



City of Kirkland

Exploration of 21st Century Transit Options for Kirkland



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Background

Current regional transportation plans do not bring transit to Kirkland as quickly as the businesses and citizens of Kirkland have anticipated. And, even when regional transit does come to Kirkland, it will not connect to the 'last mile' or the dispersed development pattern that defines this Eastside suburb. Therefore, the City of Kirkland believes that it is necessary to think 'outside the box' and examine alternative advanced transportation technologies. These technologies are able to connect the first and last mile, thereby functioning as 'feeders' to traditional transit, and have the potential to be implemented ahead of traditional transportation at a lower cost.

Advanced transit and autonomous transportation technology are growing at an exponential rate and should be considered and included in long-range planning and strategy documents of planners and policy makers. In fact, nothing in RCW Chapter 81.112, Regional Transit Authorities, would prevent one or another advanced transit technology from being deployed by the regional transit authority, in this case Sound Transit. To the contrary, Section 81.104.100 states that "Nothing in this chapter shall restrict development, construction, or operation of a personal rapid transit system by a city or county." Further, light, heavy, or rapid rail systems, monorail, inclined plane, funicular and trolley are all technologies enabled in Chapter 81.104.015 and deemed appropriate to study "to ensure an appropriate range of technologies and service policies can be evaluated" (81.104.100) in the process of planning regional transportation systems. Accordingly, the City of Kirkland examined some potential advanced transportation technologies at a February 8, 2014 [Advanced Transportation Symposium](#) that explored 21st Century Suburban Mobility Solutions for the Cross Kirkland Corridor.

The purpose of the symposium was to bring together government and private sector transportation interests to share their knowledge about advanced transit options that are being developed and implemented throughout the world. These applications currently deployed in cities, airports, and on college campuses could be adapted to connect the 'first and last mile', linking suburban business and residential districts to high capacity transit hubs.

The day's presentations and discussions focused on the potential of deploying small-scale transit as an interim use on the Cross Kirkland Corridor (e.g. ahead of light rail service) or, possibly on the entire 42-mile Eastside Rail Corridor. [The event was filmed and available to view.](#)

Economic Benefits of Transit

The advantage of advanced transit is its ability to increase employee mobility with economic benefits to businesses. Approximately 70% of Kirkland residents work outside of Kirkland, the majority traveling to neighboring communities with their primary home to work routes often congested. Similarly, major businesses in Kirkland are reliant on a workforce that is spread over the Puget Sound Region. With cuts in bus service and congested roadways, commute times are lengthy, resulting in reduced family or personal time. Additionally, there are continued negative environmental consequences of primarily single occupancy vehicle travel modes.

For businesses that border the Cross Kirkland Corridor and the 42-mile Eastside Rail Corridor, the potential of deploying some form of transit on the Corridor can mean an appreciable lowering of costs for employee overhead, as many could opt for some form of advanced transit as their preferred transportation choice. Businesses also can brand themselves as "Green" given their ability to offer a sustainable mode of transportation as well as a recreational amenity to their employees. There are approximately 14,486 employees located within 2,000 feet from the centerline of the corridor, and potentially 42,000 employees that could benefit from a transit service if the communities of Bellevue and Redmond also participate in the reuse of the corridor for transit.

Other benefits of transit have to do with the cost of development. In the Puget Sound Region, particularly the cities of Bellevue and Seattle, we are experiencing the rise of business districts that have as a primary asset the availability of transit. The South Lake Union District in Seattle is a current beneficiary, and the Spring District, a major mixed-use development, is planned alongside the Sound Transit 2 Light Rail link between Seattle, Bellevue and Redmond. In addition, downtown Bellevue is seeing extensive office and residential development and a low office vacancy rate of 4% due in part to its current bus accommodations and the promise of future light rail service.

In Kirkland, the reverse is true. Although proximity to I-405 does provide development opportunities, in recent years, development has been stymied given the cost of building structured parking in lieu of transit service. A case in point is the Parkplace mixed-use project (1.3 million square feet), whose failure to launch can in part be ascribed to the multi-layered structured parking that is part of the currently adopted master plan that needs to be built prior to the construction of various office and retail spaces. Similarly, businesses have moved given limited transit options, most recently Market Leader in the I-405 Office Park in Totem Lake.

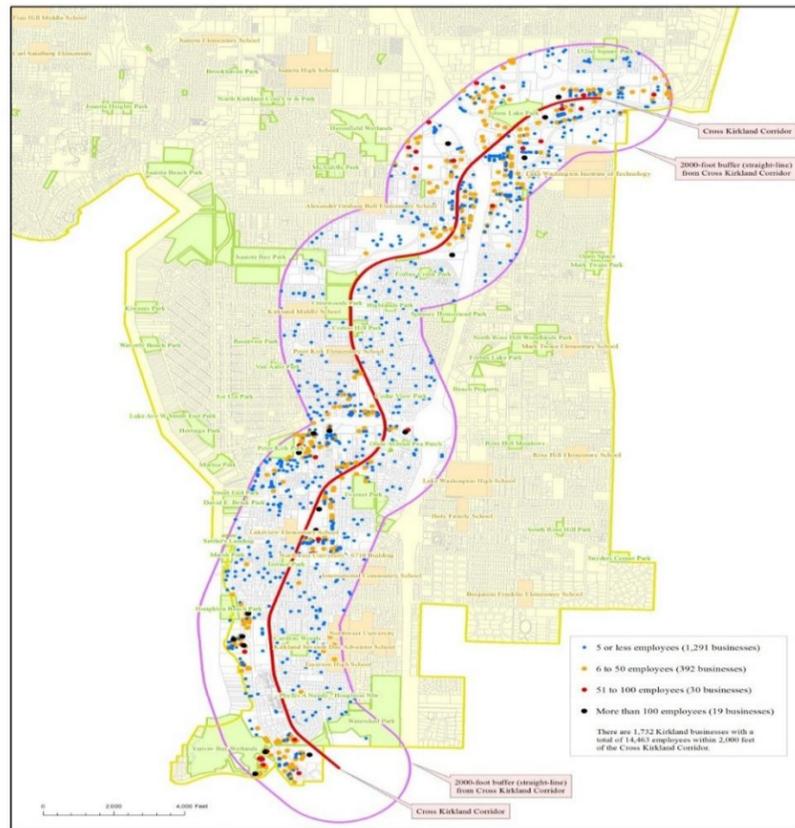
Economic Development Potential with Cross Kirkland Corridor Transit Development

Corridor redevelopment with transit, could be a defining factor in decisions by tech companies and others to locate in Kirkland as their workforces can benefit from home to work connections and recreational opportunities.

As noted previously, 1,737 businesses with 14,486 employees are located within 2,000 feet of centerline of the corridor in Kirkland alone. These include several of the largest businesses in Kirkland – Evergreen Health, Google, Nintendo, Astronics and Kenworth Truck (Paccar).

In the Parmac area of the Totem Lake Business District, the commercial zones that lie adjacent to the Corridor are currently zoned to accommodate approximately 5.8 million square feet of redeveloped office space. Using a figure of four employees per 1,000 square feet of office space, this equates to an additional 23,200 employees, and could accommodate Kirkland’s entire share of the regional target for employment growth that it must demonstrate it can handle in the 2035 Comprehensive Plan.

In the event that this is realized, \$1.7 million in additional annual business and property taxes could be collected and put back into redevelopment of the Corridor. Further detail on economic development potential for the Cross Kirkland Corridor can be found in “Economic Development and the Cross Kirkland Corridor.”

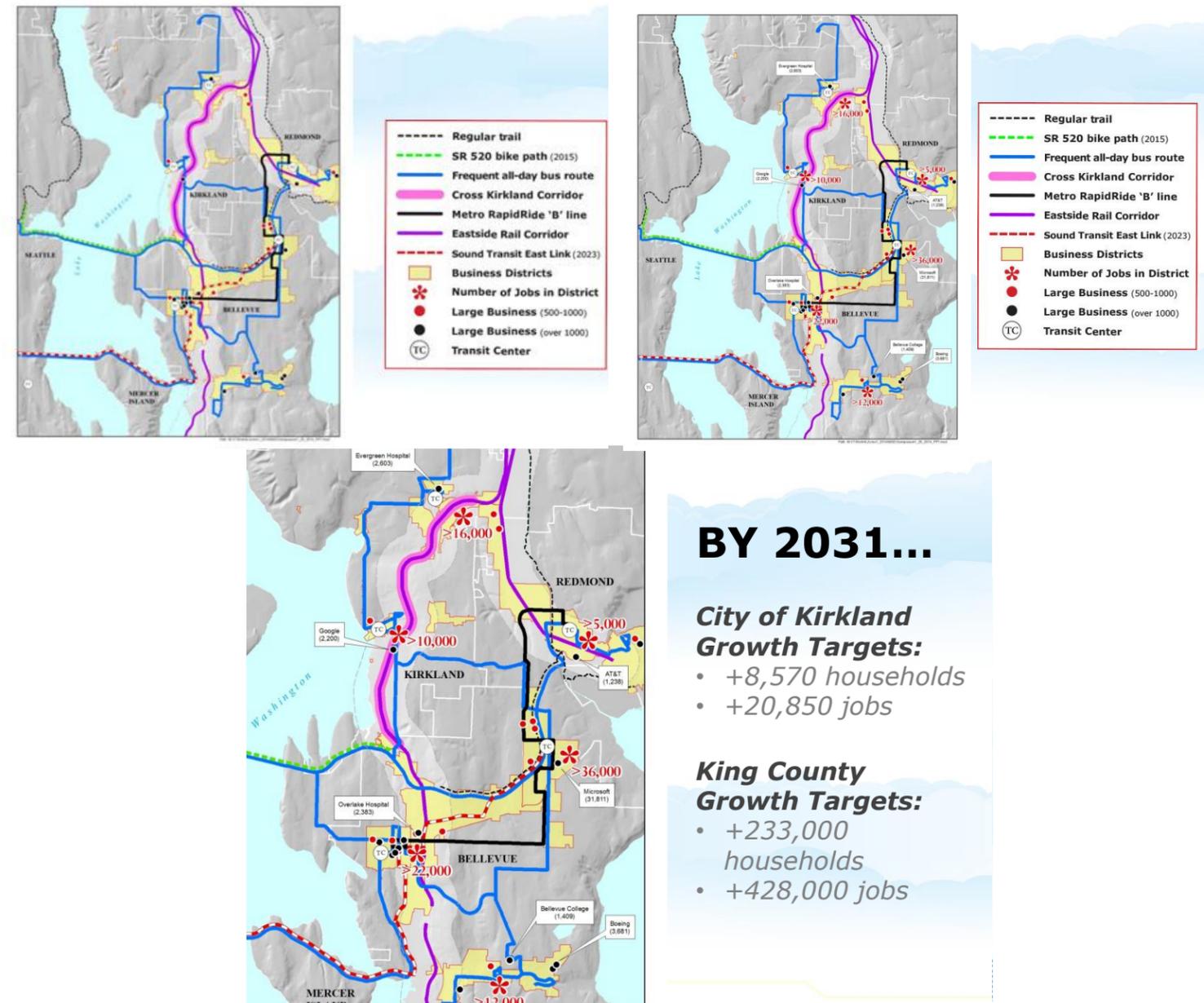


Businesses within 2000’ of Cross Kirkland Corridor

Interconnected Eastside Transportation Network Could Yield Major Mobility & Economic Development Benefits

Without connections to other locations however, especially in nearby Redmond, Bellevue and Woodinville – that either complete the journey from home to work to play, or link to hubs for light rail and bus rapid transit, thus picking up additional ridership, it is hard to envision the current 5.75 miles as an economic development driver. Linkages to these transit hubs (Sound Transit 2 light rail project at Bellevue Hospital District), I-90 bus rapid transit, as well as the regional trail systems, will need to be implemented.

The following three diagrams depict the potential for a fully integrated, interconnected, multi-modal transportation system on the Eastside:



BY 2031...

City of Kirkland Growth Targets:

- +8,570 households
- +20,850 jobs

King County Growth Targets:

- +233,000 households
- +428,000 jobs

Advanced Transportation Alternatives for the Cross Kirkland Corridor

Realizing the potential for a fully integrated, interconnected, multi-modal transportation system on the Eastside, the City of Kirkland brought [panelists](#) together to describe various types of advanced transit that may have the potential to be implemented ahead of traditional transportation. Models included manually operated and automated vehicles running on tires, rail, guideway, and cable. Deployed in airports, college campuses and major cities, these systems could be adapted to connect suburban residential and employment centers, schools, hospitals, shopping and recreation areas and high capacity transit hubs. Proponents note that these advanced technologies are energy efficient, less costly to build and operate than traditional transit, with designs that scale to people and neighborhoods.

Technology presenters and audience members at the Advanced Transportation Symposium were asked to address the following considerations in describing how their transit technology could be implemented for the Cross Kirkland Corridor and larger Eastside transit needs:

Initial Considerations in Evaluating Transportation Modes on the Cross Kirkland Corridor

- Physical Appearance
 - What is the footprint of the system?
 - Are there customization opportunities for the system to fit the CKC parameters?
 - What other facilities are required for operation?
 - What might the spacing of stations be?
- Cost
 - What is the infrastructure cost per mile?
 - What are the operating and maintenance costs?
- Funding Opportunities
 - What funding or cost sharing opportunities are available?
- Capacity
 - How many people will the vehicle accommodate?
 - What is the maximum number of passengers per hour?
 - How flexible is the system in responding to surges and off peak ridership times?
- Transportation Time
 - How does trip-time compare to alternatives such as car, bike and bus?
 - What is the normal operating speed?
- Compatibility to Connect with Regional Systems
 - How would the system connect to other systems?
 - How would the system stations accommodate the different ways people might arrive at the station such as walking, biking or driving?
- Safety Standards
 - What regulatory permits and approval is needed? What is the estimated timeframe for this?
- Environmental Standards
 - What is the environmental impact of the system and the results of any environmental impact studies that have been performed?
- Readiness
 - What is the estimated time to the build, implementation and obtain regulatory approval?

Technologies Presented at the Advanced Transportation Symposium

The first panel at the Advanced Transportation Symposium looked at traditional transit modes in the Puget Sound Region including King County Metro Buses and Sound Transit Light Rail Service.

Following was an introduction to Advanced Transit Technology that looked at several Personal Rapid Transit (PRT) and Group Rapid Transit (GRT) systems that are in operation around the world. These systems included:

Personal rapid transit (PRT), or podcars, which are a transit mode featuring small automated vehicles operating on (a network of) dedicated guideways. A PRT system provides direct origin-to-destination connections and typically operates on demand. The size of the vehicles accommodates an individual or small group (4 adults, 2 children) traveling together by choice. Systems described at the symposium include:

- [2getthere](#) operating in [Masdar City](#)
November 28, 2010 marked the first day of the operations of the PRT system at Masdar City. The system runs through the 'undercroft' providing it multiple lanes of exclusive right-of-way, connecting remote parking and the Masdar Institute of Science and Technology.
- [Ultra Global](#) operating at [Heathrow Airport](#)
21 PRT vehicles facilitate the journey between the stations at the business car park and Terminal 5. The system's infrastructure is smoothly interwoven in between the access roads to the terminal. It greatly improves the link and offers a superior service to travelers.
- [Vectus](#) operating in [Suncheon Bay](#)
The PRT System, consisting of 40 vehicles, will facilitate the transportation of visitors between Suncheon City Garden Expo site and the world famous Suncheon Coastal Wetlands Park along a 4.6 km bi-directional guideway.

Group Rapid Transit (GRT) systems feature larger vehicles (up to 25 passengers) and can be installed both in line and network configurations – offering a middle ground between mass and personally oriented systems. Systems described at the symposium include:

- [West Virginia University](#) (Morganstown, US)
The very first in the '70s is still operational today, with modifications taking place to optimize and improve the system. Originally built by Boeing, the application consists of 71 vehicles accommodating up to 18 passengers per vehicle – although named 'PRT' it is configured as a Group Transit application.
- [2getthere Rivium](#) ParkShuttle (Netherlands)
A unique GRT application in the sense that it is the only system installed at grade, with at grade crossings. With the first generation realized in 1999, the second generation debuted in 2007 with the track extended and additional stations added.

The Symposium also looked at opportunities for emerging technology on the Cross Kirkland Corridor. The Cross Kirkland Corridor offers a closed system that could be utilized as a pilot operation for emerging technology in need of regulatory approval. Technologies that were presented include:

- [LEVX](#)
LEVX® Transportation Systems are comprised of three core technical advancements that when combined offer achievable and sustainable options for mobility and the environment. Energy free [magnetic suspension](#) eliminates both static and magnetic drag from the system, dramatically slashing overall energy requirements. Each LEVX® carriage remains suspended continuously, never touching down on the guideway rails and may be moved forward or backward with minimal force.
- [SkyTran](#)
An elevated on demand two person vehicle system that is called for by computer, tablet, or smart phone and arrive almost instantaneously for a quick departure. SkyTran's magnetic levitation system can easily be powered by clean energy sources such as solar and wind making it the greenest mass transportation system available.
- [CyberTran](#)
CyberTran is a unique passenger rail system that works more like an elevator than a traditional transit system. Rather than running on a defined schedule, a computer-controlled system responds to passenger needs in real time. Passengers input their destinations at a station, and after a small amount of time has passed, vehicles arrive to deliver the passengers directly to their destinations. Multiple small vehicles and off-line stations allow for this level of flexibility and responsiveness.
- [Cable Propelled Transit](#)
While not a new concept Cable-Propelled Transit is emerging in urban landscapes. Cable-Propelled Transit (CPT) is a transit technology that moves people in motor-less, engine-less vehicles that are propelled by a steel cable. Top supported systems, also known as aerial cable systems, are supported from above via a cable. Bottom supported systems are supported by tracks or rails underneath, yet are still propelled by a cable.

Conclusion

The Advanced Transportation Symposium was the start of a conversation to determine innovative, efficient and effective transit on the Cross Kirkland Corridor and the Eastside Rail Corridor that increases transit opportunities by connecting the first and last mile. A technical evaluation of the options presented as well as others (e.g. autonomous vehicles) not included in the symposium should be conducted. An extensive list of systems can be found at <http://www.advancedtransit.org/advanced-transit/systems>.

At the staff debrief of the symposium immediately following the event, a plan for moving forward was developed:

Key Issues identified include the insufficiency of traditional modes of transportation to meet the needs of Kirkland residents and business as well as the economic need to promote transit on the Cross Kirkland Corridor.

Next Steps should include continuing to assume a leadership role in the advocacy of advanced transit solutions in the region in order to shape future discussion in the regional transportation sphere. One way of doing so is to include Advanced Transit considerations in Master Plan documents. Additionally, private investment in a multi-employer advanced transit solution should be explored.

Advanced transit and autonomous transportation technology are growing at an exponential rate and should be considered and included in long range planning and strategy documents of planners and policy makers. The Puget Sound Regional Council held a workshop in April, 2014 examining driverless technology to include in their 2040 plan. It would behoove cities within the Puget Sound Region to consider and plan for advanced transportation technology implementation. This will encourage a coordinated and collaborative effort in efficient and effective regional transportation to benefit the long term economic, environmental and livability of the region.

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