. This is, in part, due to the typically long lead time in identifying and procuring the property needed for structured parking and the construction.

As mentioned Metro would contribute to non-motorized transit access improvements in coordination with local jurisdictions. Typical elements to be considered include:

- Sidewalks at major transit hubs
- Bicycle parking at major transit hubs
- Bicycle lanes providing a direct connection to major transit hubs. These include defined portions of the roadway that have been designated by striping, signage, and pavement markings for the preferential or exclusive use of bicyclists. Improvements could also include cycle tracks, which are exclusive bike facilities that are physically separated from motor traffic and distinct from the sidewalk via a curb, median, bollards, and/or pavement treatments.

Bicycle and Pedestrian Costing Assumptions

The type and number of facilities described in the plan represent a sample of possible non-motorized improvements that could be constructed. As we move toward implementation, additional facilities or improvements may be identified. For cost estimating purposes, the representative total amount of investment for non-motorized access improvements is equivalent to the amount identified for park-and-ride facilities.

Project costs were estimated for quantities of bicycle parking at major transit hubs, sidewalks, and bicycle lanes and/or cycle tracks by using Metro historical costs, and considering recent engineer's estimates for constructed projects. The engineer's estimates represent the current industry standard for typical unit bid-based costs for known elements such as cement concrete sidewalk, asphalt, concrete curb and gutter, ADA ramp, demolition, and pavement restoration. Typical elements for non-motorized improvements are shown in Table D-1.

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Table D-1 **Bicycle and Pedestrian Facility Typical Elements**

Project Type	Typical Elements
Sidewalks	Site preparation 8-foot new sidewalk (one direction) Curb and gutter Associated stormwater improvements Illumination Americans with Disabilities Act (ADA) compliant ramps
Bicycle parking at major transit hubs	High capacity bike parking in cages with secure access On-demand bicycle lockers
Bicycle Lanes and/or cycle tracks	Site preparation 5-foot bicycle lane (one direction) or 8-foot cycle track (one direction) 8-foot new sidewalk (one direction) Curb and gutter Associated stormwater improvements Illumination ADA ramps

Park-and-Ride Expansion

Table D-2 shows the relative share current of transit access provided by park-and-ride lots in the four transit access zones defined in the plan. These results are based on current park-and-ride utilization data from Metro and travel model data from the Puget Sound Regional Council (PSRC). It is important to recognize that the results in Table D-2 reflect the "home" location of where park-and-ride demand originates, and not the location of the park-and-ride lot itself. As an example, park-and-ride users from Zone 4 areas can and do park at park-and-ride lots located in Zone 2 and 3 areas, where most of the county's park-and-ride lots are located. It is also important to note that there is no currently available data on the number of people who park on-street and walk to an adjacent transit stop (often referred to as "hide-and-ride"). These types of riders are not considered to be park-and-ride users since they do not park at a lot where they can be counted.

Table D-2 **Existing Conditions: Park-and-Ride Access Mode Share**

Transit Access Zone	Park-and-Ride Stalls Used	Proportion of Transit Riders that use Park-and-Ride
Zone 1	3,920	8%
Zone 2	6,780	41%
Zone 3	7,300	64%
Zone 4	1,600	84%
Total	**19,600**	**N/A**

As shown in Table D-2, park-and-ride lots provide access to more than half of all transit riders in Zone 3 and 4, meaning that most people who use transit in these areas access it via a park-and-ride lot). On the other hand, in Zone 1, more than 90 percent of transit users walk, bicycle, or get dropped off at a bus stop. In Zone 2 , which include a large portion of suburban King County, just over 40 percent of transit users park at a park-and-ride lot to access transit. It is important to note that this data reflects current conditions and not the extensive 2040 transit network envisioned in METRO CONNECTS.

To determine the number of future park-and-ride spaces that Metro could partner to construct, the agency considered several factors:

- Population within walking distance to frequent transit service
- Future local/express service expansion

- Proposed park-and-ride capacity identified to be provided by Sound Transit
- Future park-and-ride access mode shares reasonably assumed for each access zone

With the above considerations in mind, the following assumptions were used:

- Metro's existing owned and leased lots will be actively managed in the future to provide maximum capacity for transit riders, including pricing to incentivize more efficient use of lots. Metro will continue and expand its leased lot program as a way to add capacity without the significant expense of construction, particularly in areas where long term service expansions would mitigate or reduce the need for auto parking.
- Sound Transit has proposed to construct more than 10,320 new park-and-ride stalls in King County as it expands the regional light rail and bus rapid transit system as part of the planned ST2 and proposed ST3 investments
- People who live in Zone 1 and 2 will be within a half-mile walking-distance to RapidRide and frequent transit and it is proposed that they receive no additional park-and-ride capacity.
- The envisioned expansion of the local/express network, assumes that Zone 3 park-and-ride access mode share could drop from 64 percent in 2015 to 50 percent by 2040. This would represent a 22 percent drop in park-and-ride mode access, which would be mitigated by a 26 percent increase in the amount of transit service in the Zone 3 area. Additionally, it is important to note that a 50 percent park-and-ride access mode share is substantially higher than existing park-and-ride access shares in Zone 1 and 2 in 2015.
- For Zone 4, park-and-ride access mode share is assumed to remain unchanged. Park-and-ride lots would continue to be the predominant means of accessing transit in these low-density areas in the future and additional capacity is proposed to address the growth in ridership in this zone.

Based on these assumptions, Table D-3 summarizes the future park-and-ride capacity envisioned as part of METRO CONNECTS. As shown, both Metro and Sound Transit have identified new park-and-ride supply, with Sound Transit potentially adding more than 10,320 spaces and Metro adding 3,300.

Table D-3   METRO CONNECTS Future Conditions: Park-and-Ride New Capacity

Transit Access Zone	Metro and Sound Transit Planned or Proposed New Park-and-Ride Stalls Provided by 2040	Estimated Proportion of 2040 Transit Riders that use Park-and-Ride
Zone 1	0	4%*
Zone 2	0	33%*
Zone 3	2,900	56%
Zone 4	400	84%
Sound Transit (not assigned to access zones)	10,320	N/A
Total	13,620 (3,300 from Metro, 10,320 from Sound Transit)	N/A

* These proportions could be higher if transit riders in these areas use the new Sound Transit lots.

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To identify the most effective locations for Metro to add the 3,300 new park-and-ride spaces, the following factors were considered:

- Transit ridership and population growth along major transit corridors
- Currently utilized locations along the major transit corridors
- Future Sound Transit park-and-ride investments

The results of the location analysis are summarized in Table D-4.

Table D-4   Location of METRO CONNECTS Envisioned New Park-and-Ride Capacity

Major Transit Corridor	Current Usage (parking stalls)	Sound Transit Planned and Proposed Future Growth	Envisioned Metro Future Growth	Total Sound Transit and Metro Growth (percent change from existing)
I-5 North King County	1,850	930	400	1,330 (72%)
SR 522	1,300	900	0	900 (69%)
I-405	2,400	930	900	1,830 (76%)
SR 520	1,500	2,080	0	2,080 (139%)
I-90	4,600	1,380*	600	1,980 (43%)
SR 167 / Southeast County	2,600	950	600	1,550 (60%)
I-5 South King County	3,700	3,150	800	3,950 (107%)
Non-Major Corridors	1,650	0	0	0 (0%)
Total**	19,600	10,320	3,300	13,620 (69%)***

* Sound Transit will expand South Bellevue Park-and-Ride by 881 stalls as part of East Link. This analysis attributes these stalls to the I-90 corridor. The proposed light rail extension to Issaquah would include a 500 space garage.
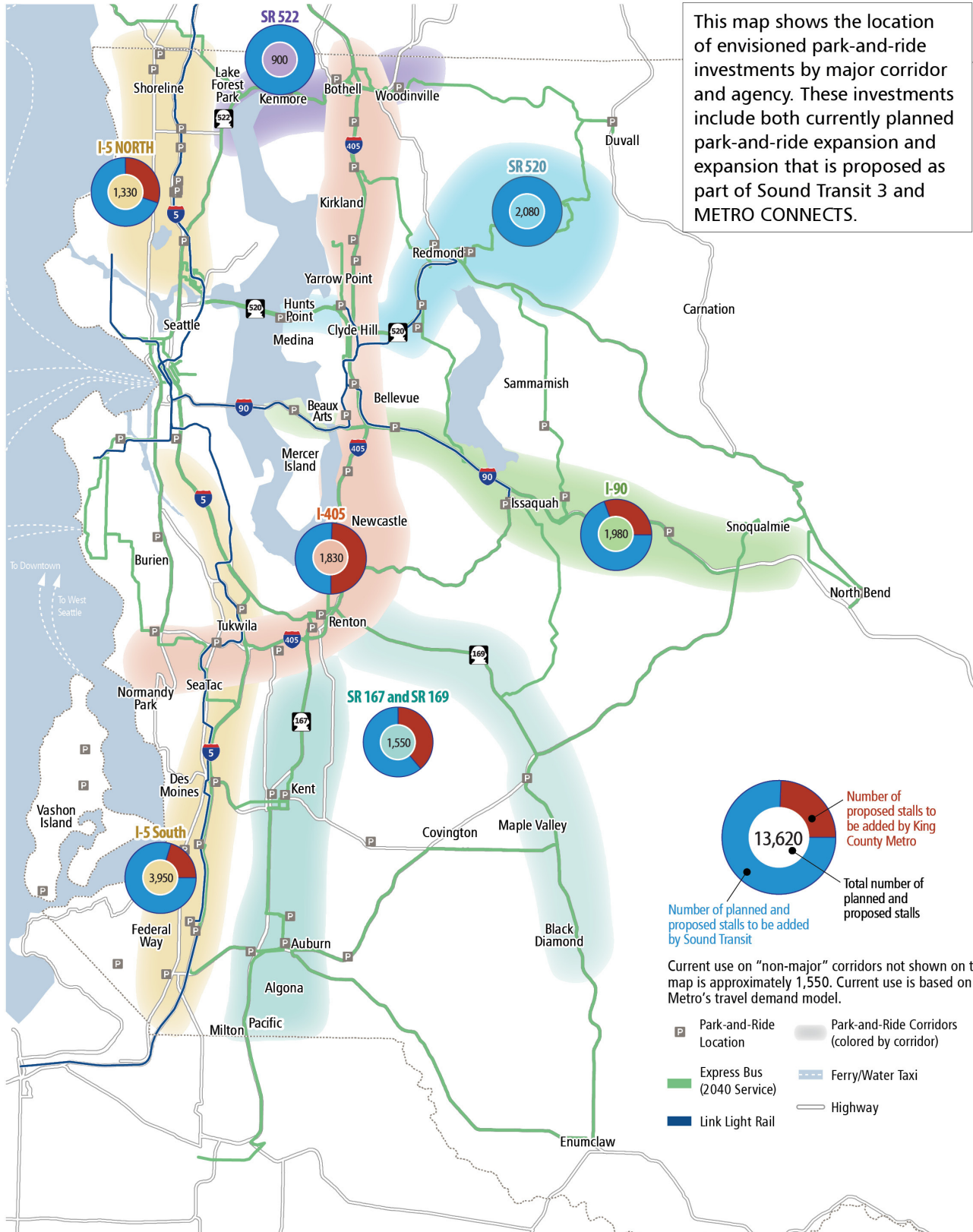
**Reflects total demand, per Metro's travel demand model. Actual park and ride utilization at all lots in King County, including those owned or leased by Metro, Sound Transit, WSDOT, and others during the first quarter of 2015 is approximately 20,000. Note that total supply of owned lots within the county is approximately 25,000 stalls.

***This analysis does not include the leased lot program.

Table D-4 indicates that all major transit corridors would receive additional park-and-ride spaces, with the largest percentage increases in the I-405, SR 520, and I-5 South King County corridors. In terms of total number of new stalls, the I-5 South King County and SR 520 corridors would increase the most. In total, the park-and-ride system would increase by 69 percent.

Figure D-2 shows the location of envisioned park-and-ride investments by corridor.

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This map shows the location of envisioned park-and-ride investments by major corridor and agency. These investments include both currently planned park-and-ride expansion and expansion that is proposed as part of Sound Transit 3 and METRO CONNECTS.

SR 522
900

I-5 NORTH
1,330

SR 520
2,080

I-90
1,980

I-405
1,830

SR 167 and SR 169
1,550

I-5 South
3,950

13,620

Number of proposed stalls to be added by King County Metro

Total number of planned and proposed stalls

Number of planned and proposed stalls to be added by Sound Transit

Current use on "non-major" corridors not shown on this map is approximately 1,550. Current use is based on Metro's travel demand model.

P Park-and-Ride Location

Express Bus (2040 Service)

Link Light Rail

Park-and-Ride Corridors (colored by corridor)

Ferry/Water Taxi

Highway

Park-and-Ride Expansion Cost Estimating Assumptions

Park-and-rides traditionally have been constructed as structured parking garages or surface parking lots. The cost analysis assumed structured parking, which at a higher cost provides a conservative cost estimate. This was also used as an assumption because many locations are spatially constrained and a surface lot is prohibitive. This costing assumption is also consistent with ST3 planning for typical light rail transit garages.

Costs were estimated based on historical construction information from Metro's most recently completed projects in Burien and Redmond Park-and-Ride structured parking facilities. These projects were adjusted using Construction Cost Index (CCI) inflation rates, and then divided to determine a unit price per structured stall which was then applied to the number of stalls.

Typical elements of a structured parking facility include the following:

- Structured parking garage and foundation
- Pedestrian plaza/sidewalk
- Stairs/elevators
- Electrical components
- Illumination
- Utilities
- Site civil work to access garage entrance
- Right-of-way (based on typical structured garages in King County)

Access to Transit Parking Cost Estimates

Table D-5 and Table D-6 summarize the estimated costs for access to transit improvements included in METRO CONNECTS.

Table D-5   Bicycle and Pedestrian Cost Estimates

Non-motorized Access Improvements	Unit	Total Units	Estimated Metro Cost (in millions YOE $)
Sidewalks	Per mile (one way)	50	$218
Bicycle Parking at Major Transit Hubs	Per each	55	$34
Bicycle Lanes	Per mile (one way)	40	$245
Unidentified Investments	---	---	$49
		Total	$546

Table D-6   Park-and-Ride Expansion Cost Estimates

Vehicular Access to Transit Investments	Unit	Total Units	Estimated Metro Cost (in millions YOE $)
Park-and-Ride Garage Structure	Stall	3,300	$552
Unidentified Investments	---	---	$54
		Total	$606

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Appendix E.   Passenger Facilities

Improving the passenger experience is a key part of METRO CONNECTS and represents a significant element of Metro's proposed capital investment. There are two major categories of passenger facilities: transit centers and bus stops and shelters.

As shown in Figure E-1, passenger facility investments make up 15 percent of the METRO CONNECTS capital investment.

Figure E-1   *Passenger Facilities Portion of Capital Costs*
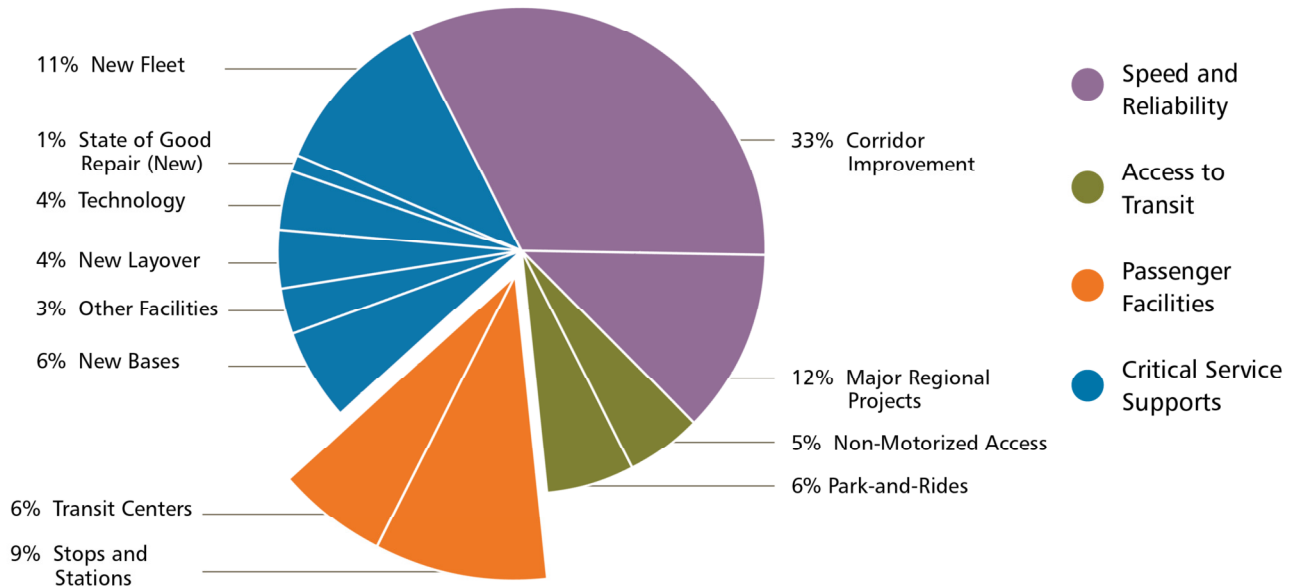
Transit Centers

Metro has tentatively identified the locations of major transit centers or transfer facilities that would be needed to support the envisioned future service network in 2040. By 2040, total transit boardings in King County would double compared to 2015. This growth in ridership would be shared between Sound Transit, with new riders on expanded rail and bus rapid transit (BRT) service, King County Metro, and to a lesser extent Pierce Transit. To achieve this level of transit ridership growth, the envisioned METRO CONNECTS 2040 service network relies on a significantly higher level of bus-to-bus and bus-to rail transfers than the existing network. The facilities necessary to effectively meet customer needs in this future system are very different from what is provided by current facilities. For one, there will be greater passenger activity, including boardings, alightings, and transfers than exists today. Through Metro's integration with Sound Transit, full busloads of passengers would be expected to transfer to light rail trains to complete their commute, especially during the peak periods. With the anticipated increase in activity, the location and design of transfer facilities would become more important in order to create an efficient and effective transit network and a comfortable, safe, and easy-to-navigate environment for passengers.

Metro calculated the need for future transit centers based upon the envisioned 2040 service network using the following methodology:

- Identified locations of high boarding and transfer activity (more than 2,500 daily boardings/transfers) and high bus volumes (more than 40 buses per hour during the peak period)
- Evaluated existing facilities at each location
- Identified areas that Sound Transit (ST) is planning and proposing investments in bus/rail integration facilities (ST2 or ST3), at which ST plans to include:
    - 2 off-street bus bays
    - 5 off-street bus layovers
    - 2 on-street bus bays
    - An area of approximately one acre at each site
    - A canopy, wind screen, benches, trash cans, information pylon, etc.
- Determined net future investment needed

The locations of major facilities in the METRO CONNECTS 2040 service network and their anticipated boarding and transfer levels are shown in Figure E-2 and Figure E-3. These figures illustrate the anticipated passenger volumes and activities at these locations.

Several of the envisioned future transfer points are existing or planned light rail stations that will be designed and constructed by Sound Transit. In addition to being located at light rail stations, major transit centers and transfer points would be located where bus boardings are high and transfers are anticipated.

Metro would contribute to investments in transit centers and bus stop projects to support the METRO CONNECTS 2040 service network but assumes that these investments would be built in partnership with local jurisdictions, state agencies, and other transit providers to ensure they meet the jurisdictional character and needs. Transit centers will include both on- and off-street facilities. Approximately 85 transit centers would be needed to support the 2040 service network. The type of investments and design of transit will be based upon a number of factors, including bus volumes and location. Consistent design elements, such as wayfinding signage and passenger information, can help to provide consistency across all sites. Coordination among Metro and other transit providers would be required to create standard features at major transit centers.
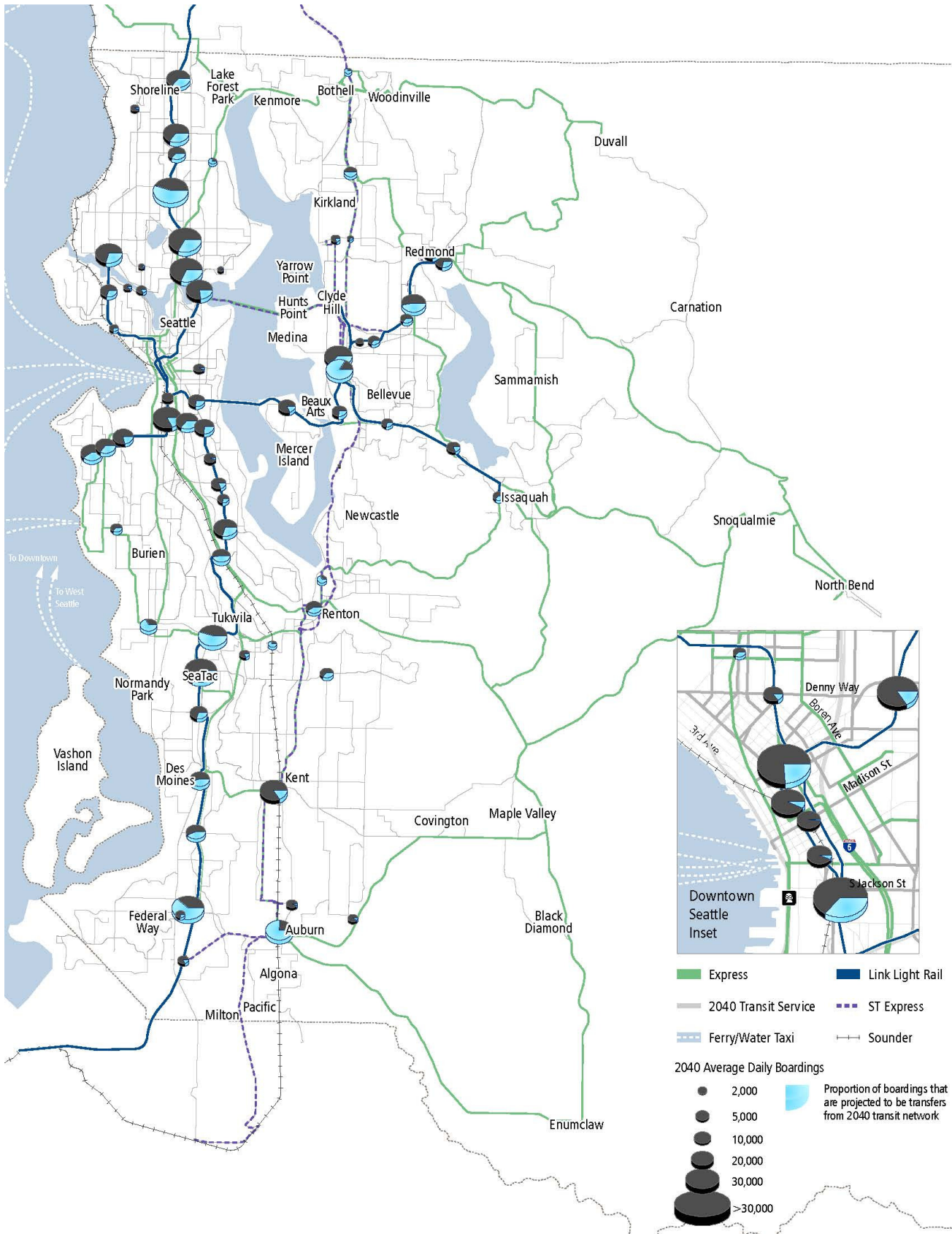
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Transit Center and Transfer Point Costing Assumptions

The estimated cost for off-street facilities was based on historical construction cost information from Metro's most recently completed facilities: Burien and Redmond Transit Centers. The costs were adjusted using CCI inflation rates and then divided to determine a unit price per bus bay. The estimated costs for on-street facilities were based on a recent engineer's estimate for a minor roadway widening/bus bulb plan. The estimates represent the current industry standard for typical unit bid-based costs for known elements such as cement concrete sidewalk, asphalt, concrete curb and gutter, ADA ramp, and pavement restoration. Typical elements are shown in Table E-1.
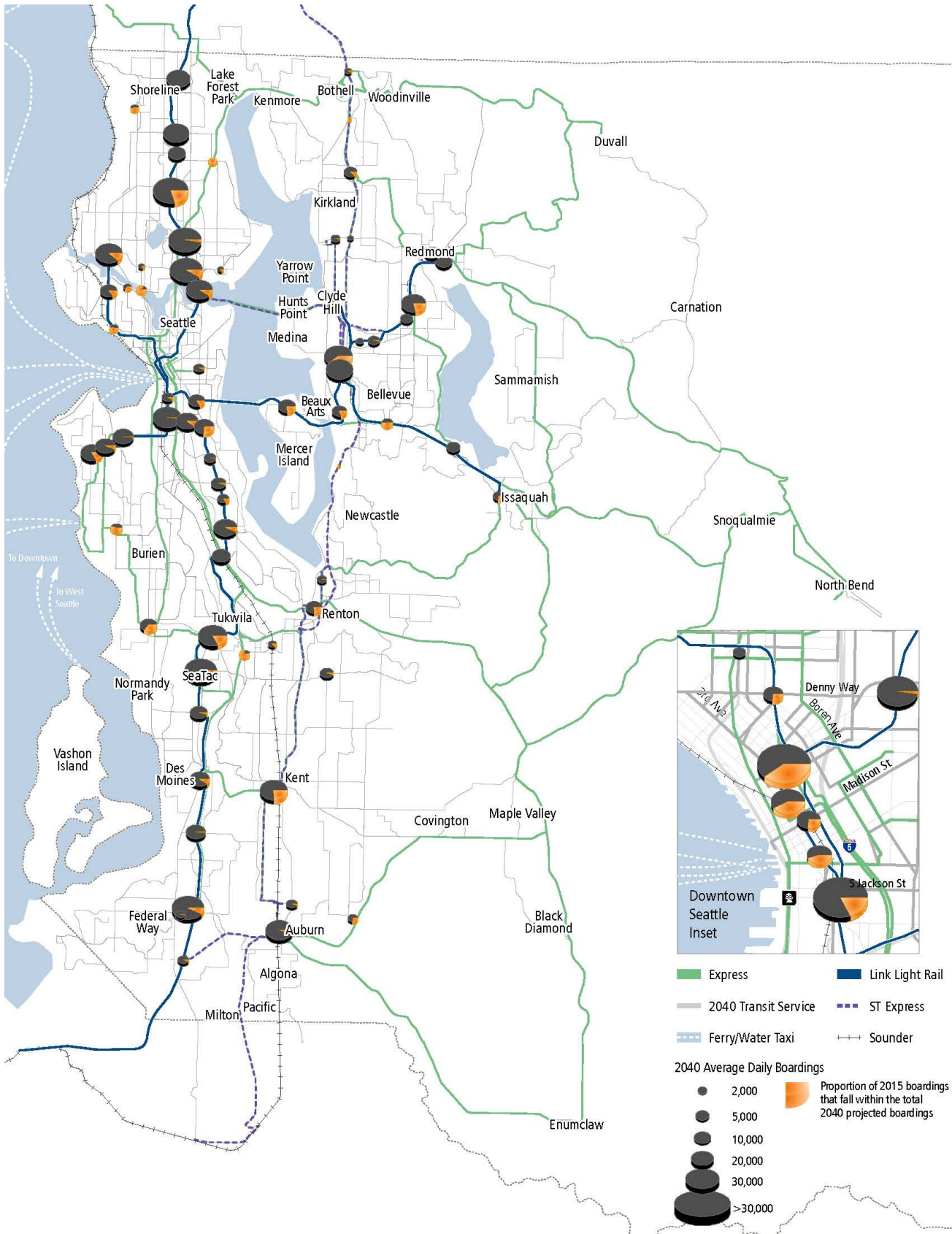
Table E-1   *On- and Off-Street Facility Typical Elements*

Project Type	Typical Elements
Off-street transit center facility	Right-of-way (based on right-of-way required for Burien/Redmond Transit Centers) 6 active bus bays 6 to 8 layover spaces Emergency call stations Security Driver comfort station Minor roadway work Sidewalk modifications Driveways Access road paving
On-street transit center facility	Roadway paving Sidewalk Concrete pad Additional signage

Figure E-2   Transit Centers – METRO CONNECTS Anticipated Boarding and Transfer Levels

Downtown
Seattle
Inset

Express

Link Light Rail

2040 Transit Service

ST Express

Ferry/Water Taxi

Sounder

2040 Average Daily Boardings

2,000

5,000

10,000

20,000

30,000

>30,000

Proportion of boardings that
are projected to be transfers
from 2040 transit network

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Figure E-3   Current and METRO CONNECTS 2040 Boarding Levels

Shoreline
Lake Forest Park
Kenmore
Bothell
Woodinville
Duvall
Kirkland
Redmond
Yarrow Point
Carnation
Hunts Point
Clyde Hill
Seattle
Medina
Bellevue
Sammamish
Beaux Arts
Mercer Island
Newcastle
Issaquah
Snoqualmie
Burien
North Bend
To Downtown
To West Seattle
Tukwila
Renton
SeaTac
Normandy Park
Vashon Island
Des Moines
Kent
Covington
Maple Valley
Black Diamond
Federal Way
Auburn
Algona
Milton
Pacific
Enumclaw

Downtown Seattle Inset

Denny Way
Boren Ave
Madison St
S Jackson St
Downtown Seattle Inset

Express — Link Light Rail
2040 Transit Service — ST Express
Ferry/Water Taxi — Sounder

2040 Average Daily Boardings
2,000
5,000
10,000
20,000
30,000
>30,000

Proportion of 2015 boardings that fall within the total 2040 projected boardings

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Bus Stops and Shelters

Bus stops and shelters are some of the most important places where customers interact with the agency. Annually, Metro makes an investment in these facilities and also ensures that they are maintained in a state of good repair. Metro serves a variety of bus stops and shelters containing different amenities, based on ridership and service levels. As the agency grows and modifies its service network to meet future needs consistent with the METRO CONNECTS vision, it will need to provide new and expanded passenger facilities. As with transit centers, the envisioned increase in ridership and the increased level of transfer activity will merit an increased investment in passenger facilities, creating a more comfortable and safe environment for passengers.

Metro assumes these facilities would be developed in partnership with local jurisdictions, state agencies, and/or other transit providers. In particular high ridership and transfer facilities will be built with close coordination and partnership with jurisdictions to ensure they meet local needs and character.

Metro currently serves standard bus stops (unsheltered or sheltered) and RapidRide bus stops (standard, enhanced, and stations). Metro owns and maintains approximately 8,400 bus stops with nearly 1,700 of these having shelters. Each type of facility includes different programmatic elements based on passenger needs.

Standard Bus stops (non-RapidRide)

At bus stops with lower ridership, Metro provides a bus stop sign, which indicates to passengers where and which buses will stop to pick them up. Metro provides bus shelters at bus stops based on ridership. Metro's current threshold for installation of a bus shelter at a bus stop is 50 or more riders per day within the city of Seattle and 25 or more riders per day in areas outside of Seattle (Metro 2013). The anticipated increase in ridership associated with the METRO CONNECTS 2040 service network means that the number of facilities will grow.

Metro calculated the need for future standard bus stop improvements based upon the envisioned 2040 service network using the following methodology:

- Calculated number of bus stops with fewer than 1000 daily boardings
    - Assumed that all existing shelters remain in place
    - Assumed that the proportion of stops that meet the daily shelter requirements increases proportionally with ridership on non-RapidRide lines
    - For newly identified shelters:
        - Assumed half will receive standard shelter investment (bus shelter, shelter footing, litter receptacle, bench)
        - Assumed half will receive twice the standard shelter investment.
- Calculated number of bus stops with more than 1,000 daily boardings, low transfer activity (fewer than 500 daily transfers)
    - Assumed four times the standard shelter investment at these locations
- Calculated number of bus stops with more than 1,000 daily boardings, high transfer activity
    - Assumed an investment comparable to a RapidRide station
- Assumed that half of existing sheltered bus stops will need an additional investment equal to the standard shelter investment as ridership grows

RapidRide Bus Stops

Metro's BRT system, known as RapidRide, currently has six limited-stop bus routes. These routes have three classes of bus stops: standard, enhanced, and station. All bus stops have unique design and branding that identifies them as RapidRide stops. RapidRide standard and enhanced bus stops have features that are similar, respectively, to non-sheltered and sheltered bus stops that are not part of the RapidRide system. RapidRide stations are the largest in size and have the highest level of passenger amenities:

- Shelters that are well-lit so people can see around themselves and be seen.
- Shelters with more weather protection overhead than typical shelters.
- Lights on top of station shelters help identify them from a distance.
- ORCA card readers at stations that allow riders with ORCA cards to pay before they board a RapidRide bus and get on at any door.
- Electronic signs that display how many minutes it will be until the next bus will arrive. When a RapidRide station is served by additional routes, the signs also display the arrival time for them.
- Large, illuminated maps of the RapidRide line showing all the bus stops and destinations.
- Request signals at the bus stop that trigger a light at night to indicate to the driver that they are waiting.
- Accessible boarding platforms which also have, benches, trash receptacles, and bicycle racks.
- Amenities for the sight and hearing impaired, including tactile paving, different colored/textured pathways, braille signage, and audio announcement buttons.

The scale of amenities provided at each RapidRide stop is based on several factors, including ridership. Generally, RapidRide stops with more than 150 daily boardings receive the station level of amenities, stops with 50 to 149 daily boardings receive a RapidRide enhanced bus stop, and stops with less than 50 daily boardings receive a standard RapidRide stop (Metro 2013).

The need for future RapidRide bus stops is based upon the METRO CONNECTS 2040 service network which identifies that the system will grow to 26 lines. The following methodology was used to determine the individual elements:

- Reviewed the existing percentage of bus stops with stations, enhanced, and standard amenities
- Determined the total number of RapidRide bus stops based on miles of envisioned 2040 RapidRide service and half-mile stop spacing
  - Estimated the growth in riders/mile from existing to the future (approximately 45 percent)
  - Applied a riders/mile growth rate to the existing station percentages
- Calculated the number of RapidRide stops by type by multiplying the new station percentages and the number of new RapidRide stops

Passenger Facility Cost Estimating Key Assumptions

Passenger facilities are assumed to include investments along existing and future RapidRide corridors, as well as non-RapidRide corridors. Estimated costs were based on historical construction cost information from Metro for passenger facilities, extrapolated into the future. Non-RapidRide corridors were broken down into categories according to the number of boardings/transfers and appropriate costs were applied. Additionally, costs were estimated to support expansion of the RapidRide network which will require more facilities of all types.

Typical elements are shown in Table E-2.

Table E-2   Bus Stop and Shelter Typical Elements

Project Type	Typical Elements	
Standard shelter (Non-RapidRide/fewer boardings)	50 percent of shelters identified include 1 shelter 50 percent of shelters identified include 2 shelters Litter receptacle Bench	
Standard shelter (Non-RapidRide/low transfers)	4 standard shelters Litter receptacle Bench	
Standard shelter (Non-RapidRide/high transfers)	Comparable elements to RapidRide station, including; • Shelter and foundation • Bench • Lit blade • Litter receptacle • Bicycle rack (optional) • iStop (optional) • Pedestrian lighting • Real-time bus information • Power supply	50 percent of existing sheltered bus stops receive additional improvements: • 1 additional standard shelter • Litter receptacle • Bench
RapidRide standard bus stop	Bench iStop (optional) Unlit blade marker (RapidRide branding sign)	
RapidRide enhanced bus stop	Shelter and foundation Bench iStop (optional) Litter receptacle	
RapidRide station	Shelter and foundation Bench Lit blade Litter receptacle Bicycle rack (optional) iStop (optional) Pedestrian lighting Real-time bus information Power supply	

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Passenger Facility Cost Estimates

Table E-3 shows the level of investment in passenger facilities to accommodate future ridership at transfer centers. Table E-4 shows the estimated costs for bus stops and shelters.

Table E-3   METRO CONNECTS Transit Center Estimated Costs

Transit Center Investments	Unit	Total Units*	Estimated Metro Costs (in millions YOE $)
Off-street Transit Center	Bus Bay	80	$503
On-street Transit Center	Bus Bay	40	$11
Unidentified Investments	---	---	$50
		Total	$564

* A single transit center is comprised of multiple bays. This quantity allows for consistent cost estimation across locations, but does not specify the size of each facility.

Table E-4   METRO CONNECTS Bus Stops and Shelters Estimated Costs

Bus Stops and Stations Investments	Unit	Total Units	Estimated Metro Costs (in millions YOE $)
Bus Stop Projects			
Shelters (low boarding activity)	Shelter	1,180	$132
Shelters (low transfers)	Shelter	350	$105
Shelters (high transfers)	Shelter	405	$169
Existing Bus stop Improvements	Bus Stop	1,615	$60
Standard Bus stop (RapidRide)	Bus Stop	110	$21
Enhanced Bus stop (RapidRide)	Bus Stop	240	$46
Station (RapidRide)	Station	720	$369
Unidentified Investments	---	---	$88
		Total	$990

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Appendix F.   Critical Service Supports

Critical Service Supports include technology, new fleet, new bases, new layover, other facilities, and keeping new facilities in a state of good repair. Together, these investments make up 29 percent of the METRO CONNECTS Capital Investment.

Figure F-1   Critical Service Supports Portion of Capital Costs
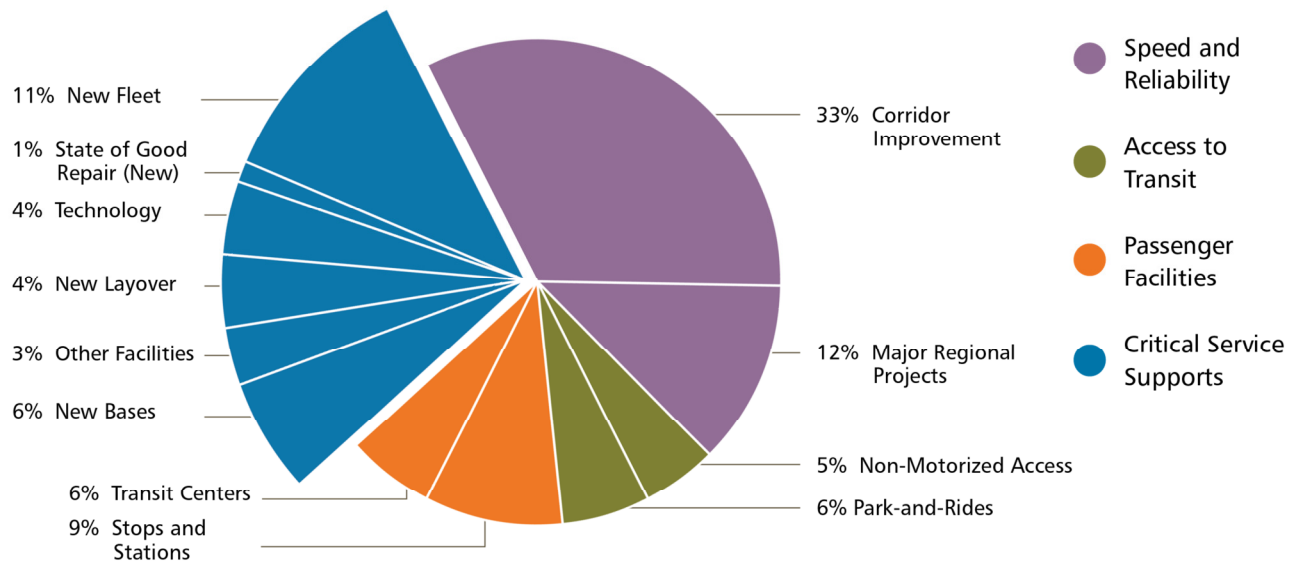
Technology

Over the last few years, technology investments have represented significant portions of Metro's budget. Improvements such as the ORCA system, a new radio system, real time arrival signs at RapidRide stations and elsewhere in the system, and next stop reader boards and audio announcements on all buses provide valuable information and benefits to Metro's customers and help to improve Metro's operations. Other technological investments help Metro collect customer and operational data, manage network operations, and provide improved customer information. Technology investments are expected to continue through the period of METRO CONNECTS as a means to continuously improve payment systems, bus operations, and customer information. METRO CONNECTS proposes an additional $448 million in technology investments to be able to take advantage of new technologies to improve the customer experience and to increase the efficiency of current operations. As with all of our assets, our technology investments will require continuous maintenance and upgrades. These costs are included under State of Good Repair, and will include maintenance and upgrades of physical technology components, such as real time arrival signs and ORCA card readers, as well as upgrades to ensure we have the most useful and effective software.

Technology investments make up 4 percent of the METRO CONNECTS capital investment.

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New Fleet

In order to provide the service levels described in METRO CONNECTS Metro will need to expand its fleet. These costs represent 11 percent of the METRO CONNECTS capital investment. Through the network improvements, Metro anticipates that fleet utilization will improve and the doubling of ridership envisioned by 2040, does not require a doubling of the bus fleet.

New Fleet Costing Assumptions

Metro operates a bus fleet of approximately 1,400 vehicles. This fleet includes a mix of standard and articulated hybrid diesel-electric buses, electric trolley buses, and some remaining clean diesel buses which will be gradually phased out of the fleet. Metro currently operates a bus fleet mix of approximately 50 percent articulated buses and 50 percent standard buses (currently 40-foot buses). By 2018, 100 percent of the bus fleet will be hybrid or electric. This supports the King County Strategic Climate Action Plan which provides a goal for Metro to operate a zero emission bus fleet. The evaluation of emerging technologies will be integral to this transition. In 2016, Metro introduced its first all-battery powered bus into service. In addition to buses, Metro has an active paratransit fleet of over 300 vehicles and growing active vanpool fleet of almost 1,750 vehicles.

Metro will need to expand the size of its bus fleet in order to support the added service hours envisioned in METRO CONNECTS. The number of additional buses needed to support the METRO CONNECTS 2040 service network is calculated based on the amount of service hours needed to meet service levels. Metro calculated the need for additional bus fleet investment based upon the 2040 service network using the output from the Sound Transit Incremental Ridership Forecasting Model. This model (which is also used to forecast future transit ridership levels for all transit agencies in King County) directly outputs fleet estimates based on the route length and average speed. Metro's standard "reserve ratio" was applied to include the need for spare buses to ensure reliable service.

Based on the current service configuration and split between peak and non-peak service, Metro currently needs a bus for every 2,500 annual service hours provided. This assumption is based on historically high morning and evening peaks for bus service. In the envisioned 2040 service network, morning and evening service peaks would be less pronounced and service hours would be more evenly distributed throughout the day. The more even distribution of service throughout the day would shift the demand for new buses from one per every 2,500 hours upwards to one per every 3,200 service hours. A total of 2.5 million additional service hours would be required to support the METRO CONNECTS 2040 service network, which would require between 550 and 650 additional buses depending on the final distribution of services.

Consistent with the vision in METRO CONNECTS, Metro anticipates growth in both the paratransit and vanpool fleets. The paratransit fleet would be expected to grow by 170 vehicles and the vanpool fleet would be expected to more than double, growing by 1,750 vehicles.

Table F-1 shows the costing assumptions for new fleet vehicles.

Table F-1   Bus Fleet Costing Assumptions

Fleet Type	Assumptions	Unit Costs
Bus Fleet	New bus purchases split between: • 40' Bus - 50% of total • 60' Bus - 50% of total	Vehicle costs were developed using 2015 prices as follows: • 40' Bus - $700,000 • 60' Bus - $1,1000,000
Vanpool Fleet	1,800 new vans would be needed from 2015 to 2040 to support an estimated 3 % annual increase in passenger trips, up to a total of 8,100,000 trips per year.	Vehicle costs were developed using an average cost per van of $25,000
Paratransit Fleet	140 total new vans would be needed from 2015 to 2040 to support an anticipated 55% increase in ridership, up to a total of 1,400,000 passenger trips per year.	Vehicle costs were developed using the average cost per van of $89,000

Fleet Cost Estimates

Table F-2 summarizes the total fleet investment needed to support the envisioned 2040 service network. The estimates include cost for the initial purchase of incremental vehicles, as well as associated replacement vehicles.

Table F-2   METRO CONNECTS Fleet Investments Estimated Costs

Fleet Investments	Unit	Total Incremental Units	Estimated Metro Costs (in millions YOE $)
Bus Fleet	Vehicles	620	$950
Vanpool Fleet	Vehicles	1,750	$122
Paratransit Fleet	Vehicles	170	$80
		Total	**$1,152**

New Bases and Other Facilities

To support the provision of transit service in King County, Metro needs to ensure that it has sufficient capacity to dispatch and service its vehicles. In addition, facilities to support areas of growth such as vanpool and passenger facilities may be required. Such facilities represent a large capital investment. The following sections detail the investments needed for Metro to expand its network of supporting infrastructure, including layover, bus and vanpool base facilities, the trolley network, maintenance facilities consistent with the vision contained in METRO CONNECTS. Any such projects will be done in close coordination with partners to ensure that these facilities address local needs in addition to Metro's. Also, given the local considerations for the existing trolley system, it is expected that expansion of the trolley system will be done with financial contributions from partners.

New Bus Bases
Metro currently maintains and operates seven bus bases located around King County. Bus bases serve a variety of daily operational needs that are crucial to providing transit service, such as bus parking and vehicle maintenance. They provide for bus maintenance, repair, inspection, fueling, interior and exterior washing, and minor paint and body work. Bases also include facilities to support employees located at that facility, such as office space, transit operator lockers and luncheon rooms, and meeting rooms.

Adequate base facilities are essential to supporting the proposed METRO CONNECTS 2040 service network. Increasing the overall fleet requirements by between 550 and 650 buses will require additional base capacity (see Fleet section). Currently, Metro's bases vary in the number of buses they can support – from roughly 125 buses to about 270 buses; therefore Metro would need to provide capacity either through siting and constructing new operating bases or expanding capacity at existing facilities through renovation and modifying the footprint of the base. Availability of land and cost of potential sites will affect the location and size of bases that are built by 2040. In addition, new base facilities could be shared with other transit agencies as a way to reduce costs for all agencies. Reducing operations costs and deadheading is a key element in siting new facilities. With significant increases in service projected in south King County, a new bus base would likely be needed there. Metro may also need to make modifications to existing bases to be consistent with changes in fleet and propulsion technology, such as charging stations for battery-powered buses.

Vanpool Distribution Base
Metro currently manages a fleet of over 1,900 vans to support its vanpool and other programs. This fleet is expected to increase to nearly 2,900 vans by 2026 and almost 3,700 vans by 2040. Vanpool distribution bases require parking

for vans, van inspection and van wash bays, storage for van accessories, structures to support office space for staff while on-site, a sales office, and parking for customers coming to pick up and return vehicles. No maintenance or fueling is performed at these facilities. A planned expansion of an existing vanpool distribution base will support the next 10 years of growth. One additional new facility with approximately 300 spaces would be needed in 2027 and would support the program through the envisioned demand in 2040. Similar to bus maintenance bases, availability of land and cost of potential sites would affect the size and location of a future vanpool distribution base. Co-locating or developing the vanpool distribution base with a bus maintenance base could be considered.

Access Fleet Base

King County Metro currently has an active paratransit fleet of over 300 vans comprised of a variety of vehicle sizes and types. The Access program currently leases operating bases located in Bellevue, Kent, Shoreline, and Seattle to support this fleet. Access facility requirements include fenced, paved, secure and lighted lot for 100 – 135 vehicles, on-site fueling, onsite maintenance services, and general office space for employees. It is estimated that the program would need to add another base by 2030. Based upon the envisioned 2040 service network, an eastside location would be preferred. Similar to bus maintenance bases, availability of land and cost of potential sites would affect the size and location of a future vanpool distribution base. Co-locating or developing the Access fleet base with a bus maintenance base could be considered.

Facilities Maintenance Site

In addition to bases, Metro needs satellite facilities maintenance sites for the efficient report and dispatch of staff which support passenger facilities. These sites are used for fabrication, maintenance, and repair of Metro facilities, such as bus shelters. Major components of these sites include a fabrication/repair and carpentry shop; landscaping, sign, and constructor shops; covered materials shed(s); covered and heated storage; vehicle parking areas; security fencing; and office space for on-site staff. One additional facilities maintenance site will be needed to support the METRO CONNECTS 2040 service network. Availability of land and cost of potential sites would affect the size and location of a future facilities maintenance site.

New Trolley Wire

The METRO CONNECTS 2040 service network anticipates continued use of the existing trolley bus network as well as some minor modifications to the network. These modifications generally constitute fixing gaps in the existing network to allow for longer or more continuous routes. Metro anticipates a 10 percent increase in the total number of trolley overhead wire miles. Modifications to the trolley bus network includes construction of new two-way wire, including poles, switches, and wire.

New Bases and Other Facilities Costing Assumptions

New Bus Base Assumptions

The additional capacity was determined by the size of the future bus fleet. Estimated costs were developed from historical information from a 2008 estimate developed by King County Metro's Design and Construction section. This bus base estimate was developed using 2008 dollars and designed for 250 vehicles. In order to relate this estimate to current year dollars, a CCI inflation adjustment was included. The total planning, design and construction cost was divided by the number of vehicles to determine a unit cost of construction per vehicle.

Typical elements for bus bases are as follows:

- Site excavation and preparation
- Paving (12 acres)
- Landscaping and irrigation
- Storm water drainage and utilities
- Underground tank farm
- Security fencing and access

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- Operations building (15,000 sq. feet)
- Fuel/wash building (10,000 sq. feet)
- Maintenance building (60,000 sq. feet)
- Major Equipment
- Building furniture
- Electrical lighting
- Off-site mitigation, including roadway development, intersection improvements, and traffic signals
- Right-of-way (based on average size needed per bus determined by the current size of the Metro bus base)

Vanpool Distribution Base Assumptions

One vanpool distribution facility would be required in the future to accommodate future fleet growth beyond the existing vanpool facility's capacity. The new facility must provide up to 100 parking spaces for vehicles by 2027. The new facility would need a building on-site to support office space for staff, a sales office, van inspection and van wash bays, storage for van accessories, and a training/multipurpose room. The existing vanpool facility maintains 50 percent of the site for landscaping, and the new facility would be built with a similar configuration.

Unit costs were developed using the existing Van Distribution facility located in Redmond to determine the approximate size and support facility requirements. The Redmond facility includes space for 530 vehicles, therefore unit costs were developed based on the unit of measure of per vehicle space. The ratio was applied to the total quantity of vehicle spaces required in the future. In addition, unit costs for the square footage cost of a building were based on the King County Metro bus base project cost per square foot. Equipment and furniture needs were also included at 15 percent, similar to the King County Metro bus base estimate.

Surface parking lot costs were determined by developing an average from other planning level projects, including Sound Transit's Lynnwood Link Extension, ST3 planning, and the Puyallup Sounder station. The average cost determined by these three projects was divided by the total number of stalls for each specific location to determine a unit price per stall. The facility lot size was based on a ratio determined by the existing Redmond facility. Similar to the Redmond facility, it was assumed that half the site would require landscaping. Unit costs for landscaping were included similar to ST3 planning level unit costs.

Typical Elements include:

- Surface parking for up to 700 vehicles
- Service building
- Landscaping
- Right-of-way

Access Fleet Base Assumptions

One new access fleet facility would be required in the future. This facility must be able to accommodate up to 100 to 135 vehicles. The site would need to be fenced, paved, secure, and lighted. The facility would also require on-site fueling with diesel, unleaded gasoline with liquid propane gas as an option. The facility would include on-site maintenance services, including nine maintenance bays, work area, parts room, tire storage, fluids distribution and waste, washing area, backup power supply, and space for employees such as lunch/meeting rooms, training room, dispatch office, and manager offices. The approximate space of the maintenance building would be 13,000 square feet. Similar to the vanpool distribution facility, it is assumed that 50 percent of the site would be landscaping.

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Unit costs were developed consistent with the methodology used for the Van Distribution Base. Equipment and furniture needs were also included at 15 percent, similar to the King County Metro bus base estimate.

Typical elements include:

- Surface parking up to 135 vehicles
- Maintenance building (13,000 sq. feet)
- Landscaping
- Right-of-way

Facilities Maintenance Site Costing Assumptions
One additional facilities maintenance site will be required to support expanding passenger facilities. This facility would be required when either the operating base capacity is addressed or if three or more parking garages and/or transit centers were constructed. The facility would include common elements similar to the existing facility such as office spaces, lunchroom, mechanical room, sign shop, stores area with loading dock and secure area, fabrication/repair and carpentry shop, landscape shop, locker rooms, constructor shop, laundry room, and a data/computer room. In addition, the proposed facility would need to double the truck yard and provide the following amenities: covered sand and landscape material shed, covered and heated external storage, paint and sand blast room to accommodate shelter refurbishment, and full security fencing, door locks, and cameras. The site is assumed to include 10 percent landscaping.

Unit costs were developed using the existing North Facility site details to determine approximate size and support facility requirements. The number of parking stalls, support facility building size, and size of the site is expected to be 1.5 times the existing North Facility.

Unit costs for the building were based on the 2008 King County Metro bus base cost per square foot estimates. In addition, equipment and furniture needs were also included at 15 percent. Surface parking lot costs were determined by developing an average from other planning level projects, including Sound Transit's Lynnwood Link Extension, ST3 planning, and the Puyallup Sounder station. The average cost of these projects was used to develop a per stall estimate that was then applied to this facility. The facility lot size was based on increasing the existing North Facility site by 1.5 times. It was assumed that 10 percent of the site would require landscaping. Unit costs for landscaping were included similar to ST3 planning level unit costs. Typical elements include:

- Support buildings
- Employee Parking
- Landscaping
- Right-of-way

New Trolley Wire Costing Assumptions
New trolley wire would be added to fix gaps in the existing trolley wire network. The future new trolley wire is assumed to increase by at least 10 percent based on the existing total trolley overhead wire miles.

Costs for trolley wire investments were estimated by using historical construction information by King County Metro from the most recent trolley projects and then extrapolated into the future. The estimated costs include construction, design, project management, and construction administration. Because these efforts will be extension to existing trolley wire, as opposed to totally new wire, 65 percent of the historical costs were used for the estimates. These costs do not include the cost of new substations, or land acquisition. Typical elements include:

- New wires (two-way)
- New poles
- Switches

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New Bases and Other Facilities Cost Estimates

Table F-3 shows the estimated costs for new bases and other facilities.

Table F-3   METRO CONNECTS New Bases and Other Facilities Cost Estimates

New Bases and Other Facilities Investments	Unit	Total Units	Estimated Metro Costs (in millions YOE $)
Bus Maintenance Base	Vehicles	620	$625
VanPool Distribution Base	Base	1	$105
Access Fleet Base	Base	1	$41
Facilities Maintenance Site	Site	1	$75
New Trolley Wire*	Miles	7	$28
Unidentified Investments	---	**---**	**$88**
		Total	**$962**

New Bus Layover

The ability to have buses in the right place to start and end their routes, results in a more efficient system as less time is spent getting the bus to the right location. This is known as bus layover. Time for layover is included in bus schedules and is the periods of time between trips when drivers can take a break, including using the restroom. Layover also provides a cushion of time that allows the driver to start the next trip on schedule if the preceding trip ran late. Current layover facilities include space at transit centers where buses can wait as well as street space reserved for transit use in a place that does not disrupt traffic and is located throughout the county. Street space layover is often used at trip ends that do not terminate at transit centers or other off-street facilities. Having dedicated locations for layover serves an important function by providing Metro with increased flexibility for route scheduling and operations.

METRO CONNECTS 2040 will rely on appropriately sized and located layover facilities. Use of on-street parking is becoming more difficult to locate. The need for future layover space was estimated using the following methodology:

- Calculated future layover need by subregion (see Figure F-2) based on demand by route category
- Identified existing layover spaces based on the current route end points
- Calculated future layover need by identifying the number of bus route ends within a subarea. Future layover demand was assumed at a number of layover spaces per every peak hour bus trip based on service that ends in the subarea – this is consistent with existing layover space demand per peak hour bus trip. The assumed layover demand for each route service type was the following:
    - Frequent – Four layover spaces
    - Express – Two layover spaces
    - Local – 1 layover space
- Calculated net new layover demand by subtracting existing layover supply against new demand within the subarea; planned layover spaces at Sound Transit and Metro transit centers were also considered in the calculations.
- Assumed all new layover spaces would be off-street; no low-cost on-street spaces were assumed for cost estimating purposes
    - The rationale for the all off-street assumption is an acknowledgement that some of the existing on-street layover spaces could be lost to development over time. There is no way of knowing which layover spaces might be lost or how developers would mitigate for lost spaces.

In addition to the layover space included in planned transit centers (See Transit Centers and Transfer Points), Metro would need to secure approximately 270 additional layover spaces throughout the county to support the METRO CONNECTS 2040 service network.

Specific siting of layover facilities would be identified in collaboration with local agencies and right-of-way owners to ensure the most efficient service network (e.g., layover should be selected near the termini of routes to reduce deadheading wherever possible). Additionally, layover facilities could be jointly maintained and operated with other transit providers.

Layover Costing Assumptions

For costing estimating all new layover spaces were assumed to be accommodated in off-street layover facilities. The cost estimates assumed off-street facilities in order to provide a conservative estimate as many locations are spatially constrained. There are also existing on-street facilities that may be converted into off-street facilities in the future. Before facilities are built, the availability of on-street facilities will be evaluated to determine if right-of-way space can be secured.

Project estimates were based on the layover element of the One Center City project currently being developed by King County and City of Seattle. The One Center City project evaluated multiple options to determine a unit cost range which was then converted to a per unit price per layover bay.

Typical elements for an off-street layover facility include:

- Site excavation and preparation
- Access
- Road paving
- Driveway(s)
- Sidewalk
- Restroom facilities for drivers
- Illumination
- Signal work
- Right-of-way (based on average size of layover space needed per bus determined by the City Center project)

Figure F-2 identifies potential locations for future layover space by subregion, not including planned transit centers.

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Additional Parking Spaces Needed

- □ < 0
- ▨ 1 - 10
- ▨ 11 - 20
- ▨ > 20

— Express
— Link Light Rail
— 2040 Transit Service
- - - ST Express
- - - Ferry/Water Taxi
+—+ Sounder

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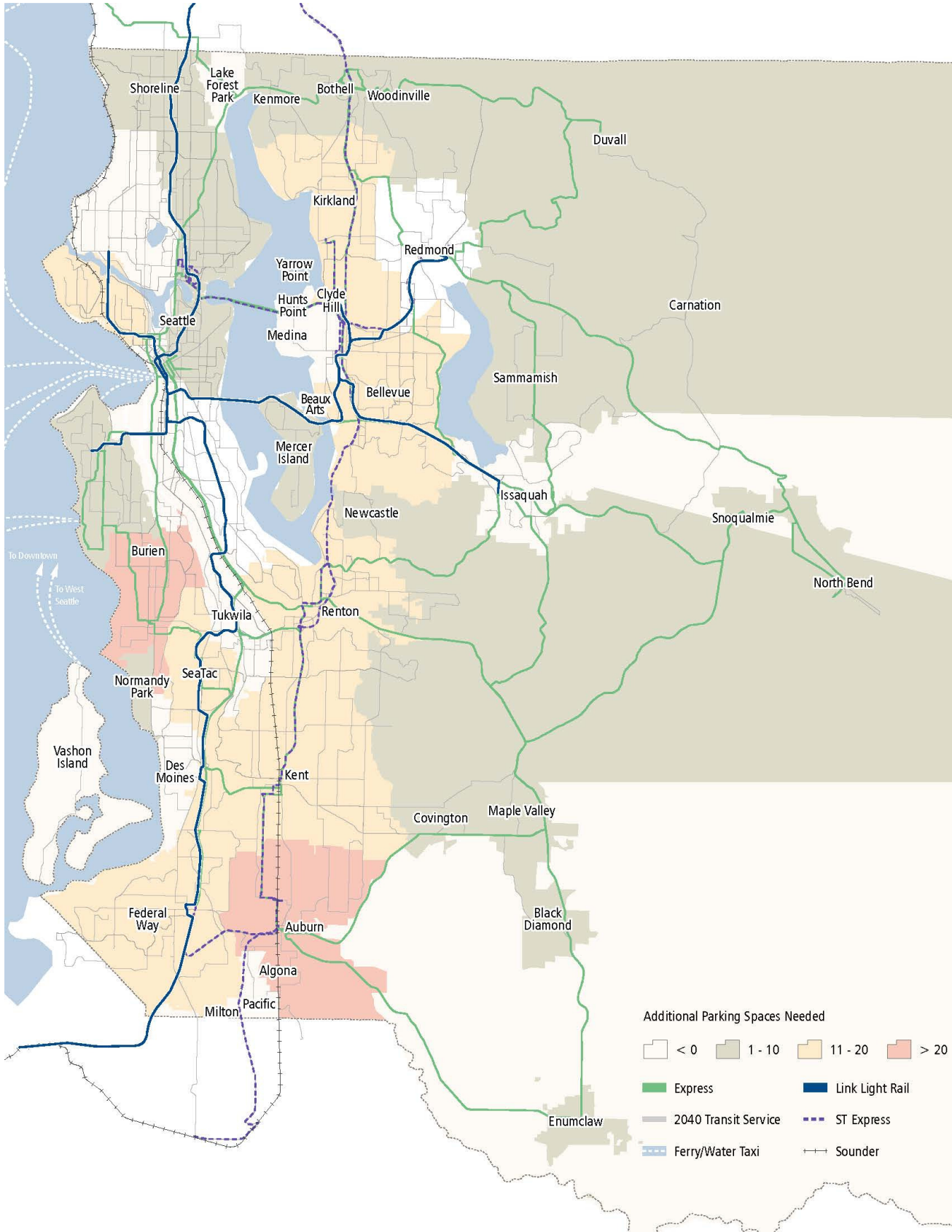
Layover Cost Estimates

Table F-4 shows the estimated costs for new layover.

Table F-4   METRO CONNECTS Layover Cost Estimates

Layover Investments	Unit	Total Units	Estimated Metro Costs (in millions YOE $)
Layover Spaces	Bus Bay	270	$370
		Total	**$370**

State of Good Repair (New Infrastructure)

The number of assets owned by Metro is expected to grow as the METRO CONNECTS vision is implemented. As these new items are completed, they will be added to the inventories that are used to determine the investments needed to maintain them in a state of good repair. Newer buildings and facilities generally do not require infrastructure maintenance for the first several years that they are in operation. However, as facilities reach the five, 10 and 15 year marks, additional investment in state of good repair activities is anticipated. As a result, the budget for state of good repair is expected to increase $132 million between 2018 and 2040, representing another 1 percent of the total capital budget envisioned to implement METRO CONNECTS.

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Appendix G.   RapidRide Expansion Report

Background

RapidRide is Metro's Bus Rapid Transit (BRT) service program. This successful program provides frequent service and enhanced customer amenities in major travel corridors. Compared to the bus routes they replaced, the RapidRide A to F lines combined carry about 50 percent more riders – about 60,000 passenger trips per weekday. In addition, travel time is as much as 20 percent faster, with most lines saving one to five minutes per trip.

As part of the budget planning process for the 2017-2018 biennial budget, the Service Development and Strategy and Performance groups were asked to develop a preliminary proposal for expanding the RapidRide program beyond the City of Seattle's Move Seattle initiative.

The following factors were considered in identifying corridors that may be appropriate for RapidRide:

- Creating an interconnected network of bus rapid transit throughout the County
- Performance of underlying routes and/or route segments
- Geographic distribution
- Social Equity
- Designated Speed and Reliability Corridors
- Integration with ST2 and projected ST3 projects
- Integration with the Move Seattle Initiative
- Integration with Metro's Long Range Planning efforts

This report analyzes frequent corridors identified in METRO CONNECTS for potential RapidRide lines. More information on how the METRO CONNECTS 2040 service network was developed can be found in the METRO CONNECTS Appendix A. Candidate RapidRide lines are identified as either near-term (~2025) or long-term (~2040). Candidate RapidRide lines within the City of Seattle match those identified in the Seattle Transit Master Plan.

Assessing Candidate RapidRide Lines

Evaluation

To identify candidate RapidRide lines for the 2025 and 2040 network vision, a variety of factors were taken into account. The frequent service network in METRO CONNECTS, which has been coordinated with local jurisdiction transit plans, was considered the starting point for potential future RapidRide lines. In general, frequent service in METRO CONNECTS was selected for high ridership route segments connecting numerous destinations along a route, and where additional growth is planned in the future.

Measures of productivity, social equity, and geographic value were all used to determine which routes within METRO CONNECTS should be designated for future RapidRide investments. These measures expand on what is used in the Metro's Service Guidelines and the 2014 King County Metro RapidRide Performance Evaluation Report (Table G-1). Half-mile buffers were used instead of quarter-mile buffers when running many of the calculations. This

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is consistent with the idea that high quality and very frequent transit is more capable of attracting riders from a larger catchment area. Each above measure was selected to provide insight into the productivity, social equity, and geographic value of each corridor.

Table G-1   RapidRide Evaluation Measures

Factor	Measure
Productivity	Existing Employment Density
	Existing Population Density
	Existing Boardings / Hour
	2040 Estimated Employment Density
	2040 Estimated Population Density
Social Equity	Population below Poverty
	Minority Population
Geographic Value	Number of centers connected
	Major transfer points and hubs connected

Each corridor is designated as "urban" or "suburban" as defined by Metro's service guidelines, and is identified as either a candidate RapidRide corridor or an existing RapidRide Route. For each measure, the corridors are ranked on a scale of high, medium or low performance. High indicates that a corridor scored in the top 25 percent of its Urban or Suburban designation. Medium indicates that a corridor scored less than the top 25 percent, but greater than the bottom 25 percent. Low means that a corridor scored in the bottom 25%.

The measures used to evaluate Candidate RapidRide routes are described on the next page.

Current Productivity
- Existing Employment Density

    o Current estimated population within a half-mile buffer of each corridor divided by the length of the corridor. Used 2012 Longitudinal Employer-Household Dynamics data.

- Existing Population Density

    o Current estimated jobs within a half-mile buffer of each corridor divided by the length of the corridor. Used 2013 American Community Survey data.

- Existing Boardings / Hour

    o The average number of daily boardings on weekdays in spring 2015 on the existing underlying route(s) – no truncation – for each METRO CONNECTS route. Average weekday daily boardings are divided by the daily revenue hours for each existing route to get Daily Boardings/Hour.

2040 Productivity
- 2040 Employment Density

    o   2040 estimated jobs within a half-mile buffer of each corridor divided by the length of the corridor.

- 2040 Population Density

    o   2040 estimated population within a half-mile buffer of each corridor divided by the length of the corridor.

Social Equity
- Population below Poverty

    o   Used census data from the 2013 American Community Survey, based on a 5-year period from 2008 - 2013 to calculate people per square mile falling below the nationwide poverty level. A half-mile "as the crow flies" buffer is used to determine what percentage of a census block falls within a half-mile of the corridor. The percentage of each census block that is overlapped by the half-mile buffer is multiplied by the number of people in poverty in each census block. The result is an estimated total number of people in poverty within a half-mile of the corridor. This estimate is then divided by the total current estimated population within the half-mile buffer to get a percentage.

- Minority Population

    o   Used census data from the 2013 American Community Survey, based on a 5-year period from 2008 - 2013 to calculate people per square mile who are non-white of Hispanic origin. A half -mile "as the crow flies" buffer is used to determine what percentage of each census block falls within a half mile of the corridor. The percent of each census block that is overlapped by the half mile buffer is multiplied by the total number of minorities in each census block. The result is an estimated total number of minorities within a half-mile of the corridor. This estimate is then divided by the total current estimated population within the half-mile buffer to get a percentage.

Geographic Value
- Centers Connected

    o   Number of Urban, Manufacturing, Industrial, and Activity Centers within a half mile of a corridor.

- Major Transfer Points and Hubs Connected

    o   Number of Park & Rides, Transit Centers, Sounder Stations, and Link Stations (current, planned and proposed) that are on a corridor.

Findings and Discussion

Table G-2   2025 RapidRide Candidate Lines

Urban or Suburan		LRP ID #	To / From / Via	Comparable Route(s)	One-Way Miles	Productivity			Equity		Geographic Value	
						Current Boardings /Hour	Current people /mile	Current jobs /mile	Percent Poverty	Percent Minority	Number of Centers	Transfer Points & Hubs
Urban	Candidate RapidRide Lines	RR 40	Lake City - Seattle CBD - Ballard	40	13.7	Low	Medium	Medium	Low	Medium	High	High
		RR 120	Burien TC - Seattle CBD - Westwood Village	120	13.0	Medium	Low	Medium	Medium	High	Medium	Medium
		1002	Richmond Beach - UW - 15th Ave NE	73, 373, 348	12.1	Low	Low	Low	Medium	Medium	Medium	Medium
		1009	Bothell - UW - Lake City	372	14.8	Low	Low	Medium	Medium	Medium	Medium	Medium
		1012	Ballard - Children's Hospital - Wallingford	44	5.9	High	High	Medium	Medium	Low	Medium	Low
		1013	Northgate - Mount Baker - Seattle CBD	67, 70	7.1	Medium	High	High	Medium	Medium	Medium	Medium
		1014	Loyal Heights - U. District - Green Lake	45	6.5	High	Medium	Medium	Medium	Low	Medium	Medium
		1059	Madison Valley - Seattle CBD - E Madison St	11, 12	2.4	Medium	High	High	Medium	Medium	Low	Low
		1061	Uptown - Madison Park - Capitol Hill	8, 11	7.6	Medium	Medium	Medium	Low	Low	Low	Medium
		1063	U. District - Rainier Beach - Mount Baker	7s, 48	10.7	Medium	Medium	Low	High	High	Medium	Medium
		1064	U. District - Othello - Beacon Hill	36, 49	10.1	Medium	Medium	Medium	High	High	Medium	Medium
		1071	U. District - Mount Baker - Seattle CBD	7n, SLU	4.8	Medium	High	High	High	High	Medium	Medium
		1202	Sand Point - Seattle CBD - Green Lake	62	11.3	Low	Medium	Medium	Low	Low	Medium	High
		1996	U. District - Northgate - Lake City	75	10.1	Medium	Low	Low	High	Medium	Medium	Medium
	Current RapidRide	C Line	SLU - Westwood - West Seattle	C	10.8	Medium	Medium	Medium	Medium	Medium	Medium	Medium
		D Line	Crown Hill - Seattle CBD - Ballard	D	9.2	High	Medium	High	Low	Medium	Medium	Medium
		E Line	Shoreline - Seattle CBD - SR-99	E	13.1	High	Medium	Medium	Medium	Medium	Medium	High
Suburban	Candidate RapidRide Lines	1025	Kenmore - Overlake - Totem Lake	234, 235	15.7	Low	Medium	Medium	Low	Low	Low	Low
		1027	Totem Lake - Eastgate - Bellevue	234, 235, 271	14.6	Low	Medium	High	Low	Low	Medium	High
		1028	Crossroads - Bellevue - NE 8th St	B South	3.3	High	High	High	Medium	Medium	Low	Low
		1030	Overlake - Renton - Newcastle	240, 245	17.7	Medium	Low	Medium	Medium	Medium	High	Medium
		1033	Renton - Auburn - Kent	169, 180	16.5	Medium	Medium	Medium	Medium	High	Medium	High
		1037	Kirkland - Eastgate - Overlake	221, 245	10.8	Low	Medium	Medium	Low	Medium	Low	Medium
		1052	Twin Lakes - Green River CC - Federal Way	181	13.9	Medium	Low	Low	Medium	Medium	Medium	Medium
		1056	Highline CC - Green River CC - Kent	164, 166	11.9	Medium	Medium	Low	Medium	Medium	Low	Low
		1215	Kenmore - Shoreline - North City	331	8.9	Low	Medium	Low	Medium	Low	Medium	Low
		1514	Covington - SeaTac - Kent	180, 168	16.5	Medium	Low	Low	Medium	Medium	Medium	Medium
	Current RapidRide	A Line	SeaTac - Federal Way - Des Moines	A	12.0	High	High	Medium	High	High	Medium	High
		B Line	Redmond - Bellevue - Overlake	B	9.9	High	High	High	Low	Medium	Medium	Medium
		F Line	Renton - Burien - Tukwila	F	12.9	Medium	Low	Medium	High	High	Medium	Medium

The 23 candidate RapidRide lines identified for this near-term analysis were drawn from the 2025 frequent service network in METRO CONNECTS. To compare and discuss the merits of each candidate, the productivity, social equity, and geographic value of each corridor were calculated (as shown in the above matrix with different shades of green).
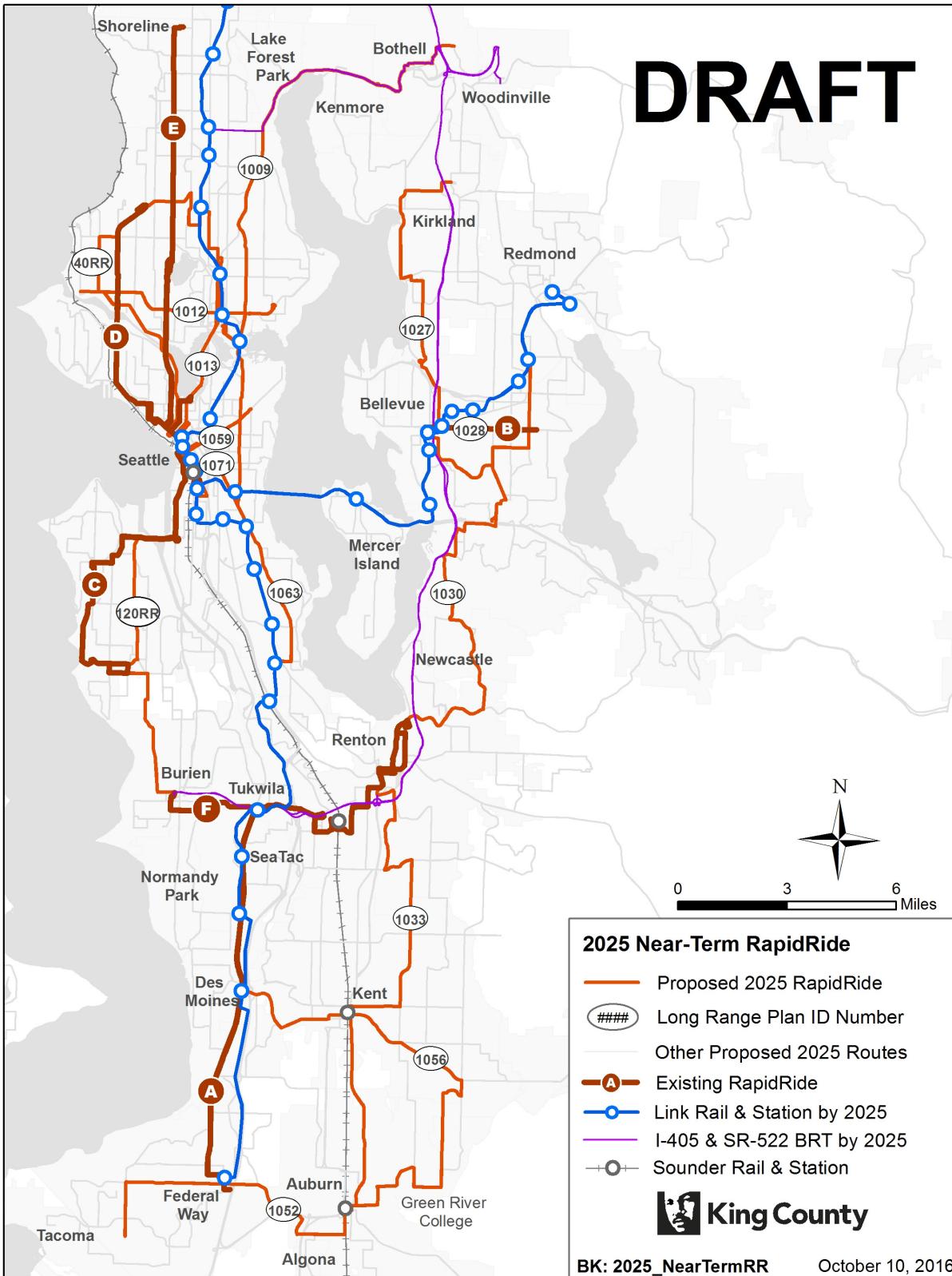
There are 13 proposed new near-term 2025 RapidRide lines and six existing RapidRide routes in Table G-3. As Metro begins work on new RapidRide lines, Metro will work closely with cities and the public to plan alignments, stop and station locations, and connecting service. Sequencing of these lines will depend on when other large transportation projects are planned to be implemented within the region and when funding becomes available. The exact pathways of proposed lines may change in the design and implementation process, which includes Metro's regular service change process.

Table G-3   Proposed 2025 RapidRide Lines

LRP Route ID	Comparable Route(s)	To / From / Via	One-Way Miles	Urban (U) or Suburban (S)
1009	372	Bothell - UW - Lake City	15	U
RR 40	40	Lake City - Seattle CBD - Ballard	14	U
1012	44	Ballard - Children's Hospital - Wallingford	6	U
1013	67, 70	SLU - Northgate - Eastlake	7	U
1027	234, 235, 271	Totem Lake - Eastgate - Bellevue	15	S
***1028 (B Line)**	B South	Crossroads – Bellevue – NE 8th St	3	S
1030	240, 245	Overlake - Renton - Newcastle	18	S
1033	169, 180	Renton - Auburn - Kent	16	S
RR 120	120	Burien TC - Seattle CBD - Westwood Village	13	U
1056	164, 166	Highline CC - Green River CC - Kent	12	S
1059	11, 12	Madison Valley - Seattle CBD - E Madison St	2	U
1063	7s, 48s	U. District - Rainier Beach - Mount Baker	11	U
1071	7n, SLU	SLU- Mount Baker - Seattle CBD	5	U
1052	181	Twin Lakes - Green River CC - Federal Way	14	S
A Line	A	SeaTac - Federal Way - Des Moines	12	S
C Line	C	SLU - Westwood - West Seattle	11	U
D Line	D	Northgate - Seattle CBD - Ballard	9	U
E Line	E	Shoreline - Seattle CBD - SR-99	13	U
F Line	F	Renton - Burien - Tukwila	13	S

*Includes changes to a current RapidRide Lines

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Figure G-1   Map of 2025 Proposed RapidRide Network

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2025 Near-Term RapidRide

— Proposed 2025 RapidRide

(####) Long Range Plan ID Number

— Other Proposed 2025 Routes

—(A)— Existing RapidRide

—o— Link Rail & Station by 2025

—— I-405 & SR-522 BRT by 2025

—o— Sounder Rail & Station

King County

BK: 2025_NearTermRR   October 10, 2016

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Table G-4   2040 RapidRide Candidate Lines

2025 Proposed & 2040 Candidates	Urban or Suburban	LRP ID #	To / From / Via	Comparable Route(s)	One-Way Miles	Productivity			Equity		Geographic Value	
						Current Boardings /Hour	2040 people /mile	2040 jobs /mile	Percent Poverty	Percent Minority	Number of Centers	Transfer Points & Hubs
By 2025 Propsed RapidRide Lines	Urban	1001	Shoreline - Seattle CBD - SR-99	E	12.8	High	Medium	High	Low	Medium	Medium	High
		1009	Bothell - UW - Kenmore	372	14.8	Low	Low	Low	Medium	Medium	Medium	Medium
		1012	Ballard - Children's Hospital - Wallingford	44	5.9	High	High	Medium	Medium	Low	Medium	Low
		1059	Madison Valley - Seattle CBD - E Madison St	11, 12	2.4	Medium	High	High	Medium	High	Low	Low
		1063	U. District - Rainier Beach - Mount Baker	7s, 48	10.7	Medium	Medium	Medium	High	High	Low	Medium
		1993	Northgate - Seattle SBD - Ballard	40	13.7	Low	Medium	High	Low	Medium	High	High
	Suburban	1027	Totem Lake - Eastgate - Kirkland	234, 235, 271	14.6	Medium	Medium	High	Low	Low	Medium	High
		1028	Crossroads - Bellevue - NE 8th St	B South	3.3	High	High	High	Medium	Medium	Low	Low
		1030	Overlake - Renton - Eastgate	240, 245	17.7	Medium	Medium	Medium	Medium	Medium	High	Medium
		1033	Renton - Auburn - Kent	169, 180	16.5	Medium	Medium	Medium	Medium	Medium	Medium	High
		1041	SODO - Burien - Delridge	120	11.7	High	High	High	High	High	Medium	Medium
		1048	Renton - Burien - Tukwila	F	11.3	Medium	Medium	High	High	High	Medium	High
		1052	Twin Lakes - Green River CC - Federal Way	181	13.9	Medium	Low	Low	Medium	Medium	Medium	Medium
		1056	Highline CC - Green River CC - Kent	164, 166	11.9	Medium	Medium	Low	High	Medium	Medium	Medium
By 2040 Candidate RapidRide Lines	Urban	1002	Richmond Beach - UW - 15th Ave NE	73, 373, 348	12.1	Low	Low	Low	Medium	Medium	Low	Medium
		1007	Shoreline CC - UW - Lake City	75	11.6	Low	Low	Low	High	Medium	Medium	Low
		1010	Fremont - Lake City - Ballard	D, 41	8.1	High	Low	Low	Low	Low	High	Medium
		1013	Northgate - Mount Baker - U. District	67, 70	7.1	Medium	High	High	Medium	Medium	Medium	High
		1014	Loyal Heights - U. District - Green Lake	45	6.5	High	Medium	Medium	Medium	Low	Medium	Medium
		1061	Uptown - Madison Park - Capitol Hill	8, 11	7.6	Medium	Medium	Medium	Low	Low	Low	Low
		1064	U. District - Othello - Capitol Hill	36, 49	10.1	Medium	High	Medium	High	High	Medium	Medium
		1202	Seattle CBD - Sand Point - Green Lake	62	11.3	Low	Medium	High	Medium	Medium	Medium	High
	Suburban	1025	Kenmore - Overlake - Totem Lake	234, 235	15.7	Low	Medium	Medium	Low	Low	Medium	Medium
		1026	Campton - Kirkland - Redmond	248	7.4	Low	High	Medium	Low	Low	Low	Medium
		1031	Issaquah Highlands - Eastgate - West Lake Sammamish Pkwy	271	11.7	Medium	Low	Medium	Low	Low	Medium	Medium
		1037	Kirkland - Eastgate - Overlake	221, 245	10.8	Low	Medium	High	Low	Medium	Medium	Medium
		1042	Alki - Tukwila - White Center	125	16.1	Medium	Medium	Low	Medium	Medium	Medium	Medium
		1043	Alki - Burien - West Seattle	128, 131	11.6	Medium	High	Low	Medium	Low	Low	Low
		1047	Rainier Beach - Federal Way - SeaTac	A, 124	16.1	High	High	Medium	High	High	High	High
		1049	Kent - Rainier Beach - Tukwila	150	12.9	High	Low	Medium	High	High	Medium	Medium
		1075	Renton Highlands - Rainier Beach - Renton	105, 106	11.1	High	High	Medium	High	High	Medium	Low
		1083	Beacon Hill - Burien - Georgetown	60, 132	9.5	Medium	Low	Medium	Medium	High	Medium	Low
		1215	Kenmore - Shoreline CC - North City	331	8.9	Low	Low	Low	Medium	Low	Medium	Low
		1513	NE Tacoma - Federal Way - Twin Lakes	903	7.8	Low	Medium	Medium	Medium	Medium	Low	Low
		1514	Covington - SeaTac - Kent	180, 168	16.5	Medium	Low	Medium	Medium	Medium	Medium	Medium
		1515	Kent - Twin Lakes - Star Lakes	183, 901	11.7	Low	Medium	Low	Medium	Medium	Low	Medium
		1999	Redmond - Eastgate - Overlake	B, 245	10.6	High	Medium	High	Low	Medium	Medium	Medium

Candidate RapidRide lines for long-term investments – implementation between 2025 and 2040 – were drawn from the frequent service network in METRO CONNECTS. The lines selected for potential RapidRide service were determined using the evaluation criteria, including how well they connect to the proposed 2040 high capacity transit network and urban/manufacturing/activity centers, filling gaps within the existing, planned, and proposed high capacity transit network, and building strong connections to the regional and countywide transit network. In total, 36 candidate RapidRide lines were evaluated in the long-term 2040 candidate RapidRide analysis.
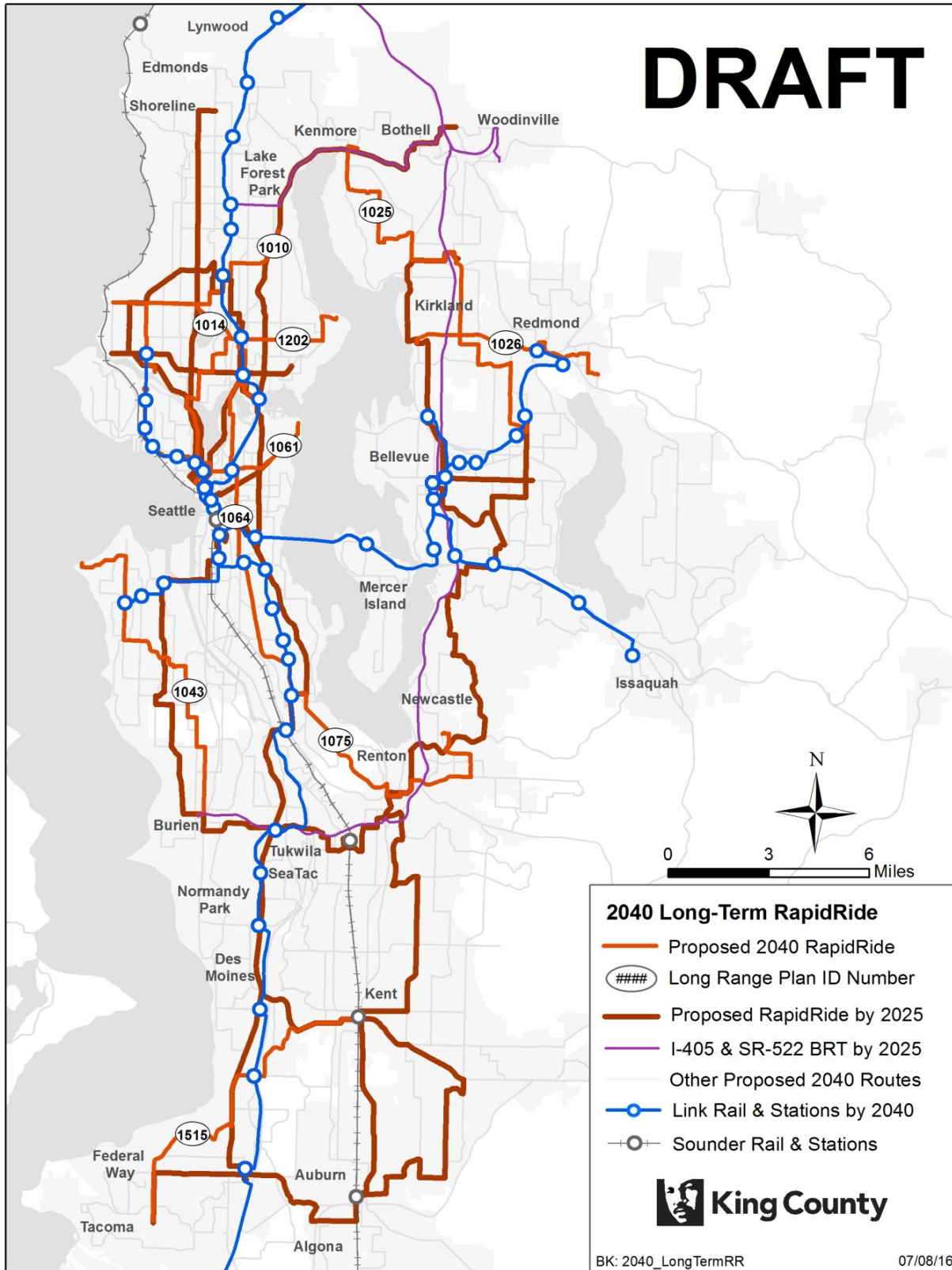
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Table G-5   Propsoed 2040 RapidRide Lines

LRP Route ID	Comparable Route(s)	To / From / Via	Route Miles	Urban (U) or Suburban (S)
1001 (E Line)	E	Shoreline - Seattle CBD - SR-99	13	U
1009	372	Bothell - UW - Kenmore	15	U
***1010 (D Line)**	D, 41	Fremont - Lake City - Ballard	8	U
1012	44	Ballard - Children's Hospital - Wallingford	6	U
1013	7n, 70, 67	Northgate - Mount Baker - U. District	11	U
1014	45	Loyal Heights - U. District - Green Lake	6	U
1025	234, 235	Kenmore - Overlake - Totem Lake	16	S
1026	248	Campton - Kirkland - Redmond	7	U
1027	234, 235, 271	Totem Lake - Eastgate - Kirkland	15	S
***1028 (B Line)**	B South	Crossroads - Bellevue - NE 8th St	3	S
1030	240, 245	Overlake - Renton - Eastgate	18	S
1033	169, 180	Renton - Auburn - Kent	16	S
1041	120	SODO - Burien - Delridge	12	U
***1043 (C Line)**	128, 131	Alki - Burien - West Seattle	12	S
***1047 (A Line)**	A, 124	Rainier Beach - Federal Way - SeaTac	16	S
1048 (F Line)	F	Renton - Burien - Tukwila	11	S
1052	181	Twin Lakes - Green River CC - Federal Way	14	S
1056	164, 166	Highline CC - Green River CC - Kent	12	S
1059	11, 12	Madison Valley - Seattle CBD - E Madison St	2	U
1061	8, 11	Uptown - Madison Park - Capitol Hill	8	S
1063	7s, 48	U. District - Rainier Beach - Mount Baker	11	U
1064	36, 49	U. District - Othello - Capitol Hill	10	U
1075	105, 106	Renton Highlands - Rainier Beach - Renton	11	S
1202	62	Seattle CBD - Sand Point - Green Lake	11	U
1515	183, 901	Kent - Twin Lakes - Star Lakes	12	S
1993	40	Northgate - Seattle SBD - Ballard	14	U

*Includes changes to a current or 2025 RapidRide Lines

Figure G-2   Map of Proposed 2040 RapidRide Network

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