Cross Kirkland Corridor
BUS RAPID TRANSIT

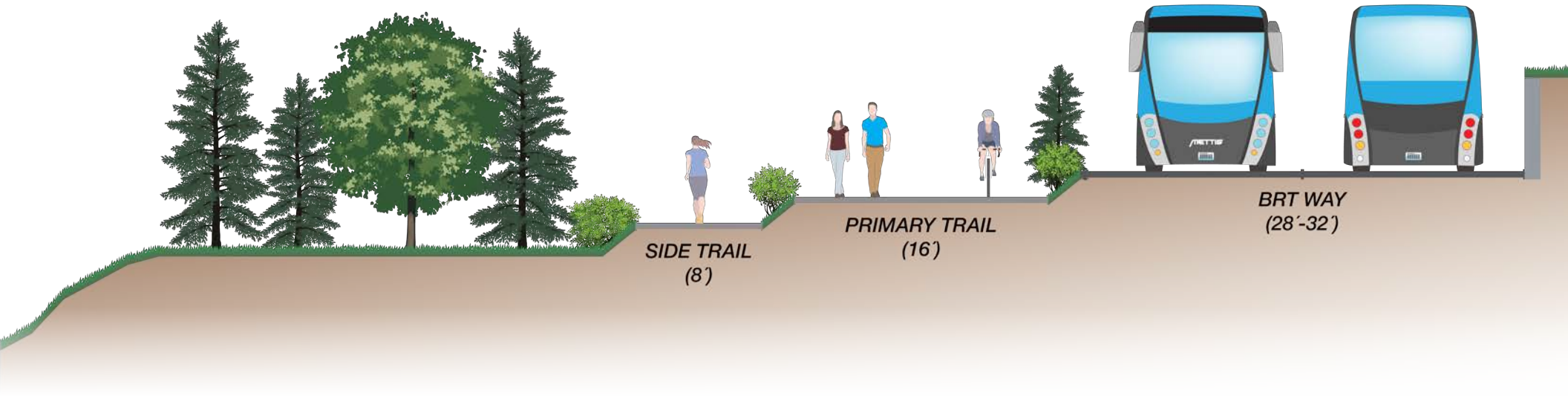
October 2016

PREPARED FOR THE CITY OF KIRKLAND
by BRT Planning International, LLC
in association with Transpo Group and Perteet

CITY OF KIRKLAND
WASHINGTON

“

Walkable, vibrant, livable, green and connected...



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GLOSSARY OF TERMS

BAT	Business Access and Transit
BRT	Bus Rapid Transit uses a toolbox to provide fast, rail-like service using buses
BRT Way	Facility used by BRT vehicles
CKC	Cross Kirkland Corridor is the former BNSF rail corridor through the City of Kirkland
ERC	Eastside Rail Corridor is the same as the ERC but beyond the City of Kirkland boundary
GIS	A Geographic Information System is used to map data
HCT	High Capacity Transit refers to transit investments which carry a larger number of passengers
HOV	High Occupancy Vehicle lanes are used to prioritize the movement of buses and carpools
LEED	Leadership in Energy and Environmental Design is a rating system for buildings
LOS	Level of Service can be defined in a number of ways and is used to quantify how well a transportation facility is performing
PSRC	The Puget Sound Regional Council coordinates land use and transportation planning throughout the central Puget Sound
ST	Sound Transit is the regional transit provider
ST3	Sound Transit 3 is the third regional transit investment package developed by Sound Transit
TC	Transit Centers are areas in which a number of different transit routes come together, allowing transfers between routes

Source: ODOT Flickr

1.0 OVERVIEW

Walkable, vibrant, livable, green and connected...

...these are the shared community values that guided the City of Kirkland's recent comprehensive planning process. These same values are echoed through the recently adopted City Transportation Master Plan and are being realized through implementation of the City of Kirkland's Cross Kirkland Corridor Master Plan. Complementing these plan efforts, regional partners, Sound Transit and King County Metro, have been in the planning stages to develop long term transit investments and Kirkland is working closely with these partners to optimize travel choices for Kirkland residents.

1.0 INTRODUCTION

The Cross Kirkland Corridor (CKC), which was built in 1891 by the Great Northern Railway, is a part of Kirkland's transportation heritage and will play an important role in the City's transportation future. The 5.75 mile-long CKC segment is a part of the 100 foot-wide, 16.7 mile Eastside Rail Corridor (ERC) running roughly parallel to Lake Washington from Renton to Woodinville. While this rail line once served industries along the Eastside it fell into disrepair and disuse over the last few decades. Through a coordinated multi-agency effort to preserve the corridor intact, the corridor was transferred to public ownership in 2008.

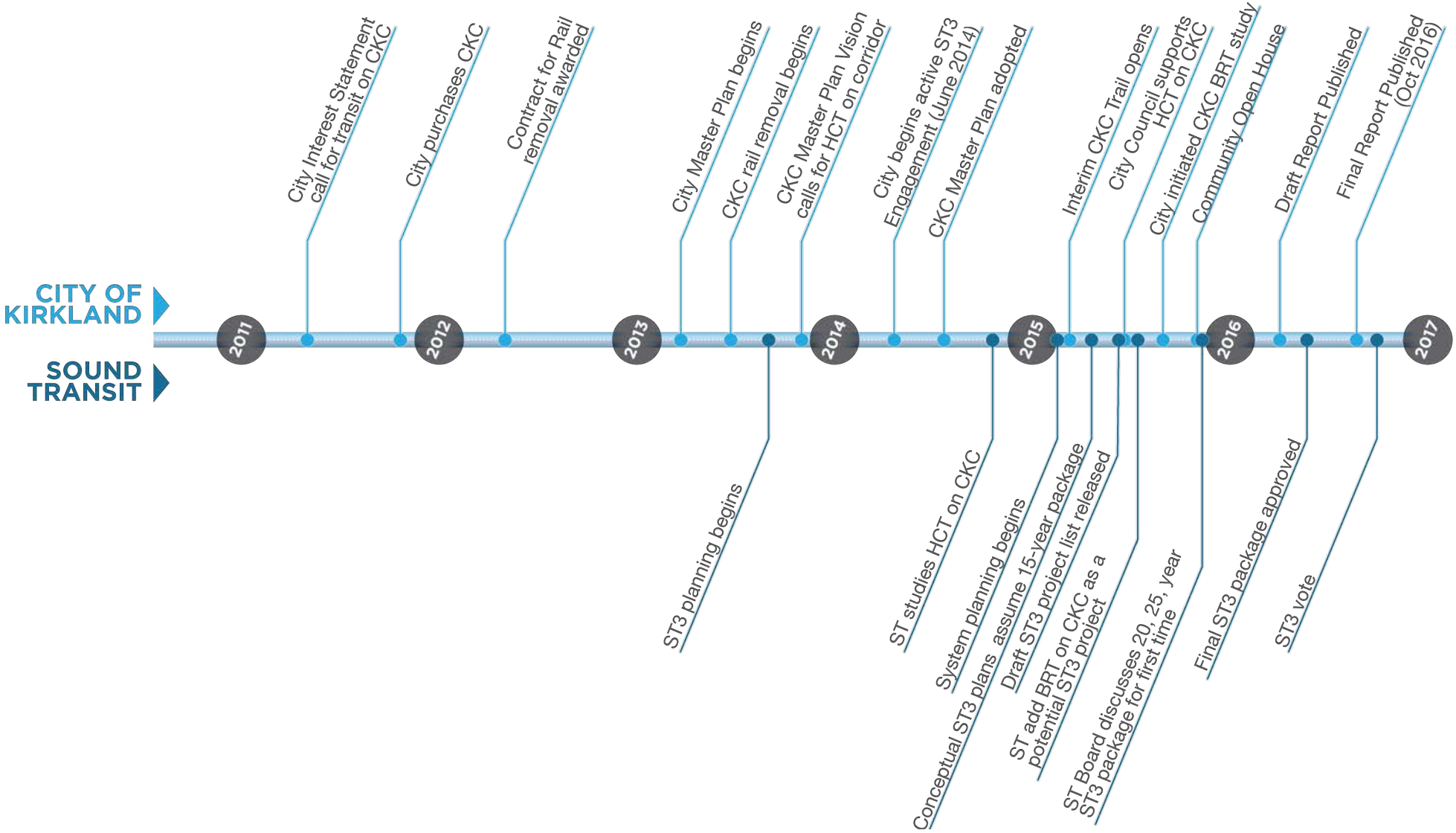
As part of this ownership transfer, the City of Kirkland purchased a 5.75-mile segment in 2011 and completed the CKC Master Plan, which was adopted in 2014. The CKC Master Plan identified a number of goals, structured around the central tenant that the corridor should serve as a multimodal transportation corridor in the future, including High Capacity Transit (HCT). A map of the Cross Kirkland Corridor within the ERC is provided to the left.

In the fall of 2015 the City of Kirkland secured consultant services to inform and support ongoing City discussions, analysis and planning related to the Sound Transit 3 (ST3) regional transit package. It appeared that ST3 investments in Kirkland would only include implementation of Bus Rapid Transit (BRT) along I-405, which would only provide limited benefits.

Facilitated by consultant support the City was able to educate and inform the community and decision makers on the City's HCT options beyond I-405 BRT, including development of a "Gold Standard" BRT concept optimizing the Cross Kirkland Corridor (CKC) as intended in the Master Plan. Through this study the City was able to investigate if BRT on the CKC was an effective, valuable and feasible opportunity within ST3.

Figure 1-1: Cross Kirkland Corridor

Figure 1-2: Cross Kirkland Corridor and Sound Transit 3 Timeline



This document describes the key elements of the "CKC BRT" concept including the requirements of Gold Standard BRT, the physical elements of such a system like the dedicated guideway, as well as what transit services would be provided on the CKC. The document also includes analysis of system performance including travel time estimates, ridership forecasts and preliminarily planning-level cost estimates. This information was compiled based on interim work products develop over the duration of the study.

BRT CONCEPT

The BRT concept described in more detail in Section 2 through 5 was developed through an iterative process of discovery, needs assessment, conceptual system design, cross-section design, site analysis, stakeholder engagement, and integration of best practices. The list below describes the general goals that guided development of the CKC BRT concept:

- Gold Standard BRT, the highest quality of BRT possible, is most appropriate for this corridor and clearly aligns with the City's intent when it purchased the corridor.
- Any plans must preserve the current and planned multiuse trail. Corridor cross sections should be developed in alignment with the CKC Masterplan.
- Transit service on the corridor should be customized to meet the needs of Kirkland residents and employees by connecting to major destinations, quickly, frequently and directly.
- Stations should be located to provide mobility solutions for travel within Kirkland while also providing time competitive regional travel.
- This study should identify the City's vision for transit on the corridor to help guide the multi-decade process of bringing transit to the CKC.

"The CKC BRT concept is envisioned as a Gold Standard BRT system, which would make it the highest-quality BRT system in the United States.

Figure 1-3: Look for the Gold Standard symbol to highlight gold standard features suggested for the Kirkland BRT.

KEY FEATURES

- √ Dedicated Right-of-Way
- √ Busway Alignment
- √ Off-board Fare Collection
- √ Intersection Treatments
- √ Platform-level Boarding

Central to this concept is the idea that BRT on the CKC should be developed to the "Gold Standard BRT", which would make it the highest quality BRT system in the United States. Gold Standard BRT is defined by the Institute for Transportation and Development Policy (ITDP) as a BRT system that provides high-quality, rail-like transit service. The ITDP has developed the "BRT Standard" which ranks the quality of BRT service from Basic to Gold Standard, with Gold Standard BRT representing the high quality service possible.

Achieving Gold Standard BRT is only possible by utilizing the same elements employed by rail systems like Sound Transit Link Light Rail. For example, grade-separated and dedicated right-of-way allow BRT vehicles to bypass congestion while off-board fare collection and a limited number of stations reduce delays from boarding. Frequent service, prominent fully-enclosed stations, real-time passenger information and sleek specially branded buses all add to the passenger experience. The "CKC BRT" system described throughout this document includes all of these elements.

SUMMARY OF FINDINGS

Combined, these investments would provide the City with a transit system that delivers fast, frequent, and reliable HCT service cutting transit travel times in half between major destinations like Downtown Kirkland and Bellevue. This faster, more reliable service would provide attractive mobility options for the City, especially to and from Totem Lake which is a regional growth center and is planned to receive a large share of the City's housing and employment growth. Based on existing transit ridership data, BRT on the CKC could carry roughly 26,000 daily riders in 2030, if constructed, which would make it one of the highest ridership BRT projects in the United States.

The key findings from this study are noted below:

- BRT is an effective transit solution for the CKC that could physically fit within the current available right-of-way without compromising the ability of the corridor to accommodate the multiuse trail.
- BRT on the CKC fits Kirkland's transit and land use needs by directly serving employment areas such as Totem Lake, Downtown Kirkland, and 6th Street/Houghton as well as many residential neighborhoods and major Park & Rides such as South Kirkland and Kingsgate.
- BRT along the CKC would provide substantial travel time and reliability benefits for transit passengers as compared to existing transit service on congested parallel corridors, attracting new riders and connecting the City to the region.
- The transit service concept provides high-frequency, high-quality transit service to Kirkland as well as direct and reliable connections to major destinations outside the City.
- Concerns raised during the community engagement were investigated and reasonable solutions were identified. Key community goals and concerns were documented to inform future work.

DOCUMENT OVERVIEW

In addition to this introduction, this document includes the following sections focused on specific aspects of the BRT on the CKC. An appendix with more detailed reference materials is also available separately.

2 WHAT IS HIGH QUALITY BRT?

An overview of the elements necessary to create high-quality BRT, introduction of "Gold Standard BRT" and application of it to the CKC, and key examples of BRT projects across the United States and world.

3 FACILITY CONCEPT

A description of the physical design along the CKC including guideway, stations, buses, intersections and trail as well as transit facilities connecting to the CKC.

4 SERVICE CONCEPT

A description of the various BRT transit services which could be provided on the CKC including an overview of existing transit demand patterns and frequency of proposed service.

5 SYSTEM PERFORMANCE

An assessment of BRT performance on the CKC including travel time benefits, ridership forecasts and preliminary planning-level cost estimates.

6 CITY PRIORITIES AND COMMUNITY ENGAGEMENT

A documentation of community concerns identified through public engagement, identification of City priorities and documentation of engagement meetings.

NEXT STEPS

This study provides a starting point for future considerations of transit along the CKC and in Kirkland in general. Currently, the ST3 package includes a HCT study of the CKC and will be decided by voters on November, 8 2016. If approved by the voters, this study would be completed as part of a 25-year regional transit expansion program. Additionally, the City plans to develop its own citywide transit plan in 2017 to define a preferred transit network, which will help guide City investments and inform King County Metro and Sound Transit planning and service moving forward.

> We all are strongly committed to keeping Kirkland the livable, walkable, green, and vibrant City we all love. We may have differing views on how to achieve those goals. But if we remember what we share in common, we can discuss our differences in a manner that appeals to the best of us. And from those discussions may come compromise and new solutions that we can't yet see today.
>
> *– Mayor Walen State of the City address, February 2016*

Source: Ed Webster Flickr

2.0 WHAT IS HIGH QUALITY BRT?

2.1 BUS RAPID TRANSIT IN THE UNITED STATES
2.2 TYPES OF BUS RAPID TRANSIT
2.3 BRT SYSTEMS WITH TRAILS

2.0 INTRODUCTION

Bus Rapid Transit (BRT) is a system that provides fast and reliable travel to its riders. This service is achieved through a combination of factors, including dedicated bus lanes, off-board fare collection, level boarding, priority at intersections, and other high-quality elements such as real-time information technology and strong branding. Special vehicles and iconic full-featured stations can help make a good BRT system great.

BRT systems have been implemented in a number of cities across the United States, and around the world. Starting in 2010, a committee composed of the world's leading BRT experts came together to define the common elements of the best BRT systems. The result of this effort, first codified in 2012, is a rating system known as **The BRT Standard**.

Similar to environmental building standards like LEED, the BRT Standard scores the quality of BRT. It lays out the essential elements of BRT and provides a framework for engineers, decision makers, and community leaders to compare their own system or plans against best practices. The BRT Standard uses design characteristics that have been proven to correlate with enhanced performance and superior customer experience in a wide variety of circumstances.

A bus corridor must have most of the basic BRT elements illustrated in Figure 2-1 to qualify as a 'basic' BRT; however, the highest quality BRT systems also have a host of other elements, such as express bus passing lanes at stations, paths along the BRT corridor, bike parking and bike sharing at BRT stations, modern and sleek buses, and other elements listed in Figure 2-2. The BRT Standard provides a scorecard and ranks the quality of a BRT corridor using tiers, with gold-standard as the highest quality BRT and silver, bronze, and basic BRT representing successively lower quality.

Figure 2-1 Five key elements essential for BRT

The BRT Standard

Dedicated Right-of-Way
Bus-only lanes fully segregated from mixed traffic.

Busway Alignment
Bus-only lanes aligned to the middle, not the curb, of a road

Off-Board Fare Collection
Turnstile-controlled or proof-of-payment fare collection system

Intersection Treatments
Mixed-traffic is prohibited from making turns across the busway

Platform-Level Boarding
Station platforms level with bus floors with boarding and alighting

Source: ITDP.org

Figure 2-2 The BRT Standard Scorecard and rankings

The BRT Standard Scorecard

This scorecard shows the criteria and point values that make up The BRT Standard, followed by a detailed description of each.

CATEGORY	MAX SCORE
BRT Basics	
Dedicated Right-of-Way	8
Busway Alignment	8
Off-board Fare Collection	8
Intersection Treatments	7
Platform-level Boarding	7
Service Planning	
Multiple Routes	4
Express, Limited, and Local Services	3
Control Center	3
Located in Top Ten Corridors	2
Demand Profile	3
Hours of Operations	2
Multi-corridor Network	2
Infrastructure	
Passing Lanes at Stations	4
Minimizing Bus Emissions	3
Stations Set Back from Intersections	3
Center Stations	2
Pavement Quality	2
Stations	
Distances Between Stations	2
Safe and Comfortable Stations	3
Number of Doors on Bus	3
Docking Bays and Sub-stops	1
Sliding Doors in BRT Stations	1

CATEGORY	MAX SCORE
Communications	
Branding	3
Passenger Information	2
Access and Integration (PP. 44–49)	
Universal Access	3
Integration with Other Public Transport	3
Pedestrian Access	3
Secure Bicycle Parking	2
Bicycle Lanes	2
Bicycle-sharing Integration	1
Point Deductions	
Commercial Speeds	-10
Peak Passengers per Hour per Direction (pphpd) Below 1,000	-5
Lack of Enforcement of Right-of-Way	-5
Significant Gap Between Bus Floor and Station Platform	-5
Overcrowding	-5
Poorly Maintained Busway, Buses, Stations, and Technology Systems	-10
Low Peak Frequency	-3
Low Off-peak Frequency	-2

Source: BRT Standard 2014

BRT Standard Rankings

Gold-standard BRT
85 Points or above

Gold-standard BRT is consistent in almost all respects with international best practice. These systems achieve the highest level of operational performance and efficiency while providing a high quality of service. It is achievable on any corridor with sufficient demand to justify BRT investments, but may cost a little more to achieve. These systems have the greatest ability to inspire the public, as well as other cities.

Silver-standard BRT
70–84 points

Silver-standard BRT includes most of the elements of international best practice and is likely to be cost-effective on any corridor with sufficient demand to justify BRT investment. These systems achieve high operational performance and quality of service.

Bronze-standard BRT
55–69 points

Bronze-standard BRT solidly meets the definition of BRT and is mostly consistent with international best practice. Bronze-standard BRT has some characteristics that elevate it above the BRT Basics, achieving higher operational efficiencies or quality of service than basic BRT.

Basic BRT

Basic BRT refers to a core subset of elements that the Technical Committee has deemed essential to the definition of BRT. This minimum qualification is a precondition to receiving a gold, silver, or bronze ranking, yet a corridor may only qualify as Basic BRT.

2.1 HIGH-QUALITY BUS RAPID TRANSIT IN THE UNITED STATES

In the United States today, there are eight cities with BRT that meet The BRT Standard, including:

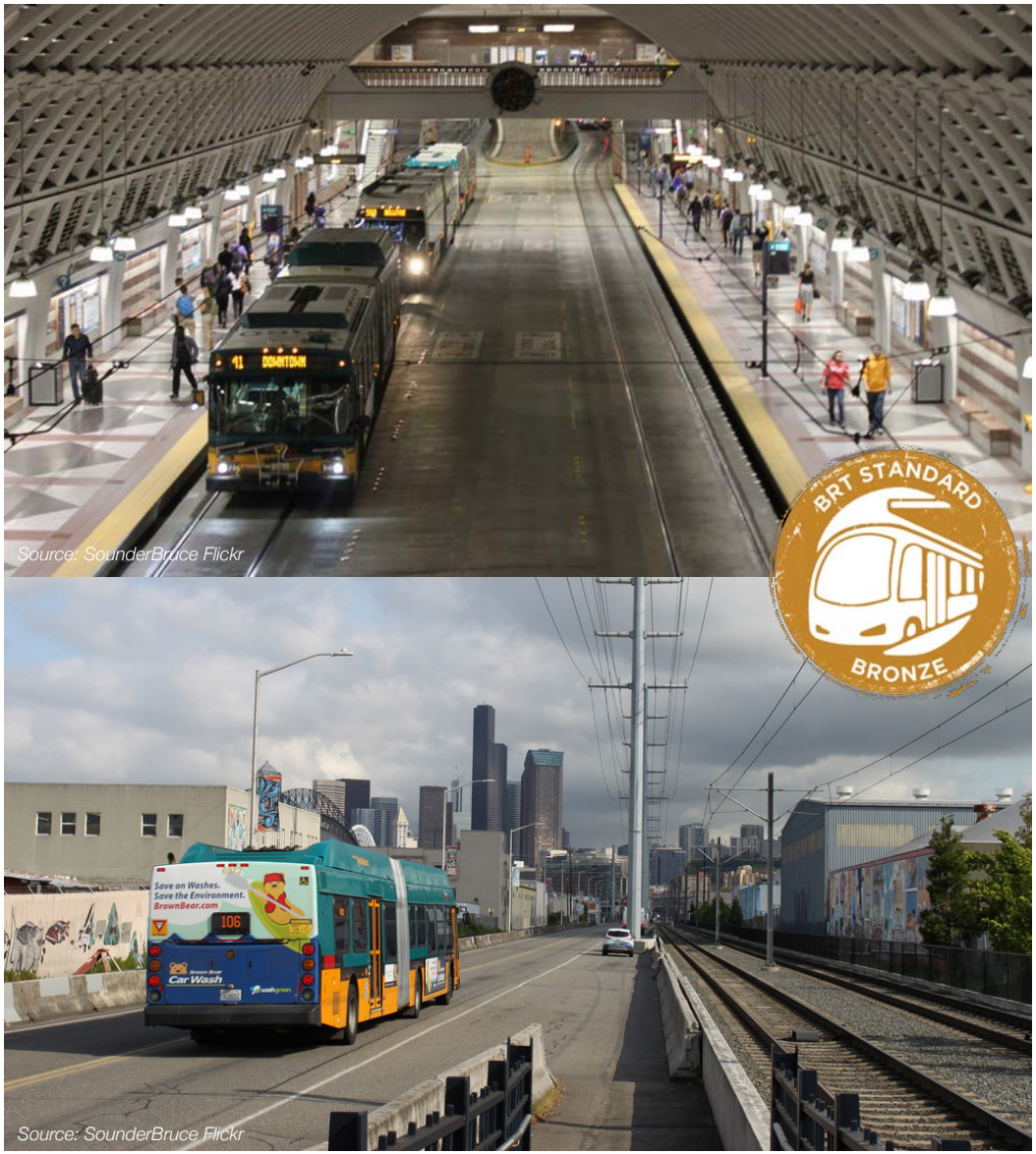
Figure 2-3: Bronze, Silver, and Gold medals awarded by The BRT Standard. Source: The BRT Standard

Close to home, the Downtown Seattle Transit Tunnel and SODO (South Of DOwntown) Busway (Figure 2-4) provide buses with fast and reliable travel routes from Spokane Street in SODO to the Convention Center on the north end of Downtown Seattle. The Downtown Seattle Transit Tunnel is ranked as a "Bronze BRT" and scores well on dedicated right-of-way, comfortable stations, and a mix of routes that serve many neighborhoods.

King County Metro's RapidRide lines, which are intended to provide frequent service, do not quite meet minimum BRT standards as identified by The BRT Standard. While RapidRide has some aspects of BRT such as off-board fare payment at high-ridership stops, real time information, and distinct branding, many of the important elements like dedicated bus lanes, signal priority, high frequency service, and station designs fall below The BRT Standard minimum qualifications.

The CKC BRT concept described throughout this document was developed specifically to meet the BRT Gold Standard, which would make it the highest quality BRT system in the United States.

Figure 2-4: Seattle Transit Tunnel and SODO Busway



2.2 TYPES OF BUS RAPID TRANSIT

BRT typically runs along three main types of corridors: arterial streets, former freight rail corridors, and freeway, all of which are detailed in the following section.

ARTERIAL BRT

Many BRT systems are built along dense urban arterials, because this is where the most popular bus routes tend to travel, and where employment and housing tend to concentrate. Many of the design elements of BRT are aimed at reducing the types of delay typically found on an urban arterial. For example, bus-only lanes in the center of the street (center running) help buses avoid conflicts with turning vehicles, delivery vehicles, parking vehicles, bicyclists and other slow moving traffic that typically delay buses in the curb lane.

The Cleveland HealthLine, on Euclid Avenue (Figure 2-5) is typical of high-quality urban arterial BRT. The HealthLine not only significantly improved the commute of 15,800 daily passengers, it helped spark the regeneration of downtown Cleveland including $6.3 billion in new real estate investment along the corridor. The HealthLine cost roughly $50 million for 4.5 miles of silver-standard BRT infrastructure. Las Vegas and Eugene also have high-quality BRT lines located primarily on urban arterials.

The best BRT systems outside the United States are located on urban arterials: Bogota's TransMilenio (Figure 2-6), Curitiba's URBS, Mexico City's Metrobus (Figure 2-7), all travel primarily along dense urban arterials. In many cities where downtown streets are too narrow for both BRT and other vehicles, an entire street is dedicated to BRT.

Figure 2-5: Cleveland's HealthLine is the highest-ranking BRT in the United States with a silver designation

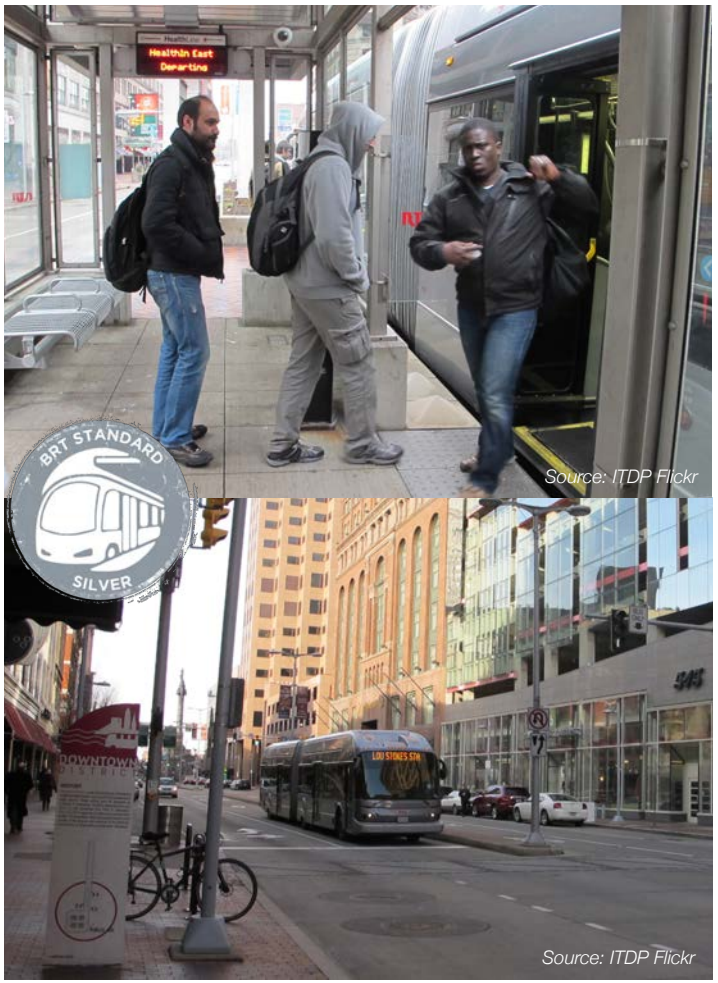


Figure 2-6: Bogota's TransMilenio runs on a bus- and pedestrian-only street downtown

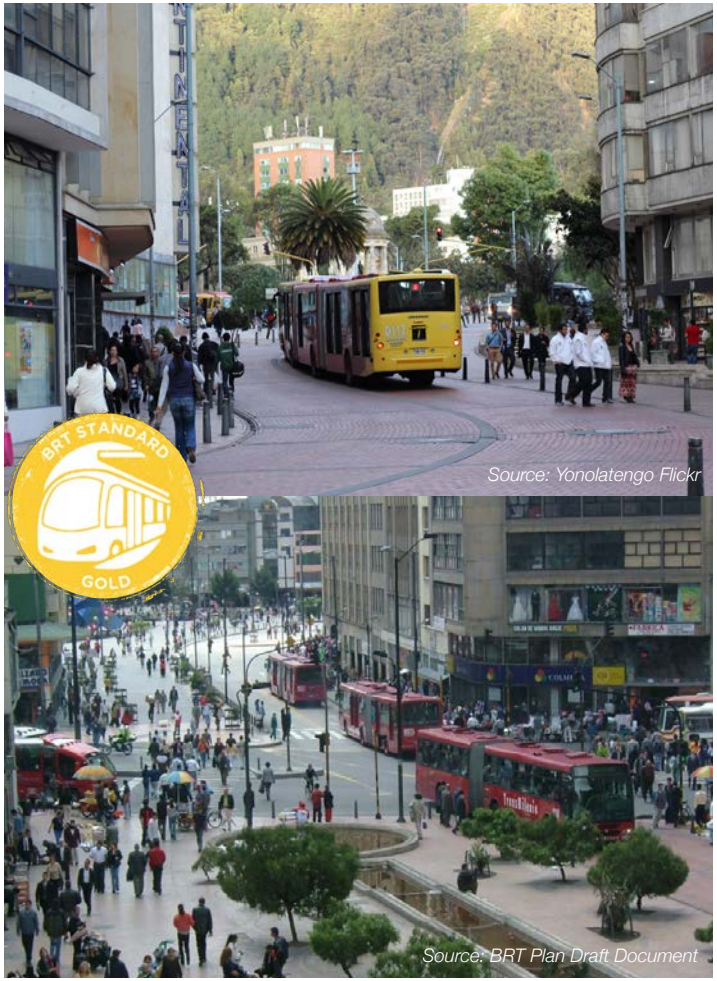


Figure 2-7: Corridor 4 of Mexico City's Metrobus travels through Mexico City's Centro Historico on fully-dedicated BRT-only streets

> BRT along former freight corridors is the second most common type of BRT.

RAIL CORRIDOR BRT

BRT along former freight corridors, which best describes BRT on the CKC, is the second most common type of BRT. As cities grow and congestion becomes worse, disused freight rail corridors become an attractive option for building high-quality BRT. Several of the better BRT systems in the United States and Canada, including the Los Angeles Orange Line (Figure 2-8), parts of Connecticut's CTfastrak, the Pittsburgh BRTs, the Ottawa BRT, along with the Cambridgeshire BRT in England, and a segment of the Cape Town and Brisbane BRT systems, utilize former freight rail corridors. Often these corridors are called "busways" or "BRT-way".

For understandable historical reasons, employment and housing centers are often located away from freight rail corridors, so BRT routes along freight rail corridors may need to provide connections to downtowns and other key destinations. In the best systems, these "last mile" routes utilize bus-only lanes to ensure a fast and reliable connection between the BRT-way and key destinations. In the case of the LA Orange Line, the BRT route terminates at a metro station providing connectivity to the regional transit network. In other systems, where dedicated right-of-way into a downtown was not provided, the BRT route operates in mixed traffic with other vehicles to provide the connection, as is the case in Pittsburgh, Hartford, and Cambridgeshire.

Figure 2-8: LA Metro Orange Line and trail on former rail corridor

The CKC is somewhat different from most other former freight rail lines. The CKC is much closer to key destinations, like Downtown Kirkland, Totem Lake, and residential neighborhoods, than are most former freight rail lines. As such, stations along the CKC BRT would be in closer proximity to employment and housing.

FREEWAY BRT

BRT systems along freeways are the least common type of system, primarily because employment and housing are often located beyond walking distance of a freeway, making stations in the middle of the freeway unattractive. Freeway BRT works best along corridors where the urban fabric is built right up against the freeway, allowing people to easily walk to or from the stations. Alternatively, freeway BRT can work well if the BRT service leaves the freeway using a fully-dedicated arterial or former rail corridor and connects directly to population centers, as is done in Cheng Du China (Figure 2-9).

Investments currently under way for the I-405 BRT as part of the Sound Transit 3 (ST3) initiative could be similar to other freeway BRT systems, however it may not have all the elements of a full BRT system. On I-405 the BRT right-of-way will be shared with other vehicles in the Express Toll Lanes and potential general purpose vehicles along some segments. Other elements have yet to be finalized. Most passengers are expected to reach these stations using Park & Rides.

Figure 2-9: Freeway BRT in Chengdu

Source: Webb Chung Flickr

Source: Karl Fjellstrom, ITDP China

2.3 BRT SYSTEMS WITH TRAILS

The highest ridership BRT systems in the United States and the world rely on walking and biking as the primary mode of access, therefore BRT and trails are a natural combination of investments. This synergy is captured by The BRT Standard with construction of bike facilities along a BRT corridor, bike parking and bike-share facilities at BRT stations contributing to this project ranking. There are a number of both BRT and Light Rail corridors in the United States and internationally, where a former rail right-of-way is shared with high-quality trails.

The Cambridgeshire Guided Busway in the United Kingdom (Figure 2-10), is built on the former track bed of the Cambridgeshire and Huntingdon railway, travels on a guided busway with grass along the guideway, minimizing the visual appearance and reducing stormwater runoff. Along the busway, steering is controlled using a mechanical guidance system, allowing buses to travel along a very narrow guideway.

Figure 2-11 shows a well-traveled multiuse trail that parallels the Cambridgeshire Guided Busway. A bicycle advocate from the Netherlands wrote, “When it’s complete and goes all the way to St. Ives, this will be almost certainly the best quality cycle path in the UK, offering a combination of a direct route to somewhere that you might actually want to go with a good degree of safety away from cars, with a width such that it’s possible to pass other cyclists, and with a surface quality that allows cyclists to ride at any speed they find comfortable.”

Figure 2-10: Cambridgeshire Guided Busway - UK

Source: Ed Webster - Flickr

Figure 2-11: Cycle path along the Cambridgeshire Guided Busway - UK

Source: www.aviewfromthecyclepath.com

Figure 2-12: Cedar Street CTfastrak Station

An example of BRT and trails coexisting in the United States include the new CTfastrak BRT system (Figure 2-12) between Hartford and New Britain, Connecticut. Despite a narrow right-of-way of 60 feet or less in width, the state built a high-quality trail along five miles of the corridor. A 100-foot wide corridor such as the CKC would allow for improved separation between the BRT-way and trail.

Figure 2-13: Rendering of Silver Line Gateway

A more urban example of BRT and trails along a corridor is from Chelsea, a suburb just north of Boston, where construction is underway for the Silver Line Gateway (Figure 2-13). This project, which is along a former rail corridor, is generally 50 to 60 feet wide and includes a trail along a majority of the project length. It will result in large travel time savings cutting some travel times from 39-minutes to just 15-minutes.

Figure 2-14: MyCiTi BRT in Cape Town, South Africa

MyCiTi BRT in Cape Town, South Africa (Figure 2-14) is another example of a former freight rail corridor and includes both a BRT and a fully separated trail. A large portion of the corridor is roughly 60 feet wide.

Source:
www.flickr.com/photos/oregondot/15113819873/in/album-72157648750998749/

3.0 FACILITY CONCEPT

3.1 TYPICAL TRAIL AND BRT CROSS SECTION
3.2 PINCH POINTS
3.3 BRT-WAY SEGMENTS ON THE CKC
3.4 BRT-WAY SEGMENTS OFF THE CKC
3.5 STATIONS
3.6 VEHICLES
3.7 INTERSECTIONS AND NON-MOTORIZED CROSSINGS

3.0 INTRODUCTION

The CKC, as envisioned in the Master Plan, will be a destination in itself, not just a way to get around Kirkland. The CKC Master Plan envisions a world-class walking and bicycling trail for transportation and recreation purposes on the west side of the corridor, providing great views of Downtown Kirkland and Lake Washington. Consistent with the CKC Master Plan, this document envisions a bus corridor on the east side of the CKC, with iconic stations that reflect their context and the values embodied in the CKC Master Plan.

Both trail and transit would function independently and yet provide important interactivity. The pedestrian and bicycle trail would provide access to the BRT stations allowing passengers to walk or bike to the stations, with the BRT offering reliable, congestion-free connections to regional destinations, better connecting the city.

The "CKC BRT concept" and "BRT-way" as referenced and described throughout the rest of this document, combines all aspects of gold standard BRT systems, such as:

- Dedicated BRT-way designed to minimize visual and physical barriers
- Multi-use trail and public spaces as envisioned in the CKC Master Plan
- Quiet, modern electric buses
- Convenient, frequent, high-quality bus service to key destinations
- Attractive, full-featured, rail-like stations

The CKC BRT concept is a Gold Standard BRT system, which would make it the highest-quality BRT system in the United States. It would provide mobility choices for Kirkland residents and employees, now and into the future, while also protecting the integrity of the CKC as a regional trail resource for pedestrians and cyclists. Elements of the CKC Master Plan are shown on the opposing page.

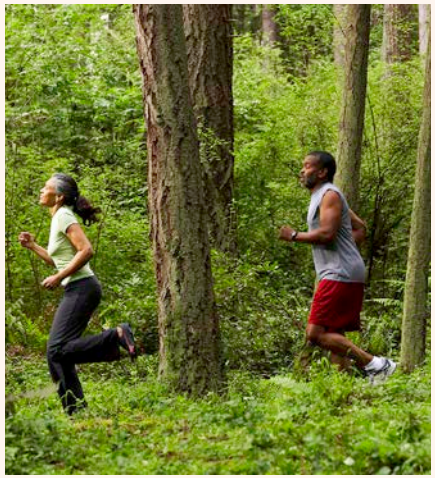
"The CKC BRT concept is conceived as a Gold Standard BRT system, which would make it the highest-quality BRT system in the United States.

Figure 3-1: Look for the Gold Standard symbol to highlight gold standard features suggested for the Kirkland BRT.

KEY FEATURES

- √ Dedicated Right-of-Way
- √ Busway Alignment
- √ Off-board Fare Collection
- √ Intersection Treatments
- √ Platform-level Boarding

CKC MASTER PLAN GOALS



01: CONNECT KIRKLAND

The Cross Kirkland Corridor is fundamentally about making connections: connecting to the city via the corridor but also connecting the city back to the corridor. The corridor can connect to existing transit, future transit and potentially become home to high capacity transit. Innovative alternative transit between the corridor and downtown Kirkland is another example of a potential connection. The corridor connects people—neighbors, kids and schools, businesses and their employees and customers—in a new model for contemporary communities.

02: SHAPE A PLACE UNIQUE TO KIRKLAND

More than a corridor that connects, the Cross Kirkland Corridor is a place, a destination, and an attraction. Kirkland is a city of diverse citizens, and the corridor will welcome and serve all citizens and visitors of all ages and abilities. The corridor will also capture the unique qualities that make Kirkland special—both in its design and in the programs and events it supports.

03: FOSTER A GREENER KIRKLAND

The Cross Kirkland Corridor master plan will shape the development of an ecologically and environmentally enhanced corridor even as it becomes an intensively used and integral part of city life. The corridor's greatest contribution to sustainability extends beyond its own project limits to offer the opportunity for all of Kirkland to become more sustainable. By providing sustainable, regional amenities, the corridor makes Kirkland 'greener.'

04: ACTIVATE KIRKLAND AND EVOLVE WITH TIME

The corridor can lead the whole city forward to achieve existing and new goals. It is designed to adapt and evolve over time to meet the needs of a growing city. The corridor offers balanced transportation solutions that today might include improved connections to transit, and also future possibilities which may one day include high capacity transit. The corridor is envisioned as a catalyst for change and growth as under-utilized areas of the city increasingly become home to new businesses and residents.

Source: Cross Kirkland Corridor Master Plan

CKC UTILITY AND TRANSIT STUDY

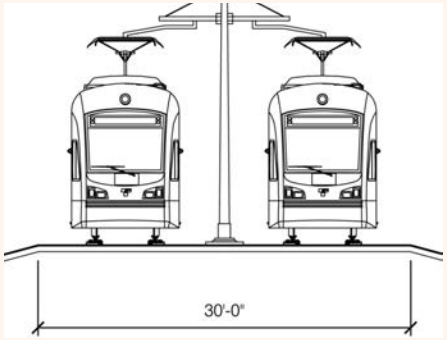
Future Transit Strategies

Given the lengthy time frame of corridor development, the master plan maintains high flexibility on the systems it accommodates. A prime example of this approach is the treatment of future transit strategies.

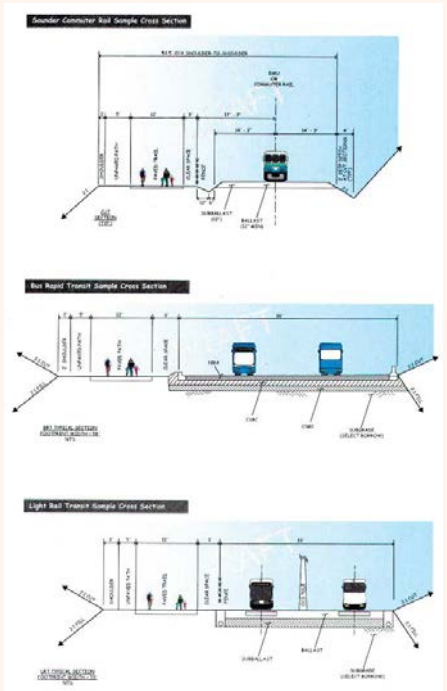
The initial and primary transit modes of the corridor will be walking/jogging and bicycling, but as development progresses additional modes of transit may be considered. These additional modes may include bus rapid transit, trams, modern streetcar, or light rail. Within each of these modes lies a multitude of further choices—electric powered, natural gas powered, human operator, driverless technology, just to name a few. This master plan does not attempt to guess which transit solutions might evolve on the corridor, but rather conservatively assumes what the maximum transit footprint might be.

A key to any transit on the corridor will be determining an operator of transit elements because the City of Kirkland, an owner of the corridor, is not a transit agency. In light of this operator and transit mode uncertainty, this master plan assumes the major regional transit agency, Sound Transit (ST), would be the operator, as they are the state mandated agency for regional transportation, have an easement on the corridor for future transit use, and are in the early stages of studying future transit expansion opportunities. Sound Transit is in the midst of numerous corridor studies, including the Cross Kirkland Corridor, that will likely result in defining ST3, a future transit expansion package. If a transit proposal emerged for the CKC, the timeline for improvements would likely be 2031 or later (assuming a vote in 2016 and a 15-year implementation schedule). The design and use of the corridor in the near term in a way that welcomes evolving to allow transition in the future is consistent with other stretches of the Eastside Rail Corridor, notably improvements completed and underway on the Redmond Spur.

Building on the assumption of ST as operator, the master plan assumes as a base condition ST's most intensive mode of transit (both in corridor footprint and passenger capacity) Link light rail, with a 30-foot-wide transit corridor and additional 5-foot buffers on either side. This combined 40-foot envelope for transit and site amenities accommodates the assumed ST transit envelopes in the current corridor study. Should other, lower capacity transit alternatives be considered, they would likely have a reduced footprint on the corridor, making the above assumptions a conservative approach to transit planning.



Typical Sound Transit Trackway Width



Source: Cross Kirkland Corridor Master Plan

3.1 TYPICAL TRAIL AND BRT CROSS SECTION

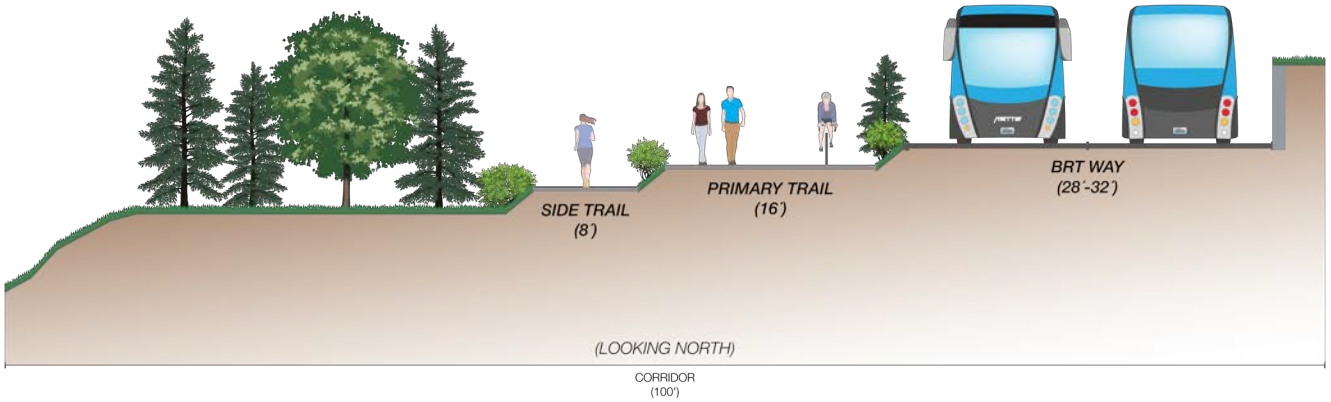
Over most of its length, the CKC is 100 feet wide, providing enough room for a primary trail, secondary trail and BRT-way. The assumed guideway design includes two 12-foot travel lanes with 2-4 feet for shoulders for a total of 28 to 32 feet. This is in line with other local and regional busway designs.

As envisioned in the CKC Master Plan, a 16-foot wide primary trail for walking and biking would extend along the full length of the CKC, with an 8-foot wide side trail along 100-foot-wide segments. Including buffers, this leaves between 44 to 48 feet of space for amenities identified in the CKC Master Plan, including landscaping, trees, park benches, mixing zones, activity areas and more.

As the concept development proceeded, the idea of a guided busway has became an attractive option due to a number of reasons. Guided busways like

Figure 3-2: BRT in Cambridgeshire, UK has a path for walking and biking alongside the grassy BRT guideway

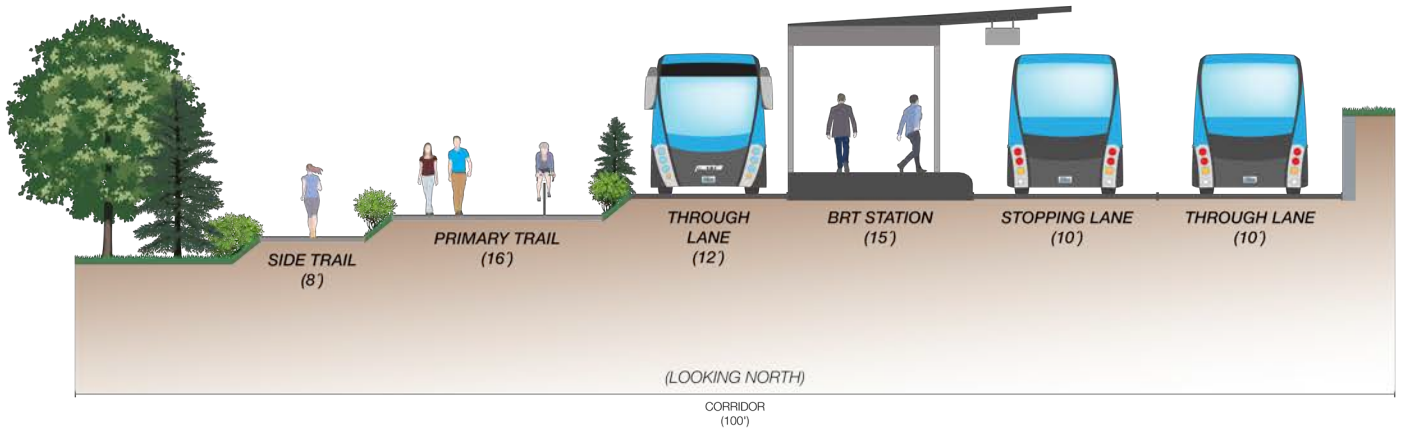
Figure 3-3: Typical CKC Trail and BRT cross section



the busway in Cambridgeshire (Figure 3-2) allows for a more aesthetically pleasing grass guideway with a narrower footprint, reducing stormwater impacts, increasing space for the trail and amenities and reducing noise. This concept should be explored in further detail for the CKC. A potential cross-section for the CKC master plan including BRT within 100 feet right-of-way is shown in Figure 3-3.

As envisioned, the BRT-way does not need to be separated from the shared use trail by a high wall or fence. A vegetative swale with heavily planted shrubbery could provide a sufficient barrier to prevent trail users from entering the BRT-way. If fences are included, they should have a low profile and be integrated with the shrubbery. Barrier fencing is generally more important for higher-speed modes, where vehicles need longer distances to stop (see “3.7 Intersections and Non-Motorized Crossings”)

Figure 3-4: Typical CKC Trail and BRT cross section at stations. Platforms are offset and one passing lane is included



Stations along the CKC BRT Way as conceived are designed to improve passenger comfort through full weather project, facilitate fast boarding and alighting of passengers using off-board fare payment and level boarding, and allow express routes to pass local routes. This results in stations that are wider than the typical BRT-Way cross section (see figure 3-4).

To minimize the additional width needed to accommodate stations an “offset station” design with a single shared platform and one passing lane can be utilized. This design reduces the width of the station by 15-20 feet over a more typical two-platform designs with passing lanes in each direction. Combined, stations would require at least 49’, leaving 51’ for the primary trail, secondary trail, buffer and other station amenities like bike parking or seating. Figure 3-5 shows a shared platform station from the Eugene EmX system.

Figure 3-5: Shared single-station platform, Eugene, OR

Source: ODOT Flickr

3.2 PINCH POINTS AND CONGESTION

Before the City of Kirkland purchased the CKC, the City commissioned a detailed survey of the corridor to confirm the right-of-way limits and corridor location. Building off this survey, both the CKC Master Plan and this document confirmed that the corridor is 100-feet wide for a large majority of its length, and that both transit and a trail will fit.

Along the CKC, there are five locations where the corridor is less than 100-feet in width. These narrower pinch points, which are typically around 70-feet wide, are shown in Figure 3-6.

Figure 3-7 shows a typical cross section for these 70-foot CKC segments. Despite the narrowing of the corridor, there is still sufficient space for both BRT and the trail. Multiple examples of busways with trails have narrower right-of-way than the CKC in the United States and internationally.

Figure 3-7: Cross section at typical constricted pinch point

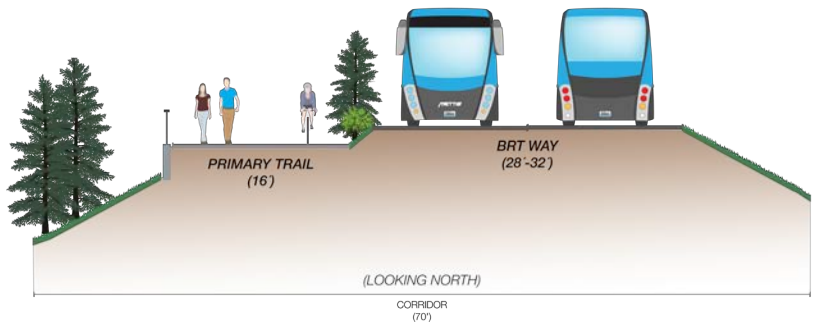
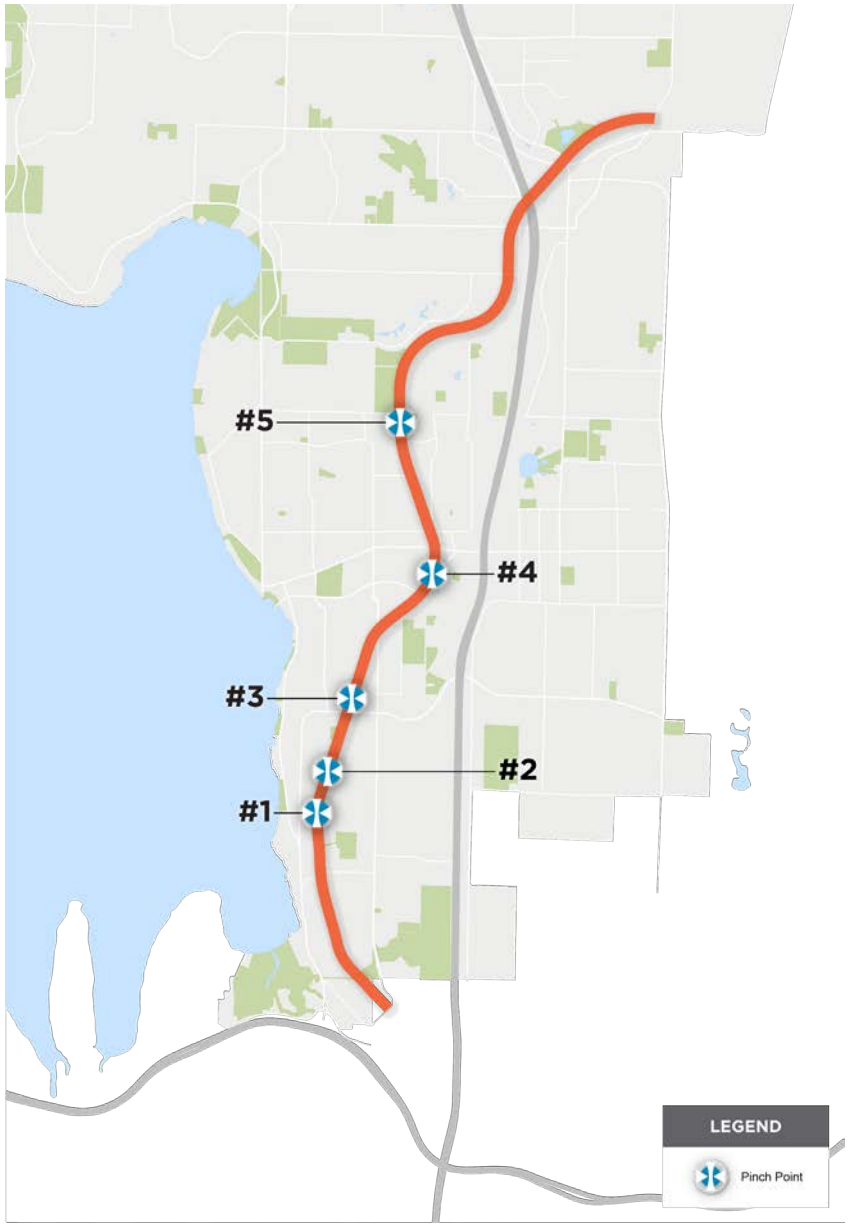


Figure 3-6: Pinch Points

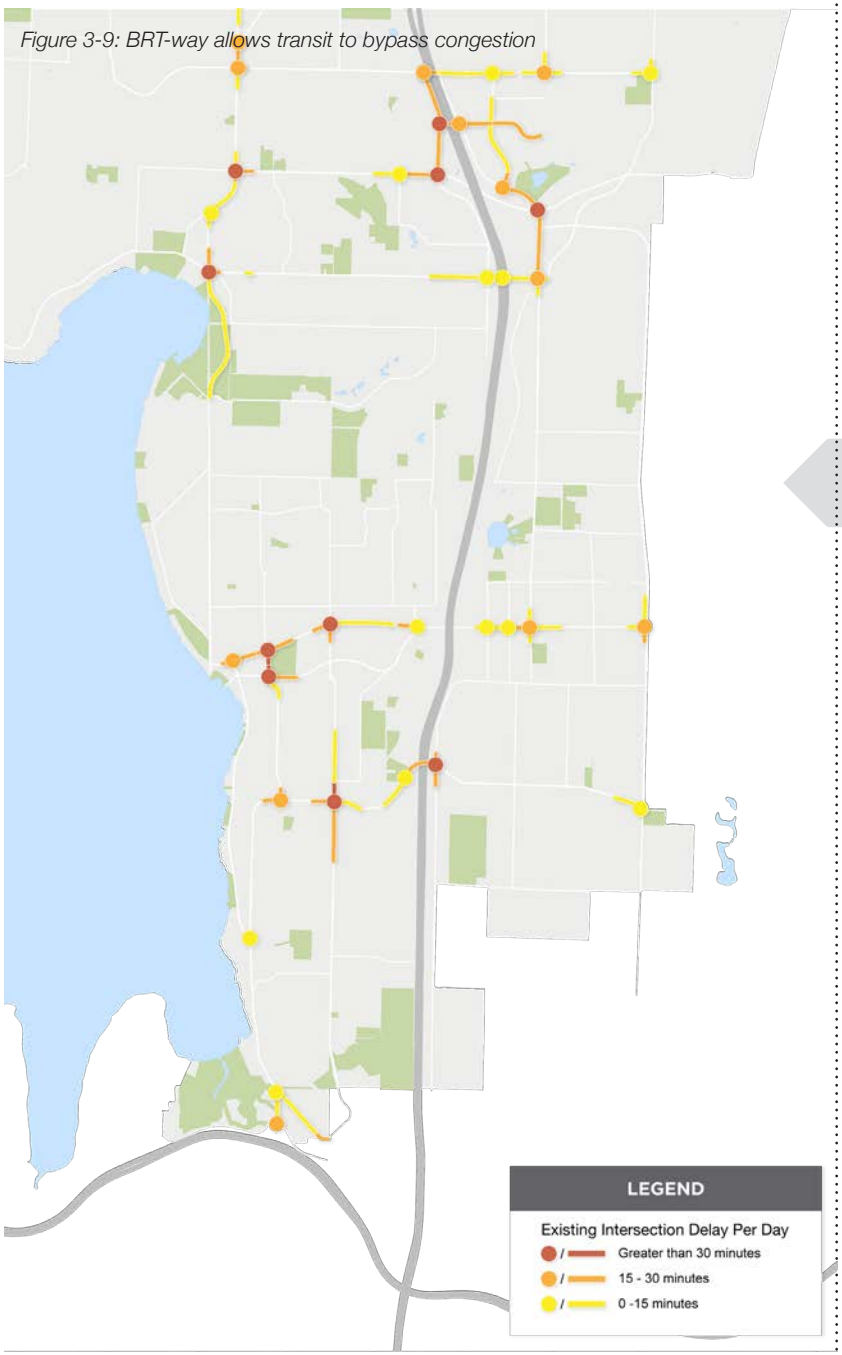


Congestion throughout the City on arterial streets delays transit. East-west streets such as NE 70th Street, NE 85th Street and NE 124th Street all experience congestion as vehicles travel to and from I-405. North-south streets such as Lake Washington Boulevard, 108th Avenue NE/6th Street, Market Street and 124th Avenue NE also experience congestion. Congestion areas (Figure 3-8) typically delay transit resulting in transit being less reliable for passengers. If BRT traveled on the CKC corridor without other cars, it would bypass this congestion (Figure 3-9).

Figure 3-8: Typical Congestion for Transit in Kirkland

Source: Transpo Group

Figure 3-9: BRT-way allows transit to bypass congestion

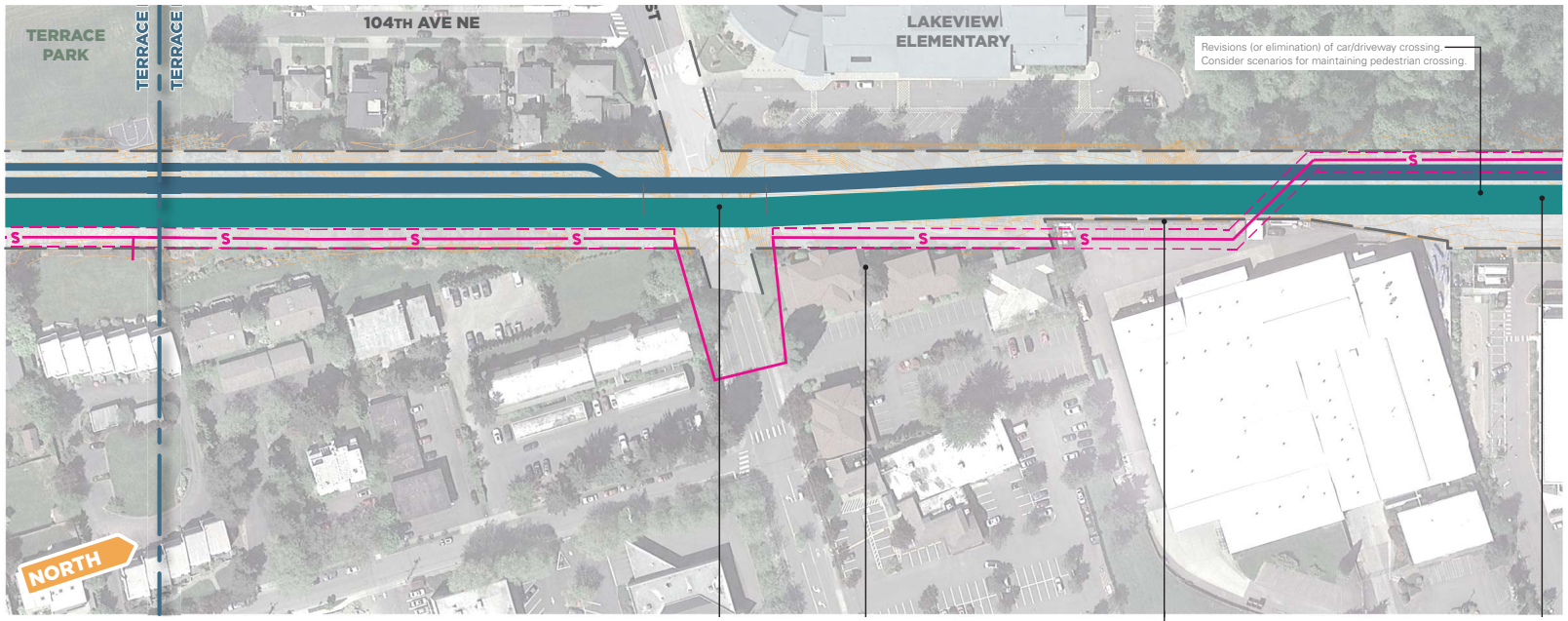


3.3 BRT-WAY SEGMENTS ON THE CKC SECTION

The CKC BRT concept includes segments both on and off the CKC in strategic locations, allowing BRT vehicles to avoid current and future congestion while also serving major residential and employment destinations.

BRT-way segments both on and off the CKC total approximately 10.4 miles and are proposed as fully dedicated BRT lanes. Of this, 7.3 miles are located on the CKC and Eastside Rail Corridor (ERC), and 3.1 miles are on-street, transit facilities. For the most part, the alignment of the BRT-way and BRT stations would be located within the east side of the CKC Corridor. In narrow locations, or areas where environmental constraints are present, the BRT-way and trail could shift right or left within the CKC corridor to avoid obstacles as shown below.

Figure 3-10: Example of shifting alignment to avoid pinch points.



The BRT way on the CKC has been broken into five segments:

A. South Kirkland Park & Ride to NE 68th Street

B. NE 68th Street to Kirkland Way

C. Kirkland Way to NE 85th Street

D. NE 85th Street to 116th Avenue NE

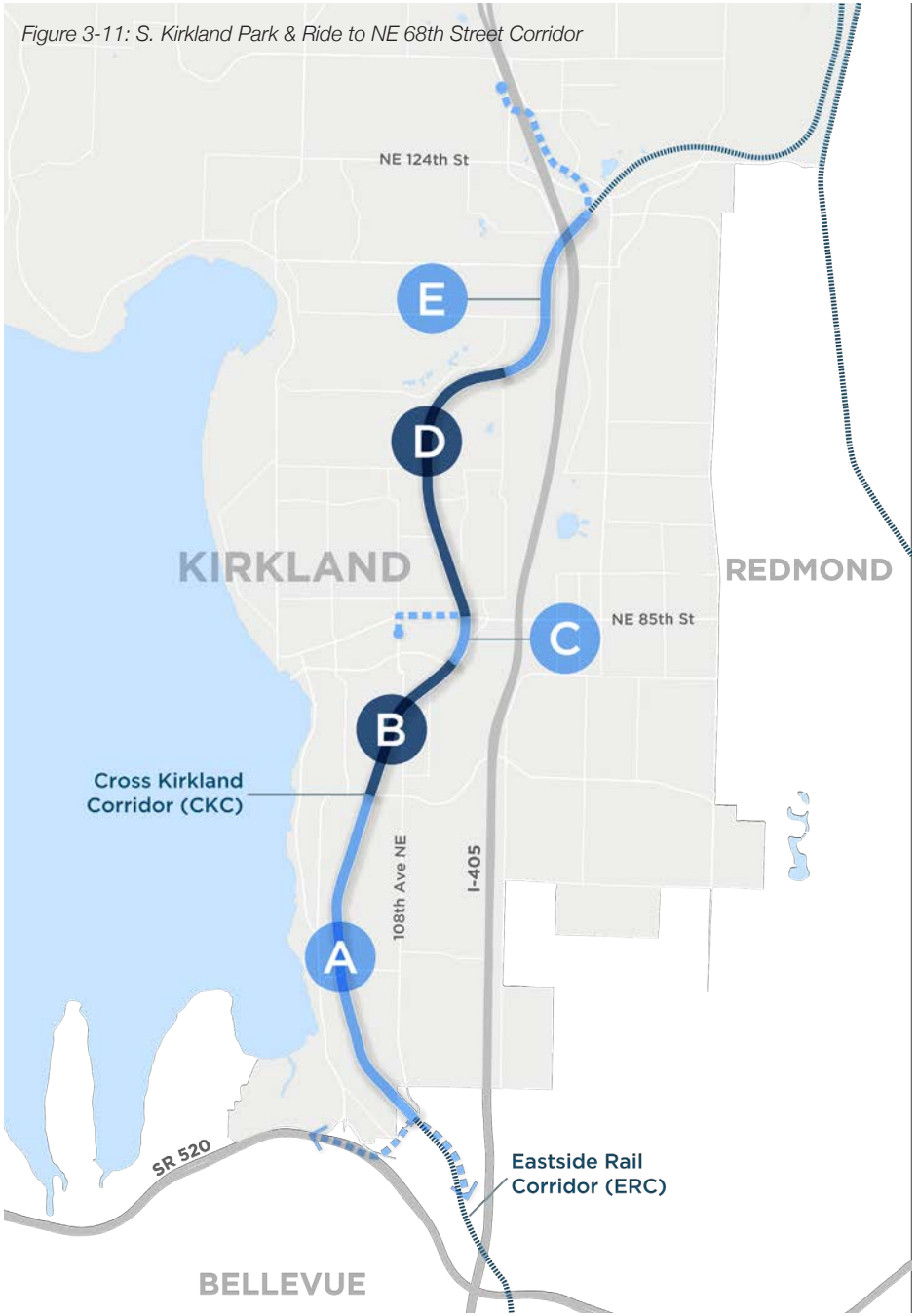
E. 116th Avenue NE to NE 120th Street

As shown in Figure 3-11, each segment has a description including the segment's character, environmental and right-of-way characteristics, and typical cross section. These segments correlate to the CKC Master Plan to ease reference between these two documents.

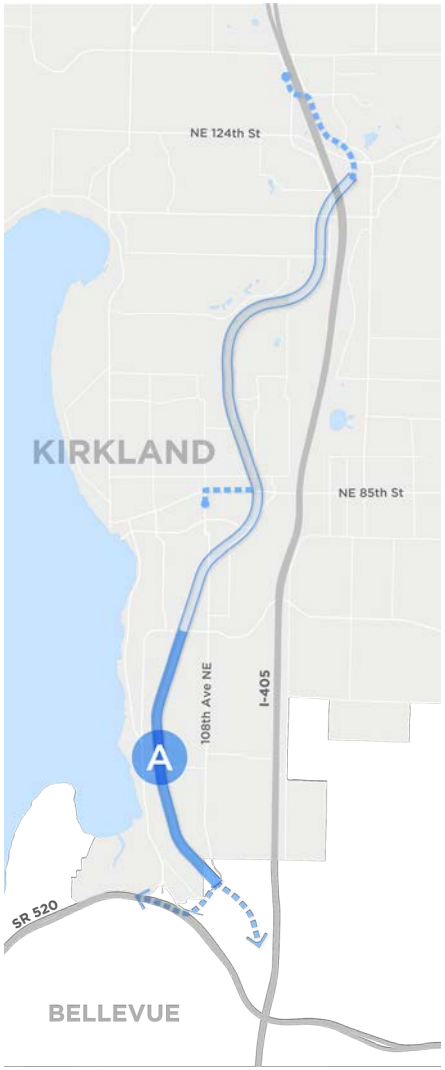
KEY FEATURES

- √ Dedicated Right-of-Way
- √ Smooth Guideway
- √ Universal Access
- √ Pedestrian Access & Safety
- √ Secure Bicycle Parking
- √ Bike Facilities
- √ Bike-Share Integration

Figure 3-11: S. Kirkland Park & Ride to NE 68th Street Corridor



SEGMENT A. SOUTH KIRKLAND PARK & RIDE TO NE 68TH STREET SECTION



SEGMENT CHARACTER

This segment spans both the "Yarrow Woods" and "Houghton Porch" zones described in the CKC Master Plan. The South Kirkland Park & Ride is the southern terminus of this segment. Steep cut or fill slopes exist on both sides of this segment of the corridor. There is a thick forested canopy along some parts of the segment and a number of sensitive areas such as wetlands and streams.

A typical cross section in this segment, showing two running lanes of BRT, and primary and side trail, is shown in Figure 3-12.

There are access points along the corridor, notably the trails that access the Watershed Park as well as street-end access points between NE 52nd Street and NE 64th Street. Single family homes exist adjacent to most of the corridor. Toward the northern portion of this segment, the corridor opens up with lighter vegetation and more level terrain.

ENVIRONMENTAL CHARACTERISTICS

Creek crossings include Yarrow Creek, Carillon Creek, and other unnamed creeks. There are several wetlands close to the east side of the corridor. These sensitive areas can be protected with the use of retaining walls or with shifts in the trail/BRT alignment.

RIGHT-OF-WAY CHARACTERISTICS

While the typical right-of-way width along the CKC is 100 feet, there are approximately 12 properties where property improvements or structures appear to be within the 100-foot corridor based on review of Geographic Information System (GIS) data. Additional investigation is needed to definitively assess the status of these locations. Based on the same GIS data there appear to be two pinch point locations where CKC right-of-way is less than 100 feet wide, with approximately 70 feet of usable width at both locations. In addition, NE 52nd Street crosses the corridor, requiring intersection crossing improvements.

SEGMENT A

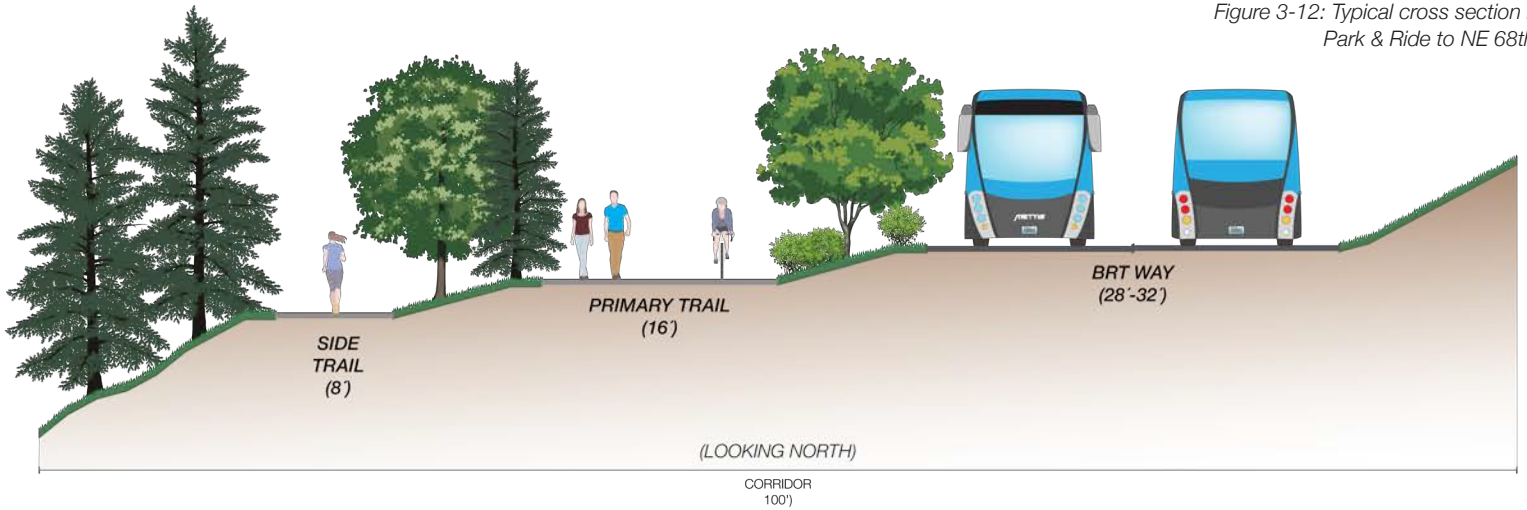


Figure 3-12: Typical cross section in South Kirkland Park & Ride to NE 68th Street segment

SEGMENT B. NE 68TH STREET TO KIRKLAND WAY

SEGMENT CHARACTER

This segment spans both the "Convergence" and "Everest Edge" zones described in the CKC Master Plan. The southern terminus is at NE 68th Street and includes the NE 68th Street and Kirkland Avenue overpasses. A typical section for this segment is shown in Figure 3-13.

The Google campus development, light industry and small professional services office buildings, is adjacent to this segment along most of its length. The segment south of the 6th Street S intersection continues to redevelop and is becoming a more important employment center for the City of Kirkland. From the 6th Street S crossing to the northern limits of this segment at Kirkland Avenue, the corridor passes through a wooded area with more level terrain ("Everett Edge Zone") and a light industrial area just south of Kirkland Avenue. A parallel frontage road provides a pedestrian connection.

The two existing overpasses at NE 68th Street and Kirkland Way are narrow and were built originally to only serve rail traffic. A typical section at the NE 68th Street crossing is shown in Figure 3-14.

ENVIRONMENTAL CHARACTERISTICS

There are no apparent wetlands in this segment. There is a crossing of Everest Creek between NE 6th Street and Kirkland Avenue. Impacts to this stream would be avoided.

RIGHT-OF-WAY CHARACTERISTICS

Just north of the NE 68th Street overpass there are approximately three structures that appear to protrude slightly into the corridor based on review of GIS data. Further north, a large commercial building housing a number of smaller businesses appears to protrude on the right-of-way between the Google campus and NE 6th Street. Additional investigation is needed to definitively assess the status at these locations. GIS data also indicates one pinch point where the CKC right-of-way narrows to less than 100 feet. A majority of the recently constructed Google Phase II campus park is within the CKC corridor.

SEGMENT B

Figure 3-13: Typical cross section for NE 68th Street to Kirkland Way segment

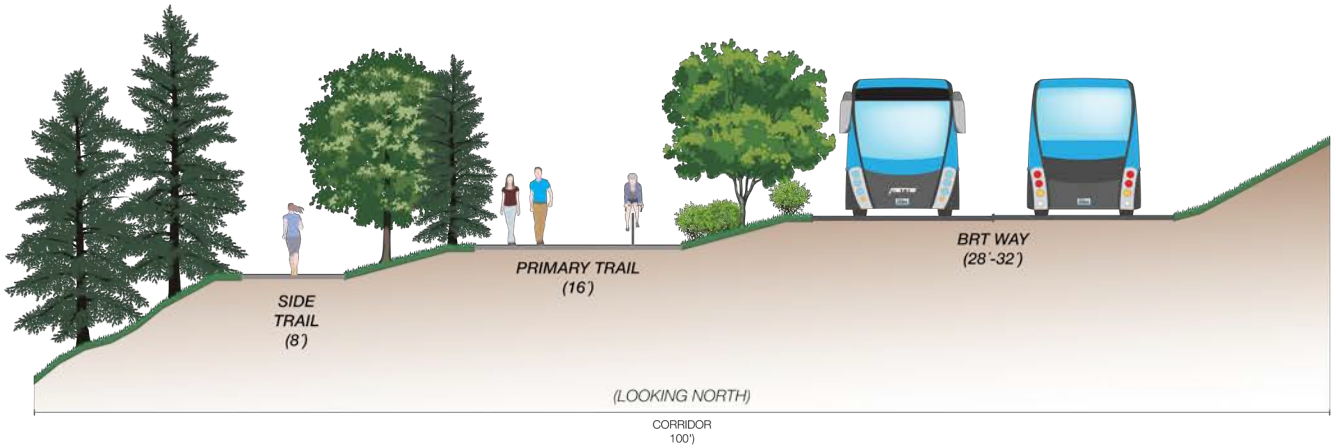
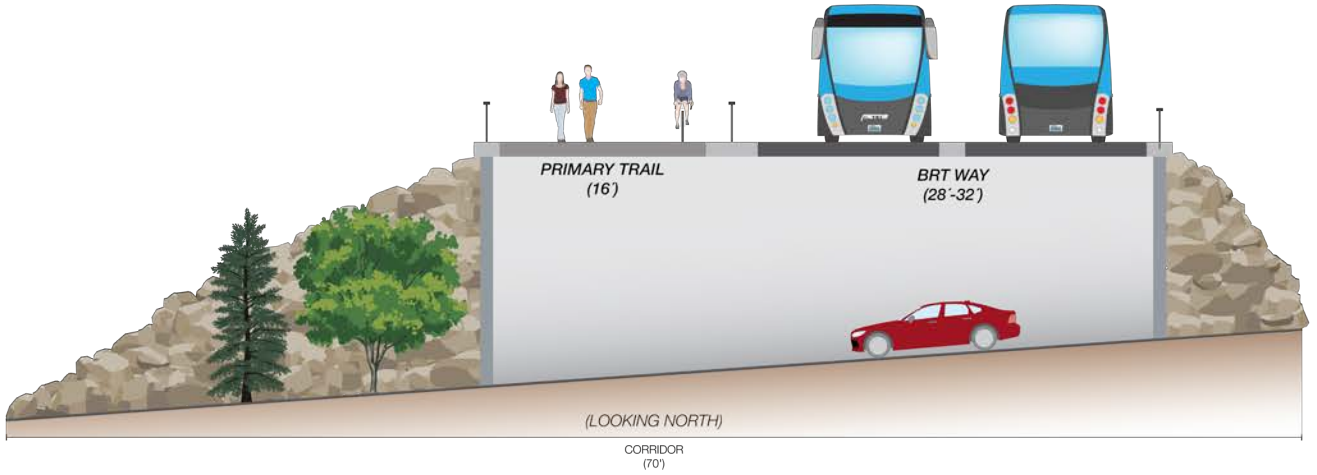
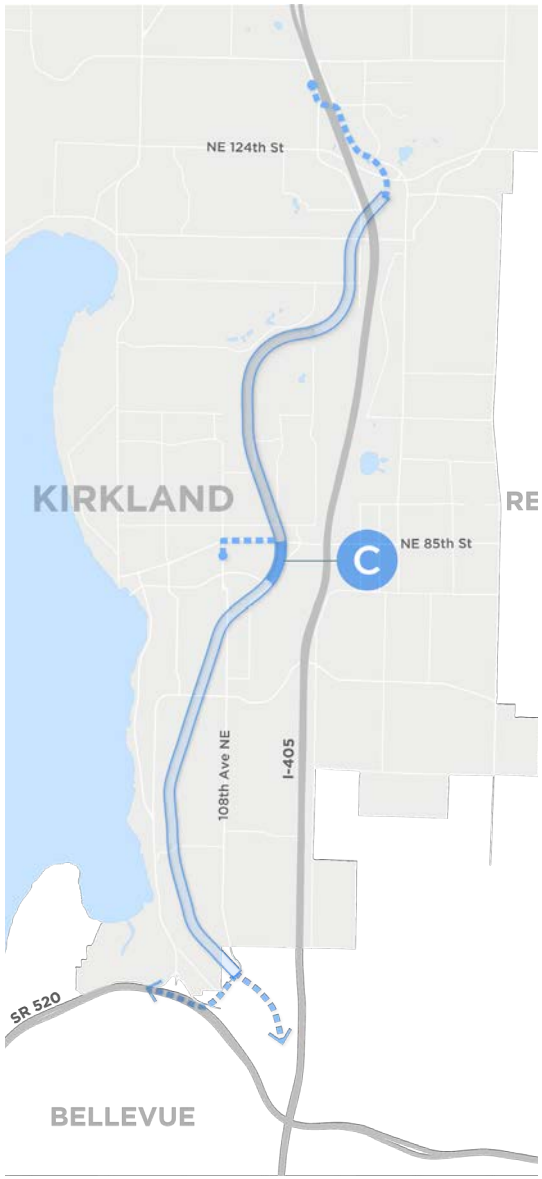


Figure 3-14: Typical bridge cross section



SEGMENT C. KIRKLAND WAY TO NE 85TH STREET



SEGMENT CHARACTER

This segment consists of the remainder of the "Everest Edge" zone. The CKC right-of-way narrows at one pinch point with light industrial use structures on the east side of the corridor and multi-family residential units on the west side of the corridor. Topography along the old rail bed of the corridor itself is flat, while slopes exist on the edges of the CKC right-of-way. A typical section for this segment is shown in Figure 3-15.

ENVIRONMENTAL CHARACTERISTICS

There are no apparent sensitive areas (streams/ wetlands) along this segment of the corridor.

RIGHT-OF-WAY CHARACTERISTICS

The majority of this segment has a constrained right-of-way of approximately 70 feet due to the two large light industrial building along the east side of the corridor.

Due to the constrained nature of the right-of-way and pinch points, the typical section for this segment consists of a 16-foot wide primary trail along the existing old rail bed, with 28-32 feet remaining for HCT two-way travel, east of the primary trail but within the existing right-of-way. There is insufficient right-of-way to construct a side trail. Short retaining walls on the east side may be required to avoid impacts to the light industrial properties.

SEGMENT C

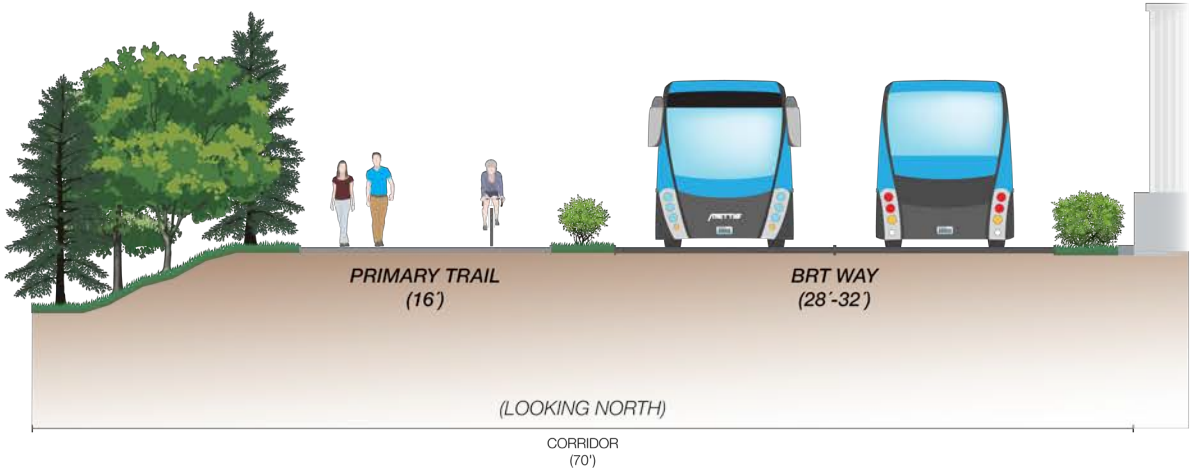
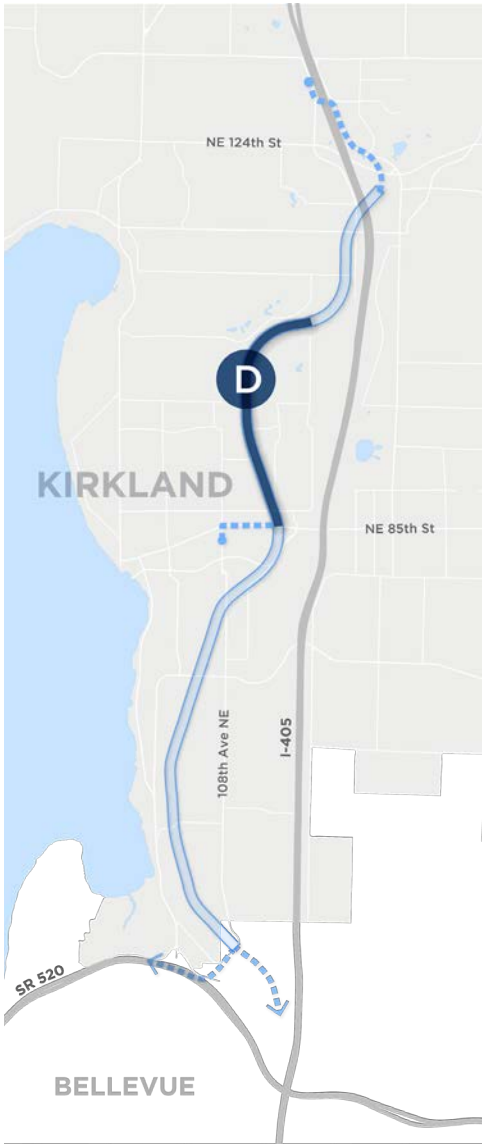


Figure 3-15: Typical cross section Kirkland Way to NE 85th Street segment

SEGMENT D. NE 85TH STREET TO 116TH AVENUE



SEGMENT CHARACTER

This segment spans from NE 85th Street ("Norkirk Edge Zone") to approximately 116th. Avenue NE ("Highlands Pass Zone"). The "Norkirk Edge Zone" (from NE 85th Street to 12th Avenue) is characterized by light industrial/commercial development on the west. The Highlands Neighborhood borders on the east side with primarily single-family homes. Access to Peter Kirk Elementary is provided roughly where the CKC crosses 12th Ave/110th Ave/NE 97th St. Topography varies throughout this segment. A typical cross section for this segment is provided in Figure 3-16.

The "Highlands Pass Zone" (from 12th Avenue to approximately 116th Avenue NE) features dense vegetation and forest canopy that is likely to remain forested and undeveloped. There are formal and informal access points along the corridor including a crossing that leads up to Crestwood Park. Topographic transitions and dense trees create a canyon-like sense along parts of this corridor.

ENVIRONMENTAL CHARACTERISTICS

There is a creek crossing and a fairly large wetland located on the east side of the CKC between 11th and 12th Avenue at the northern end of the "Norkirk Edge Zone". Retaining walls could be used to avoid or minimize impacts to the wetland and/or buffer. Impacts to the stream crossing are not anticipated. Additionally, there are approximately seven additional unnamed creek crossings, a large apparent wetland on the west side south of 17th Avenue, and a large apparent wetland on the east side between 17th Avenue and 19th Place within the "Highlands Pass zone". Retaining walls could be used to avoid or minimize impacts to the wetland and/or buffers. Impacts to the stream crossing could be avoided wherever possible. If necessary, retaining walls could be utilized to minimize or avoid stream and buffer impacts.

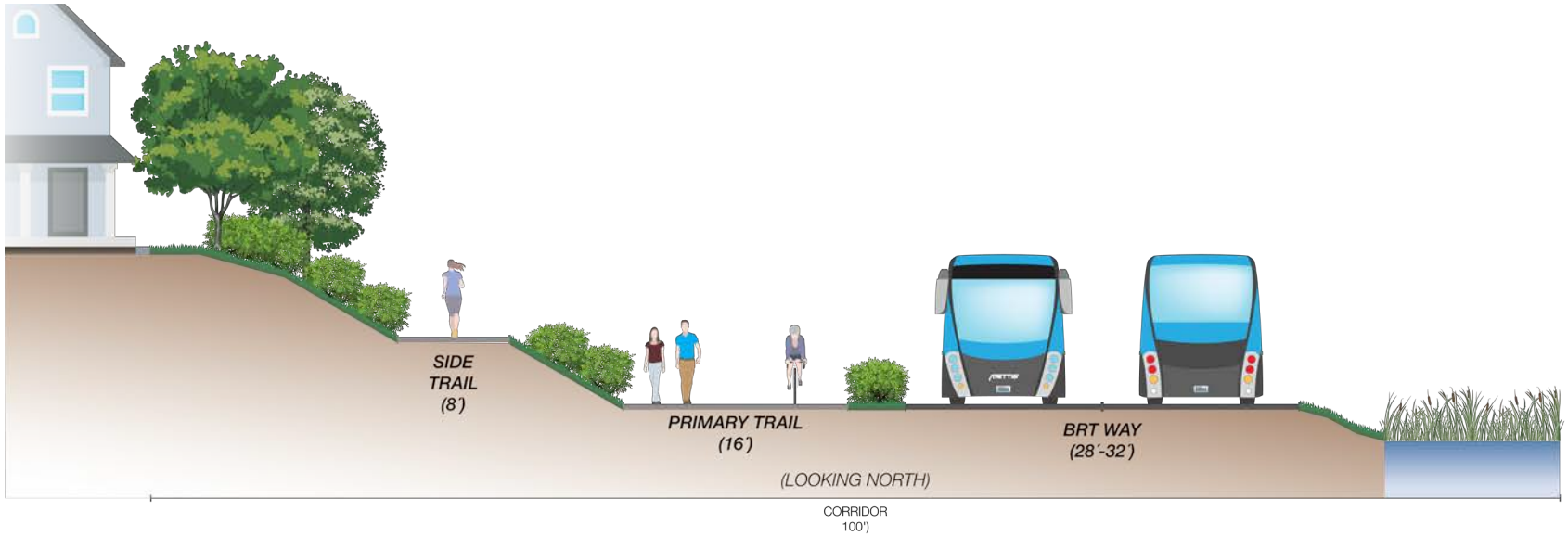
RIGHT-OF-WAY CHARACTERISTICS

While the typical right-of-way width is 100 feet, there are three structures that are potentially within the CKC right-of-way based on review of GIS data. Additional investigation is needed to definitively assess the status of these locations. This segment has one pinch point where the CKC right-of-way appears to be 70 and 90 feet wide.

Light industrial/commercial development exists on the west side of the corridor within the "Norkirk

SEGMENT D

Figure 3-16: Typical cross section for NE 85th Street to 116th Avenue NE segment



Edge Zone". Fill retaining walls can be used as needed to avoid impacts to these businesses and maintain access. The proposed section for this segment typically includes a 16-foot-wide primary trail along the existing old rail bed, with a 28-32 foot HCT width for two-way travel located east of the primary trail but within the existing right-of-way. Where the right-of-way is 100 feet, an 8-foot side trail can be constructed west of the primary trail. Retaining walls can be utilized to contain the trail and HCT in areas of steep slopes or sensitive areas.

SEGMENT E. 116TH AVENUE NE TO NE 120TH STREET

SEGMENT CHARACTER

This segment spans from approximately 116th Avenue NE at the southern end of the ParMac "Active Zone" to approximately NE 120th Street at the southern end of the "Totem Lake" segment, including the "West Totem Lake Connector" segment. Extensive commercial and industrial development exists along both sides of the corridor. In general, the zone is fairly flat in topography excluding the very southern portion of this segment. Street crossings include the NE 112th Street and 120th Avenue NE at-grade crossing, as well as the recently widened NE 116th Street overpass and the I-405 overpass. A conceptual cross section for this segment under I-405 is provided in Figure 3-17.

ENVIRONMENTAL CHARACTERISTICS

Forbes Creek is a major creek crossing at the southern end of the segment. The goal is to avoid any impacts to the crossing and buffers. Restoration planting would likely be provided where required. There are no other apparent sensitive areas (streams/wetlands) in this segment of the corridor.

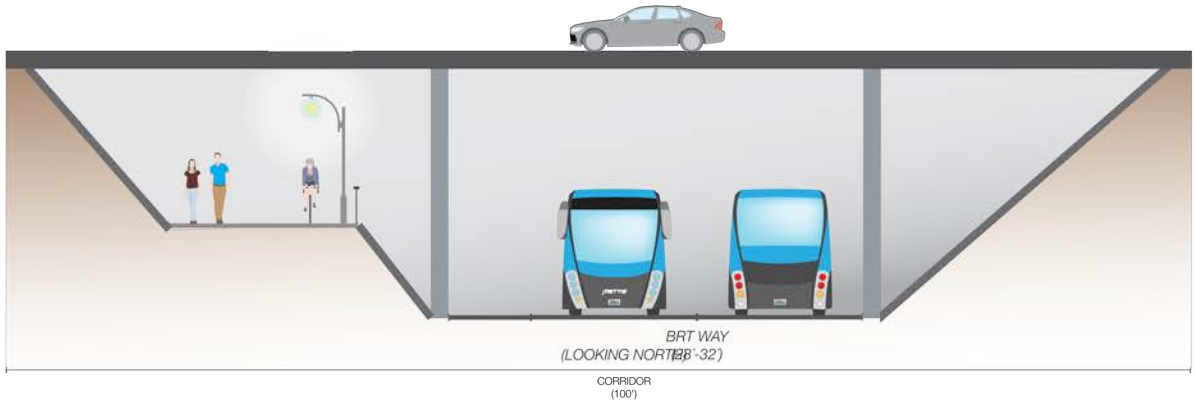
RIGHT-OF-WAY CHARACTERISTICS

Several parts of this segment have a constrained right-of-way, where property improvements associated with six to seven large light industrial/commercial properties along the east side of the corridor appear to be within the 100 foot CKC right-of-way based on review of GIS data. Additional investigation is needed to definitively assess the status of these locations.

Existing light industrial/commercial development exists on both sides of the corridor within the "Active Zone". Where needed, short retaining walls could be used to avoid impacts to these businesses, parking and access. The proposed section for this segment typically includes a 16-foot-wide primary trail along the old rail bed, with a 28 to 32 foot HCT width for two-way travel located east of the primary trail, but within the existing right-of-way. Where the right-of-way is 100 feet, an 8-foot side trail can be constructed. Retaining walls can be utilized to contain the trail and HCT in sensitive areas with steep slopes.

SEGMENT E

Figure 3-17: Typical cross section for 116th Avenue NE to NE 120th Street segment



At the I-405 overpass, the typical section will be modified to route the 28 to 32 foot HCT pathway between the support columns, and route the 16-foot-wide primary trail west of the columns. Retaining walls will be used to contain the cut slope within the existing right-of-way. When passing under I-405, the BRT-way and trail would use the same configuration.

3.4 BRT-WAY SEGMENTS OFF THE CKC SECTION

A key component of the BRT service concept described in Chapter 4 is the idea of an "open" BRT-way which allows multiple bus routes to use the corridor, entering and exiting the BRT-way along its length. To support this concept, the BRT-way requires high-quality connections which extend beyond the CKC in four places:

Bellevue Transit Center to South Kirkland Park & Ride

A connection could be made in several ways using the Bellevue segment of the Eastside Rail Corridor (ERC) or 116th Avenue NE, with a connection into Downtown Bellevue via NE 6th Street. (Figure 3-18)

South Kirkland Park & Ride to SR 520 High Occupancy Vehicle (HOV) Direct Access Ramps

This connection using NE 108th Ave and the 3+ HOV Direct Access ramp would improve access to 520 for routes to and from Seattle.

Downtown Kirkland to I-405

Connection to Downtown Kirkland via new center bus lanes on NE 85th Street and direct connection between the CKC and NE 85th Street.
The concept also includes bus lanes and BRT service extending toward Redmond on NE 85th Street.

Kingsgate Park & Ride to NE 120th Street

This segment provides a high-quality connection between CKC and NE 132nd and points beyond via Totem Lake Boulevard and a bus-only bridge.

These connections are described in further detail in this section.

BELLEVUE TRANSIT CENTER TO SOUTH KIRKLAND PARK & RIDE

Extending the CKC BRT into Bellevue would benefit residents of Kirkland and Bellevue alike and is integral to the overall CKC BRT concept. In Bellevue, the CKC becomes the Eastside Rail Corridor (ERC). Conceptual discussions with the City of Bellevue staff regarding how to route BRT on the Bellevue portion of the ERC occurred in October of 2015 and several general routing concepts were discussed. These concepts were identified because there are a number of physical constraints along the Bellevue ERC segment and a non-ERC alignment could better unite the CKC BRT concept with the City of Bellevue's Transit Master Plan.

Figure 3-18: Bellevue Transit Center to South Kirkland Park & Ride

These alignment concepts include both at-grade and aerial routing along the ERC, as well as routing along 116th Avenue NE. The CKC BRT concept includes two stations along this segment, one on the edge of the Spring District and a second at the Wilburton Link Station.

CKC BRT would connect to the Bellevue Transit Center via an extension of the High-Occupancy Vehicle (HOV)/Express Toll Lane NE 6th Street bridge, as described in the City of Bellevue NE 6th Street Extension Design Report (August 2012). This connection would provide a direct, congestion free connection between Downtown Bellevue and the rest of the CKC/ERC corridor, as well as I-405 BRT service.

CKC TO SR 520 HOV DIRECT ACCESS RAMPS

A direct connection between the CKC and the SR 520 HOV lanes (Figure 3-19) is an important aspect of the CKC BRT concept because several routes described in the service plan concept will use this connection. A variety of transit priority treatments could be used in this segment. Elimination of the circuitous bus routing through the South Kirkland Park & Ride would eliminate four turns and reduce the number of intersections buses must pass through.

Other improvements along 108th Ave could be made but analysis would need to be conducted to determine the best way to increase the speed and reliability of BRT along this short stretch. Construction of Bus Access and Transit (BAT) lanes or center running bus lanes are consistent with the level of capital investment envisioned as part of the overall CKC BRT concept.

Figure 3-19: CKC to SR 520 HOV Direct Access Ramps

DOWNTOWN KIRKLAND TO 132ND AVE NE

Downtown Kirkland has a vibrant and walkable downtown which continues to grow with projects like Kirkland Urban, a 1.1 million square foot complex that will provide over 3,000 new jobs and 250-300 new housing units. A BRT connection between the CKC and Downtown Kirkland is critical to ensure that Downtown Kirkland continues to thrive, providing those who live and work downtown easy access to both the amenities of the CKC but also to nearby regional activity centers. Figure 3-20 is a sample of the vibrant night life in Kirkland on Lake Street.

To provide a high-quality connection between the CKC and Downtown Kirkland, continuous bus only lanes and new BRT connections are proposed as part of the CKC BRT concept. The design which aligns best with Gold Standard BRT, I-405 BRT and BRT on NE 85th Street would include reconstruction of NE 85th Street with center running bus lanes and BRT only connection between the CKC and NE 85th Street. The bus lanes would ideally extend from 6th Street to 132nd Ave NE, connecting Downtown Kirkland, the CKC, I-405 BRT and Rose Hill.

In addition to center running bus lanes on NE 85th Street, this concept requires construction of direct access ramps between Downtown Kirkland and the CKC also on NE 85th Street. If this design is infeasible, other routing options are possible, with one option shown in Figure 3-21. A new BRT station is needed in downtown Kirkland, either near the intersection of 6th Street and 4th Avenue, or further downtown to connect with amenities such as the waterfront and retail areas. Figure 3-22 shows Marina Park on the waterfront, which is the heart of downtown where many festivals, fun runs and events are centered.

Figure 3-20: Downtown Kirkland's mix of uses and waterfront location makes for a vibrant nightlife.

Figure 3-21: Downtown Kirkland to 132nd Ave NE

KINGSGATE PARK & RIDE TO NE 120TH STREET

Over the next twenty years, much of Kirkland's growth is anticipated to occur in the Totem Lake area which is a Puget Sound Regional Council (PSRC) designated Regional Urban Growth Center. Traffic congestion is already a challenge in this area and BRT is important for managing traffic congestion as the area grows. A major focus of the CKC Trail and BRT concept is to provide transit improvements between Totem Lake and the region, as well as improving non-motorized circulation, and building a "sense of place" within Totem Lake. These improvements would help catalyze the type of walkable, mixed-use growth that the City envisions. (Figure 3-23)

Today, the CKC is missing a short but important link at the complicated and congested intersection of NE 124th Street and Totem Lake Boulevard NE/124th Ave NE. As a result, CKC trail users today must cross two busy streets in order to continue their journey. To solve this challenge, the CKC Master Plan identified a pedestrian and bicycle bridge connection for this location. The bridge concept is illustrated in Figure 3-24.

Likewise, the CKC BRT concept envisions a new aerial BRT connection through this area, allowing BRT to bypass congestion quickly and reliably. This aerial bridge would directly connect the CKC near I-405 to Totem Lake Boulevard NE near the Totem Lake Mall. This connection would allow buses to bypass 2 or 3 intersections, depending on at-grade routing options, reducing travel times by several minutes.

Figure 3-22: The Kirkland Waterfront is a destination for locals and visitors alike.

Figure 3-23: Kingsgate Park & Ride to NE 120th Street

Figure 3-24: Totem Lake Gateway: a bicycle/pedestrian bridge across NE 124th Street. Source: Cross Kirkland Corridor Master Plan.

To ensure fast and reliable travel times especially as the area grows, center running bus lanes on Totem Lake Boulevard should be constructed from the aerial structure to NE 128th Street, where BRT routes could access I-405 at the Totem Lake Freeway station or terminate at the Kingsgate Park & Ride. At the Totem Lake Freeway station, BRT passengers would be able to continue north via I-405, or transfer to other regional I-405 BRT/bus service.

This concept will leverage past transit investments like the I-405 Totem Lake Freeway Station as well as provide congestion free travel with the flexibility to serve other destinations in the area.

3.5 STATIONS

BRT stations along the CKC are envisioned as prominent, full featured enclosures that will be comfortable for passengers in any type of weather, and enhance the natural beauty of the corridor. Great BRT stations provide amenities similar to, or better than, light rail stations. They can be highly functional as well as aesthetically pleasing, and should be designed to minimize passenger boarding time, helping to avoid the long queues and delays at more crowded stops that are typical of regular bus systems.

DESIGN

In many cities, BRT stations have become iconic, reflecting the character of the city or symbolizing a city's regeneration. In Johannesburg, new, sleek red and white highly modern stations (Figure 3-26) have played a key role in the revitalization of the downtown into a prosperous twenty-first century international center.

BRT in Kirkland could have similar high-quality stations along the CKC that are designed to reflect Kirkland's character and history.

Figure 3-26: Glass-enclosed modern stations for Johannesburg's Rea Vaya BRT provide a comfortable place to wait.

Source: BRT Draft Report

KEY FEATURES

- √ Distances Between Stations
- √ Safe & Comfortable
- √ All-Door Boarding
- √ Real-Time Passenger Information
- √ Docking Bays & Sub-stops
- √ Sliding Doors in Stations
- √ Center Stations
- √ Passing Lanes at Stations

As envisioned, the CKC BRT concept would include the following station elements:

- Enclosed stations with weather protection and wind barriers for the full length of the station;
- Seating for waiting passengers;
- Station platforms that are level with bus floors, allowing easy boarding and alighting for passengers;
- Platforms to accommodate up to two buses boarding at the same time;
- Off-board fare collection system at all stations with ticketing vending machines and closed circuit security camera systems;
- Real-time bus arrival signs;
- Station wayfinding, signage, system information, and signature branding elements;
- Elevators and escalators where there is a direct connection to East Link; and
- Bicycle storage and bikeshare station.

Stations should be designed with guidance from Kirkland residents, incorporating artwork in the stations using the "1% for art" program and other funding.

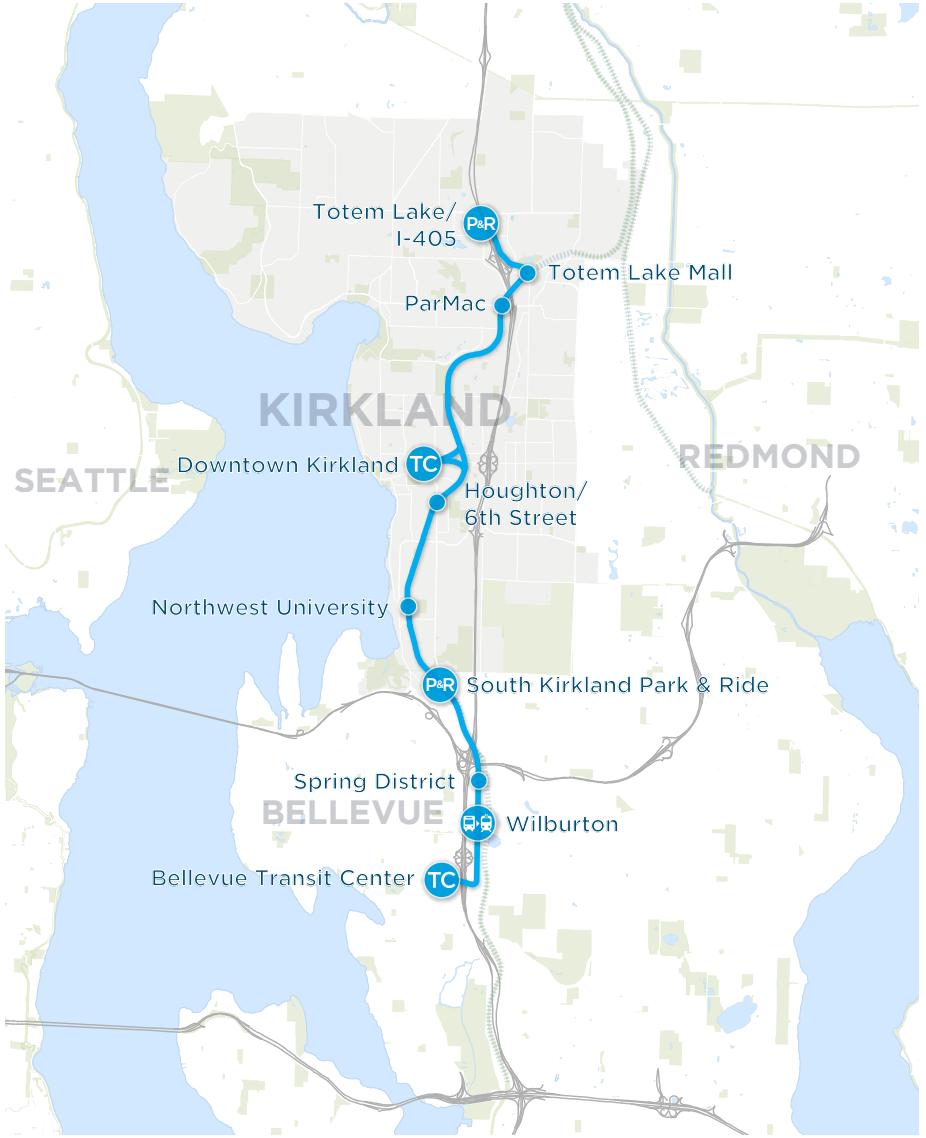
LOCATION

The location of stations near existing and future walkable, mixed-use areas of Kirkland and Bellevue was a key consideration when developing the CKC BRT concept. A total of six stations on the CKC and four stations off the CKC are identified (Figure 3-27) providing good coverage of key destinations such as Totem Lake and Downtown Kirkland. The benefits of this approach are clear, Sound Transit estimates that by 2040 nearly 43,000 residents and 119,000 employees will live or work within walking distance of these ten stations.

KIRKLAND

- **TOTEM LAKE/I-405 FREEWAY**
  Full-featured station on the existing I-405 Freeway Station structure.
- **TOTEM LAKE MALL**
  Full-featured station in the vicinity of the Totem Lake Mall and Park.
- **PARMAC**
  Standard full-featured station.
- **DOWNTOWN KIRKLAND**
  Full-featured station with supporting roundabout and layover facilities.
- **HOUGHTON/NE 6TH STREET**
  Standard full-featured station.
- **NORTHWEST UNIVERSITY**
  Standard full-featured station.
- **SOUTH KIRKLAND PARK & RIDE**
  Full-featured station plus a pedestrian elevator (planned) to the South Kirkland Park & Ride lot. This station is along the CKC and not in the Park & Ride.

Figure 3-27: Approximate locations of BRT stations. Final station locations to be determined together with adjacent communities



BELLEVUE

- **SPRING DISTRICT**
  Standard full-featured station with connections to the Spring District Station area.
- **WILBURTON**
  Standard full-featured station with direct connections, ideally by elevator and escalator, to the Wilburton Link Station.
- **BELLEVUE TRANSIT CENTER**
  Full-featured station, specially designed to fit into existing transit center facilities.

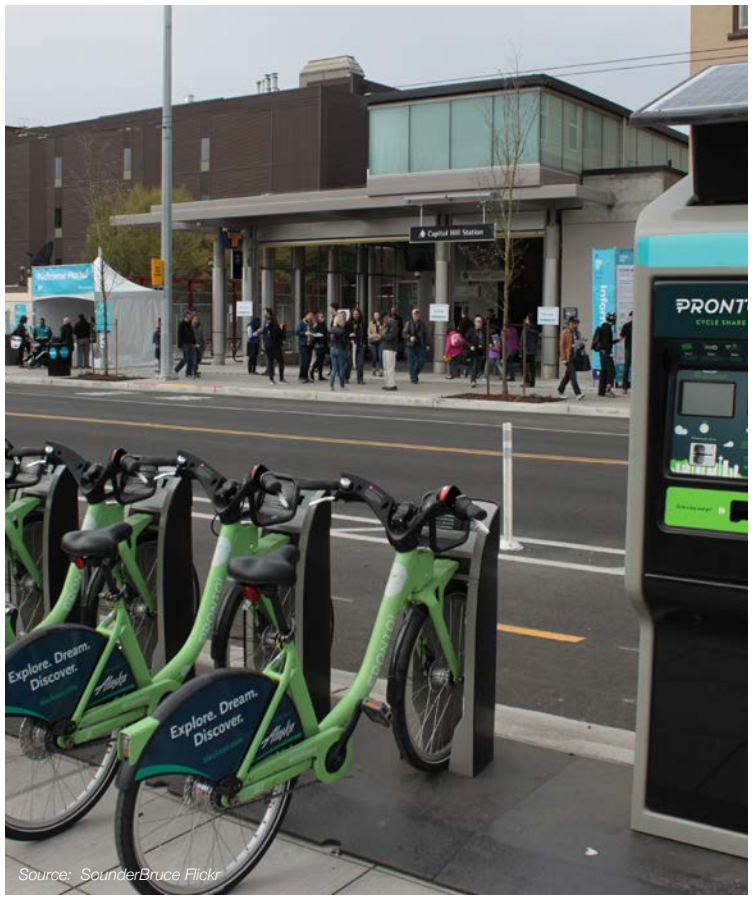
These station locations are initial concepts only and should be determined based on a more detailed concept development.

ACCESS

The general approach for the CKC BRT concept is to encourage walking, bicycling and transit access. With stations throughout Kirkland, the CKC BRT concept provides excellent coverage of the City compared to other transit improvements studied as part of ST3. In fact, Sound Transit estimates that by 2040, roughly 43,000 residents and 114,000 employees will be within 1/2 mile of a station. Bicycle parking and bike share stations could be located at each of the CKC BRT stations, providing connections to and from the station like those shown in Figure 3-28.

Additionally, a CKC BRT service plan has been designed to provide BRT access throughout many neighborhoods around Kirkland, including Juanita and Rose Hill. Like many of the existing bus routes, the BRT routes will be accessed largely on foot.

Figure 3-28: Bike share stations integrated into BRT stations can provide "last mile" solutions.



Source: SounderBruce Flickr

Park & Ride access would be available at the Kingsgate Park & Ride and South Kirkland Park & Ride. A program to minimize commuter parking intrusion into neighborhoods around stations such as restricted parking zones can be added if needed and are fairly straight forward to implement.

REGIONAL TRANSIT INTEGRATION AND CONNECTIONS

The CKC BRT concept not only adds to a connected and integrated transit network, it actually strengthens the exiting regional transit network by consolidating bus service throughout the greater Eastside into a high-quality, physically dedicated transit spine. Transit riders from Bellevue, Redmond, Issaquah and the length of I-405 would all see improved connectivity to Kirkland as well as other parts of the region, including Seattle.

In order to ensure the greatest regional connectivity, the CKC BRT concept maximizes connections to other high-capacity transit. These connections include:

- **I-405 BRT**
  Connections would occur at the Totem Lake Freeway Station, NE 85th Street, and Bellevue Transit Center.
- **SR 520 BUSES**
  Connection to Seattle bound buses would occur using the 108th Avenue NE HOV 3 plus direct access ramps to SR 520 and connecting to the at the Montlake Freeway Station, Evergreen Point Freeway Station and Clyde Hill/Yarrow Point Freeway Station.
- **EAST LINK**
  Connection to East Link would occur at Wilburton Station and Bellevue Transit Center.
- **CENTRAL LINK**
  Connection to light rail in Seattle would occur either at University of Washington Station or Westlake Tunnel Station (and all other Downtown Transit Tunnel stations).
- **I-90 CORRIDOR LRT**
  Connections to LRT service to Issaquah, if constructed, would be possible at South Kirkland Park & Ride, Wilburton Station, and Bellevue Transit Center.

3.6 VEHICLES

To meet Gold Standard BRT, the CKC BRT vehicles would provide a much higher quality of service than standard Metro buses. The CKC BRT concept includes comfortable, spacious, low or zero emission vehicles. Both express and local BRT routes on the CKC would likely use 40-foot BRT-styled buses meeting requirements of Gold Standard BRT.

There are many options for stylized BRT vehicles. Las Vegas purchased 50 hybrid buses manufactured by Wright StreetCar (Figure 3-29) for their Strip-Downtown Express BRT project. These buses are designed to mimic streetcars with wide, bright interiors and aerodynamic exterior styling.

A number of other companies from VanHool to Mercedes-Benz also develop BRT styled vehicles (Figure 3-30).

In Rouen, France, the TEOR BRT operates a fleet of 28 low-emissions Euro 3 diesel Irisbus Citelis buses (Figure 3-31) with a slanted nose, extra wide doors, an optical guidance systems allowing for precision docking at stations (see white dashes in roadway), and a sleek style.

To reduce noise and emissions, the CKC BRT concept envisions fully electric buses. King County Metro, a likely operator of many of the bus routes on the CKC BRT, continues to be on the forefront of efforts to introduce fully electric buses. Metro was one of the first transit agencies in the United States to use hybrid-electric buses in the early 2000s and currently has the largest fleet of

KEY FEATURES

- √ Rail-like Vehicles
- √ Zero/Low Emissions
- √ Specially-Branded

Figure 3-29: Las Vegas SDX buses are Wright StreetCar hybrid buses.

Source: BRT Draft Report

Figure 3-30: VanHool Exqui.City BRT bus.

Source: VanHool, www.vanhool.be/eng/homeen.html

hybrid-electric buses in the United States. Additionally, Metro is currently testing Proterra electric buses in standard operations on several Eastside routes.

As fully electric buses become more widely available, prices will likely fall and the distances they can travel without recharging will likely increase. Although fully electric bus options are limited now, if current technology trends continue, more options will be available in the future.

Another vehicle option is electric trolley buses, which use quiet, fuel-efficient, pollution-free technology and are currently used by King County Metro. Metro has the 2nd largest trolley fleet in the United States and is currently updating their entire fleet to an even quieter, low-floor trolley fleet. Electric trolley buses could be used on the Green Line between Totem Lake and Bellevue, but would require overhead catenary that may not be desirable on the CKC, and would not be appropriate for the Blue, Orange, and Gold Lines, as they would require extending the overhead catenary onto freeways.

More readily available today in North America are CNG/electric hybrids. These vehicles are a mature technology, already available from Buy-America compliant suppliers, with very low emissions, superior fuel efficiency and are quiet. Ultra-low sulfur diesel buses are somewhat noisier, but also have extremely low emissions and are more economical.

Figure 3-31: Irisbus low-emission diesel buses with wide doors and level boarding operated by Rouen

Source: Wikimedia

3.7 INTERSECTIONS AND NON-MOTORIZED CROSSINGS

Protecting the safety as well as the aesthetic experience of the CKC for recreational users has been a key community priority. The City of Kirkland places the highest priority on the safety of the CKC and the City's recently-adopted "Vision Zero" safety goal, which calls for elimination of all transportation-related fatalities and serious injuries on Kirkland's transportation system by the year 2035. This Vision Zero goal provides a clear policy basis for how the CKC Trail and BRT concept should be designed.

In a September 2013 report, which is directly applicable to the CKC, the Rails to Trails Conservancy found that "rails-with-trails are safe, common, and increasing in number." This study found that while concerns about safety were common, they are often unfounded because "a well-designed pathway provides a safe travel alternative and reduces the incentive to trespass or use the tracks as a shortcut" (Figure 3-32). The report goes on to say that, "There is a growing trend of rail-with-trail development alongside local and regional transit corridors. Fifteen percent of the active rails-with-trails identified in this study are located adjacent to mass transit corridors."

The CKC BRT concept fully embraces the dual nature of the corridor and anticipates maintaining and enhancing a majority of the existing or potential access points identified by the CKC Master Plan. Crossing points would be clearly marked as crosswalks and could be improved with tools such as enhanced lighting, rapid flashing beacons and other safety measures.

Figure 3-32: Rails-with-Trails often provide a safe travel alternative and reduce incentives to use the tracks as a shortcut.

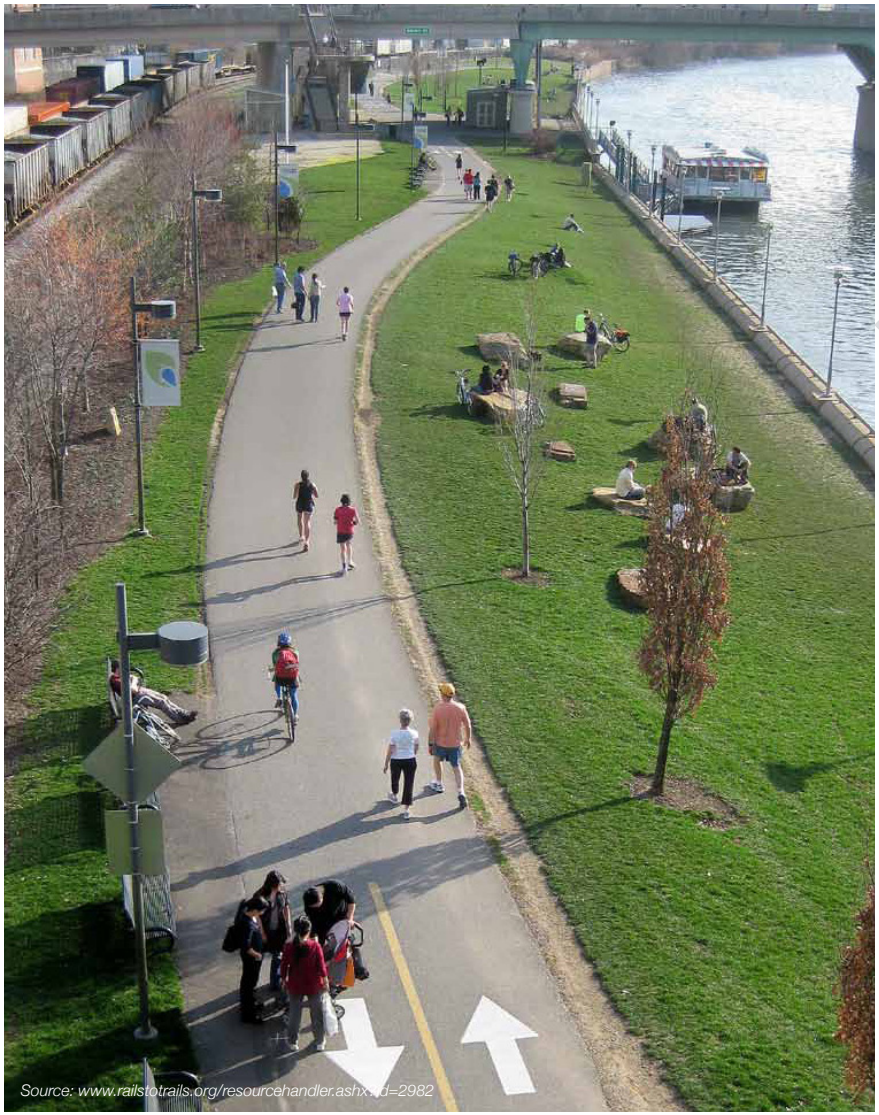
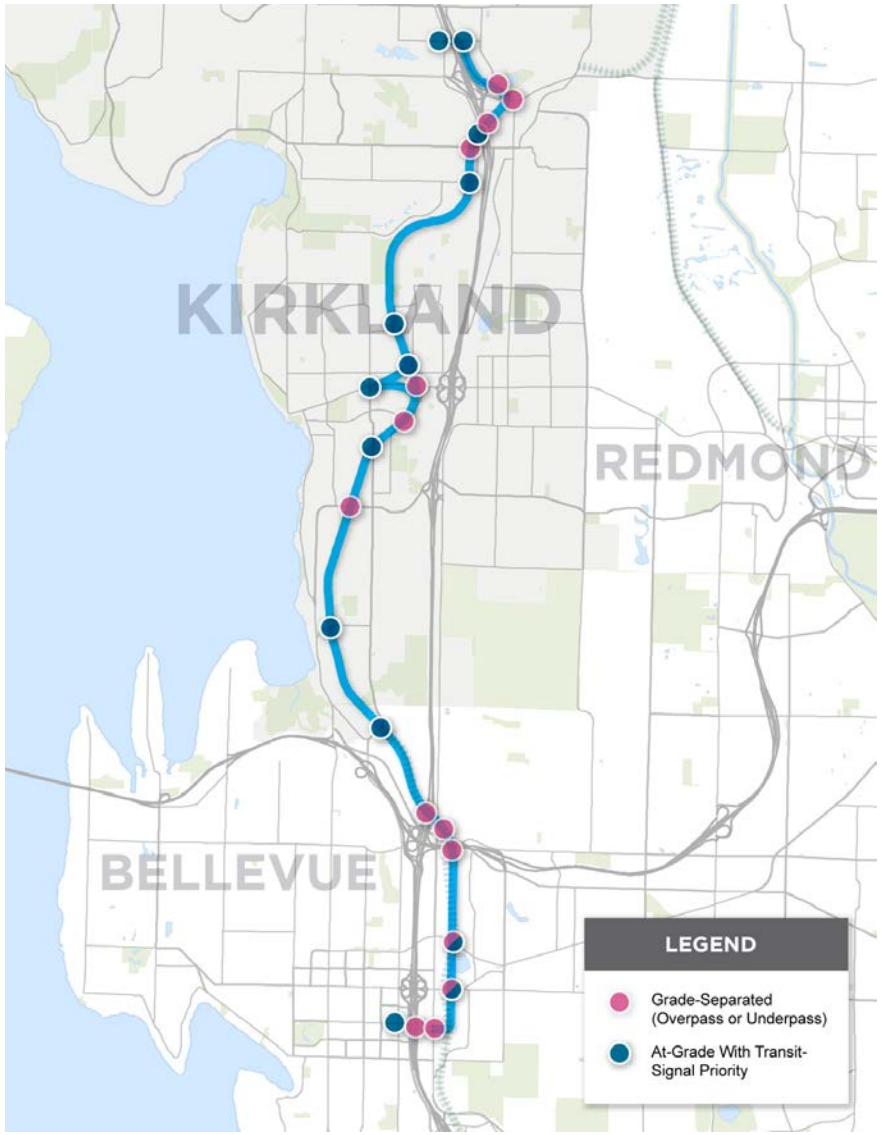


Figure 3-33: Existing and Proposed Trail Access Points



Separations between the trail and BRT vehicles could be provided by thick vegetation, shrubbery or a vegetative swale. However, if fences are required they could be lower and integrated into this vegetation, like in the Orange Line in LA which includes BRT busways in an old freight right-of-way. These solutions complement the character of the corridor while creating a physical barrier to separate pedestrians and cyclists safely from BRT vehicles.

Because of the small number of street crossings, the CKC BRT will experience limited intersection-related delays. Still, priority should be given to BRT on the CKC, such a transit signal priority which would allow buses to pass through intersections with minimal delay. These treatments are used throughout the United States and have been shown to improve transit speed and reliability without increasing congestion. In-fact, routing of buses on the CKC will likely reduce congestion on some streets, like 108th Ave NE/6th Street, because fewer buses will travel along the street blocking cars at bus stops.

Where the CKC crosses surface streets, three types of crossing treatments are proposed (Figure 3-33):

UNDERPASS (GRADE SEPARATED)

The CKC Trail and BRT will pass under the intersection

OVERPASS (GRADE SEPARATED)

The CKC Trail and BRT will pass over the intersection on a bridge

AT-GRADE WITH BRT SIGNAL PRIORITY

The CKC Trail and BRT will remain at-grade but an advanced traffic signal will be installed to give priority to approaching BRT vehicles.

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4.0 SERVICE CONCEPT

4.1 EXISTING AND FUTURE TRAVEL PATTERNS

4.2 BRT SERVICE CONCEPT

4.3 SERVICE FREQUENCY

4.4 VALUE AND LIMITATION OF I-405 BRT

Source: IngolfBLN Flickr

4.0 INTRODUCTION

A key feature of BRT is the ability to customize both capital investments and transit service to meet the unique travel patterns of each community. Using the CKC, as well as other facilities like regional HOV lanes and bus lanes on city streets, allows for time-competitive, direct service to destinations across Kirkland, the Eastside, and Seattle. Perhaps most importantly, CKC BRT service would directly serve Downtown Kirkland, which is hard to serve with Light Rail or BRT on I-405.

CKC BRT service would extend the reach of transit service beyond the area immediately around the CKC. Passengers could walk to a bus stop in their neighborhood such as Juanita and board a bus that enters the BRT-way later and still realize travel time savings. To provide these direct connections, a number of routes would operate on the corridor. A local route, which stops at all stations, would travel the entire CKC corridor. Stations along the CKC would be designed specifically to allow buses to pass each other, making it possible to run express routes – which bypasses less popular or out of direction stops, reducing travel time between key destinations. Other routes would operate along parts of the CKC BRT-way.

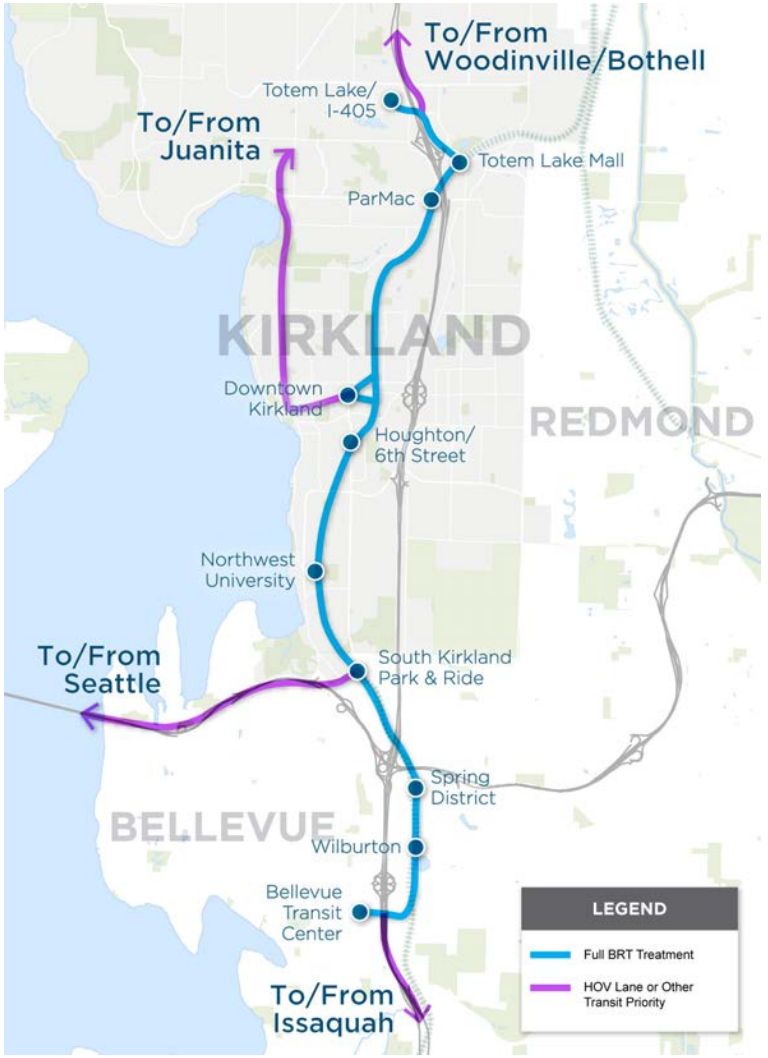
The BRT concept is shown in Figure 4-1, with the blue line indicating the CKC BRT-way and purple lines showing key connections made possible by BRT such as direct service to Juanita, Bellevue, Seattle, Woodinville and Bothell.

Much of the bus-based transit on the Eastside is designed around park & rides. While this model is beneficial at bringing more passengers to transit, and would be available at several CKC BRT stations, it also means increased demand for parking around stations where land is valuable.

KEY FEATURES

- √ Multiple Routes
- √ Express-Limited Stop & Local Service
- √ Hours of Operation
- √ Integration with Other Transit Service

Figure 4-1: Proposed Places for full BRT treatments



4.1 EXISTING AND FUTURE TRAVEL PATTERNS

The CKC BRT service concept was designed to provide Kirkland residents and employees fast and reliable access to the places they want to go. To develop the service concept, analysis of current travel patterns and ridership data was conducted. This analysis included mapping data and determining peak demand loads of existing routes. Routes were then designed to provide frequent, direct service between major destinations.

EXISTING TRANSIT TRAVEL PATTERNS

CKC BRT routes were designed first and foremost to serve and improve existing trips for Kirkland residents. Initially, existing trips will make up the majority of HCT trips as origins and destinations change over time. The most popular transit trips for Kirkland residents today are shown on Figure 4-2.

The majority of BRT users, in any system, come from pre-existing bus routes. Therefore, the design of the CKC BRT routes was based on the existing routing of King County Metro and Sound Transit bus routes through Kirkland. However, some modifications were made to take advantage of dedicated BRT-ways, to serve new developments and create new, transfer-free rides.

Today, there are about 23,800 bus trips taken in Kirkland every day. These routes are shown in Figure 4-3. Roughly 72% of these, or about 17,100 trips, are carried by the seven bus routes as shown in Figure 4-4.

FUTURE TRANSIT TRAVEL PATTERNS

Downtown Kirkland has historically been the densest part of the city and continues to densify today with some significant projects in the development pipeline, such as Downtown Kirkland (e.g. the Kirkland Urban Project Figure 4-5). The 6th Street corridor is also becoming a major high-tech employment corridor.

Figure 4 2: Most popular transit origins and destinations for Kirkland residents. Thicker line indicates larger demand.

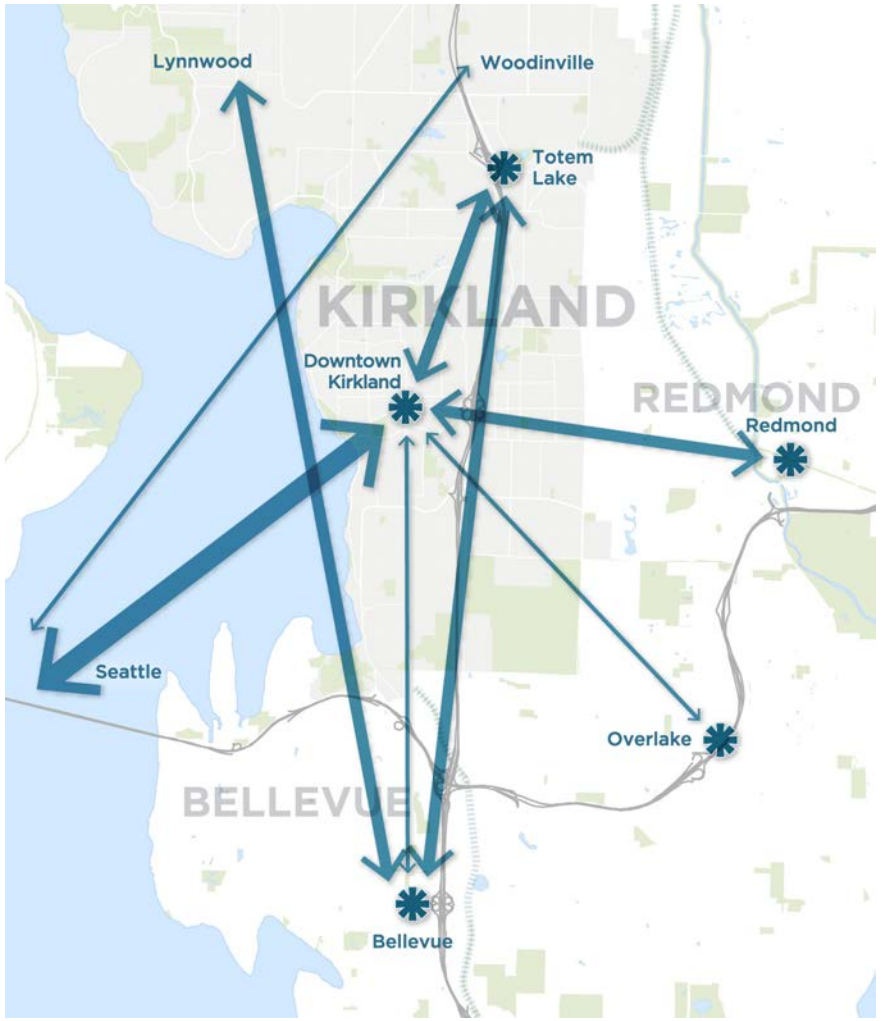


Figure 4-3: Existing map of transit routes in Kirkland

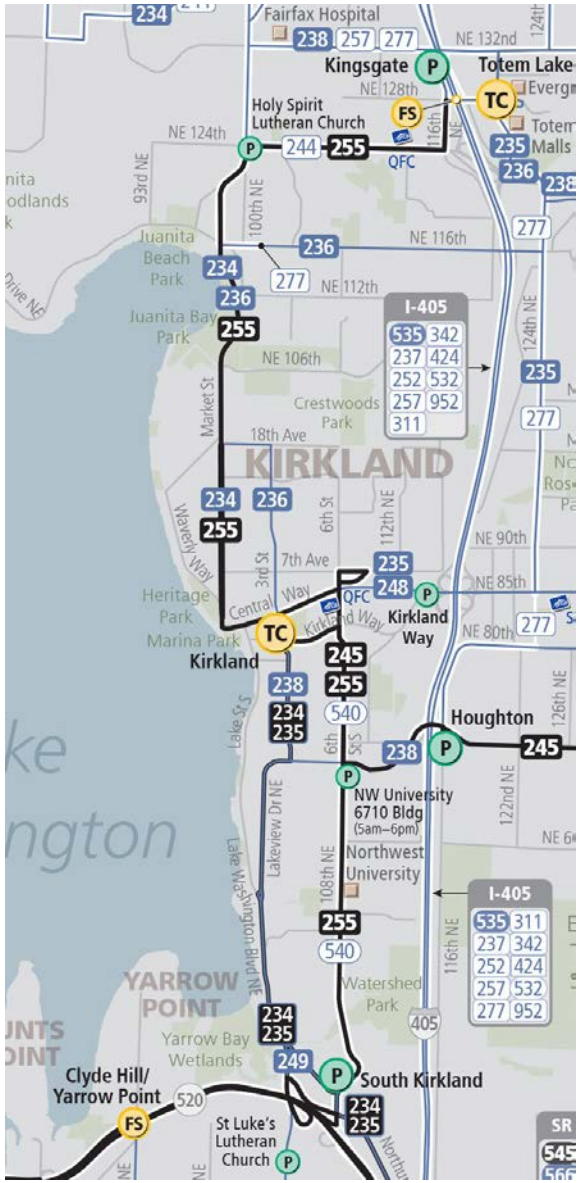
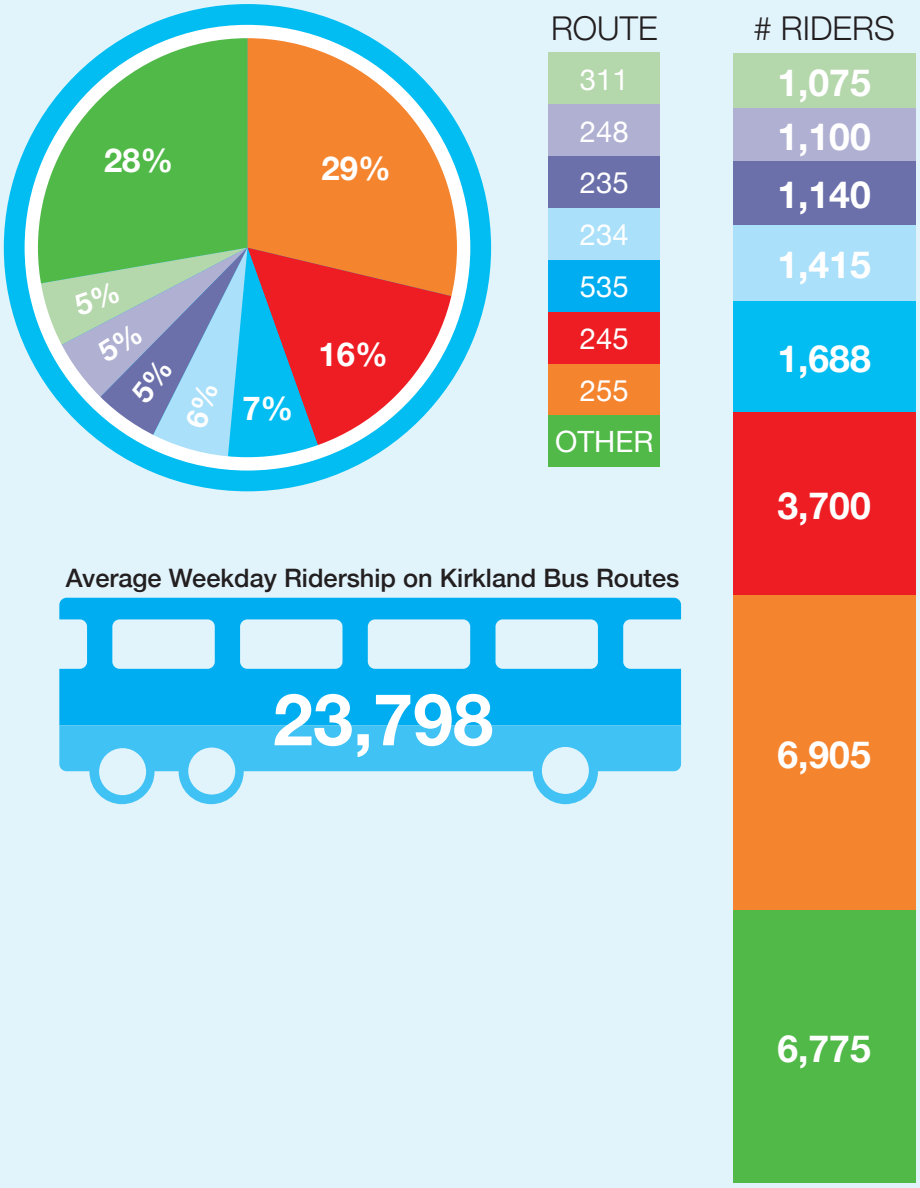


Figure 4-4: 72% of weekday trips on bus routes are divided among the top 7 routes in Kirkland



Totem Lake, the PSRC designated Regional Urban Growth Center, is currently undergoing major changes as well, with redevelopment of the Totem Lake Mall (see Figure 4-6) currently under way. Kirkland has completed the rezoning of a number of areas for additional growth, particularly in the ParMac area, where extensive new development is expected.

These centers of growth are clustered along or near the CKC. Improved transit connections to Seattle, Bellevue, Redmond, Overlake, and other key residential and employment centers is key for the continued economic growth of Kirkland. Access to transportation choices is becoming an ever important priority for employees as regional roads become more and more congested. Similarly, improved regional transit service to Kirkland is key for maintaining the quality of life that Kirkland residents enjoy today. To this end, the CKC service plan was designed to serve, and reinforce connections to these growth centers.

Figure 4-5: Kirkland Urban, planned development

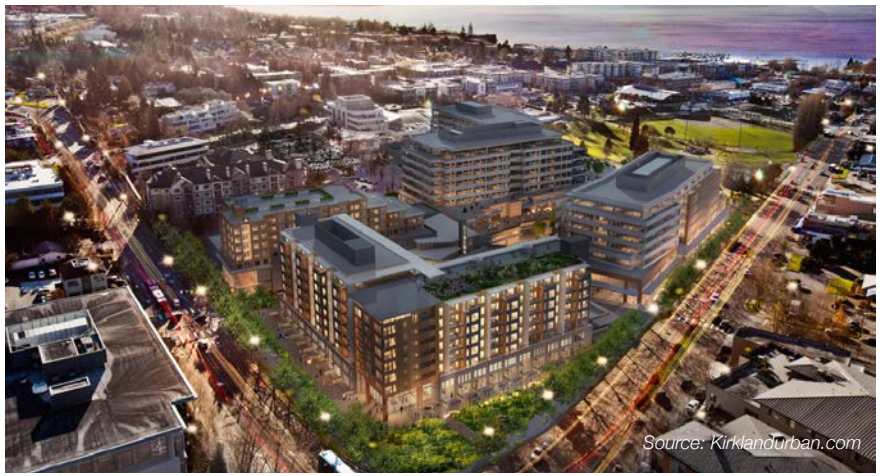


Figure 4-6: Planned redevelopment of Totem Lake Mall. The BRT station will be on Totem Lake Boulevard

4.2 BRT SERVICE CONCEPT

Following is a concept for how routes could operate on and around the CKC. This concept illustrates what could be done with BRT on the CKC, but would ultimately have to be coordinated with King County Metro, Sound Transit, and the other surrounding communities.

The overall purpose of this service concept was to create a transit spine that runs north-south through Kirkland with frequent service stopping at all stations (local service) and faster, commuter oriented service overlayed during the morning and afternoon peak (frequent and express service). Routes were developed because they serve the most popular destinations – both on and off the spine – for current and future residents of Kirkland. For example, service provided by the 255 would largely become the Blue Line.

As shown in Figure 4-7, the CKC service concept includes four routes:

- Orange Line: Woodinville/Bothell to Seattle (Express)
- Blue Line: Juanita to Seattle via Downtown Kirkland (Local)
- Green Line: Totem Lake to Bellevue Transit Center via Downtown Kirkland (Local)
- Gold Line: Issaquah to Seattle via Bellevue TC (Express)

Two additional BRT routes on NE 85th Street and I-405 have been also been identified. Although these routes do not operate on the CKC, they provide valuable connectivity and are discussed briefly later in this chapter. They are shown as:

- Purple Line: Downtown Kirkland to Redmond (Local)
- I-405 BRT: Downtown Bellevue to Lynnwood

CKC intersect

Figure 4-7: System map for CKC BRT

These routes were largely based on travel patterns on the current bus system. For example, roughly 30,000 passengers used King County Metro and Sound Transit bus service to cross Lake Washington on SR 520 in 2014/2015. Therefore, 3 of the 5 routes identified in this service concept travel to and from Seattle via SR 520.

Existing bus routes were re-routed onto the CKC where it provided an equivalent or more direct connection between popular trip origins and destinations. Metro's Long Range Transit Plan, Metro Connects, was also taken into consideration. Additionally, stop and routing decisions considered future developments planned in the City of Kirkland.

Like other major service restructuring efforts, if the CKC BRT concept is advanced, King County Metro, Sound Transit, and other agencies like the City of Kirkland would need to work together to integrate the transit network both on and off the CKC. The goal of the restructure would be to maximize benefits of the CKC BRT-way and improve access to this service, while ensuring adequate service coverage. Any restructuring would, of course, require outreach to the public.

Details of this service concept are provided by route in the following sections.

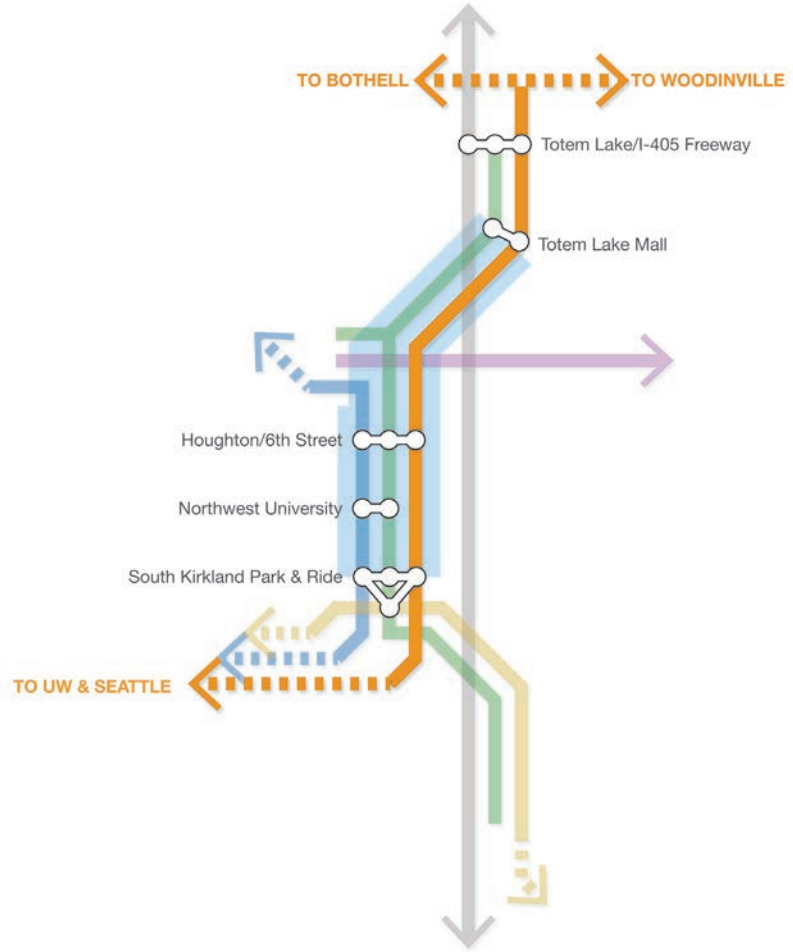
ORANGE LINE

WOODINVILLE/BOTHELL TO SEATTLE (EXPRESS)

The Orange Line (Figure 4-8) would be the quickest way for people in Totem Lake to reach Seattle. It would establish a new HCT link between Downtown Kirkland, Woodinville, Bothell and Seattle. It would also be a fast and reliable connection for Seattle-bound buses on I-405.

As envisioned, this route would begin at the Woodinville Park & Ride and

Figure 4-8: Orange Line route map



make a limited number of stops in Woodinville, then using SR 522 travel to I-405, stopping at the Brickyard Park & Ride before exiting I-405 at the Totem Lake Freeway Station. From here, the route will enter the BRT-way on Totem Lake Boulevard, and travel express to Seattle stopping at Houghton/6th Street and South Kirkland Park & Ride before entering the SR 520 HOV lanes. To reduce travel time, this route would not stop at Downtown Kirkland or other intermediate stops along the CKC BRT-way.

BLUE LINE

JUANITA TO SEATTLE VIA DOWNTOWN KIRKLAND (LOCAL)

The Blue Line (Figure 4-9) would be the quickest, most direct way for most people in Kirkland to reach Seattle - much like the current Metro Route 255. This will likely hold true even with the opening of East Link due to additional out-of-direction travel required to use Link. This route would connect Juanita to Downtown Kirkland via Market Street using a combination transit priority treatments such as queue jumps to bypass morning congestion, in-line bus stops and stop consolidation to increase speed and reliably of service. In areas with little congestion buses will operate in mixed traffic. The route would use the BRT-way in Downtown Kirkland, then follow the CKC BRT corridor, making all stops on the CKC while heading toward the South Kirkland Park & Ride. From there, it would join the direct access ramps to access the SR 520 HOV 3+ lanes heading into Seattle.

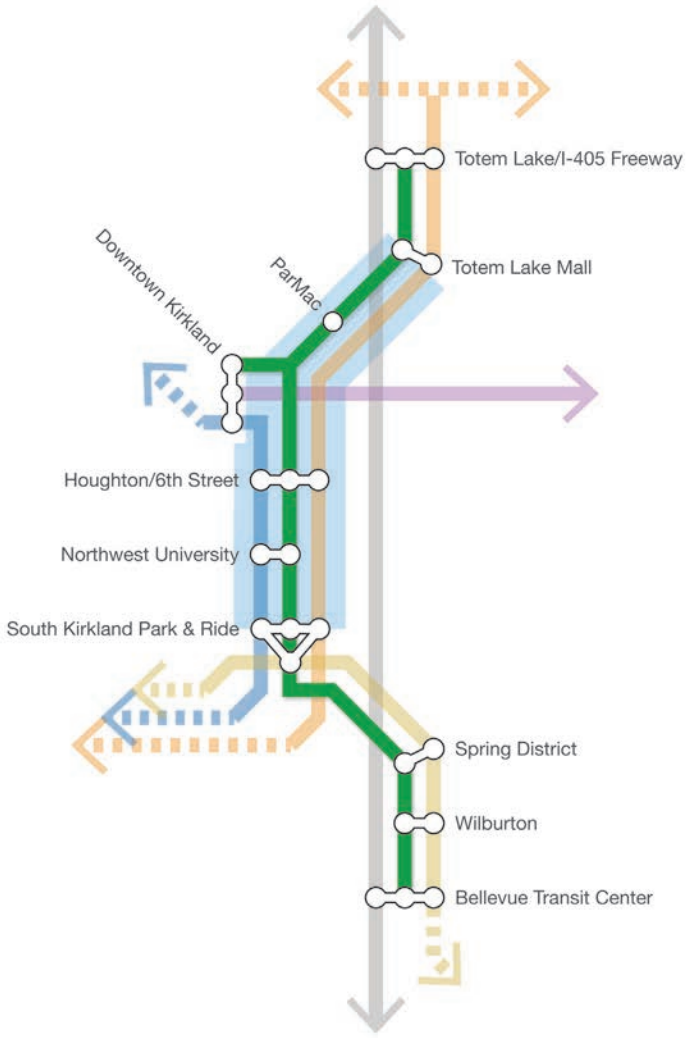
Figure 4-9: Blue Line route map

GREEN LINE

TOTEM LAKE TO BELLEVUE TRANSIT CENTER VIA DOWNTOWN KIRKLAND (LOCAL)

The Green Line (Figure 4-10) would provide backbone service along the entirety of the CKC BRT-way, connecting Totem Lake, Downtown Kirkland and Bellevue beginning at the Totem Lake Transit Center before joining the BRT-way on Totem Lake Boulevard near the Totem Lake Mall BRT station. From there it would make all local stops on the CKC/ERC to the Bellevue Transit Center, including at the new East Link stations at Spring District and Wilburton.

Figure 4-10: Green Line route map



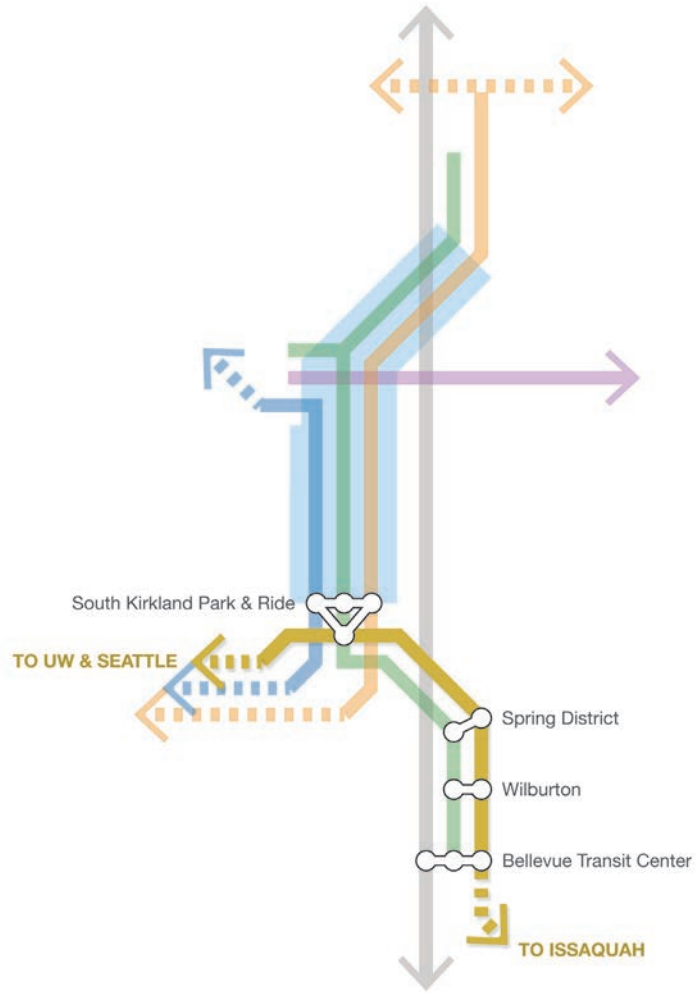
GOLD LINE

ISSAQUAH TO UNIVERSITY OF WASHINGTON VIA BELLEVUE TRANSIT CENTER (EXPRESS)

The Gold Line (Figure 4-11) would provide a direct express connection between South Kirkland Park & Ride, Issaquah, Bellevue and Seattle. The concept for the Gold Line is mixed traffic operations from Issaquah following the route of the 271 as far as the Bellevue Transit Center. From there it could join the CKC BRT-way, after stopping at Wilburton Station and Spring District. Next, it could stop at the South Kirkland Park & Ride and enter the SR 520 HOV lanes on its way to the University of Washington Link Station. Like all the preceding routes, this one in particular would require consultation with a variety of stakeholders.

This would be the fastest route to the University of Washington for passengers transferring from I-405 BRT, local bus service and even East Link passengers heading to the University of Washington.

Figure 4-11: Gold Line route map

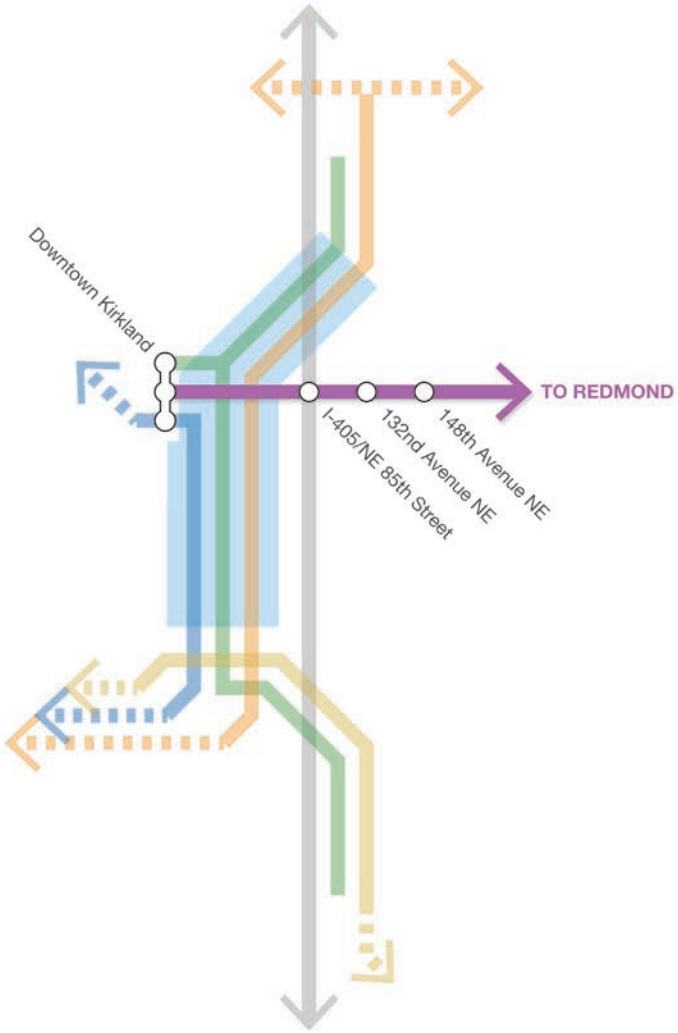


PURPLE LINE

DOWNTOWN KIRKLAND TO DOWNTOWN REDMOND

The Purple Line (Figure 4-12) would provide a direct express link between downtown Kirkland and the Redmond Transit Center. It is the only route identified in the CKC BRT concept that does not use the CKC, instead using bus lanes and the mixed traffic lanes of NE 85th Street. The route would start at Downtown Kirkland, stopping at the I-405 BRT station at NE 85th St and end in Redmond. This route would be useful for downtown Redmond riders accessing I-405 BRT service to/from north King County and Snohomish County.

Figure 4-12: Purple Line route map

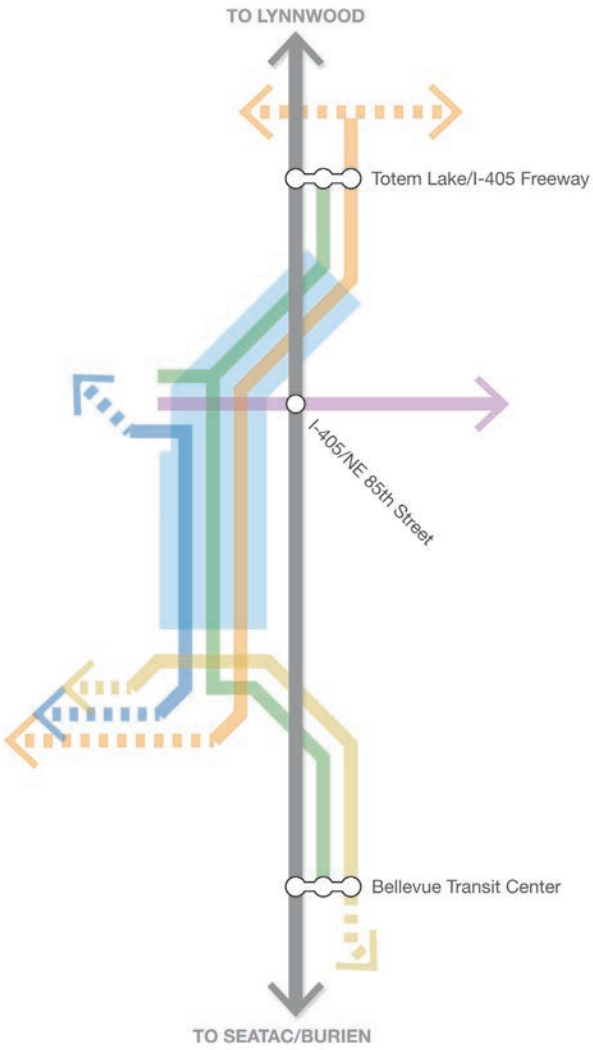


I-405 LINE

I-405 BRT as described in the Sound Transit 3, would provide enhanced long-distance regional express bus service along I-405 throughout the Eastside and Snohomish County, using the existing HOT lanes where possible. Although this service is described as BRT by Sound Transit, due to lack of dedicated running way along the entirely alignment and other key BRT elements, I-405 BRT will likely fall short of even the lowest BRT Standard ranking “Basic BRT”. Identified improvements primarily consist of two new stations, most notably a station in the vicinity of NE 85th Street. It also includes expanded park & ride capacity, including at Kingsgate Park & Ride, and some enhancement to existing stations, including at the existing in-line station in Totem Lake at NE 128th Street.

With two stations in Kirkland, I-405 BRT will have some limited value to people making trips between Kirkland and Downtown Bellevue; however, within Kirkland, I-405 BRT services provide limited utility due to the location of the stations. Additionally, I-405 BRT will not improve transit travel into Seattle, which makes up a large portion of the transit demand in Kirkland and on the Eastside.

Figure 4-13: I-405 route map



4.3 SERVICE FREQUENCY AND SPAN

With headways of 10-minutes or less, passengers can show up at a bus stop any time and on average a bus will come within 5-minutes. This means passengers don't have to plan their trips around bus schedules.

As is described by Jarrett Walker in his book "Human Transit," the freedom to be flexible is critical to public transit passengers and depends on high-frequency services. For BRT services, the maximum headway, or time between buses, should be no more than 10-minutes. Routes with higher ridership should have shorter headways to avoid overcrowding. Based on projected ridership and 40-foot vehicles (capacity of 60 people) routes on the CKC BRT-way should come every 6 to 10-minutes during the peak period.

The headways shown in this table are estimates and could be adjusted as demand grows. These estimates show that the CKC BRT concept has sufficient capacity to meet projected ridership demand.

On sections of the CKC where routes overlap, the combined headways of buses are less than the individual routes. Based on the individual headways in Table 4-1, the combined headways between destinations are shown in Table 4-2. From Houghton/6th to the South Kirkland Park & Ride, where the Orange, Blue and Green Lines all run, the average headway would be 3-minutes per direction. Other segments would have a lower combined headway of every 4-minutes.

Span of service, which describes the time period between the first and last bus of the day, should generally be around 20-hour per day for high quality BRT. This translates into service from 5 AM to 1 AM.

Table 4-1: Headway during peak periods

BRT ROUTE	HEADWAY (MIN)
	6
	8
	10
	8

Table 4-2: Combined headways on CKC per direction

SECTION	HEADWAY (MIN)
Totem Lake to Downtown Kirkland	4
Houghton/6th Street to South Kirkland P&R	3
South Kirkland P&R to Bellevue TC	4

Source: Portal PBH Flickr

5.0 SYSTEM PERFORMANCE

5.1 TRAVEL TIME & RELIABILITY ESTIMATE

5.2 RIDERSHIP FORECAST

5.3 COST ESTIMATE

5.0 INTRODUCTION

BRT is at its best when it significantly reduces travel times and improves reliability for many existing and potential bus passengers. The more travel time that can be reduced through the full toolbox of BRT elements, the more successful the system is. Evidence from BRT systems around the world has shown that decreased travel times translate directly into higher ridership. As part of the analysis of BRT on the CKC, a travel time savings analysis and a passenger ridership forecast analysis were performed. The results of this analysis are described in this section.

5.1 TRAVEL TIME & RELIABILITY ESTIMATE

CKC BRT could reduce time to regional destinations for many Kirkland residents. Based on this analysis travel time savings would be realized from the first day of service and grow as delays on freeways and Kirkland's surface streets grow.

ASSUMPTIONS AND METHODOLOGY

A travel time savings analysis was conducted for trips between popular destinations in and around Kirkland. Travel time calculations where developed for a typical weekday morning between 7am and 8 am when transit ridership in Kirkland is at its highest. Existing peak hour travel times between popular destinations were determined based on the fastest current bus routing and the associated bus schedules including transfers between routes if needed.

BRT travel times were calculated from the same origins and destinations following the proposed BRT routes, factoring in congestion-free travel on segments where buses travel on the BRT-way or in bus-only lanes as identified. Where BRT vehicles are expected to travel in mixed traffic, current bus travel times were used. BRT boarding times were calculated based on experience in other system which is 1.2 seconds per boarding passenger per door, assuming off-board fare collection, level boarding and three doors. A fixed dwell time (the time every BRT vehicle takes to arrive and depart from stations, regardless of passengers boarding) of 14 seconds was used for every station.

The duration that passengers wait for a bus was based on one-half (i.e. average) of the existing or proposed route-by-route frequencies. This is a common transit planning assumption when conducting high-level travel time estimates.

TRAVEL TIME SAVINGS SUMMARY

Figure 5-1 provides a comparison of transit travel times currently, and with BRT, and compares existing peak hour (7 – 8am) travel times between popular destinations using current bus routes and the CKC BRT routes. All travel time estimates are calculated based on current speeds. Over time, bus speeds on congested arterial streets shared with other vehicles will slow, while BRT on separate right-of-ways will stay the same, so the savings from BRT will grow.

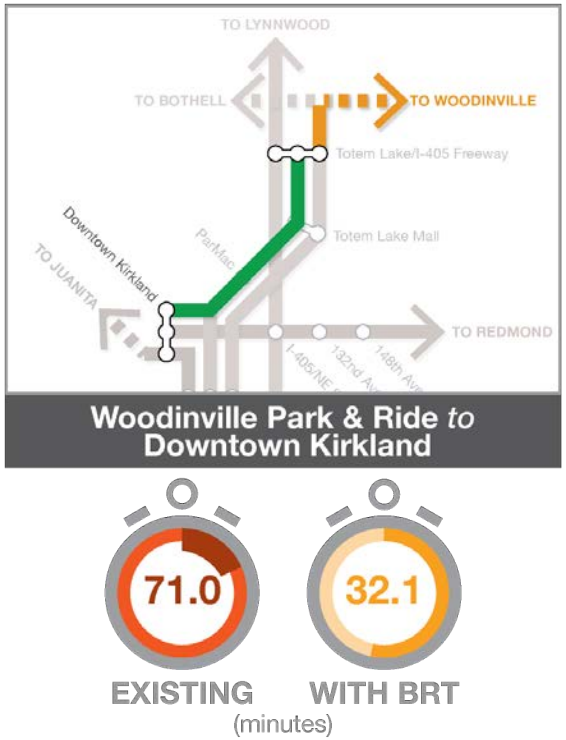
These benefits are achieved for a number of equally important reasons:

1. **LESS CONGESTION.** The BRT is not subject to traffic congestion and other conflicts because it is fully separated from traffic along the CKC and will operate in bus lanes and HOV lanes while not on the CKC.
2. **DIRECTNESS OF ROUTES.** Because the CKC creates a new direct link between Totem Lake and Downtown Kirkland, most of the BRT routes are more direct than the current bus routes.
3. **FEWER STOPS.** The BRT stops less frequently than the current bus routes so there is less dwell time at stations.
4. **FASTER BOARDING TIMES.** Off-board fare collection and level boarding features ensure that the boarding process is swift.

TRAVEL TIME SAVINGS DETAILS

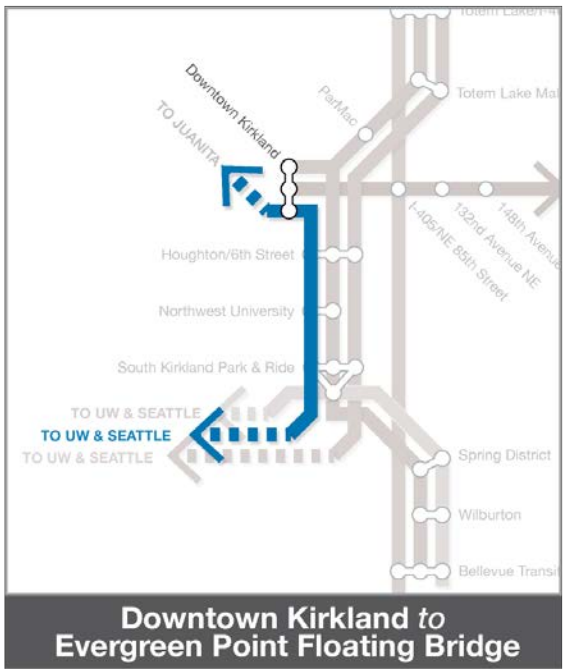
Totem Lake to Downtown Kirkland

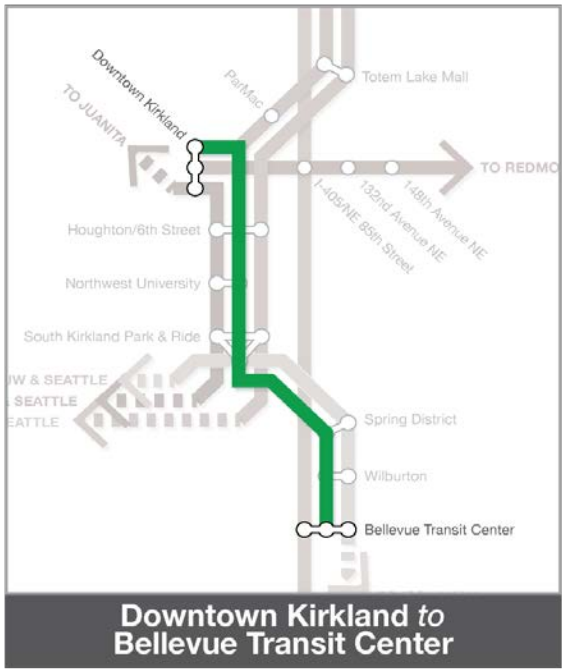
The CKC BRT will create quick and convenient connection between Kirkland's two most important growth centers: Downtown Kirkland and Totem Lake. Travel times between Totem Lake and Downtown Kirkland are estimated to be about 13-minutes on the BRT Green Line during the peak hour. Today, the same trip takes about 33-minutes on Metro Route 235 during the peak hour, a **20-minute time savings** and a 59% improvement. Not only is this trip significantly quicker than the current bus route, it is also competitive with car travel and would be much more reliable.



Woodinville to Downtown Kirkland

Traveling by transit between Downtown Kirkland and other nearby cities will also become much quicker and more direct. Passengers traveling from the Woodinville Park & Ride to Downtown Kirkland would be able to travel to the Houghton and 6th Station near the Google Campus using the Orange Line, and walk or transfer to get to Downtown Kirkland. Their travel time will drop from 71-minutes during the peak hour to 32-minutes, a **39-minute savings** and a 55% reduction.





Downtown Kirkland to Seattle

Trips between Downtown Kirkland and Seattle are expected to see noticeable travel time savings and improved reliability. Passengers riding the Blue Line from Downtown Kirkland to the Evergreen Point Bridge (and onwards to Seattle) are expected to see an **8-minute travel time savings**, with this benefit increasing substantially as congestion worsens. This is due, in part, to the direct access to the SR 520 HOV lane and avoidance of congestion on 108th Ave/6th Street.

Downtown Kirkland to Downtown Bellevue

The connection between Downtown Kirkland and Downtown Bellevue is forecasted to be much improved. The trip currently takes 35-minutes on average during the peak hour using Metro Routes 234 or 235, while on the new BRT Green Line the trip is estimated to take 17-minutes, **cutting the time in half**.

RELIABILITY

Along this corridor, bus service is challenged with congestion resulting in bus bunching and poor schedule reliability. The more buses are stuck in traffic, or are subject to variability in the boarding time of passengers, the more likely they are to fall behind schedule.

BRT systems are designed to minimize factors that make transit unreliable using the same techniques used for light rail such as Link Light Rail. The following elements of the CKC BRT will provide much greater reliability in the BRT system:

1. **BRT-WAY.** By providing BRT vehicles with their own dedicated right-of-way, as is proposed on the CKC BRT concept, as well as on some extensions, they will be subject less often to the variability of traffic congestion.
2. **OFF-BOARD FARE COLLECTION.** By handling fare collection at the stations and not on the buses, the time BRT vehicles spend stopped at stations will be reduced and more consistent. This is because off-board fare payment allows passengers to board at all doors and eliminates delays and variability associated with passengers paying their fare with the bus driver.
3. **LEVEL BOARDING.** By providing a level platform from which to board, passengers who have a harder time boarding or are disabled, can board much more easily. This, once again, reduces the variability of boarding times which will result in much greater reliability for the BRT system.

5.2 RIDERSHIP FORECAST

This section discusses how many passengers are forecasted to use the CKC BRT opening year and in the future. Conservative estimates, using existing ridership data, indicated that the CKC BRT concept could attract roughly 15,500 daily passengers if it theoretically opened in 2018. Due to projected growth in Kirkland and the region, ridership on CKC BRT could be expected to grow to 25,500 daily passengers by 2030. An estimated 2,500 daily passengers could be expected to use the BRT route on NE 85th Street theoretically in 2018, growing to an estimated 4,000 passengers by 2030.

ASSUMPTIONS AND METHODOLOGY

Ridership forecasts were developed at the planning level and are based on existing Metro bus stop boarding and alighting data. Ridership demand on existing bus routes serving similar trip origins and destinations was assumed to switch to the BRT routes due to shorter travel times and better reliability and frequency. Ridership from stops far from the BRT routes were not added to the projected demand. The following assumptions were made by route to form the basis of the ridership forecast:

- **Metro Route 234:** Most passengers north of Downtown Kirkland would use the Blue Line and most passengers south of Downtown Kirkland would use the Green Line.
- **Metro Route 235:** Most passengers will use the Green Line.
- **Metro Route 245:** Most passengers would use the Purple Line on NE 85th Street.
- **Metro Route 248:** Most passengers will use the Purple Line on NE 85th Street.
- **Metro Route 255:** Most passengers north of NE 124th Street would use the Orange Line and most passengers south of NE 124th Street would use the Blue Line.

- **Metro Route 311:** Most passengers would use the Orange Line.
- **Sound Transit Route 535:** This route would be replaced by the proposed I-405 BRT service.

Once the above assumptions were made, an increase of 20% was assumed for mode shift based on the attractiveness of the BRT relative to existing bus routes and driving. This is a conservative estimate and is in line with existing mode shift data in the United States which has shown on average a 20% increase of existing ridership for BRT routes in the early years of service. Ridership on two of Metro's RapidRide corridors, which include only some of the BRT elements described here have grown up to 50%. An additional 3.3% per year growth factor based on available Sound Transit forecasts was added as a conservative projection estimate. However, this growth was distributed according to the City's growth plans, with stations like Totem Lake and ParMac receiving a higher proportion of growth than stations like Northwest University.

FORECAST BY ROUTE

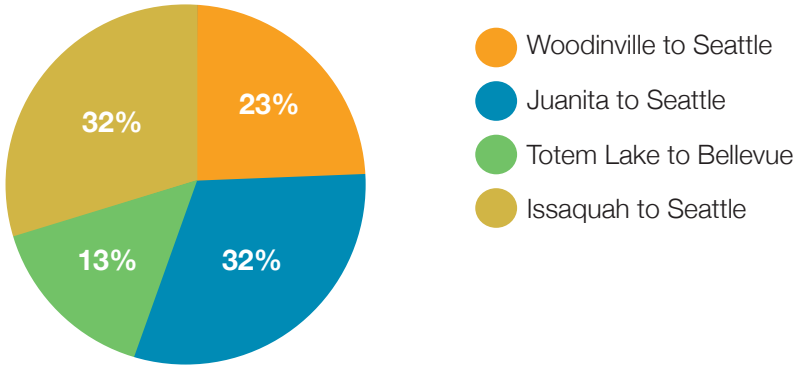
Broken down by route, the forecasted daily ridership on the CKC BRT is shown in Table 5-1 and Figure 5-1. A separate column for the Purple Line (Downtown Kirkland to Downtown Redmond) is included in the table since the Purple Line does not operate on the CKC, but is still an important component of the network.

Table 5-1: Estimated daily ridership on the CKC BRT routes plus the NE 85th Street Purple Line.

YEAR	ORANGE	BLUE	GREEN	GOLD	CKC TOTAL	PURPLE
2018	3,500	5,000	2,000	5,000	15,500	2,500
2030	5,500	8,500	3,000	8,500	25,500	4,000

Another way of depicting the route by route ridership is in the pie chart in Figure 5-1, which provides a better picture of the share of each route to the total CKC ridership.

Figure 5-1: Proportion of CKC BRT Ridership by Route:



This chart demonstrates that the BRT route between Totem Lake, Downtown Kirkland and Bellevue, which Sound Transit assumed in its ST3 BRT and LRT template for the CKC, only represents 13% of the overall ridership along the corridor. The Blue, Gold, and Orange Lines, which all go into Seattle, make up a much larger proportion of the total transit ridership market, yet none of the concepts advanced by Sound Transit as part of the Draft ST3 package improve travel for these markets.

FORECAST BY SEGMENT AND STATION

Ridership data can be depicted in another way for planning purposes. Transit ridership on all of the routes traveling through Kirkland can be displayed in terms of the peak number of passengers (load) traveling between stations during the AM peak hour (7am – 8am). This method allows planners to

understand where the largest passenger demands are, and how the system can handle it. The image below shows ridership loads for all routes put together between stations.

This image shows that combined, the CKC would experience the heaviest demand in the morning at the approach to the South Kirkland Park & Ride. This demand would reach about 1,100 passengers over the course of the 7am – 8am hour. Based on systems across the United States and the world, these volumes can easily be handled by BRT and demonstrate the need for HCT on the CKC.

The estimated AM peak hour inbound boarding and alighting numbers per station in 2030 are shown in Figure 5-2 and projected ridership accumulation is shown in Figure 5-3. Boarding and alighting in opening year would be highest at Bellevue TC, Downtown Kirkland, and South Kirkland P&R. A large number of alightings in Seattle destinations are not shown.

Figure 5-2: Projected 2030 AM inbound peak hour (7am – 8am) loads, CKC BRT

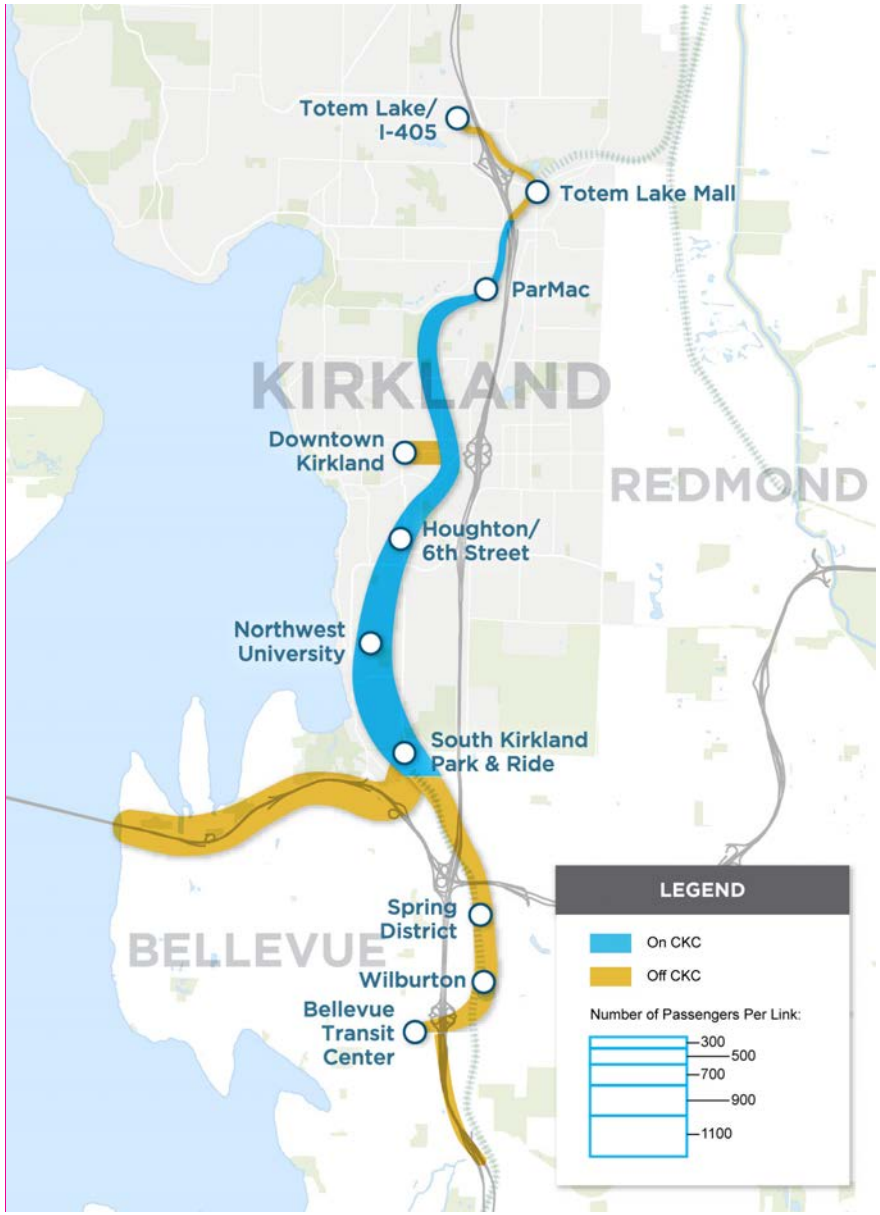
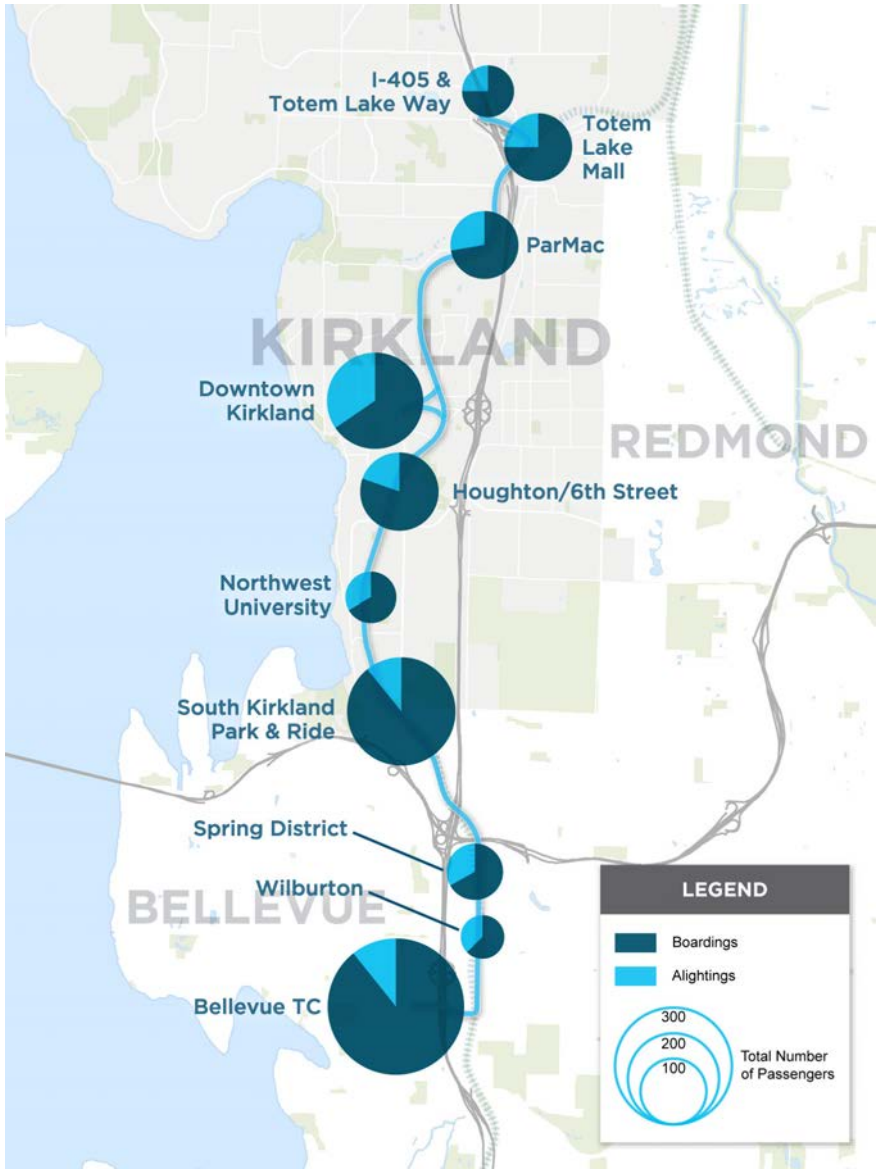


Figure 5-3: Projected 2030 AM inbound peak hour (7am – 8am) station boarding and alighting numbers on the CKC BRT



COMPARISON TO OTHER BRT SYSTEMS

Viewing the CKC BRT in the context of other BRT systems around the country, the projected opening year ridership of 15,500 falls in the middle range.

Table 5-2: Average daily weekday ridership for BRT systems around the United States

BRT System	Average Daily Weekday Ridership
Pittsburgh MLK, Jr. East Busway	28,000
Kirkland CKC BRT (estimate 2030)	**25,500**
Los Angeles Orange LIne	25,000
Las Vegas SDX	16,700
Cleveland Healthline	15,800
Kirkland CKC BRT (estimate 2018)	**15,500**
CTfastrak	14,000
Eugene EmX	10,000
San Bernardino sbX	2,300

Based on ridership forecasts, CKC BRT would have similar ridership as the Las Vegas SDX, Cleveland's HealthLine, and CTfastrak systems, and would have higher ridership than Eugene's Emerald Express (EmX) and San Bernardino's sbX BRT. All of these systems are considered successful, have received awards and have seen consistent ridership growth. The relatively high ridership forecast for the CKC BRT indicates that this project has strong merit and that if built, will be critical investment to help the City accommodate its planned development and growing transportation needs.

5.3 COST ESTIMATE

A planning-level cost estimate was developed to help inform discussions and future planning efforts (Table 5-3). This estimate is preliminary in nature and is not the result of a detailed engineering study. The cost estimate was developed by combining estimates from multiple plans and studies as a well as new cost estimate for BRT specific elements like the guideway and stations. Although there would likely be cost savings from construction the CKC trail and BRT guideway at the same time, no savings were assumed.

Cost estimates from other plans include:

- CKC Master Plan Appendix A (Berger 2014)
- NE 6th Street Extension, I-405 to 120th Ave NE Design Report (HNTB 2012)
- Sound Transit 3 Candidate Priority Project E-02c1
- Sound Transit 3 Candidate Priority Project E-02c2

The cost estimate for capital components of the CKC BRT concept is $530-650 million (2016 dollars) excluding vehicles, support facilities, and improvements between the CKC and SR 520. The cost above includes bus lanes on NE 85th Street from 6th Street to 132nd Ave NE, which could be scaled down to reduce costs, especially if the I-405 BRT station at NE 85th Street is not built. The cost estimate for the I-405 BRT NE 85th Street station is $260-280 million (2016 dollars). This station is shown separately because it is both ancillary to the core CKC BRT concept and has a significant cost implication, increasing total capital cost estimates by 43 to 50 percent.

Table 5-3: Preliminary Planning Level Opinion of Cost (in Millions, 2016 Dollars)

CKC BRT Concept	Low[7]	High[7]
BRT Guideway and Stations	$410	$500
Core CKC Segment (Wilburton to Totem Lake)[1]	$210	$270
NE 6th Street Bridge Extension[2]	$90	$110
CKC to SR 520 Improvements	TBD	TBD
NE 85th Street Bus Lanes and Ramp[3]	$110	$120
Trail & Amenities[4]	$120	$150
Vehicles & Support Facilities	TBD	TBD
Total Capital Cost[5]	**$530**	**$650**

I-405 BRT ELEMENTS	Low[7]	High[7]
NE 85th Street Station[6]	$260	$280

Note:

1. *Hard costs include construction of guideway, bridges, stations, ROW, stormwater detention/treatment, retaining walls, intersections, signals and lighting. Also includes baseline ROW restoration, minor wetland mitigation, temporary erosion and sediment control. Soft costs include environmental permitting, preliminary engineering, construction engineering, agency costs, engineering and construction contingency and inflation.*
2. *Based on City of Bellevue NE 6th Street Extension/Bridge study (HNTB, 2011).*
3. *Sound Transit 3 Candidate Priority Project E-02c2*
4. *Based on City of Kirkland CKC Master Plan (Berger, 2014).*
5. *Cost of operations and support facilities not included.*
6. *Sound Transit 3 Candidate Priority Project E-02c1*
7. *Cost rounded up to nearest tens of millions*

The nature of cost estimating at a planning-level requires that a number of assumptions be made. The list below indicates the assumptions used when estimating costs for the "Core CKC BRT Segment". This list is followed by items that were included or excluded from the cost estimates for the Core CKC BRT Segment cost estimate.

ASSUMPTIONS

- Project costs normalized to 2016 dollars
- No major utility upgrades or relocations
- No major wetland mitigation or stream upgrades (per avoidance approach)
- No significant property restoration outside right-of-way
- Lump sum station cost
- Sales tax is included in bid items
- No noise walls are required
- Guardrails/jersey barriers only on bridge structures

INCLUSIONS

Agency/Administration

- Agency staff costs
- Environmental permitting

Guideway, bridges and retaining structures

- Two-lane busway
- Two-lane bridge structures including primary trail (ex. NE 68th Street Bridge)
- Retaining walls to avoid sensitive area and development impacts
- Intersections and signal upgrades
- Intersection illumination

Stations

- Structure
- Passengers amenities
- Ancillary elements

Site work

- Stormwater detention/treatment (use of dispersion)
- Minor wetland mitigation
- Baseline plantings for restoration within right-of-way
- Temporary erosion and sedimentation control (TESC)

Right-of-way

- ROW for aerial structure in Totem Lake

Professional Services

- Preliminary engineering
- Construction engineering

Contingency

- Planning-level contingency range
- Engineering & construction contingency
- Inflation

EXCLUSIONS

Station Area

- Park & Ride improvements/expansion
- Non-motorized access improvements

Trail

- Fences between primary trail and BRT
- Grade separated crossings near schools

Mitigation

- Disposing of hazardous material or contaminated soil
- Use of stormwater facility ponds or vaults
- Temporary easements

Source: Transpo Group

6.1 CITY PRIORITIES

6.2 COMMUNITY CONCERNS

6.3 COMMUNITY ENGAGEMENT

6.0 CITY PRIORITIES AND COMMUNITY ENGAGEMENT

6.0 INTRODUCTION

Development of the CKC BRT concept was prompted by the City's desire to better understand, inform and communicate the City's priorities with regards to Sound Transit 3 and the transit future of the CKC. This plan documents the outcomes of this work for future reference.

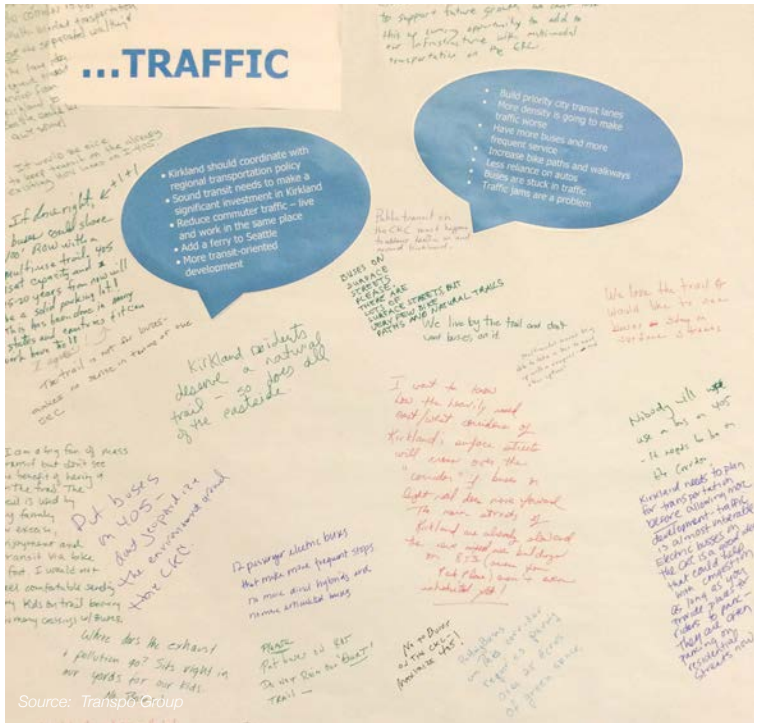
During this process, the City also engaged in extensive outreach with the community on ST3 and the CKC. The City received a large amount of feedback through this engagement informing both the priorities that the Council has shared with Sound Transit and documenting community concerns that should be further addressed.

6.1 CITY PRIORITIES

The City of Kirkland has established a set of objectives related to the CKC Trail with BRT, in order to ensure a high-quality, high-functioning BRT while also maintaining a first-class trail. In a letter to Sound Transit, the City has identified seven requirements that must be met for BRT on the CKC:

1. Projects serving Kirkland must deliver capital and service components that significantly advance the structure of transit service in Kirkland. Fulfilling the regional vision of transit on the ERC in Kirkland and Bellevue is key to this objective.
2. Any transit on the CKC should address the community's concerns about noise, safety, visual impacts, and environmental impacts.
3. Any project constructing High Capacity Transit (HCT on the CKC should include design and construction of a trail that implements the CKC Master Plan vision for the main trail.)
4. Within the bounds of any existing easements, HCT on the CKC must generally be to the east of the centerline of the corridor unless a different alignment is needed to preserve the natural features of the corridor that enhance the trail experience. HCT needs to be on the edges of the CKC to ensure the remaining width is sufficient to fulfill the CKC Master Plan vision.

Source: Transpo Group



Source: Transpo Group

5. Accessibility across the corridor should be preserved. Numerous access points and safe crossings, in addition to those at intersections, should be provided in keeping with the CKC Master Plan vision.
6. Only vehicles that are quiet and have zero or near-zero emissions, such as electric vehicles, should operate on the CKC.
7. The City of Kirkland will work to mitigate any parking impacts from station locations.

The Kirkland Transportation Master Plan included an additional objective which can be summed up as:

8. Safety is our top priority. The BRT-way must be safe and easy to cross, even for children.

Finally, as a result of this study additional objectives for BRT on the CKC are included as part of this list:

9. The BRT must not be too rapid. The trail should continue to be a peaceful place for walkers and cyclists.
10. The BRT must neither be so infrequent that it deters riders, nor so frequent that the trail and adjacent properties become unpleasant.
11. The Trail and BRT must retain its broad variety of vegetation and tree canopy

6.2 COMMUNITY CONCERNS

The City of Kirkland has conducted a broad program of public outreach to gather comments concerning Sound Transit 3. Sound Transit staff have helped to support this effort and presented at the larger of these meetings. Based on these outreach efforts the following community concerns surfaced. Some of these concerns are directly addressed in this document, others require more detailed planning and design, and others are policy decisions that must be made by the city. These concerns are documented here to ensure that future planning, studies, discussion and outreach can inform these concerns.

1. **SAFETY FOR TRAIL USERS.** The proximity of trail users and transit vehicles, and safety concerns about crossing HCT to access the corridor.
2. **ACCESSING THE CORRIDOR.** There is a perception that HCT will form a barrier in the community and prohibit crossings in many places where they now exist.
3. **IMPACTS TO NATURAL ENVIRONMENT**. Concerns have been raised about environmental impacts to wetlands, trees, and views. These concerns have raised questions about where (laterally) on the corridor HCT and the trail will be located.
4. **NEED FOR A TRAIL TO REMAIN.** There is a worry in the community that if HCT is built on the CKC, there will not be a trail, or the trail will be inadequate to meet community needs.
5. **OTHER PLACES FOR TRANSIT.** Because of its perceived negative impacts on the trail, some community members are suggesting that transit should be located somewhere else (such as on I-405) and believe that other locations could be equally effective for transit.
6. **NEGATIVE IMPACTS OF TRANSIT VEHICLES.** Visual and noise impacts of transit vehicles.

7. **FREQUENCY OF BUSES.** Concern that bus frequencies will exacerbate concerns 1, 5 and 6.
8. **ABILITY TO FIT ON THE CORRIDOR.** There is a perception that the corridor is not wide enough to support proper development of a trail and HCT together, or that there are parts of the corridor where width is not adequate. (See item 3)
9. **COMMITMENT FROM SOUND TRANSIT.** There is an overarching concern from community members – even those with different viewpoints about HCT on the CKC – that Sound Transit may construct the corridor in a way that does not take Kirkland's interests into account. Some of those who have said they oppose HCT on the CKC have said that they would support it if there were a "legally binding" way to obtain assurance that the CKC would be built out according to the CKC Master Plan vision.
10. **PARKING IMPACTS**. Community members have expressed the need for added parking areas for corridor access, and that failure to adequately plan for this will cause impacts such as parking in neighborhoods.
11. **PROPERTY VALUES.** Some people who live along the corridor are concerned that adding HCT will decrease property values.
12. **CKC TRANSIT WILL BE FOR "OTHERS."** This concern is that BRT on the CKC may serve routes that carry people who are passing through Kirkland, impacting the corridor without direct benefits to the residents of Kirkland.
13. **CONSTRUCTION IMPACTS.** Concern that during construction, the entire trail or portions of the trail will be closed for long periods of time.

Broad outreach was critical to this effort. City staff held 56 meetings with a range of public, private, and agency stakeholders over the seven month study period, including two broadly advertized public meetings/open houses on November 19 and January 5.

6.3 COMMUNITY ENGAGEMENT

Meeting	Location	Date/Time
ST3 conversation w/ Transpo Group (Adam Parast)	City Hall	Sept 15, 9:30 am
Discuss TOD on Eastside w/ Reps McBride/Hunter, Mayors Balducci/ Marchione	McBride's home	October 7, noon
Sound Transit Project Planning w/ Mike Harbour, Brian McCartan, and Ric Ilgenfritz	City Hall	October 12, 3:30 pm
Kirkland Business Round Table	Kirkland	October 14, 7:30 am
Chamber of Commerce: Public Policy Committee	Kirkland	October 19, 12:45 pm
ST3 Candidate projects w/ Rachel Smith	City Hall	October 19, 3:00 pm
ERC Regional Advisory Council	King St Center	Oct 28, 2pm
Transportation Commission	City Hall	Oct 28, 6pm
ST3 Candidate projects w/ Rep. McBride	City Hall	October 29, 2:00 pm
ST3 Candidate projects w/ Mayor Butler	Issaquah	November 2, 10:00 am
ST3 w/ Exec. Dow Constantine	Seattle (restaurant)	November 2, 4:00 pm
BRT concepts on CKC w/ Darcy Nothnagle	Google	November 3, 4:15 pm
City Council Meeting: Special Presentation "Transit options on the CKC Update"	City Hall	November 4, 7:30 pm
ST3 w/ Keller Williams	Keller Williams	November 5, noon
ST3 follow up w/ Mayor Marchione	Phone	Nov 9, 4pm
ST3 Meeting with KC Metro	King St Center	Nov 13, 10am

Meeting	Location	Date/Time
ST3 w/ Kirkland Reporter (Matt Phelps, TJ Martinell)	City Hall	Nov 13, 11am
ST3 w/ Rob Butcher	City Hall	Nov 13, 1pm
Seattle Times Interview w/ Lynn Thompson	City Hall	Nov 16, 1:30 pm
Moss Bay Neighborhood Meeting	Heritage Hall	Nov 16, 7pm
Highlands Neighborhood Meeting	Maintenance Center	Nov 18, 7pm
Keeping Kirkland Moving Community Open House	Kirkland Performance Center	Nov 19, 6:30 pm
Kirkland Alliance of Neighborhoods	Heritage Hall	Nov 23, 7pm
CKC Brown Bag	Council Chambers	Nov 30, noon
Fireside Chats w/ City employees	KJC/Council Chambers	Dec 1/2
Norkirk Neighborhood Meeting	Heritage Hall	Dec 2, 7pm
ST3 w/ Elizabeth Kiker, Cascade Bicycle	City Hall	Dec 3, 1pm
Youth Council	City Hall	Dec 3, 4pm
Totem Lake Conversations	Café Veloce	Dec 7, noon
Transportation Commission	City Hall	Dec 9, 6 pm
ST3 Presentation to Park Board	City Hall	Dec 9, 6 pm
ST3 Public Outreach w/ Penny Mabie	City Hall	Dec 14, 8:30 am
Chamber of Commerce Executive Board	Arete	Dec 14, noon
ST3 w/ KIRO TV (Alison Grande)	City Hall	Dec 14, 3pm
Houghton Community Council	City Hall	Dec 14, 6pm
Eastside Transportation Association	Master Builder's office	December 16, 8 am

Meeting	Location	Date/Time
ST3 discussion w/ Scott Becker	City Hall	December 16, 10 am
ST3 discussion w/ TCC Shefali Ranganathan	City Hall	December 21, 10:00 am
ST discussion w/ Forterra, Leda Chahim	City Hall	December 21, 1:00 pm
ST discussion w/ Houghton Community Council (John Kappler, Rick Whitney)	Beach House Café	December 21, 4:00 pm
ST discussion w/ Senator Mullet	Phone	To be rescheduled
City Council Meeting	City Hall	January 5, 7:30 pm
Public Meeting	Lake Washington Institute of Technology	January 11, 6:00 pm
South Rose Hill- Bridle Trails Neighborhood Meeting	LW Methodist Church	January 12, 7:00 pm
Joint Meeting: Planning Commission, Transportation Commission & Park Board	City Hall	January 14, 6:00 pm
Special Transportation Commission Meeting	City Hall	January 14, 7:15 pm
City Council Meeting	City Hall	January 19, 7:30 pm
Market Neighborhood Meeting	Heritage Hall	January 20
Everest Neighborhood Meeting		January 26
City Council Meeting	City Hall	February 2
City Council Meeting	City Hall	February 16
Transportation Commission	City Hall	February 24
Meeting with Exec. Dow Constantine (elected officials only)	Seattle	February 25
City Council Meeting	City Hall	March 1
ST Capital Committee	Union Station	March 10
Meeting with Paul von D	King County	March 14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Cross Kirkland Corridor

BUS RAPID TRANSIT APPENDICES

A: EXISTING DATA EVALUATION

B: MODELING ASSUMPTIONS

C: RESPONSE TO ST3 PROJECT TEMPLATES

D: ENGINEERING CONCEPTS (CKC BRT)

E: ENGINEERING CONCEPTS (I-405 BRT)

F: PLANNING LEVEL COST ESTIMATES

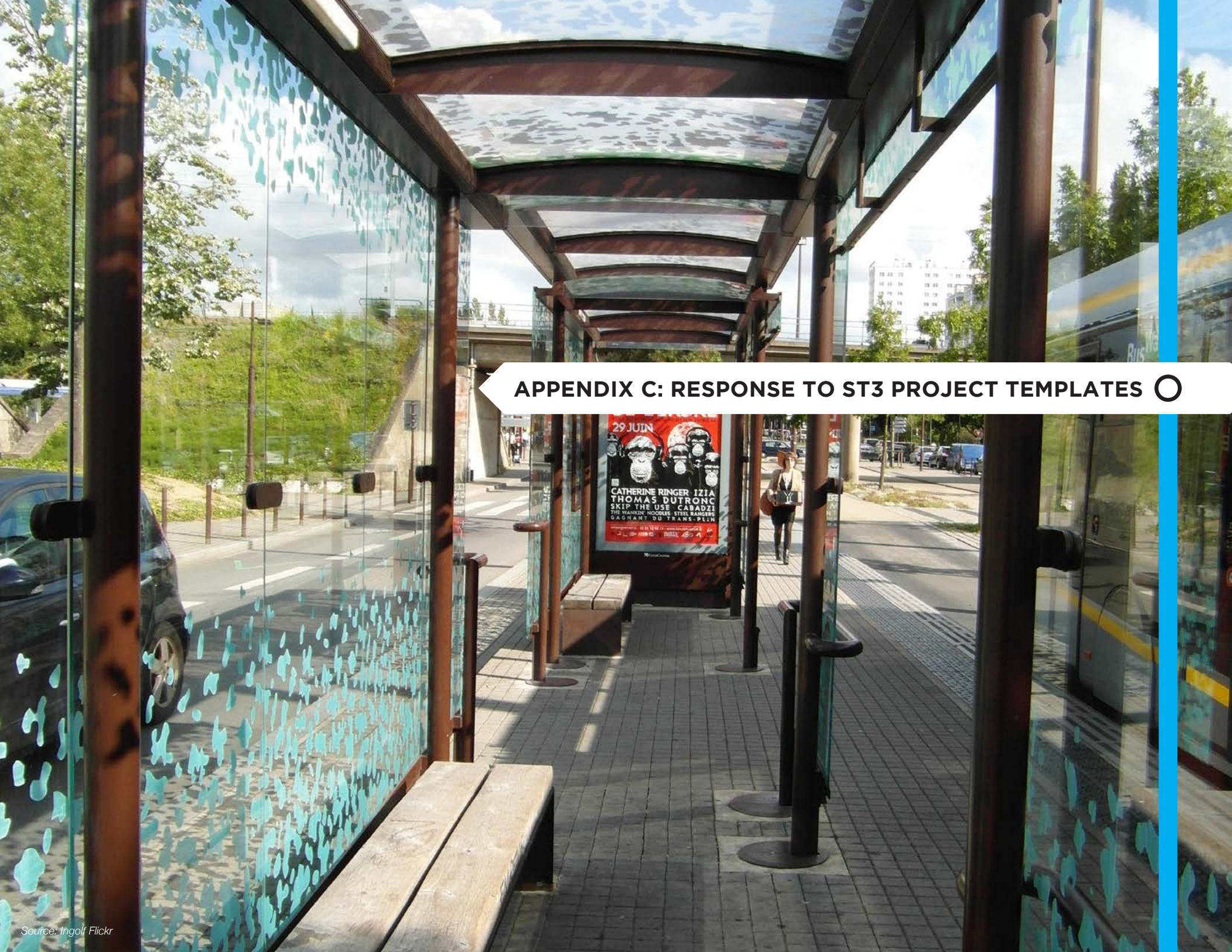
APPENDIX A: EXISTING DATA EVALUATION

Source: Ed Webster Flickr

APPENDIX B: MODELING ASSUMPTIONS

Source: Ed Webster Flickr

APPENDIX C: RESPONSE TO ST3 PROJECT TEMPLATES



Source: Ingolf Flickr

APPENDIX D: ENGINEERING CONCEPTS (CKC BRT)

Source: Oran Viriyincy

APPENDIX E: ENGINEERING CONCEPTS (I-405 BRT)

Source: Ingolf Flickr

Source: Webb Chung Flickr

APPENDIX F: PLANNING LEVEL COST ESTIMATES