

King County Metro Transit

Access to Transit Phase 1 Report

The role of park-and-rides and other community infrastructure related to access to transit and industry best practices and innovative approaches to improve access to transit capacity

December 31, 2014

Prepared for:
King County Council

Prepared by:



Department of Transportation
Metro Transit Division
Service Development Section
King Street Center, KSC-TR-0415
201 S Jackson St.
Seattle, WA 98104
www.kingcounty.gov/metro

Alternative Formats Available
206-477-3832 TTY Relay: 711

Contents

Executive Summary

Introduction

I. The Role of Infrastructure in Access to Transit

II. Industry Best Practices

III. Innovative Approaches to Improve Access to Transit Capacity

IV. Next steps

Executive Summary

Metro is undertaking a two-year study of the many factors that affect the public's access to the transit system and how access might be improved. This study will be an important component of Metro's effort to develop a long-range plan. The study will consider infrastructure that provides access, how access needs are reported and funded, and regional coordination and policies.

This report, required by Ordinance 17641, Section 3B, is a preliminary step in that two-year process. It gives an overview of park-and-rides and other infrastructure related to transit access, and discusses industry best practices and innovative approaches to improving access.

The three primary ways people get to the transit system are walking, biking, and driving. Several factors affect their choices. Walkers and cyclists want a direct route—they look for the shortest possible distance and travel time. They also want routes that make them feel safe and secure—in particular, they want to be protected from vehicle traffic. People who use wheelchairs or other mobility devices need facilities that accommodate their needs. Cyclists need places to securely store and transport their bicycles.

For people who drive, park-and-rides are the primary point of access to the transit system. Demand for parking spaces has been increasing, and many park-and-rides in King County are at or near capacity. To expand the park-and-ride system, or manage it to accommodate more people within existing resources, transportation agencies will have to work together to understand the needs and how to address and fund them.

As Metro moves forward with its study and long-range plan development, as well as conversations with its regional partners, we can draw on practices developed by other transportation agencies and cities.

This report surveys examples of practices put into place by other agencies and jurisdictions to guide planning and implementation of access improvements. These include establishing design guidelines, policies, and strategic plans for promoting access to transit.

The report also considers examples of innovative approaches to improve access to transit that have or are being considered for implementation. Strategies to promote walking and bicycling include improving traffic signal timing, street lighting, and wayfinding signage. Other efforts explored to make better use of park-and-ride facilities include charging parking fees to recover revenue and to manage use.

Phase 2 of Metro's Access to Transit Study will consider these and other issues in more depth. It will explore the access habits of transit users in King County, regional and local plans that address access, ongoing local studies on transit access infrastructure, and how best practices and innovative approaches could be applied in King County. Metro will also explore with its partner agencies the issues of access needs reporting and funding as well as regional coordination and policies.

Introduction

Purpose of this Report

As required by Ordinance 17641, Section 3B, this is a report on (a) the role of park-and-rides and other community infrastructure related to access to transit, and (b) industry best practices and innovative approaches to improve access to transit capacity.

Background

This report is an initial step in a two-year study about access to transit that is required by Ordinance 17641. It sets the stage for Metro's continued exploration of transit access as part of its long-range planning efforts that Metro will embark upon in 2015. As identified in the Access to Transit Study Work Plan adopted in March 2014, by Motion 14089, the Access to Transit Study will consider multiple facets of transit access, including infrastructure that improves access to transit, access needs reporting and funding, and regional coordination and policies.

The Access to Transit Study Work Plan was developed with input from representatives of cities, the Washington State Department of Transportation (WSDOT), the Puget Sound Regional Council (PSRC), Sound Transit, County Executive and legislative staff, and the private sector. Per Ordinance 17641, the work plan includes a timeline, milestones, lead agency and scope to define:

- a. the role of park-and-rides and other community infrastructure related to access to transit;
- b. industry best practices and innovative approaches to improve access to transit capacity including but not limited to parking management, technology, nonmotorized corridors, and transportation demand management;
- c. options for regional needs reporting and funding of access to transit infrastructure;
- d. model policy language that supports access to transit through transit-oriented communities and infrastructure; and
- e. potential updates to the Strategic Plan for Public Transportation and Metro Service Guidelines to clarify the role, measurement and funding of access to transit as they relate to the King County Metro transit system.

The work plan divided the study into two phases, with a report due at the end of each phase.

- **Phase 1:** Information gathering (elements a and b)
- **Phase 2:** Regional coordination and policy development (elements c, d and e)

This Phase 1 report responds to the requirements in Ordinance 17641, Section 3B. It provides an overview of different modes used to access transit and the infrastructure that supports those modes, a review of what some agencies are doing to guide and improve transit access planning, and a look at what approaches agencies are considering or have implemented to improve access to transit.

Motion 14089 provided for adjustments in the delivery of the study in the event that staff were required to support development of major service reductions. Metro did focus significant resources in planning and developing service reductions during this time period. As such, some elements of the study originally envisioned for inclusion in this report will be addressed in the later phases of the Access to

Transit Study as part of Metro's long-range plan development which will be launched in 2015. Phase 2 of the Access to Transit Study will further consider the definition of access, review of access to transit habits in King County, review of regional and local plans that address transit access, continued tracking of ongoing local studies on transit access infrastructure, and continued consideration of how best practices and innovative approaches could be applied in King County.

Why access is important

This report considers three primary modes of reaching transit and the factors that influence the attractiveness of each mode. It also reviews what some agencies and researchers are doing to better understand access issues and to guide investments and policies to improve access.

The accessibility of transit is an important determinant of a transit system's success. Good access increases ridership, reduces transportation costs for riders, promotes social equity, and supports economic prosperity and environmental sustainability.

The Transit Capacity and Service Quality Manual¹ gives this definition of access:

Access to transit considers the spatial elements of transit availability:

- *Is transit service provided near one's desired origins and destinations?*
- *Can one get to and from the necessary transit stops or stations?*

Consistent with the common industry approach, Metro measures transit accessibility by calculating the number of people who live or work within one-quarter mile of a bus stop or within two miles of a park-and-ride. This measure alone however does not capture all the factors that determine whether people have access to transit that works for them. Access to transit is affected by many factors, including land use, development patterns, road design, bike and pedestrian facilities, park-and-ride availability, and transit coverage and service levels. For a large bus system such as Metro, which serves areas with a range of land uses and development patterns, riders reach the system in many different ways. Access points range from simple bus stops to park-and-rides to major hubs and transit centers.

With increasing crowding at park-and-rides, high costs to expand park-and-ride capacity, challenges in bridging first- and last-mile connections to transit, growing interest in walking and biking to transit, and continued need to address accessibility for all mobility levels, King County Metro and its partner agencies are seeking strategies and tools to better understand and respond to access needs as individual agencies and as a combined region.

Coordination with other agencies

Metro is coordinating its transit access study with other efforts in the region. Sound Transit and WSDOT have initiated studies to explore management strategies at park-and-ride lots. Metro is partnering with Sound Transit to look at access improvements for nonmotorized modes. The Puget Sound Regional Council (PSRC) is conducting a transit access assessment as part of their transit-related 2014-2015 work program under Urbanized Formula (Section 5307) funds, and Metro has been working closely with them over the past year. The PSRC will have a lead role in portions of Metro's Access to Transit Study, especially during the regional coordination and policy development phase of the study.

Metro has also been an active participant in the Regional Transit Access Working Group convened by PSRC as part of their transit access work program. This group includes representatives of transit and transportation agencies and local jurisdictions in the Puget Sound region. Participation in this group has enabled Metro to track and coordinate with the other transit access-related studies underway in the

region, as well as maintain contact with jurisdictions on transit access issues. The PSRC-facilitated Transit Operator's Committee made up of representatives from the transit agencies in the region also tracks the transit planning activities in the region, including the work on access to transit and long-range planning.

Metro is also coordinating closely with Sound Transit on long-range planning, including system access issues.

I. The Role of Infrastructure in Access to Transit

This section discusses the primary modes of transportation people use to reach the fixed-route transit system, and factors that affect the attractiveness of those modes. Connections between transit services are also an important aspect of transit access, but this report focuses on connections to and from the transit system.

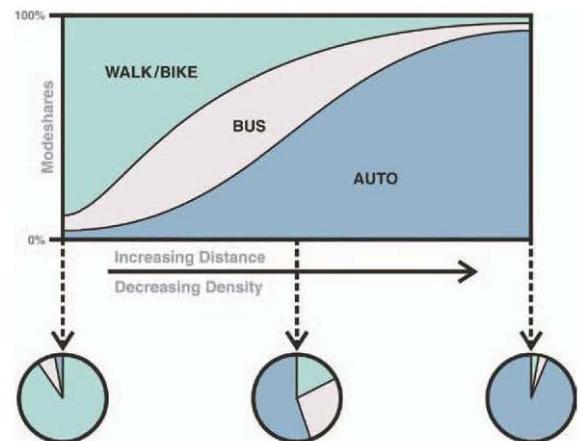
Modes of access

Three primary modes of access to the fixed-route public transportation system are considered in this paper:

- 1) Walking, including use of wheelchairs or other mobility aids
- 2) Bicycling
- 3) Driving, including driving alone, formal and informal carpools, commuter vans, and being dropped off

Factors that affect mode choice

Factors that affect the feasibility and desirability of the various modes of access include cost, safety, time, distance, availability of a vehicle, topography, weather, aesthetics, wayfinding and user information such as real-time transit arrival information. The adjacent graph shows how distance and density can influence mode share. The physical abilities of the customer also influence what mode is chosen. Creating good access means supporting a range of modes that respond to different needs and markets.



Source: TCRP Report 153

1) Walking, including use of wheelchairs or other mobility aids

Walking is the most basic and common way people get to and from the transit system, especially in densely populated areas and at the destination end of a trip.

How far people are willing to walk depends on many factors, including the street network pattern, availability of sidewalks, ease of crossing streets, terrain, and a person's age and physical abilities.

A number of studies have looked at the factors that influence how willing people are to walk to transit. In general, the findings suggest that people are willing to walk between one-quarter mile and one-half mile to reach transit. Research by the Transit Cooperative Research Program has found however that many pedestrians are willing to walk between one-half and one mile to access transit, longer than the traditional focus on one-half mile. Findings also suggest that people tend to be willing to walk farther when transit is more frequent and when conditions are favorable with safe and direct paths. Studies also

suggest that people in suburban areas are more willing to walk longer distances than those in urban areas to reach high-frequency transit (Schlossberg et. al)².

As mentioned above, direct routes are important to people; their top consideration is the shortest distance and the fastest travel time available. Safety is the next most important consideration. People want sidewalks and safe crossings on streets with high traffic volumes. Other factors include attractiveness of the route, sidewalk quality, lighting, and the length of wait times at traffic lights.

Overall walkability is also important. Walkability is influenced by a combination of land-use density, land-use mix and the street network pattern—particularly intersection density (Ryan and Frank)³.

All of these values are reflected in guidelines developed through the Transit Cooperative Research Program⁴ which identify the following factors as essential in designing pedestrian access to transit service:

- **Directness and speed of route** – Pedestrians want direct walking routes, with minimal delays when crossing streets.
- **Safety and security** – Pedestrians must perceive that their route is secure and visible to other road users, particularly in the evening. Highway safety is also important, especially when people are crossing busy roadways.
- **Pedestrian-friendly design** – Lighting, building setbacks and orientations, and sidewalks help determine whether pedestrians feel like "unwelcome guests" or perceive that the street is designed to meet their needs. Pedestrian facilities should be designed at a "human scale," with the needs of people in mind as well as vehicles.
- **Information** – New, occasional, and visiting travelers particularly need wayfinding information to reach local destinations.

The accessibility of the pedestrian network for people who use wheelchairs or other mobility aids will also affect walk access. Primary elements of an accessible pedestrian network include⁵:

- Sufficient clear width on access routes for wheelchairs, with passing opportunities provided at intervals
- Firm, stable, slip-resistant surfaces
- Limits on the grade, cross-slope, and surface discontinuities of an accessible route
- Need for suitable transitions between sidewalks and streets (e.g., detectable warnings, curb ramps or blended transitions)
- Accessible pedestrian signals.

Considerations

Infrastructure investments that increase walkability – the directness, safety and connectivity of areas surrounding transit stops and stations – promote increased walk access to transit. A pedestrian network people with disabilities can use increases the mobility options of that population and improves overall access to transit.

2) Bicycling

When conditions around a transit stop or station are adequate for bicycling, people in a wider area have access via bicycle. Bicycle-supportive conditions depend both on the connections to transit and the availability of options to safely transport or store a bicycle.

Network considerations

A study on bicycle access to transit done by the Mineta Transportation Institute (Flamm and Rivasplate)⁶ found that many people use bikes to reach transit, and that cyclists will travel a greater distance to do so. The study also found that many cyclists not only biked as a means to reach transit, but also combined biking and transit so they could ride their bikes more frequently.

Like walkers, the top consideration for cyclists in choosing a route is the shortest distance or fastest travel time afforded by a transportation network. The next most important consideration is safety in vehicle traffic (Kuzmyk et al).⁷ Important network features for cyclists were found to be:

- Marked lanes on mixed-use streets and roads
- On-road (or immediately parallel) bike lanes physically separated from the vehicle right-of-way (cycle tracks)
- Separate off-road paths and trails
- Marked routes (bike boulevards) through suburban neighborhoods and low-volume streets

Bike parking

Bicycle parking varies from uncovered bicycle racks to staffed bicycle garages, as seen in some high-density European cities. Studies have observed that the majority of cyclists prefer to bring their bikes with them on the bus or train, even when bicycle parking is available. Many riders said they feel more secure bringing their bikes with them rather than leaving the bikes at the place where they boarded transit.

Bike share

Bike share programs can also provide access to and from transit. A bike share system is an automated public bicycle rental program with a network of stations. Bike sharing is a relatively new form of transportation. Pronto bike share program was recently introduced in Seattle with about 500 bikes and 50 stations.

Bike-transit integration

Key observations about bicycle and transit integration include (Schneider and Toole Design Group)⁸:

- Bicycle services help attract more transit riders by extending the transit system's draw area and by providing greater mobility to customers at the beginning and end of their transit trips.
- Compared with the capital costs of buses, rail cars, and automobile parking facilities, it is relatively inexpensive for transit agencies to purchase bicycle equipment, such as bike racks on buses, bike hooks in rail cars, and bike racks and lockers at transit stations.
- Transit agencies have generally experienced few maintenance problems with their bicycle services. Problems reported included obtaining replacement parts for broken bus bike racks, abandoned bicycles in bicycle racks, bus bicycle racks interfering with windshield wipers, and the need to remove the bus bicycle rack when a bus is towed.

Considerations

Bicycling can extend access to transit and increase ridership. Improved facilities that support cycling can result in more people using this mode. The Federal Transit Administration (FTA) considers bicycle improvements up to three miles from a station location as having a relationship to public transportation. Bicyclists' use of transit often depends on safe pathways to transit stops and stations and the ability to travel with their bike or park it securely. Pathway and security improvements may require either significant capital investment or installation of relatively inexpensive equipment. Secure bicycle parking is less expensive than parking spaces for cars and will likely be increasingly important. As more people use bikes to access transit, transit vehicles may not have sufficient bike storage capacity.

3) Driving

Vehicles help people gain access to transit—often from farther distances than walking or bicycling. Transit users can drive alone (sometimes in electric or carshare vehicles) and use carpools or vanpools, to drive to park-and-rides, transit stations or stops. Riders can also be dropped off, or “hide-and-ride” by parking near transit stops at locations other than park-and-rides. This discussion focuses on park-and-ride lots, which are major points of access for people who drive to transit.

Park-and-ride lots

Park-and-ride lots create transit access points for people who drive, most often driving alone. Park-and-rides help extend transit service across a larger area. They can play an important role in providing access in outlying and lower-density areas, which may not have sufficient demand to support effective local bus or walk/bicycle access to transit stops.

Some key functions of park-and-rides:

- Increase the availability of transit especially in lower density areas
- Concentrate rider demand to a level that supports productive transit service
- Reduce vehicle miles traveled by enabling users to take transit for part or most of their trip
- Shift the demand for parking away from central business districts, though sometimes at the expense of shifting congestion to the vicinity of the park-and-ride
- Relieve neighborhoods of uncontrolled informal parking

Park-and-rides also enable riders to save money by reducing fuel consumption and wear and tear on their vehicles. These savings may be offset by the cost of transit fares. The transit portion of a trip also relieves the stress of driving and allows passengers to focus on other activities.

Park-and-ride facilities range from multistory parking garages to simple surface lots and have varied functions from serving as major intermodal hubs to enabling people to meet up for ridesharing. Some park-and-rides offer amenities such as bike racks and electric vehicle charging stations to encourage lower emission travel. Park-and-ride facilities must have infrastructure such as walkways to enable transit customers to safely connect from the parking area to the transit services.

Some characteristics of successful park-and-ride⁹ :

- Located where they intercept motorists in advance of congestion
- Located sufficiently far away from the city center

- Serve low-density residential areas
- Serve multiple markets
- Located in safe areas
- Complement and reinforce land development
- Provide fast and frequent rapid transit service
- Provide good roadway access

Who uses park-and-rides and why

Surveys of park-and-ride users in the regions of Sacramento, northern Virginia, Chicago, Seattle, and Phoenix referenced in the Transit Capacity and Service Quality Manual, led to the following findings about riders and their choice to use a park-and-ride:

- Park-and-ride users are choice riders
- Park-and-ride users have significantly higher incomes than local bus riders
- The majority of park-and-ride users (more than 60 percent) travel to the central business district for work more than four times per week
- Parking at the destination is expensive
- Convenient, frequent bus service is offered at the park-and-ride
- Most riders find park-and-ride facilities because they can see them from their regular commute routes

Considerations

In King County, demand for park-and-ride lots has increased. A number of lots are highly utilized, and some are over capacity. More information on park-and-ride utilization in King County can be found in the Park-and-Ride Utilization Report, <http://metro.kingcounty.gov/am/accountability/park-ride-usage.html>. Increasing the number of parking spaces by building additional park-and-ride lots or spaces is expensive and can be unpopular in some neighborhoods. Park-and-rides require significant capital investment for construction as well as ongoing maintenance cost. Total cost per stall in a surface lot is approximately \$20,000-35,000. Cost per stall in a structured park-and-ride lot ranges from \$35,000-55,000. (Cost estimates are based on construction, project management, design and construction management. They do not include the cost of land). They can also increase local congestion in the area of the park-and-ride, and they can induce driving if they draw riders who might otherwise walk to transit.

An alternative to building more lots is to improve the efficiency of the existing lots, with efficiency defined as the number of people served per parking space. Many strategies could be used to achieve this goal, but the primary mechanisms include pricing to manage demand and giving priority use to multi-occupant vehicles (e.g., carpools) as well as local transit options and nonmotorized modes (e.g., walking, bicycling). Leased lots and partnerships with organizations such as churches can also provide parking opportunities at a lower cost.

Options for moving forward will take a regional effort. Given the complexity of the park-and-ride system and the interconnected nature of transit service in the area, multiple agencies will need to be part of the discussion about how to respond to and manage park-and-ride demand. Sound Transit and WSDOT are both exploring different management strategies. Section III discusses these options further.

II. Industry Best Practices

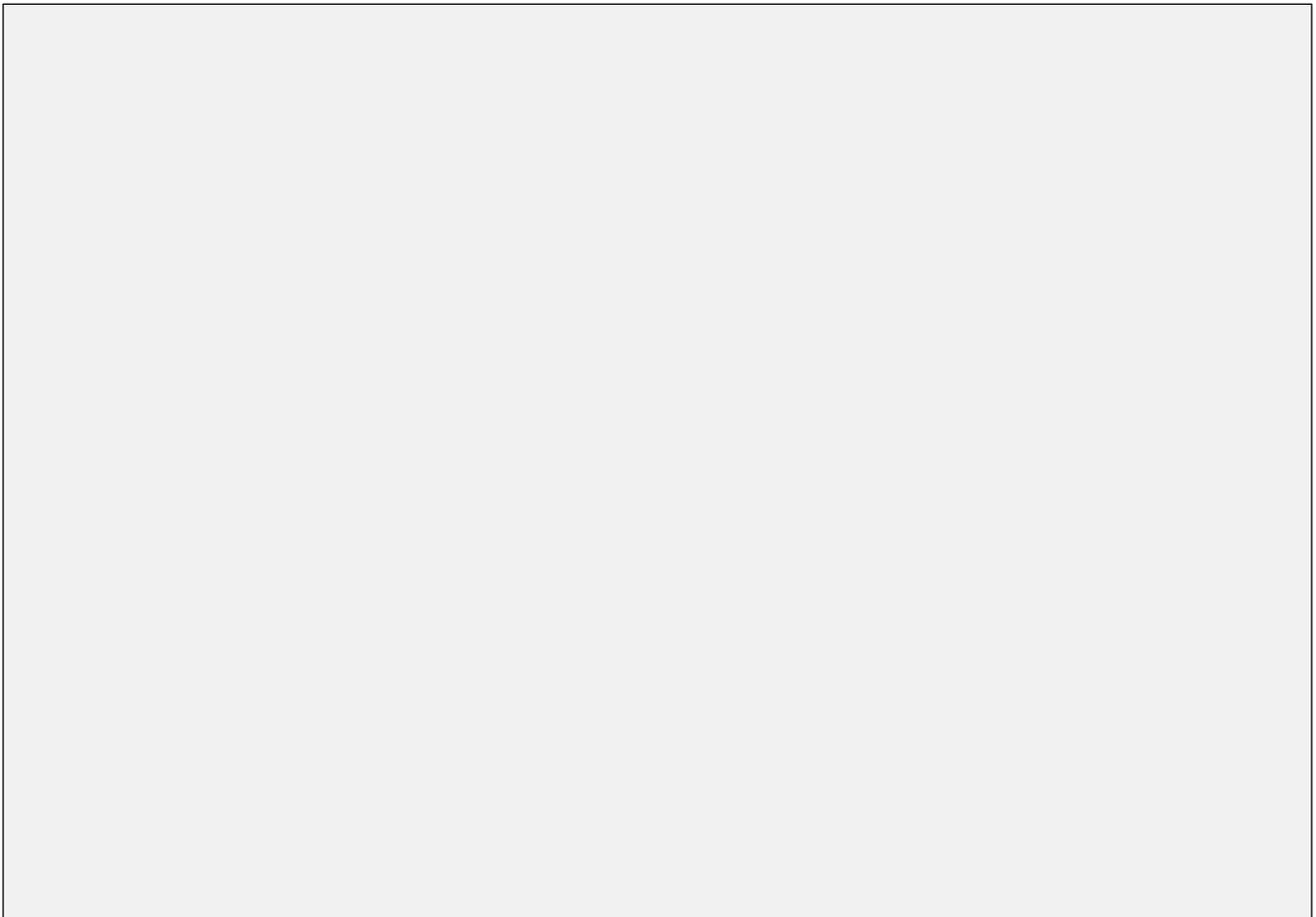
Many agencies and jurisdictions are developing guidelines, policies and strategic initiatives for improving access to transit. This section looks at planning and investment guidance related to system access that has been developed in Denver, Portland, the Puget Sound region, Seattle and Los Angeles. Metro will be able to build on the examples from these areas to inform our long range planning effort.

1) Guidelines

Transit access guidelines are one tool that some agencies are developing.

Denver and Portland

Some agencies such as Denver's Regional Transportation District and Portland's TriMet have developed guidelines for transit access (see insert box). These guidelines address design aspects of stops and stations and consider how the facilities fit into the context of the greater community. They also provide guidance on the role jurisdictions can play in improving access. Denver's guidelines encourage transit-oriented design as part of general development. They also establish a hierarchy among access modes with the order of priority being: pedestrians, bus riders, bicyclists, vehicles (short-term parking), and vehicles (long-term parking).



Puget Sound Regional Council (PSRC)

The PSRC collaborated with local transit agencies to develop the *Transit Supportive Toolkit*¹⁰ which provides guidance on strengthening the linkage between land use and transit for local jurisdictions as they develop their comprehensive plans. It includes a chapter on guidance and strategies for improving access to transit.

2) Policy

Agencies and jurisdictions also develop policies to guide access planning and decision-making.

Sound Transit

Sound Transit adopted a System Access Policy in 2013 that established a broad framework for Sound Transit’s support, management, and investment in infrastructure and facilities to provide access to its transit services. Sound Transit may make system access-related investments in its own transit facilities or in access infrastructure such as signage, and systems that are designed to effectively connect Sound Transit services with surrounding communities.

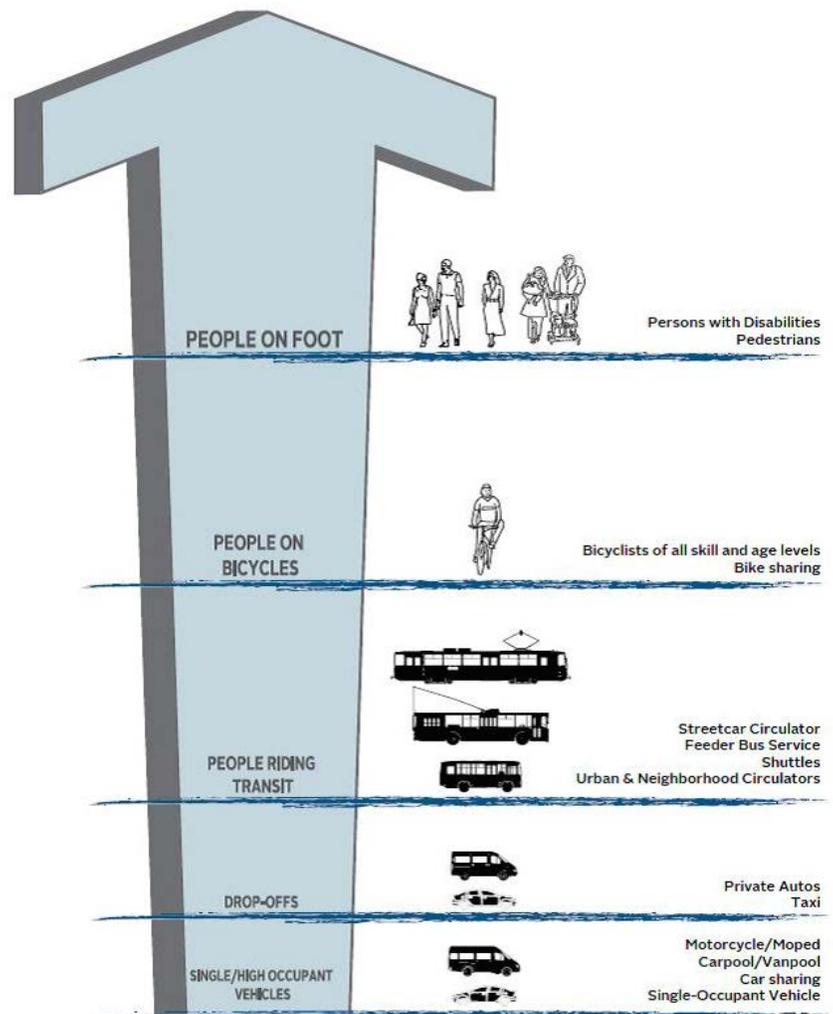
The System Access Policy:

- Establishes general criteria for assessing and prioritizing potential access-improvement projects. These are based on ridership, total cost of ownership or total lifecycle cost to Sound Transit, Sound Transit and local jurisdiction plans and planning documents, and public input.
- Introduces parking management strategies as a tool to increase the efficiency of park-and-rides and increase access and ridership to high-capacity transit (HCT).

City of Seattle

Through the City of Seattle Transit Master Plan (TMP) Seattle recommends policies, establishes an access hierarchy and identifies best practices for access to transit. The recommendations are part of a greater goal of developing transit-oriented neighborhoods. As the TMP notes, studies have shown that improvements in pedestrian conditions can increase transit mode share and decrease the frequency of short automobile trips.

Access Hierarchy



Seattle Transit Master Plan, 2012

In Seattle's TMP, pedestrian access to transit refers to the extent to which the pedestrian environment, amenities, and infrastructure support passengers in accessing transit services. The quality of these features is paramount in attracting new riders and maintaining existing ridership. The TMP:

- Discusses how to design pedestrian friendly transit streets where pedestrians are more visible and safer.
- Describes elements of a healthy pedestrian environment including human-scale sidewalks, wayfinding information, visual interest and urban nature.
- Identifies items that support a comfortable and safe walking environment for people of all ages and abilities.
- Identifies an access hierarchy (see figure to the right) to provide guidance in planning and investing in transit corridors, with the order of priority being walking, biking, connecting transit, drop-offs, and high-occupancy and single-occupancy vehicles.

3) Strategic Planning

Some agencies have developed strategic plans to address access issues. The following example discusses a planning effort in the Los Angeles area.

Los Angeles County Metropolitan Transportation Authority (Metro) and the Southern California Association of Governments (SCAG)

Metro and SCAG collaborated to develop the draft *First Last Mile Strategic Plan: Path Planning Guidelines (2013)*.

The First Last Mile strategic plan strives to expand the reach of transit through infrastructure improvements and to maximize multimodal benefits with the ultimate goal of increasing ridership. The plan outlines a specific infrastructure improvement strategy to facilitate easy, safe and efficient access to Metro system. This plan:

- Defines first- and last- mile planning, reviews the challenges to transit access specific to the Los Angeles area and discusses land use and urban design in transit accessibility.
- Includes a guide to improve access and checklists to evaluate station safety, aesthetics, and accessibility.
- Introduces the concept of the Path, which proposes a countywide, transit access network designed to reduce the distance and time it takes people to travel from their origins to stations and from stations to destinations, while simultaneously improving the user experience.
 - The Path identifies five categories of transportation improvements that extend to and from Metro rail and bus rapid transit stations (see adjacent box).
 - The Path is proposed along specific access routes selected to shorten trip length and seamlessly connect transit riders with intermodal facilities. Intermodal facilities may include bus stops, bike hubs, bike share and car share programs, parking lots, or regional bikeways, depending on the location and context of the station.

Five categories of specific path improvements:

1. *Crossing enhancements and connections*
2. *Signage and wayfinding*
3. *Safety and comfort*
4. *Allocation of street space*
5. *Plug-in components*

III. Innovative approaches to improve access to transit capacity

This section discusses studies that explore innovative approaches to improve access to transit. These approaches consider opportunities to make drive access more efficient and to draw more riders by bike and on foot.

1) Increasing the efficiency of drive access

Many regions, including King County are faced with overcrowded park-and-ride lots. Each park-and-ride space in these lots is expensive to build and takes up potentially valuable space that could be used for a different purpose. Consequently, many agencies and organizations are trying to find ways to improve the efficiency of their park-and-ride lots. Many approaches to increasing parking efficiency involve parking management strategies and pricing.

Pricing – charging for parking in this case – can be designed to raise revenue and recuperate costs or to manage demand. Park-and-rides could require parking permits or provide pay-on-demand parking. These strategies would also help ensure that people using the parking are accessing the fixed-route transit system.

Differential pricing and other management strategies can also help promote multi-occupant vehicle access. For example, parking fees could be imposed for single-occupant vehicles, and lower or no fees could be charged for carpools. Other strategies include providing guaranteed or preferential parking spaces for carpools and vanpools. Practices that encourage carpools and vanpools result in access for more people in fewer vehicles.

Efforts in the Puget Sound Region

Sound Transit and WSDOT have each initiated studies, described below, that explore parking management and pricing strategies. The Sound Transit study includes transportation demand management strategies and the use of technology to monitor and communicate parking availability. King County Metro is working on a study to identify opportunities to make available underutilized parking in multifamily developments near transit.

a) Parking Management Pilot. *Sound Transit*

Sound Transit is conducting a pilot program to test several strategies for helping customers access public transit by managing parking more efficiently. The pilot program includes the following ideas:

1. Offer optional limited permit parking for frequent riders at selected locations
2. Provide real-time customer information about parking availability at selected locations
3. Collaborate with rideshare programs

Sound Transit completed a six-month permit parking pilot at the Mukilteo Sounder Station, Issaquah Transit Center, Sumner Sounder Station, and Tukwila International Boulevard Link Station in July 2014. The pilot provided hundreds of transit riders with assurance of parking during the busy morning rush while also providing Sound Transit with valuable data and customer input about pros and cons of a potential parking permit program.

The remaining two elements of the pilot are still underway. Through these elements, Sound Transit customers will be able to use web and mobile applications to check the availability of parking spaces at

park-and-rides in real-time. The applications will also suggest alternate parking locations if the preferred facility is full. By early 2015, this information will be available at the Puyallup Station, Federal Way Transit Center, South Everett Freeway Station, and Auburn Station.

A final report on all elements of the parking pilot is scheduled to be available in early 2015.

b) Maximize the Efficiency and Increase Person Occupancy at Overcrowded Park-and-Ride Lots.
WSDOT, Sound Transit, King County

WSDOT initiated this project, in collaboration with Metro and Sound Transit to obtain more detailed information on the use of 17 of the busiest park-and-ride facilities in the central Puget Sound region. These park-and-ride lots, like many lots across the region, are currently operating at or near capacity. This detailed usage information will inform potential parking management strategies to increase the number of people served by the limited parking spaces.

The project included the following data collection activities:

1. An on-site audit of the current use of 10 of the 17 facilities.
2. A user intercept survey administered both in-person at all 17 lots and electronically to registered vanpool users at these facilities and those who could not complete the survey on site.

The survey collected detailed information from individual park-and-ride users about their trip purpose, origin and destination, mode of entry and exit, reasons for using park-and-rides, and user reactions to potential strategies, including pricing, that could help increase efficiency at crowded lots.

The data collected suggests that the following strategies might be successful at improving person efficiency at overcrowded park-and-ride facilities:

1. Implement parking fees for single-occupant vehicles as a disincentive to their use
2. Dedicate a portion of parking spaces at each lot for multi-occupant vehicle use only
3. Revise local transit service near crowded park-and-rides to enable more people to use transit to get to them
4. Examine the use of parking at available lots near the park-and-ride facilities for overflow or single-occupant vehicle parking.

The 17 park-and-rides studied were Auburn Station, Eastgate Transit Center, Federal Way Transit Center, Issaquah Highlands Park-and-Ride, Issaquah Transit Center, Kenmore Park-and-Ride, Lynnwood Transit Center, Mercer Island Transit Center, Overlake Transit Center, Puyallup Station, South Everett Freeway Station, South Kirkland Park-and-Ride, Sumner Station, Tacoma Dome Station, Tukwila International Boulevard Station, Tukwila Park-and-Ride and Tukwila Station.

c) Park-and-Ride Pricing in Multifamily Developments. *King County Metro*

Metro is undertaking an effort to identify strategies to make available and price underutilized parking in multifamily developments near high-capacity transit corridors. Metro has conducted extensive research on the occupancy rates of multifamily parking through its Right Size Parking Project (www.kingcounty.gov/rightsizeparking) and has determined that significant spaces are available. These could be used by potential transit customers who are willing to drive from their homes to locations which have better transit service levels in lieu of driving all the way to work.

The purpose of this project is to determine how to make it easier for transit customers to get access to these parking spaces. In phase one of the project, Proof of Concept, multiple subjects will be explored, including market assessment, transit capacity, technology applications, financial pro formas, parking management strategies, policy and legal issues, and relevance to other regional efforts, like construction mitigation. Business model alternatives will be developed with input from stakeholders. If a viable business model is identified, a pilot project will be designed and implemented in phase two of the project. Phase one will kick off in December 2014 and phase two is planned for 2016.

2) Improving nonmotorized connections

Nonmotorized modes are important ways to reach transit—many riders prefer to access transit by walking or biking if they can. In many areas, however, transit access is limited by poor or nonexistent, support for nonmotorized connections to bus and train stops. Many cities have walk and bike plans that outline blueprints for nonmotorized travel, but often they have broad goals and access to transit may not be a high priority. Other cities lack plans for supporting nonmotorized travel altogether. This section describes some specific studies and strategies to identify opportunities for improving pedestrian and bike access to transit.

a) **Nonmotorized Connectivity Study (2014).** *Metro and Sound Transit*

<http://metro.kingcounty.gov/programs-projects/nmcs/>

Through a partnership between King County Metro and Sound Transit, this project presents new methods to help planners analyze bicycle and walking access to transit services. This study provides an innovative analysis approach and set of tools to evaluate the benefits of nonmotorized access improvements to transit.

Metro and Sound Transit sought to figure out how transit agencies can maximize the efficiency of their investments by increasing access to routes and transit centers through Nonmotorized connectivity improvements. To answer this question, a GIS analysis was applied to more than 500 transit stops across a 400 square mile study area. The project team collected the planned bicycle and pedestrian improvements from more than 20 jurisdictions in Snohomish, King and Pierce counties. The GIS tools forecast how many new riders might be expected at the transit stops if the jurisdictions' nonmotorized improvements were made. Areas were then identified that could expect to see the greatest gains in ridership from nonmotorized improvements based on their existing transit service and land use characteristics.

b) **Safe Access to Transit for Pedestrians and Bicyclists (2012).** *The Boston Metropolitan Planning*

Organization. http://www.ctps.org/Drupal/safe_access_transit

The Boston Metropolitan Planning Organization (MPO) conducted a study to identify low-cost, quick-implementation measures that could improve pedestrian and bicyclist access to the Metropolitan Boston Transportation Authority (MBTA) system. The study focused on four stations, but some common themes emerged. The recommended improvements included:

- Improved pedestrian signal timing, more visible crosswalks, improved lighting (for bikes as well), upgraded signals with countdowns, improved signage and wayfinding and installation of ADA-compliant detectable warning pads on all pedestrian curb-cut ramps.

- For bikes, improvements included better bike signage (i.e. Share the Road signs), pothole repair to ensure that the biking environment was safe, encouragement of businesses to install more bike racks and encouragement of adequate space for bikes in future road right-of-way planning.

c) Bike-and-Ride: Build It and They Will Come (2012). *Cervero et al, working paper. Berkeley area.*
<http://its.berkeley.edu/publications/UCB/2012/VWP/UCB-ITS-VWP-2012-5.pdf>.

This study analyzed how the improvements to the bicycle environment between 1998 and 2008 influenced access-to-transit mode split to multiple BART stations. Several stations in the study experienced significant increases in bicycle mode share access to transit, which were attributed to infrastructure investments. For instance, Ashby Station in Berkeley increased its bicycle mode share from 7.4 percent in 1998 to 11.7 percent in 2008, and significantly expanded its bike access shed through multiple improvements such as:

- Doubling the amount of bike infrastructure surrounding the station
- Including the opening of the bike boulevard network in Berkeley
- Adding ramps to facilitate bike access to the station
- Including bike-rack parking spaces, secure/enclosed lockers, and a self-serve bike station
- Added parking fees for cars (\$1/day in 2008, whereas previously there was no charge)

In addition, the Fruitvale station increased its bike mode share from 4.3 percent to 9.9 percent from 1998-2008, and also increased the bike shed traveled by commuters to/from the station. Built environment changes included:

- Increase in the mileage of bike paths, lanes, and routes surrounding the station
- Wayfinding guiding cyclists to the station entrance
- Provision of attended bike station, secure parking, repair services, and short-term rentals as well as bike racks and lockers.
- Added parking fees for cars

IV. Next Steps

This report is the first phase of an access to transit study. It sets the stage for continued consideration of transit access in King County. It provides an overview of different modes used to access transit and the infrastructure that supports those modes, a review of what some agencies are doing to guide and improve transit access planning, and a look at what approaches agencies are considering or have implemented to improve access to transit.

Motion 14089 provided for adjustments in the delivery of the study in the event that staff were required to support development of major service reductions. Metro did focus significant resources in planning and developing service reductions during this time period. As such, some elements of the study originally envisioned for inclusion in this report will be addressed in the later phases of the Access to Transit Study as part of Metro's long-range plan development which will be launched in 2015.

Phase 2 of the study will include further consideration of the definition of access, review of access to transit habits in King County, review of regional and local plans that address transit access, continued tracking of ongoing local studies on transit access infrastructure, and continued consideration of how best practices and innovative approaches could be applied in King County. As part of Phase 2, Metro will also explore with its partner agencies the issues of access needs reporting and funding, regional coordination and policies. The PSRC will be critical to this part of the study.

Metro is working with other agencies on this topic through the PSRC regional transit access working group. Metro is also looking forward to the Service Guidelines Task Force and long-range plan outreach as opportunities to engage agencies and riders about access to transit issues. Input from the King County Council will also be essential as Metro moves forward with the development of the long-range plan and the regional conversation about access to transit.

References

1. American Public Transportation Association (2012), 2012 Public Transportation Fact Book. Appendix A: Historical Tables, Washington, DC.
2. Beroldo, S. (1990), Casual car-pooling in the San Francisco Bay Area. *Transportation Quarterly*, Vol. 44, No. 1, pp. 133-150.
3. The Boston Region Metropolitan Organization (2012), Safe Access to Transit for Pedestrians and Bicyclists, *Boston* http://www.ctps.org/Drupal/improving_bp_access
4. Bowler, C.E., Noel, E.C., Peterson, R., and Christiansen, D. (1986), Park and ride facilities: Guidelines for planning, design and operation. Report for the Federal Highway Administration, Project No. DTFH61-84-C-00070.
5. Bullard, D.L., and Christiansen, D.L. (1983), Guidelines for planning, designing and operating park and ride lots in Texas. Research Study No. 2-10-74-205, Texas Transportation Institute.
6. Cervero et al, (2012), Bike-and-Ride: Build It and They Will Come, working paper <http://its.berkeley.edu/publications/UCB/2012/VWP/UCB-ITS-VWP-2012-5.pdf>.
7. Fehr and Peers, (2014), Non-Motorized Connectivity Study. Prepared for King County Metro and Sound Transit. <http://metro.kingcounty.gov/programs-projects/nmcs/pdf/nmcs-report-091214.pdf>
8. Flamm, Bradley, Ph.D. And Rivasplata, Charles, Ph.D. (2014), Perceptions of Bicycle-Friendly Policy Impacts on Accessibility to Transit Services: The First and Last Mile Bridge. Mineta Transportation Institute. Report No. CA-MTI-14-1104.
9. Gayah Vikash V., Stieffenhofer, Krae, and Shankar Venky (2014), How can we maximize efficiency and increase person occupancy at overcrowded park and rides. The National Technical Information Service, Springfield, VA 22161. <http://www.wsdot.wa.gov/research/reports/fullreports/830.1.pdf>
10. Hendricks, S., and Outwater, M. (1998), Demand forecasting model for park and ride lots in King County, Washington. *Transportation Research Record*, No.1623, pp. 80-87.
11. Khandker, N.H., Mahmoud, M.S., and Coleman, J. (2013), The effect of parking charges at transit stations on 'park and ride' mode choice: Lessons learned from a stated preference survey in Greater Vancouver. *Transportation Research Record*, No. 2351, pp.163-170.
12. King County Metro Transit (2014), *Park-and-Ride Utilization Report*, First Quarter 2014. King County Department of Transportation.
13. Kittelson & Associates, Inc; KFH Group, Inc.; Parsons Brinckerhoff Quade & Douglass, Inc.; Hunter-Zaworski, Dr. K.; *Transit Capacity and Quality of Service Manual, 2nd Edition* (2003). TCRP Report 100. Transportation Research Board.
14. KJS Associates. (2001) MAG Park-and-Ride Site Selection Study. Maricopa Association of Governments, Phoenix, Ariz.
15. Kuzmyak, J. Richard (2014), National Cooperative Highway Research Program, NCHRP, *Report 770: Estimating Bicycling and Walking for Planning and Project Development: A Guidebook*.
16. Meek, S., Ison, S., and Enoch, M. (2010), UK local authority attitudes to park and ride. *Journal of Transport Geography*, Vol. 18, pp. 372-381.
17. National Association of Regional Councils (1998), Potential of public transit as a transportation control measure: Case studies and innovations. Federal Transit Administration Report No. FTA-TPL20-98-1.
18. Noel, E. (1988), Park and ride: Alive, well and expanding in the United States. *Journal of Urban Planning and Development*, Vol. 114, No. 1, pp. 2-13.
19. Puget Sound Regional Council (2013). Transit Supportive Toolkit: Guidance and Resources for Plan and Policy Development. <http://www.psrc.org/transportation/transit/toolkit/>

20. Ryan, Sherry and Frank, Lawrence (2009), Pedestrian Environments and Transit Ridership, *Journal of Public Transportation Vol. 12 No 1*.
21. Schlossberg Marc et.al. (2007), How Far, By Which Route, and Why? A Spatial Analysis of Pedestrian Preference, Mineta Transportation Institute.
22. Shirgaokar, M., and Deakin, E. (2005), *Study of park and ride facilities and their use in the San Francisco Bay*. Transportation Research Record, No. 1927, pp. 46-54.
23. Sound Transit. (2014), System Access Issue Paper (Draft). Regional Transit Long-Range Plan Update.http://www.soundtransit.org/Documents/pdf/projects/LRPupdate/201410_SystemAccessIssuePaper.pdf
24. Su, Q., and Zhou, L. (2012), Parking management, financial subsidies to alternatives to drive alone and commute mode choices in Seattle. *Regional Science and Economics*, Vol. 42, pp. 88-97.
25. Turnbull, K. (1995), *Effective use of park and ride facilities*. NCHRP Synthesis of Highway Practice Report No. 213.

Endnotes

¹ Kittelson & Associates, Inc; KFH Group, Inc.; Parsons Brinckerhoff Quade & Douglass, Inc.; Hunter-Zaworski, Dr. K.; *Transit Capacity and Quality of Service Manual, 2nd Edition* (2003). TCRP Report 100. Transportation Research Board.

² How Far, By Which Route, and Why? A Spatial Analysis of Pedestrian Preference, Marc Schlossberg et. al., Mineta Transportation Institute, 2007

³ Pedestrian Environments and Transit Ridership, Sherry Ryan and Lawrence Frank, *Journal of Public Transportation Vol 12 No 1, 2009*

⁴ Coffel, K., J. Parks, C. Semler, P. Ryus, D. Sampson, C. Kachadoorian, H.S. Levinson, and J.L. Schafer. *TCRP Report 153: Guidelines for Providing Access to Public Transportation Stations*,

⁵ TCRP Report 165, Transit Capacity and Service Quality Manual, 3rd Edition, 2014. Chapter 5

⁶ Flamm, Bradley, Ph.D. And Rivasplata, Charles, Ph.D. (2014), Perceptions of Bicycle-Friendly Policy Impacts on Accessibility to Transit Services: The First and Last Mile Bridge. Mineta Transportation Institute. Report No. CA-MTI-14-1104.

⁷ Kuzmyk, J Richard et al; (2014) NATIONAL COOPERATIVE HIGHWAY RESEARCH PROGRAM (NCHRP REPORT 770) Estimating Bicycling and Walking for Planning and Project Development: A Guidebook. Transportation Research Board.

⁸ Schneider, R. and Toole Design Group. *TCRP Synthesis 62: Integration of Bicycle and Transit-A Synthesis of Transit Practice*. Transportation Research Board, National Research Council, Washington, D.C., 2005.
http://jonlinepubs.trb.org/jonlinepubs/jtrcrpjtrcrp_syn_62.pdf

⁹ Coffel, K., J. Parks, C. Semler, P. Ryus, D. Sampson, C. Kachadoorian, H.S. Levinson, and J.L. Schafer. *TCRP Report 153: Guidelines for Providing Access to Public Transportation Stations*. Transportation Research Board of the National Academies, Washington, D.C., 2012.

¹⁰ Puget Sound Regional Council. *Transit Supportive Toolkit (2013)*
<http://www.psrc.org/assets/10666/TransitPlanningToolkit.pdf>.