# How Can We Maximize Efficiency and Increase Person Occupancy at Overcrowded Park and Rides?


**Morgan State University**
**The Pennsylvania State University**
**University of Maryland**
**University of Virginia**
**Virginia Polytechnic Institute & State University**
**West Virginia University**

**The Pennsylvania State University**
**The Thomas D. Larson Pennsylvania Transportation Institute**
**Transportation Research Building ❖ University Park, PA 16802-4710**
**Phone: 814-865-1891 ❖ Fax: 814-863-3707**
**www.mautc.psu.edu**

**FINAL RESEARCH REPORT**

# HOW CAN WE MAXIMIZE EFFICIENCY AND INCREASE PERSON OCCUPANCY AT OVERCROWDED PARK AND RIDES?

**Prepared for**
**Washington State Department of Transportation**

Washington State Department of Transportation Technical Monitor
Michael Flood
Public Transportation Division

**Prepared by**

Vikash V. Gayah
Assistant Professor
Department of Civil and Environmental Engineering
Pennsylvania State University
University Park, PA 16802
gayah@engr.psu.edu

Krae Stieffenhofer
MS Student
Department of Civil and Environmental Engineering
Pennsylvania State University
University Park, PA 16802
kes5329@psu.edu

Venky Shankar
Professor
Department of Civil and Environmental Engineering
Pennsylvania State University
University Park, PA 16802
shankarv@engr.psu.edu

**The Thomas D. Larson**
**Pennsylvania Transportation Institute**
201 Transportation Research Building
University Park, PA 16802

**June 16, 2014**

DISCLAIMER

The contents of this report reflect the views of the authors, who are responsible for the facts and the accuracy of the information presented herein. This document is disseminated under the sponsorship of the U.S. Department of Transportation's University Transportation Centers Program, in the interest of information exchange. The U.S. Government assumes no liability for the contents or use thereof.

| 1. REPORT NO. | 2. GOVERNMENT ACCESSION NO. | 3. RECIPIENT'S CATALOG NO. |
|---|---|---|
| PSU-2013-04 | | |

| 4. TITLE AND SUBTITLE | 5. REPORT DATE |
|---|---|
| How can we maximize efficiency and increase person occupancy at overcrowded park and rides? | June 16, 2014 |
| | 6. PERFORMING ORGANIZATION CODE |

| 7. AUTHOR(S) | 8. PERFORMING ORGANIZATION REPORT NO. |
|---|---|
| Vikash V. Gayah, Krae Stieffenhofer, Venky Shankar | LTI 2014-15 |

| 9. PERFORMING ORGANIZATION NAME AND ADDRESS | 10. WORK UNIT NO. |
|---|---|
| The Thomas D. Larson Pennsylvania Transportation Institute<br>The Pennsylvania State University<br>201 Transportation Research Building<br>University Park, PA 16802 | 11. CONTRACT OR GRANT NO.<br>GCB 1382 & DTRT12-G-UTC03 |

| 12. SPONSORING AGENCY NAME AND ADDRESS | 13. TYPE OF REPORT AND PERIOD COVERED |
|---|---|
| Research Office<br>Washington State Department of Transportation<br>PO Box 47372, Olympia, WA 98504-7372<br><br>US Department of Transportation<br>Research & Innovative Technology Administration<br>UTC Program, RDT-30, 1200 New Jersey Ave., SE<br>Washington, DC 20590 | Final Report<br>10/7/2013 – 6/30/2014 |
| | 14. SPONSORING AGENCY CODE |

15. SUPPLEMENTARY NOTES

COTR: Michael Flood, FloodM@wsdot.wa.gov, 206-464-1291

16. ABSTRACT

This study was conducted in cooperation with the U.S. Department of Transportation and Federal Highway Administration. The purpose of this project was to provide the Washington State Department of Transportation (WSDOT), King County Metro Transit, and Sound Transit with 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 a large fraction of lots across the region, are currently operating at or near capacity. The agencies would like to obtain detailed information on their use to inform potential parking management strategies in the future. In particular, the long-term objective is to eventually implement strategies to increase the number of people served by the limited parking spaces. Two empirical data collection efforts were performed. The first was an on-site audit of the existing use of 10 of the 17 facilities. The second data collection effort was a user intercept survey administered both in-person at all 17 lots and electronically to the set of registered vanpool users at these facilities and those who could not complete the survey on site. The survey collected more detailed information from individual park and ride users, including trip purpose, origin-destination information, mode of entry and exit, reasons for using park and rides, and user reactions to potential strategies that WSDOT and the other agencies are considering to help increase person efficiency of these lots. The report details a few major findings from this work. The data suggest 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 to disincentivize their use; (2) dedicate a portion of parking spaces at each lot for multi-occupant vehicle use only; (3) revise local transit service near these locations to increase the fraction of drivers that have feasible transit options to the park and rides; and (4) examine the use of parking at available lots near the park and ride facilities for overflow or single-occupant vehicle parking.

| 17. KEY WORDS | 18. DISTRIBUTION STATEMENT |
|---|---|
| Park and ride, parking plan, carpool, vanpool, origin-destination, transit, multi-occupant vehicle | No restrictions. This document is available from the National Technical Information Service, Springfield, VA 22161 |

| 19. SECURITY CLASSIF. (of this report) | 20. SECURITY CLASSIF. (of this page) | 21. NO. OF PAGES | 22. PRICE |
|---|---|---|---|
| None | None | 132 | NA |

## TABLE OF CONTENTS

## LIST OF FIGURES

## LIST OF TABLES

## EXECUTIVE SUMMARY

The purpose of this project is to provide the Washington State Department of Transportation (WSDOT), King County Metro Transit, and Sound Transit with 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 a large fraction of lots across the region, are currently operating at or near capacity. The agencies would like to obtain detailed information on their use to inform potential parking management strategies in the future. In particular, the agencies' long-term objective is to eventually implement strategies to increase the number of people served by the limited parking spaces.

Two empirical data collection efforts were performed. The first was an on-site audit of the existing use of 10 of the 17 facilities. During this audit, field data collectors visited each location to measure vehicle (and person) entries and exits to these facilities. These data were then used to estimate the percentage of parking spaces occupied by time of day, the average person occupancy of parking vehicles, and the fraction of people parking at the lot for non-transit-related reasons. Overall, average person occupancy of parking vehicles tended to be very low—the values ranged between 1.02 and 1.10 persons per vehicle on average across the 10 lots audited. This suggests that the majority of people drive alone to the park and rides. Very little non-transit use was observed from those using the park and ride lots, except at Eastgate Park and Ride, where many people were observed parking at the lot and walking to the nearby Bellevue College.

The second data collection effort was a user intercept survey administered both in-person at all 17 lots and electronically to the set of registered vanpool users at these facilities and those who could not complete the survey on site. The survey collected more detailed information from individual park and ride users, including: trip purpose, origin-destination information, mode of entry and exit, and reasons for using park and rides. Additionally, the survey collected user reactions to potential strategies that WSDOT and the other agencies are considering to help increase person efficiency of these lots. These strategies include: pricing single-occupant vehicles (while having no pricing for carpools), guaranteed parking spaces for carpools, and improvement of non-motorized facilities like bicycling and walking.

Overall, the survey found the following conclusions:

- The vast majority of parking vehicles contain just a single occupant. While not unexpected, this provides justification for the implementation of strategies to improve person occupancy at these lots.
- People who park tend to primarily use these lots as a means to access transit services and not for other, non-transit uses. This includes both fixed-route (e.g., bus and train) and flexible transit (e.g., car and vanpools); however, fixed-route transit is about 25 times more common than flexible transit uses.
- Survey participants indicated that the primary reasons for using park and rides were to save money and to relax during the commute. Relatively few respondents indicated that environmental issues or parking availability at the destination were reasons they used park and rides.

- Responses indicate that improving bicycle and pedestrian access/facilities would not significant entice a significant number of users to change to these modes.
- Park and ride users seem averse to parking fees. Only about one-quarter of respondents are willing to pay a fee to park at the park and rides. However, this fraction jumps to about one-half if guaranteed spaces could be provided. The same fraction is willing to pay for a guaranteed space a 10-15 minute walk away as would be willing to pay for a general parking fee (non-guaranteed space) at the main park and ride.
- Users are willing to pay more for guaranteed parking spots located at the park and ride than for non-guaranteed spaces. They are also willing to pay the same amount for a non-guaranteed space at the park and ride as for a guaranteed space located a 10-15 minute walk away.
- About a quarter of users are willing to consider carpooling to the lots either to avoid a parking fee or to obtain a reserved parking space. And about 40% are willing to park at a satellite location a 10-15 minute walk away to obtain a guaranteed parking space.

The user intercept survey data were also used to determine the trip origins for all survey respondents who drove to the park and ride in a single occupant vehicle. Mapping these origins along with the existing transit routes allowed the authors to determine the fraction of drivers for which the existing transit service is a feasible alternative to access the park and ride. This fraction differed significantly across the set of 17 lots: 6 had fractions in excess of 30%, while 3 had fractions lower than 10%. These maps can be used by the

agencies when reviewing transit service to identify possible service changes that provide better access for existing users to the park and ride facilities.

Overall, the data suggest 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 to disincentivize their use.
2. Dedicate a portion of parking spaces at each lot for multi-occupant vehicle use only.
3. Implement parking permits that allow park and ride users (especially those in multi-occupant vehicles) to reserve parking spaces within the lots.
4. Revise local transit service near these locations to increase the fraction of drivers that have feasible transit options to the park and rides.
5. Consider using available parking lots near the park and ride facilities for overflow or single-occupant vehicle parking.

Although further work needs to be done to calibrate these strategies for implementation, the data collected here can provide an initial starting point that can be implemented and refined as users adapt to the new measures.

# INTRODUCTION

Many of the largest park and ride facilities in the Central Puget Sound Region currently operate at or near capacity. According to the latest King County Metro Transit Quarterly Park-and-Ride Utilization Report, approximately 19,700 of the 25,367 available parking spaces (78%) in the 130 park and ride facilities within the King County Metro Transit service area are used on a daily basis (King County Metro Transit, 2014). In Snohomish County, data provided by the Washington State Department of Transportation indicate that 5,314 of the available 6,075 parking spaces (87%) at park and rides were full in December 2013. In Pierce County, approximately 4,892 of the 6,387 spaces (or about 77%) at park and rides were full in December 2013. While these numbers represent all park and ride lots in their respective regions (including those that might not have fixed-route transit service), the magnitude of the problem is expected to be similar (if not greater) when considering only those lots with fixed-route transit service.

Historical data show that the demand for these facilities is steadily increasing and this trend is likely to continue in the future. Increasing the number of parking spaces by building additional park and ride lots is expensive and can be unpopular in some neighborhoods. The agencies that own and operate these lots would like to, instead, implement strategies to improve the efficiency of these lots, where efficiency is defined as the number of people served per parking space. There are many strategies that could be used to achieve this goal, but the primary mechanisms considered include using: pricing to discourage users from taking single-occupant vehicles to these lots, pricing to discourage parking at these lots for non-transit activities, and prioritization strategies to

encourage the use of multi-occupant vehicles (e.g., carpools) as well as local transit options and non-motorized modes (e.g., walking, bicycling) to access the public transportation modes available at these locations.

While the agencies have rough data on how many spaces are filled at each of these locations, they currently do not have detailed information on how these lots are actually being used. This information is essential to help inform the various efficiency improvement strategies that may be considered. Specifically, little or no information exists on:

- The distribution of modes used to enter (e.g., single-occupant or multi-occupant vehicles) and exit (e.g., fixed-route transit options like bus or train, flexible transit options like carpools or vanpools, or alternative modes like walking or bicycling) the park and ride facilities;
- Average person occupancy of vehicles that occupy a parking space;
- Trip purposes;
- Trip origins and final destinations; and
- The reasons people use these facilities.

In light of this, the purpose of this project was to collect empirical data to provide these agencies with a more comprehensive understanding of how some of the busiest park and ride facilities in the Puget Sound region are currently being used. In addition, the study collected users' reactions to various strategies that might be implemented to improve the efficiency of these critical facilities. Together, this information can be used to inform the

creation of parking management policies for park and ride facilities in the Central Puget Sound Region.

# BACKGROUND

## SUMMARY

The literature on park and ride facility utilization is rather sparse; however, the few studies that have been performed identify the need to improve parking availability issues at these locations. Related literature suggests that the most effective strategy might be through differential pricing: either to implement parking fees for single-occupant vehicles, or implement fees for all vehicles but charge multi-occupant vehicles less. Another pricing strategy that might be worth considering is some sort of subsidy to those who carpool to access park and ride facilities. An example could be a subsidy for their (existing) transit fare that could be added to any current subsidy that the commuter already receives (e.g., current employer subsidies). Another strategy is to prioritize multi-occupant vehicles to promote their use. An example could be to reserve some of the most desired spaces (i.e., those closest to the transit platforms) for carpools. While difficult to enforce, this strategy would signal to all park and ride users that this type of travel behavior is desired and will be rewarded. If enough spaces are reserved such that a few carpool spaces are always free when the rest of the lot is full, single-occupant vehicles that are not able to park might be more inclined to change modes.

## BACKGROUND

Park and ride facilities have a long history in the United States. Ad-hoc park and ride facilities first appeared along bus and rail routes during the 1930s (Noel, 1988). Since then, the popularity of these types of facilities has increased significantly, especially in

large metropolitan regions with dense urban cores. By the late 1960s, many public and private agencies had well-established and institutionalized parking facilities in remote areas outside the urban center near transit facilities (Bullard and Christiansen, 1983). Over time, these facilities were specifically designed and operated with the objective of encouraging the use of public transit. An early history of park and rides in the United States, along with legislative action on the state and federal level to promote their use, is provided by Noel (1988).

The driving principle behind park and ride facilities is simple: provide a location for people traveling in lower-occupancy vehicles to gather and aggregate into higher-occupancy vehicles, which will in turn help to promote the use of these higher-occupancy vehicles (Turnbull, 1995). Since these facilities are typically located near major rail or bus transit locations, park and ride facilities are often seen as a means to improve public transit ridership by increasing passenger access to transit. The presence of a park and ride increases the catchment area of a transit stop by allowing potential passengers to drive to the stop, as opposed to having to only walk, bicycle, or get dropped off. However, earlier park and ride facilities rarely discriminated between people using the facility to access bus and rail service (i.e., fixed-route transit modes) and people using the facility to form carpools or vanpools (i.e., flexible transit modes). Dedicated facilities without access to fixed-route transit options, called park-and-pools, were sometimes used to directly promote carpooling. However, carpools were also often allowed at park and ride facilities with transit connections, especially when these facilities were underutilized (i.e., had unused parking spaces). The logic behind this was that allowing carpools at underutilized

facilities still encouraged the use of higher occupancy vehicles while simultaneously making use of existing unused parking spaces. Carpool and vanpool users also like to use park and rides with good transit service as a meeting location, as it provides a backup in the event that they cannot make it on time or if they are left behind. For these reasons, the practice of allowing carpool formations at park and ride facilities is still sanctioned at some facilities. However, even when not officially sanctioned, the use of park and rides for carpool formation is often not enforced, so the practice continues informally. If the park and ride location is near capacity, this can prevent potential transit users from using the park and rides to access transit.

## Advantages and Disadvantages of Park and Ride Facilities

Park and rides provide a number of advantages to society (Bowler et al., 1986; Noel, 1988). First and foremost, they provide potential riders with easier access to fixed-route transit service. This promotes the use of high-occupancy vehicles for the line-haul portion of trips, which is often associated with significant reductions in total vehicle miles traveled (and harmful vehicle emissions) on a network. Park and rides also provide mobility and enable travel to a segment of the population who would not have been able to access transit facilities otherwise (e.g., because the stations were spaced too far apart to walk or bike). Furthermore, current transit users tend to find using park and rides extremely convenient because their use can often help eliminate the need for transfers between transit lines, which is especially inconvenient for bus transit. Individual commuters can also experience significant benefits in trip costs due to reduced fuel

consumption of personal vehicles combined with the traditional underpricing of transit trips. Fewer vehicle miles traveled in personal vehicles also means that these vehicles depreciate at a reduced rate and experience lower maintenance costs, which is a benefit to the vehicle owners. Park and rides can also improve travel comfort: by using a transit vehicle for the line-haul portion of the trip, travelers are able to eliminate the stress of driving and can often focus on other activities such as work or leisure. This is especially true with the proliferation of mobile computing that has occurred over the past two decades. The presence of park and rides has also been shown to have benefits to non-users, like reduced fuel consumption and improved air quality, both of which are typically associated with increased public transit use (National Association of Regional Councils, 1998). Park and rides also have the added benefit of reducing parking demands in crowded city centers.

Park and rides also have some clear disadvantages to society as well (Bowler et al., 1986; Turnbull, 1995). These facilities can transfer traffic congestion from one area to another. In some cases, this could be disadvantageous if the area where the new traffic is generated does not have the appropriate roadway facilities. The use of park and ride facilities also depends largely on the willingness of travelers to use transit or high-occupancy vehicles. This is often taken for granted, but the share of transit trips across the United States has been historically low (American Public Transportation Association, 2012) and in some areas park and rides are underutilized.

Certain societal advantages of park and rides, like reduced emissions and vehicle miles traveled, might also not be realized in some uncommon cases. Research has found that, at least in a small number of cases, park and rides can actually increase the number of vehicle miles traveled (Meek et al., 2008; Meek et al., 2010). This can occur due to induced demand (Cervero, 2002) where a trip moved to transit through the creation of a park and ride is replaced by another vehicle that would not have traveled otherwise. It can also occur when park and rides attract only those people who would have used transit anyway—in this case, the access trip by walk or bike might be shifted to a personal vehicle. Park and rides might also contribute to sprawling land use patterns in underdeveloped areas. However, park and rides are generally found to be associated with a reduction in vehicle miles traveled and vehicle emissions.

Park and rides also have advantages and disadvantages for transit agencies. These facilities help to aggregate transit demands to a few discrete locations where the demands can be more easily served. This allows transit agencies to provide more frequent service, as these few locations could be served more often with the same resources (i.e., number of vehicles). Having fewer stations also results in faster transit vehicle commercial speeds, since the vehicles would have to stop less often. The disadvantage of aggregating demand in this way is that it could create unbalanced demand patterns along a route that serves both park and rides and regular stops. These unbalanced demands are hard to plan for and could result in having to start transit service earlier in these routes than would have occurred otherwise.

## STUDIES ON PARK-AND-RIDE EFFICIENCY

Very few studies have been performed to assess the use of park and ride facilities with respect to overutilization and parking efficiency. The few studies that did relied on user intercept surveys to obtain insights on or develop models of user behavior. One of the earliest studies performed a stated-preference survey of park and ride users and non-users in King County, Washington (Hendricks and Outwater, 1998). At the time of data collection, many of the lots were already crowded: 12 of the 115 lots operated at 95% utilization or higher, and the average utilization rate at all 115 lots was an already high 71% (compared to the 78% now). Thus, it was not surprising that 36% of the survey respondents indicated that they would be more likely to use the park and ride facility if parking capacity at overcrowded lots were improved. The same study also obtained "willingness-to-pay" information for improved parking capacity and security at the lots. Approximately 35% of survey respondents said they would pay $2/day for these improvements. The fraction of those willing to pay the parking fee dropped to 16% and 9%, respectively, when the proposed fee was increased to $3/day and $4/day. The survey also gathered information about the types of amenities that travelers would like to see added at park and rides. The most positive responses were for coffee shops, dry cleaning, and car services. However, it was found that the types of amenities did not significantly affect a user's choice of park and ride facility.

Using these data, Hendricks and Outwater (1998)also developed demand models for travel in the King County region to unveil insights into travel patterns and examine the

effects of parking capacity improvements and parking fee implementations on daily trip demand. These models indicated that the proportion of users accessing transit from the park and ride facilities would grow over time from 85% in 1995 to 93% in 2010. The remaining users would use the park and ride facilities to form car or vanpools. The models also revealed that park and ride parking capacity had a significant influence on their use: approximately 27,000 more daily trips would be made in future years if sufficient parking were provided at each of the lots (equivalent to an increase of 54% over the parking-constrained demand). Furthermore, pricing was found to significantly reduce park and ride demand: fees of $0.50/day and $1.00/day were associated with demand reductions of 24% and 44%, respectively, across all lots. However, information on what happened to these trips (e.g., if they were made by another mode or not made at all) was not provided.

Another relevant study surveyed park and ride users in the San Francisco Bay Area about their attitudes and travel behavior (Shirgaokar and Deakin, 2005). Similar to King County, many of these lots were at or approaching their capacity—about 19 out of 49 lots were at a utilization of 80% or higher. Thus, unsurprisingly, about 40% of the respondents reported that they were unsatisfied with current parking availability. The survey also verified that almost all of the park and ride users were commuting from home to work (over 98%) and that 70% of the park and ride users lived within a 10-minute drive from the lot, both of which should be expected. Furthermore, information on vehicle occupancy was collected: 93-100% of those parked at any given lot arrived in a single-occupant vehicle (depending on the location), with the rest arriving in a multi-

occupant vehicle. This suggests that most users parking at park and rides do not carpool to these locations. The survey was administered by placing it on the windshields of parked cars during the day, so other access modes to the lot (e.g., kiss-and-rides, pedestrians, or bicyclists) were not considered. However, none of these modes occupy a parking space, so this provides a good idea of the parking space efficiency. Transit use at these lots varied significantly depending on location: at some lots about 97% of those parked continued to use transit for the remainder of their trip, while at others this number was just 28%. Those not using transit primarily used the lot as a means to form pre-arranged or informal carpools. Note, however, that the San Francisco Bay Area has several key bottlenecks and bridge tools that can be avoided by high-occupancy vehicles, and casual carpool formation is not an uncommon occurrence (Baroldo, 1990).

The last related study considered parking at the busiest park and ride facilities in Vancouver (Khandker et al., 2013). In this study, a stated-preference survey was performed in which park and ride users were presented with a variety of fictitious scenarios and asked to select between three alternatives: drive-all-the-way, transit-all-the-way, or park and ride. Demand models using these data suggested that parking fees were likely to reduce park and ride demands, but would be more likely to cause park and ride users to change to taking transit for the entire trip as opposed to driving for their entire trip. This suggests that parking fees might not always cause park and ride users to completely flee transit in favor of car travel, which is very promising for transit use. However, it is important to note that the size and density of Vancouver might make transit-only trips into the downtown more feasible than the much larger Central Puget

Sound Region. Additionally, the modeling results found that having a guaranteed parking space was perceived positively and would increase demand for park and ride trips, even if the user was charged to use the space. This suggests that space reservations might be a viable strategy to reduce the negative effects of implementing a parking fee.

## STRATEGIES TO INDUCE MODE SHIFT

Overall, very few studies were performed that examined the characteristics of park and ride users and their relation to parking space utilization. However, the Shirgaokar and Deakin (2005) survey of the San Francisco Bay Area was able to determine that the vast majority of park and ride users that occupy a parking space arrive in a single-occupant vehicle. This is a trend that would not be surprising to see in other large urban metropolitan regions like the Puget Sound. At locations that are highly utilized or overcrowded, there is a need to increase the efficiency of these lots by promoting multi-occupant vehicles so that more people can be served with the same existing limited resources (i.e., parking spaces) available. The transportation literature contains a large body of work on strategies to improve the use of multi-occupant vehicle travel over single-occupant vehicle travel. Unfortunately, the traditional strategies to achieve this type of behavior might actually work against increasing the efficiency of park and ride locations. For example, many studies suggest that promoting the use of carpools or vanpools would be beneficial, as they would help to reduce the overall total vehicle miles traveled and decrease congestion. However, the primary difficulty with carpools and vanpools is to identify and match potential shared riders (i.e., those with the same basic

travel schedule and origin-destination pair) (Rudjanakanoknad, 2011). Schedule compatibility might be less of an issue for commute trips, since many people start and end work within the same general time period (note that this ignores issues with chained, non-work trips immediately before and after work that are a significant barrier to forming carpools). However, finding travelers with common origins and destinations is rather difficult in sprawling urban areas due to the large variety in land use patterns. Jobs and opportunities spread out over a larger geographic region make travel patterns chaotic. Park and ride (or park-and-pool) locations are typically promoted as a way to alleviate some of the geographic constraints of carpooling by providing travelers with a convenient place to meet before making the longer line-haul portion of a trip. Doing this makes it so that the potential carpoolers would not have to share the same exact trip origin and reduces the amount of time required for the carpool to form (i.e., instead of one person driving to pick up the rest of the carpool members, each carpool member could drive to a certain location, thus saving a significant amount of total time). Of course, in the majority of cases each of these potential carpoolers drives alone to the park and ride. Thus, carpooling and vanpooling increases the use of multi-occupant vehicles on the roadways for the longest portion of the trip, but if they are allowed to form at park and rides they would simultaneously increase the number of single-occupant vehicles parked there. So while allowing car and vanpools at a park and ride promotes high-occupancy vehicle use overall, at best it does nothing to improve the person-occupancy at the park and ride facility and at worst it exacerbates the problem.

The remaining strategies to improve multi-occupant vehicle use typically do one or both of the following: provide benefits for multi-occupant vehicle use or disbenefits for single-occupant vehicle use. Methods to achieve these goals often include differential pricing schemes or the provision of non-monetary benefits (priority) for multi-occupant vehicles. Travel time on each mode tends to be the primary determinant of mode choice for most commuters (Valdez and Arce, 1990; Washbrook et al., 2006). However, numerous studies have suggested that the best way to induce mode choice change is through pricing (e.g., Koppelman et al., 1993). Anderson (2005) showed that the cost savings from single-occupant travel helps to encourage the use of vanpooling, especially when gas prices increase. Ungemah et al. (2006) studied pricing schemes to promote vanpool ridership and found that simple flat rate schemes that highlight the cost savings of vanpooling can have significant success at increasing its use. A program used by King County Metro shows that differential pricing to encourage transit use can also take place through a transit agency-sponsored voucher program that subsidizes transit trips to further differentiate the costs of driving alone or using transit and vanpooling (Allen et al., 1999). Concas et al. (2005) show that a 10% decrease in vanpool pricing can result in as much as a 7.3% increase in demand for shorter trips (those less than 30 miles). However, as trip length increases past 60 miles, demand becomes less sensitive to pricing. Subsidies are often common as they are easier to implement than pricing and provide tangible benefits to travelers. Other studies using traveler demand models have found similar results: the mere introduction of a parking fee could reduce the fraction of single-occupant vehicles parking significantly (Hess, 2001; Su and Zhou, 2012). In general, these studies also find that parking charges to single-occupant vehicles are less

effective in inducing carpool behavior than parking subsidies to multi-occupant vehicles; however, the latter is more expensive to implement than the former.

Priority strategies are also often used with much success. The most common example in many large metropolitan regions is the installation of carpool lanes to allow multi-occupant vehicles to bypass queues on congested freeways (Texas Transportation Institute, 1998). The prevailing thought is that such differentiation between vehicles would impose severe negative penalties to the single-occupant vehicles through increased differences in travel times between the two modes (e.g., Dahlgren, 1998; Chen et al., 2005). However, recent research has shown that segregating multi- and single-occupant vehicles in this way can actually provide benefits to both groups (Cassidy et al., 2009; Cassidy et al., 2010). Dynamic priority strategies that are only active when multi-occupant vehicles (like buses) are present have also been shown to provide a good compromise between multi-occupant vehicle benefits and single-occupant vehicle disbenefits (Viegas and Lu, 2001; Viegas et al., 2007; Guler and Cassidy, 2012).

## MODE SHIFT STRATEGIES AT PARK-AND-RIDE FACILITIES

In general, various types of strategies can be implemented at park and ride facilities to attempt to improve person-occupancy, but they are not without their individual challenges. In most parking garages, parking fee collection is automated with little to no interaction with parking agents. However, if a differential pricing scheme is implemented for single and multi-occupant vehicles, parking agents would be required to check the

number of people in each vehicle that enters the facility. Employing parking agents to perform this task might be costly and require the installation of basic facilities for their comfort like restrooms and heated shelter; however, these costs could be at least partially offset by the revenue generated by the parking fee. Priority parking spaces for multi-occupant vehicles (MOVs) can easily be provided by installing signs and on-pavement markings to denote spaces reserved for multi-occupant vehicles. The main challenge would be to enforce their use: a parking agent would have to be present to ensure that vehicles parking in these spaces are actually multi-occupant vehicles. The literature on carpools suggests that cameras can be used to automate this process, but this carries with it significant legal issues. Another significant challenge for both of these strategies is that they would need to be carefully calibrated; i.e., the determination of the correct differential price or the number of dedicated MOV spaces is not trivial. This requires detailed information on the use of the lots, and this information is not always available to transportation agencies.

Another strategy to increase the person-occupancy at park and ride facilities could be to more aggressively promote carpooling as a means to access these locations. An interesting observation from a survey of Washington employees was that a major impediment in switching from single- to multi-occupant vehicle travel for commute trips was a failure of travelers understanding the availability of reasonable multi-occupant vehicle alternatives (Lovrich et al., 1999). However, this study also revealed that multi-occupant vehicles (like carpools and public transit vehicles) are primarily used by those who are generally concerned more about environmental issues and who are less

concerned with the convenience and flexibility offered by single-occupant vehicle travel. In other words, these modes are not for everyone, and it might be difficult to convince those who are not predisposed to these alternatives to change modes for park and ride facility access.

Promoting carpooling to park and ride locations might also be difficult to lots that are currently full. If the carpool arrives and no space is available, the passengers might not all agree on the next best option. One method to provide space for carpool users to access park and ride lots is to relocate vanpools from transit-oriented park and ride facilities to park-and-pool lots without transit service. This strategy can free up parking spaces typically occupied by single-occupant vehicles and promote multi-occupant vehicle use when combined with other strategies. Targeted vanpool relocation was previously employed by WSDOT as part of a larger initiative to reduce vehicle trips and improve mobility during the construction on I-405 (Taylor and Gren, 2010). The program was able to successfully relocate over 130 individual vehicles from overcrowded lots to less crowded lots, although financial incentives were required to induce users to make this change. This program also implemented van-sharing programs and targeted carpool promotions that were successful in both eliminating trips and aggregating people into multi-occupant vehicles. Van-sharing, in particular, might be a viable strategy to provide access to transit facilities at park and rides while eliminating the need for single-occupant parking vehicles. However, the Taylor and Gren (2010) study only considered van-sharing as a means to allow people to access their work once they left the transit. The

reverse trip (access transit from home) was not considered but could be viable at certain, dense locations.

Flexible carpooling could potentially serve as another strategy to increase the person-occupancy of park and ride facilities. An exploratory study by Minett (2013) described how such a system could work: specific areas near residences could be designated as park-and-pool locations where commuters could gather and then travel to the transit station (i.e., park and ride facility) in one vehicle. Instead of pre-arranging the carpooling, the system would rely on a sufficient amount of people meeting at the gathering spot daily so that these carpools are formed on the fly; this is similar to the casual carpool concept that is used in the San Francisco Bay Area (Beroldo, 1990). A challenge would remain to find the best way to return commuters from the facility to the park-and-pool location in the evening; however, the same basic concept could also be applied for the return trip. Note that a drawback exists here in that late-arriving commuters could potentially be stranded during their return trip. Surveys of travelers at five popular transit stations in Seattle were performed to examine the potential benefit of such a strategy. The surveys in Minett (2013) suggest that at one overcrowded location (Sumner Station), dedicating 50 spaces for these flexible carpool vehicles (who would gather at the nearby Bonney Lake bus station) could allow an additional 100 users to access transit at Sumner. This is equivalent to increasing the person-occupancy of 50 vehicles at Sumner from 1 to 3. While this strategy has never been tested in practice, the idea that travelers could gather at nearby locations to carpool to a transit station remains valid and worthy of further exploration.

## RESEARCH APPROACH AND METHODOLOGY

In this project, empirical data were collected and analyzed from 17 of the busiest park and ride facilities in the Puget Sound region to provide a more comprehensive understanding of how these facilities are used and what strategies might be successful at improving parking efficiency. Two unique data collection efforts were performed: on-site audits of vehicular and person entries into the facilities, and intercept surveys of users of each facility. A complete list of the park and ride lots that were included in this study and dates of data collection performed at each are provided in Table 1. As shown in Figure 1, these facilities are geographically dispersed across the entire Central Puget Sound Region. All lots are located outside of downtown Seattle and have transit service by bus or train to the downtown. The type of service provided is also shown in Table 1. Note that lots with train service also have bus service; however, at these lots the train is the major source of transit service to Seattle. The only exception is Tacoma Dome Station, which has equal transit split between bus and transit service and is labeled as both in Table 1.

The remainder of this section provides more details on each of these two types of data collection methodologies and the general analysis methods.

**Table 1. List of park and ride facilities and dates of empirical data collection**

| *Lot Name* | *County* | *Date of On-Site Audit* | *Date of Intercept Survey* | *Primary Transit Service* |
|---|---|---|---|---|
| **Auburn Station** | King | 11/8/2013 | 3/7/2014 | Train |
| **Eastgate Transit Center** | King | 10/23/2013 | 3/4/2014 | Bus |
| **Federal Way Transit Center** | King | 11/7/2013 | 3/6/2014 | Bus |
| **Issaquah Highlands Park-and-Ride** | King | 10/24/2013 | 3/12/2014 | Bus |
| **Issaquah Transit Center** | King | 10/25/2013 | 3/12/2014 | Bus |
| **Kenmore Park-and-Ride** | King | n/a | 3/13/2014 | Bus |
| **Lynnwood Transit Center** | Snohomish | 11/4/2013 | 3/3/2014 | Bus |
| **Mercer Island Park-and-Ride** | King | 10/22/2013 | 3/11/2014 | Bus |
| **Overlake Transit Center** | King | 10/21/2013 | 3/1/2014 | Bus |
| **Puyallup Station** | Pierce | 11/5/2013 | 3/10/2014 | Train |
| **South Everett Freeway Station** | Snohomish | n/a | 3/12/2014 | Bus |
| **South Kirkland Park-and-Ride** | King | n/a | 3/11/2014 | Bus |
| **Sumner Station** | Pierce | 11/6/2013 | 3/10/2014 | Train |
| **Tacoma Dome Station** | Pierce | n/a | 3/5/2014 | Both |
| **Tukwila International Boulevard Station** | King | n/a | 3/14/2014 | Train |
| **Tukwila Park-and-Ride** | King | n/a | 6/9/2014 | Bus |
| **Tukwila Station** | King | n/a | 3/14/2014 | Train |

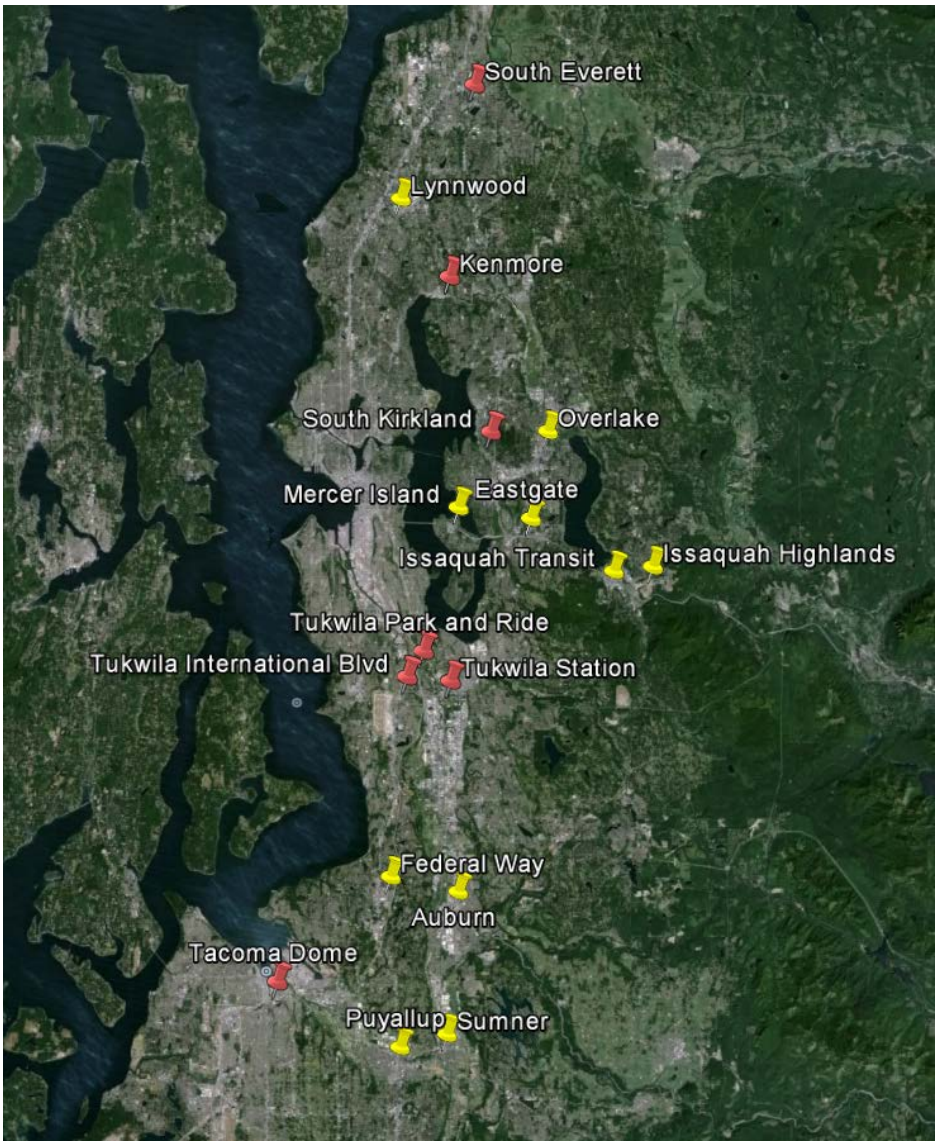



**Figure 1. Map of park and ride facilities considered**

## ON-SITE AUDIT

The primary objective of the on-site audit was to estimate the following metrics at each park and ride facility:

- Parking lot occupancy (percent of spaces utilized) by time of day;
- Passenger occupancy of parked vehicles;

- Proportion of park and ride users using transit; and
- Number of kiss-and-ride maneuvers.

The on-site audit was performed during the morning peak period at 10 of the 17 facilities, as agreed to with members of the WSDOT technical panel. The morning peak period was assumed to start at 5:30 a.m. and last until the facility was completely full or until vehicle arrivals to the lot slowed to a halt. However, experience at various sites led the field collection team to begin data collection earlier at lots with train service.

At the beginning of each on-site audit, the number of vehicles currently parked at each facility was counted and recorded. Members of the data collection team were then stationed at each major vehicle entrance and exit of the park and ride facility. The team members located themselves in such a way as to see into each of the vehicle's windshield to count (or estimate) the number of people inside the vehicle. Although this was not possible for all vehicles, the team was able to accurately estimate person occupancy of these vehicles in the vast majority of cases. During the data collection period, the total number of vehicles entering and the number of vehicles exiting the facility were recorded at 5-minute intervals. In addition, the number of people entering and the number of people exiting the facility by car were also recorded, as well as the number of people exiting the parking area for non-transit uses (when possible). This latter number was difficult to observe at some lots, especially those that had a large footprint. However, the team noted significant non-transit uses based on field observations.

A simple mass balance procedure was then used to estimate the metrics of interest. The simplest calculation was for the number of parked vehicles. Let $i$ refer to a particular analysis interval during the entire data collection period. The number of parked vehicles at the end of interval $i$ ($C_i$) is equal to the sum of the number of parked vehicles at the beginning of the analysis interval ($C_{i-1}$) and the total number of vehicles to have entered during that interval ($A_i$) minus the total number of vehicles to have exited during that interval ($D_i$); or:

$$C_i = C_{i-1} + A_i - D_i \quad \text{(Equation 1)}$$

If the last time interval of the data collection period is denoted $I$, then $C_I$ refers to the total number of vehicles parked at the end of the audit. Also, $C_0$ denotes the number of cars parked at the beginning of the audit period. The quantity $C_T = C_I - C_0$ provides an estimate of the number of cars parking during the entire audit observation period.

The total number of people using the park and ride that entered in a car during the audit period, $P_I$, is given by:

$$P_I = V_I - X_I \quad \text{(Equation 2)}$$

where $V_I$ is the cumulative number of people to arrive to the lot during the audit period and $X_I$ is the cumulative number of people to leave the lot during the audit period.

The ratio of $P_I$ to $C_T$ provides a naïve estimate of person occupancy of parked cars. However, this ratio does not consider the impacts of kiss-and-ride maneuvers and van- or carpools that form within the park and ride facility. People who are dropped off at the facility (i.e., those that access the facility as a kiss-and-ride user) do not require a parking space and should not be included in the calculation of parked car occupancy; however, these people are included in the calculation of $P_I$ since they enter the facility by car and do not leave. Similarly, those that leave through a carpool or vanpool that was formed within the lot would have had to park within the facility, but are excluded in this naïve calculation because they left the facility by car. Thus, a more refined estimate of the number of people parked at the park and ride is:

$$PP_I = V_I - VAN_I - 2KR_I \qquad \text{(Equation 3)}$$

where $VAN_I$ is the total number of carpools or vanpools leaving the lot during the entire audit period, $KR_I$ is the total number of kiss-and-ride vehicles to have used the parking area, and $PP_I$ is the estimate of the total number of people parked. The logic behind this equation is as follows. Of the total number of people to have entered the lot during the study period ($V_I$), all would have used a parking space except for those that were part of a kiss-and-ride maneuver and those driving a carpool or vanpool exiting the facility. This equation assumes that kiss-and-ride vehicles contain two people: one being dropped off and one driving. The field team estimates that this was true for the majority of kiss-and-ride drop-offs that were directly observed. Furthermore, it assumes that carpool or vanpool vehicles exiting the lot were single-occupant vehicles when they arrived. While

this last assumption could not be verified empirically, it seems reasonable based on expectations for carpool and vanpool formations. The ratio of $PP_I$ (Equation 3) to $C_T$ (from Equation 1) provides a more accurate estimate of the person occupancy of parked vehicles. These values can be found in Table 2 of this report.

The disaggregated audit data were also used to estimate the variance in the occupancy of individual parking vehicles identified using the above methodology. This variance was then applied to determine the confidence interval of the mean occupancy of all parking vehicles.

The proportion of people using fixed-route transit was estimated using the estimates of car/vanpools and non-transit activities. Overall, the team noticed very little of this latter activity, as will be discussed in the results section. However, the user intercept survey provides a more accurate estimate of this behavior.

Depending on the facility, kiss-and-ride maneuvers were either directly recorded or estimated using the audit data. In some lots, kiss-and-ride vehicles would both enter and exit at the same location within a short time period (e.g., 2-3 minutes). At these lots, the field team directly recorded these maneuvers as kiss-and-rides. In other lots, kiss-and-ride vehicles would enter at one location and exit through another. At these locations, the kiss-and-ride maneuvers were estimated as the number of single-occupant vehicles exiting the facility. This estimate assumes that very few people arrived to the park and ride on transit and used their car to leave the facility during the data collection period. However, the

field team rarely observed this type of trip at the park and rides. Kiss-and-ride maneuvers were only noted if they occurred within the parking area. At many locations, drivers would pull up directly at the transit boarding areas to drop off passengers; however, these maneuvers were not recorded because they did not influence parking operations within the lots.

The audit was also used to collect qualitative information on how best to conduct the user intercept survey that provided a majority of the data for this study. This included where to place survey data collectors and the optimal time periods for survey data collection.

## USER INTERCEPT SURVEY

The primary objective of the user intercept survey was to collect data about how people currently use the park and ride facilities. This includes the:

- Mode used to access park and ride;
- Mode used to depart from the park and ride;
- Major origins and destinations of each park and ride;
- Departure time at origins and anticipated arrival time at destinations;
- Purpose of trip;
- Perceived level of traffic congestion along trip;
- Reasons for using park and rides; and
- Alternative travel plans had parking not been available.

In addition, the survey collected information on several strategies that WSDOT might wish to eventually implement to improve parking management at these facilities. These strategies included parking fees, priority treatments for multi-occupant vehicles (e.g., guaranteed parking spaces), improvement of pedestrian and bicycling facilities, and the provision of additional parking spaces at nearby off-site locations.

The survey was developed in close coordination with the WSDOT technical review panel, which included members from WSDOT, King County Metro, and Sound Transit. A pre-test was performed during the audit data collection process to identify and clarify any potentially confusing content and improve the survey before full-scale administration. The pre-test was also used to estimate the time required for the survey to be completed and eliminate questions that took too long to answer. The final survey is provided in Appendix A. On average, this survey took about 7 minutes to fully complete.

The survey was administered to park and ride users in one of two ways. A paper version of the survey was provided to park and ride users on-site. Since the survey could be completed during typical transit headways, many passengers were able to complete the survey while waiting for transit service. When transit headways were short or users were reticent to take the paper survey, a flyer was provided to the park and ride users with a website address to access the survey electronically. The website address was also provided to the group of registered vanpool users at several lots to ensure that the survey was received by a representative proportion of the population. These registered vanpool users were available for the following park and rides:

- Eastgate Park and Ride;
- Issaquah Highlands Park and Ride;
- Kenmore Park and Ride;
- South Kirkland Park and Ride; and
- Tukwila Park and Ride.

The electronic survey was a faithful representation of the paper version provided in Appendix A.

Before the survey responses were analyzed, the raw data were filtered and cleaned to remove erroneous values. The question that was of particular concern was question 10: "How did you leave this park and ride this morning?" A significant fraction of survey participants responded with the same mode as question 9: "How did you get to the park and ride this morning?" Obviously, several pairs of arrival-departure modes would not be realistic: drove alone—drove alone, walk—walk, bicycle—bicycle, walk—bicycle and dropped off—picked-up. For example, someone driving to the facility alone is unlikely to immediately leave the facility by car without going to an intermediate destination. These pairs were identified and true exiting modes inferred from the remaining questions. For example, if responses to other questions indicated that these participants valued the convenience of transit at the park and ride, then the exiting mode was changed to the most likely form of transit service. This was possible for the majority of the erroneous responses. For the remaining responses that could not be handled in this way, the origin-destination information was examined manually to infer the most likely mode. For

example, walk was not a feasible exit mode for final destinations that were located far from the park and ride facility. Instead, the type of transit that services that location could be determined and inferred as the exit mode.

Statistical methods were used to analyze the collected survey data. General summary statistics were developed on the entire dataset to give a summary of the average behavior across the 17 park and ride facilities surveyed. Chi-square statistical tests were performed to determine if the distribution of several metrics was the same across park and ride facilities and the primary type of service provided (bus, train, or both). Furthermore, mapping was used to plot the set of origins for single-occupant vehicles collected in the survey data to determine if feasible transit alternatives exist for these park and ride users.

# RESULTS AND FINDINGS

In this section, we present the major findings of our empirical data analysis. We first discuss the analysis of the data obtained from the on-site audit, and then discuss the analysis of the data obtained from the user intercept survey.

## ANALYSIS OF ON-SITE AUDIT DATA

Table 2 presents estimates of the parked car occupancy and number of kiss-and-ride maneuvers from the on-site data. The majority of the facilities operated at maximum capacity on the day of data collection (evidenced by 100% of the parking spots being full when the data collection team left the site). Of the three lots that did not completely fill, two of them (Auburn Station and Issaquah Transit Center) were audited on a Friday when travel demands can be expected to be lower than other weekdays. Even so, more than 80% of the spaces at these locations were used, suggesting that they are at or near capacity on typical weekdays.

**Table 2. Summary of on-site audit data**

| *Lot Name* | *Day of week audited* | *Start Time* | *Lot Filled Time* | *% Filled* | *Average Parked Car Occupancy* | *Fraction of Parking by Fixed Route Transit Users* | *Kiss-and-Ride Maneuvers Within Parking Area* |
|---|---|---|---|---|---|---|---|
| **Auburn** | Friday | 5:05 | n/a (8:30) | 85.8% | **1.045** | 96% | 8 |
| **Eastgate** | Wednesday | 5:00 | n/a (10:00) | 90.8% | **1.019** | 96% | 125 |
| **Federal Way TC** | Thursday | 5:10 | 7:45 | 100.0% | **1.102** | 92%** | 50 |
| **Issaquah Highlands** | Thursday | 5:05 | 9:10 | 100.0% | **1.044** | 84% | 46 |
| **Issaquah TC** | Friday | 5:10 | n/a (9:10) | 82.3% | **1.046** | 95% | 62 |
| **Lynnwood TC** | Monday | 5:15 | 7:25 | 100.0% | **1.060** | 88%** | 18 |
| **Mercer Island** | Tuesday | 5:00 | 7:50 | 100.0% | **1.081** | 95% | 74 |
| **Overlake TC** | Monday | 5:00 | 7:40 | 100.0% | **1.017** | 99% | 47 |
| **Puyallup** | Tuesday | 5:15 | 5:23 | 100.0% | **n/a** | n/a | n/a |
| **Sumner** | Wednesday | 4:45 | 5:40 | 100.0% | **1.051** | 88%** | 9 |

The total number of parked vehicles at the end of each time period for each park and ride was calculated using Equation 1. The ratio of this value to the total number of parking spaces per lot provides the percentage of parking spaces filled by time of day; see Figure 2. This figure reveals that the Sumner Station becomes full significantly earlier than the other lots. In general, park and rides with train service were found to fill up much more quickly than those with just bus service. This is further evidenced from the observations at Puyallup Station. Note that summary statistics for Puyallup Station are not presented because the parking spaces at the main lot filled within 10 minutes of the data collection team arriving at the lot, at approximately 5:25 a.m. Overflow lots at Puyallup followed shortly thereafter; in fact, most overflow lots were full (or nearly so) before the team could even reach them from the main lot.

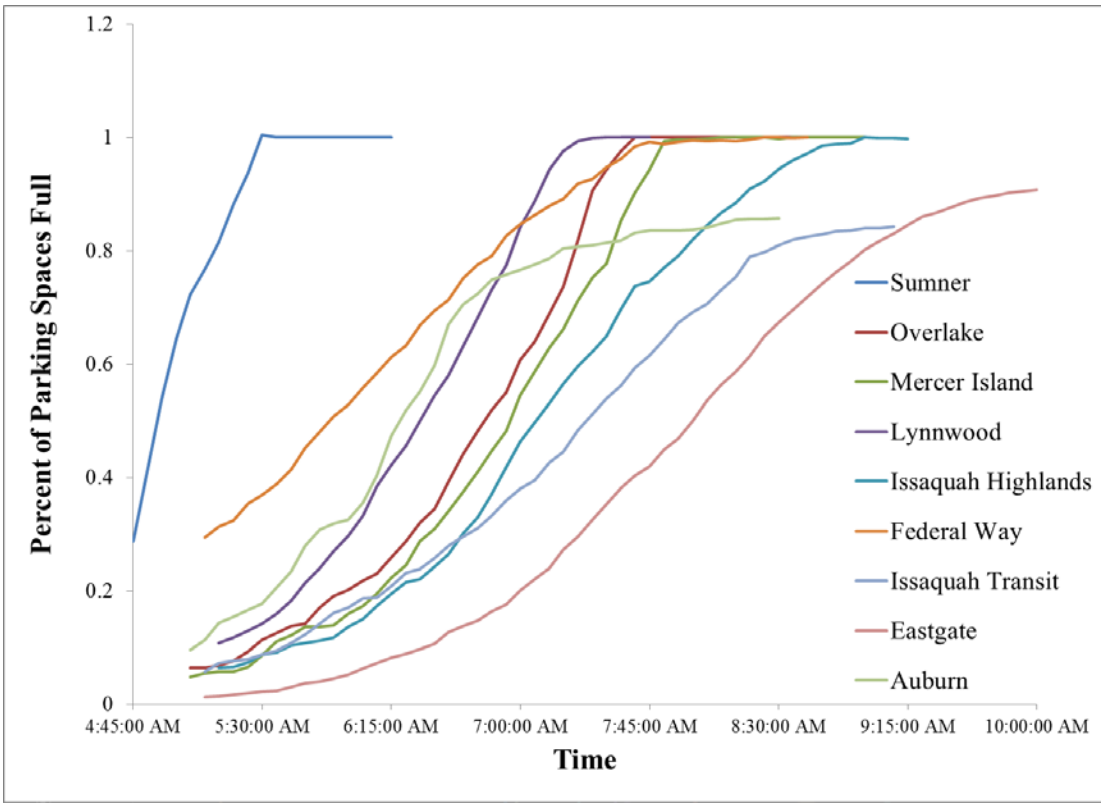



**Figure 2. Proportion of parking spaces filled by time of day**

The average parked car occupancy values calculated using the method previously described are also provided in Table 2. In general, the parking car occupancy values are very near 1; the highest is just 1.102 passengers per parked car. This suggests that the majority of people parking at these facilities arrive to the park and rides in a single-occupant vehicle, which confirms prior expectations. Confidence intervals of 95% were created for the mean person-occupancy of parking vehicles and are provided in Table 4.

**Table 3. Confidence intervals for parking car occupancy by lot**

| *Location* | *Mean* | *Std. Error* | *95% Lower Bound* | *95% Upper Bound* |
|---|---|---|---|---|
| **Auburn** | 1.045 | 0.009 | 1.027 | 1.063 |
| **Eastgate** | 1.019 | 0.004 | 1.012 | 1.026 |
| **Fed. Way** | 1.102 | 0.010 | 1.083 | 1.121 |
| **Issaquah Highlands** | 1.044 | 0.007 | 1.030 | 1.058 |
| **Issaquah Transit** | 1.046 | 0.009 | 1.028 | 1.064 |
| **Lynnwood** | 1.06 | 0.009 | 1.042 | 1.078 |
| **Mercer Island** | 1.081 | 0.013 | 1.055 | 1.107 |
| **Overlake** | 1.017 | 0.009 | 1.000 | 1.034 |
| **Sumner** | 1.051 | 0.016 | 1.019 | 1.083 |

Although not shown in Table 2, the data collection team also noted that nearly all of the users parking at the park and ride facilities continued to use transit. Less than 2% of users were observed leaving the park and ride lot for a non-transit use. The only exception to this was the Eastgate Transit Center, where about 3% of the park and ride users were noted leaving the parking facility for non-transit uses. The data collection team observed that these were mostly people walking toward Bellevue College.

Table 2 also provides an estimate of the fraction of people who parked that went on to use fixed-route transit options (either bus or train, or in the case of Overlake the Microsoft shuttles). The remaining users (i.e., those that did not use formal transit or non-transit) were identified as using flexible transit options like carpools or vanpools. At some locations, the lot geometry made it difficult to estimate the fraction of parking users that used fixed transit options; these lots are denoted with a double asterisk in Table 2.

## ANALYSIS OF USER INTERCEPT SURVEY DATA

A summary of the survey data collected is provided in Table 4. During the course of the user intercept survey data collection, over 3,300 unique surveys were collected. Of these, about 2,000 were paper surveys and the remaining 1,300 were completed online. The last column of Table 4 presents the ratio of the total number of surveys collected to the total number of parking spaces available at each lot, which we use as a measure of the survey penetration. The survey had an average penetration of about 25% of the total number of parking spaces across all facilities. At individual park and ride facilities, the penetration rate ranged between 11 and 40 percent. The lowest penetration was achieved at Tacoma Dome Station; however, this was the largest facility surveyed, with well over 2,000 parking spaces, so the absolute number of surveys was still very high (more than 250). Tukwila Park and Ride also had a relatively low penetration rate with just 13% of users responding. Overall, these levels represent a very high penetration of the user intercept survey.

**Table 4. Summary of user intercept survey collection**

| *Lot Name* | *Total Completed Surveys* | *Paper Surveys* | *Online Surveys* | *Lot Capacity* | *Penetration Rate* |
|---|---|---|---|---|---|
| **Auburn** | 172 | 121 | 51 | 633 | 0.272 |
| **Eastgate** | 348 | 146 | 202 | 1,614 | 0.216 |
| **Federal Way TC** | 283 | 217 | 66 | 1,190 | 0.238 |
| **Issaquah Highlands** | 396 | 217 | 179 | 1,000 | 0.396 |
| **Issaquah TC** | 284 | 197 | 87 | 819 | 0.347 |
| **Kenmore** | 121 | 20 | 101 | 603 | 0.201 |
| **Lynnwood TC** | 305 | 221 | 84 | 1,368 | 0.223 |
| **Mercer Island** | 108 | 53 | 55 | 447 | 0.242 |
| **Overlake TC** | 80 | 54 | 26 | 222 | 0.360 |
| **Puyallup** | 165 | 105 | 60 | 432 | 0.382 |
| **South Everett** | 148 | 132 | 16 | 397 | 0.373 |
| **South Kirkland** | 223 | 159 | 64 | 852 | 0.262 |
| **Sumner** | 138 | 75 | 63 | 343 | 0.402 |
| **Tacoma Dome** | 262 | 88 | 174 | 2,283 | 0.115 |
| **Tukwila International Boulevard** | 199 | 159 | 40 | 600 | 0.332 |
| **Tukwila P&R** | 33 | 11 | 22 | 255 | 0.129 |
| **Tukwila Station** | 76 | 45 | 31 | 208 | 0.365 |
| **Total** | **3,341** | **2,020** | **1,321** | **13,266** | **0.252** |

Summary statistics of the information collected in the user intercept survey are provided in Appendix B. For brevity, this report only discusses a few of the more relevant metrics to understand the use of park and ride facilities.

Table 5 provides the distribution of trip purposes aggregated across all facilities. Work trips are the clear majority, as expected, as they account for more than 94% of all trips. The combination of work and school trips accounts for more than 97% of all trips. This would suggest that park and ride users are commuters that use these facilities on a very regular basis. This insight is confirmed by the data in Table 6, which presents the average number of times each survey participant uses the park and ride facilities. In general, each participant uses the lot an average of nearly 4.5 times per week, indicating that they are

extremely regular users. Furthermore, usage frequency is quite consistent across all individual facilities. Statistical t-tests were performed and confirmed that the mean value at each lot did not significantly differ from the overall mean value across all lots.

**Table 5. Trip purpose summary statistics**

| *Trip Purpose* | *Fraction* |
|---|---|
| **Work** | 94.39% |
| **School** | 3.23% |
| **Errands** | 1.22% |
| **Shopping** | 0.30% |
| **Appointment** | 0.15% |
| **Other** | 0.70% |

**Table 6. Park and ride usage frequency summary statistics**

| *Lot Name* | *Average times per week* |
|---|---|
| **Auburn** | 4.48 |
| **Eastgate** | 4.46 |
| **Federal Way TC** | 4.38 |
| **Issaquah Highlands** | 4.48 |
| **Issaquah TC** | 4.42 |
| **Kenmore** | 4.53 |
| **Lynnwood TC** | 4.35 |
| **Mercer Island** | 4.57 |
| **Overlake TC** | 4.28 |
| **Puyallup** | 4.34 |
| **South Everett** | 4.56 |
| **South Kirkland** | 4.35 |
| **Sumner** | 4.47 |
| **Tacoma Dome** | 4.44 |
| **Tukwila International Boulevard** | 4.50 |
| **Tukwila P&R** | 4.68 |
| **Tukwila Station** | 4.57 |
| **All** | 4.44 |

Survey participants were asked to identify all the reasons that they used park and ride facilities. These responses are summarized in Table 7. Of the potential responses provided, the primary reason for using park and ride facilities was clearly affordability: 77% of participants indicated that they used park and rides to save money. This could be because parking at the destination is expensive and the fuel costs to drive directly to the destination are prohibitive to driving. This is reasonable considering that parking in downtown Seattle (where a majority of destinations were located) is relatively expensive and trips to downtown are relatively long. A majority of users also indicated that they use park and rides for the convenience and relaxation opportunity provided within transit vehicles. This is extremely likely, as travel times from most park and rides to downtown Seattle are long, on average (estimated at over an hour in congested conditions by car). Surprisingly, less than half of participants indicated that they used park and rides because driving takes too long. Thus, it appears that park and ride users simply prefer taking transit, as they can work and relax on the transit vehicle on the way to work when compared with driving. Only about a third said that they consciously used park and rides for environmental reasons.

**Table 7. Reasons for using park and rides summary statistics**

| ***Reasons for Using Park-and-Rides*** | ***Fraction that Agreed*** |
|---|---|
| **No parking at destination** | 34.9% |
| **Driving too long** | 44.9% |
| **Environmental reasons** | 36.1% |
| **To save money** | 77.1% |
| **Can relax on transit** | 59.6% |

The majority of the participants indicated that they had an ORCA card (One Regional Card for All, used to pay one's fare on buses and trains in the Puget Sound region), as expected; only about 6% of survey participants did not have an ORCA card. Of the ORCA card holders, about 56% of those indicated that their employer or some other entity paid for all or most of the amount, while another 21% indicated that they had some of the ORCA card amount subsidized. Overall, 77% of users received some form of transit subsidy, which might be a primary reason why they elect to use transit. This set of subsidized transit users might not be as price sensitive as the rest when it comes to pricing strategies at park and rides, since a significant portion of their transit fare is being subsidized. Since so many receive ORCA cards at a reduced rate, allowing users to pay for parking with their ORCA card might not significantly disincentivize single-occupant vehicle use, as many individuals do not experience the full pricing effect.

**Entry Mode**

One of the key metrics of interest to WSDOT is the mode used to access the park and ride facilities. Table 8 provides a summary of participant responses to mode of entry. The clear majority (nearly 74%) of participants drive in a single-occupant vehicle. Of the remaining participants, the highest uses appear to be either using public transportation (i.e., bus), kiss-and-ride maneuvers (i.e., dropped off), carpools, or walking.

**Table 8. Entry mode summary statistics**

| *Mode* | *Freq. Entering* | *% Entering* |
|---|---|---|
| **Drive Alone** | 2,418 | 73.9% |
| **Walk** | 156 | 4.8% |
| **Train** | 4 | 0.1% |
| **Vanpool** | 17 | 0.5% |
| **Bicycle** | 26 | 0.8% |
| **Dropped off** | 222 | 6.8% |
| **Carpool** | 162 | 5.0% |
| **Bus** | 257 | 7.9% |
| **Other** | 10 | 0.3% |
| **Total** | 3,272 | 100.0% |

Since we are specifically concerned here with the person-efficiency of the park and ride lots, we also examine the distribution of entry modes considering only those participants that required a parking space to access the park and rides. These individuals were identified as those selecting among the following modes: drive alone, carpool, or vanpool. The summary statistics for these survey participants are provided in Table 9 and indicate that 93% of those driving to the park and ride do so in a single-occupant vehicle. This result is consistent with the on-site audit results, which show that the person occupancy of entering vehicles is very near one in all cases.

The fraction of participants that used a parking space and drove alone to access the park and ride for every lot is also provided in Table 10. In most cases, this fraction is between 90-100%; however, Overlake TC and Sumner have single-occupant parking percentages near 85%, indicating that higher levels of carpool or vanpool activities to access the park and ride may occur at these locations. A chi-square test was performed to see if this fraction was statistically equal across all lots. The resulting p-value was >0.01, which suggests that the distribution was not statistically different across all facilities. Therefore,

there is not enough statistical evidence to suggest that Overlake and Sumner are statistically different from the average distribution. Table 10 also provides 95% confidence intervals for the fraction of parking vehicles that had a single occupant for each of the facilities. These 95% confidence intervals were calculated using the Wilson Score Interval approach.

**Table 9. Mode of entry for parking vehicles only, summary statistics**

| *Mode* | *Freq. Entering* | *% Entering* |
|---|---|---|
| **SOV** | 2,418 | 93.1% |
| **Vanpool** | 17 | 0.7% |
| **Carpool** | 162 | 6.2% |
| **Total** | 2,571 | 100.0% |

**Table 10. Mode of entry for parking vehicles only, by lot**

| *Lot Name* | *Mean SOV Parking Vehicle Fraction (Survey)* | *LB of 95% Confidence Interval* | *UB of 95% Confidence Interval* | *SOV Parking Fraction (AUDIT)* | *Average SOV Parking Fraction (Survey and Audit)* |
|---|---|---|---|---|---|
| **Auburn** | 91.3% | 84.2% | 95.3% | 95.5% | 93.4% |
| **Eastgate** | 91.7% | 87.8% | 94.4% | 98.1% | 94.9% |
| **Federal Way TC** | 93.1% | 89.0% | 95.7% | 89.8% | 91.5% |
| **Issaquah Highlands** | 92.9% | 89.7% | 95.2% | 95.8% | 94.4% |
| **Issaquah TC** | 95.4% | 92.1% | 97.3% | 96.% | 95.7% |
| **Kenmore** | 93.1% | 86.4% | 96.6% | --- | 93.1% |
| **Lynnwood TC** | 92.8% | 88.3% | 95.7% | 94.3% | 93.6% |
| **Mercer Island** | 93.2% | 85.9% | 96.8% | 91.9% | 92.6% |
| **Overlake TC** | 84.2% | 72.6% | 91.5% | 98.3% | 91.3% |
| **Puyallup** | 93.0% | 86.9% | 96.4% | --- | 93.0% |
| **South Everett** | 96.5% | 91.4% | 98.6% | --- | 96.5% |
| **South Kirkland** | 93.4% | 88.5% | 96.3% | --- | 93.4% |
| **Sumner** | 84.1% | 75.0% | 90.3% | 94.7% | 89.4% |
| **Tacoma Dome** | 96.4% | 93.1% | 98.2% | --- | 96.4% |
| **Tukwila International Boulevard** | 95.0% | 90.0% | 97.5% | --- | 95.0% |
| **Tukwila P&R** | 100% | - | - | --- | 100% |
| **Tukwila Station** | 90.4% | 81.5% | 95.3% | --- | 90.4% |
| **All** | 93.0% | 92.0% | 94.0% | --- | 93.0% |

The estimated SOV parking fractions obtained from the on-site audit data are also provided in Table 10 for comparison with those obtained through the surveys. In most cases, SOV fractions obtained from the audit are higher than the fractions obtained from the survey. The two exceptions are Federal Way TC and Mercer Island, but in these cases the differences are rather small and fall within the 95% confidence interval. However, the audit estimates do not fall within the 95% confidence interval obtained from the survey data for Auburn, Eastage, Issaquah Highlands, Overlake TC, and Sumner. Of these, only Eastgate, Sumner, and Overlake TC have significant differences (i.e., differences greater than 6%) between the audit and survey data. Reasons for these discrepancies might include: self-selection bias for the users who chose to respond to the surveys, differences in park and ride facility during the audit and survey periods, and estimation inaccuracies during the on-site audit process. Because errors might exist with both the survey and on-site audit, a simple average of the two individual estimates can provide a good overall estimate for the fraction of single-occupant vehicles parking at these locations. These values are provided in the last column of Table 10.

During the on-site audit, the field team noted that park and ride facilities with train service had very different behavior that those without; for example, users arrived much earlier and the parking spaces filled more quickly. Therefore, the SOV parking fraction was computed when aggregating the facilities by the primary type of transit service offered: either train or bus. Recall that Tacoma Dome offered both types of service as a primary mode and was classified as both. The results are provided in Table 11. Another chi-square test was performed to assess the difference in this distribution across these

facility types. The resulting p-value was >0.01, which suggests that the mix of parking vehicles between single- and multi-occupant vehicles is statistically the same at all facility types. A confidence interval of 95% was also calculated for the single-occupant parking vehicle fraction and the same estimates from the on-site audit data are also included. Aggregating at this level, the estimates are more consistent between the survey and audit data.

**Table 11. Mode of entry for parking vehicles only, by facility type**

| *Lot Type* | *Mean SOV Parking Vehicle Fraction* | *LB of 95% Confidence Interval* | *UB of 95% Confidence Interval* | *SOV Parking Vehicle Fraction (AUDIT)* | *Average SOV Parking Fraction (Survey and Audit)* |
|---|---|---|---|---|---|
| **Train only** | 91.3% | 88.6% | 93.4% | 94.8% | 93.1% |
| **Bus Only** | 93.2% | 92.1% | 94.4% | 95.2% | 94.2% |
| **Both** | 96.4% | 93.1% | 98.2% | N/A | 96.4% |

## Exit Mode

A second critical metric of interest was the mode used to leave the park and ride facility. Table 12 provides a summary of filtered participant responses at all facilities. In general, the majority of participants either used bus (73%) or train (19%) to exit the facility. The next highest use was walking, which accounted for just under 3% of all trips. Carpools (0.5%) and vanpools (3%) accounted for a significant share as well. Table 13 aggregates these exiting modes obtained from the survey into three categories that might be useful to WSDOT: fixed-route transit modes (either bus or train), flexible transit modes (either carpools or vanpools), and other. Notice that over 92% of all participants used fixed-route transit modes at the lots and another 3% used flexible transit. Since we are especially concerned with the parking efficiency of these lots, Table 13 also provides the same

summary for only those users that parked a vehicle at the park and ride facility. The results for those parking are almost identical to those who arrive to the lot by all modes. Thus, it appears that fixed-route transit is the primary mode used to exit the park and rides and that flexible transit modes are not very prevalent. Note, however, that the survey distribution took place primarily at the transit boarding areas, so some carpool and vanpool users who were waiting within their cars may not have been reached.

**Table 12. Exit mode summary statistics**

| *Mode* | *Freq. Exiting* | *% Exiting* |
|---|---|---|
| ***Drive Alone*** | *21* | 0.64% |
| **Walk** | 91 | 2.79% |
| **Train** | 663 | 20.35% |
| **Vanpool** | 90 | 2.76% |
| **Bicycle** | 2 | 0.06% |
| **Dropped off** | 5 | 0.15% |
| **Carpool** | 15 | 0.46% |
| **Bus** | 2,351 | 72.16% |
| **Other** | 20 | 0.61% |
| **Total** | 3,258 | 100.00% |

**Table 13. Summary of exiting mode by transit use, summary statistics**

| | ***All Users*** | | ***Only Parked Vehicles*** | | ***Parked Vehicles (AUDIT DATA)*** |
|---|---|---|---|---|---|
| | **Frequency** | **Fraction** | **Frequency** | **Fraction** | |
| **Fixed-Route Transit** | 3,014 | 92.5% | 2,391 | 92.5% | 92% |
| **Flexible Transit** | 105 | 3.2% | 94 | 3.6% | 7% |
| **Other** | 139 | 4.3% | 99 | 3.8% | 1% |

Table 13 also provides the estimate of mode share by fixed-route and flexible route transit from the on-site audit for comparison with the survey values. The two estimates

are very consistent for fixed-route transit use (both are about 92%). The share of flexible transit use from the audit (7%) is about twice as much as that from the survey (3%). This is reasonable, given that some vanpool users might not have been reached by the survey but would have been captured by the audit.

Table 14 provides a breakdown of exit mode obtained from the survey for each individual facility. Note here that Total Transit refers to the sum of fixed-route and flexible transit modes. Unfortunately, the multiple categories of exit mode made a chi-square test impossible. However, this table provides interesting insights into the lots for which carpool and vanpool use may be high. Eastgate and Issaquah Highlands had the highest fraction of flexible transit use. Kenmore also had a level of flexible transit use that was higher than the average. Furthermore, Overlake had the lowest overall transit fraction, with 14% of participants exiting the lot using other modes. This is not surprising, since the lot is near the Microsoft campus and there are a variety of destinations located around the facility.

**Table 14. Summary of exiting mode by transit use, by lot**

| *Lot Name* | *All Users* | | | *Parked Vehicles* | | |
|---|---|---|---|---|---|---|
| | **Fixed-Route Transit** | **Flexible Transit** | **Total Transit** | **Fixed-Route Transit** | **Flexible Transit** | **Total Transit** |
| **Auburn** | 92.3% | 1.8% | 94.1% | 92.2% | 1.9% | 94.2% |
| **Eastgate** | 88.7% | 8.0% | 96.7% | 88.0% | 9.1% | 97.1% |
| **Federal Way TC** | 97.1% | 0.0% | 97.1% | 98.7% | 0.0% | 98.7% |
| **Issaquah Highlands** | 84.8% | 11.2% | 95.9% | 83.2% | 12.6% | 95.9% |
| **Issaquah TC** | 95.7% | 2.2% | 97.8% | 95.7% | 2.3% | 98.1% |
| **Kenmore** | 92.4% | 5.0% | 97.5% | 93.1% | 4.0% | 97.0% |
| **Lynnwood TC** | 97.5% | 0.4% | 97.9% | 97.4% | 0.5% | 97.9% |
| **Mercer Island** | 97.2% | 0.0% | 97.2% | 97.7% | 0.0% | 97.7% |
| **Overlake TC** | 88.8% | 0.0% | 88.8% | 86.0% | 0.0% | 86.0% |
| **Puyallup** | 90.2% | 1.2% | 91.5% | 90.4% | 0.9% | 91.2% |
| **South Everett** | 98.6% | 0.0% | 98.6% | 99.1% | 0.0% | 99.1% |
| **South Kirkland** | 94.3% | 3.3% | 97.6% | 94.5% | 3.7% | 98.2% |
| **Sumner** | 95.6% | 1.5% | 97.0% | 95.4% | 2.3% | 97.7% |
| **Tacoma Dome** | 90.3% | 0.8% | 91.1% | 90.2% | 0.9% | 91.1% |
| **Tukwila International Boulevard** | 91.0% | 1.5% | 92.5% | 94.2% | 0.7% | 95.0% |
| **Tukwila P&R** | 91.0% | 3.0% | 94.0% | 96.3% | 0% | 96.3% |
| **Tukwila Station** | 93.5% | 2.6% | 96.1% | 95.8% | 1.4% | 97.2% |

Table 15 provides a direct comparison of the fraction using fixed-route and flexible transit from the on-site audit (data in Table 2) and the user intercept survey (data in Table 14). Notice that these data are not always consistent between the two data collection efforts. For example, the audit suggests that there is a large amount of flexible transit use at the Lynnwood and Sumner lots, while the user intercept survey suggests very little of this activity at these locations. One reason for this discrepancy is the sprawling geometry of the Lynnwood and Sumner lots, which made tracking carpool and vanpool activities very difficult. Another reason is that these lots were not part of the registered vanpool groups that received the online survey invitation through direct email. Thus, while vanpoolers at some facilities (like Eastgate and Issaquah Highlands) were reached by the

survey and thus fully captured in the survey, at Lynnwood and Sumner these users were more likely to have been missed if they gathered at remote areas within the parking facility. To rectify this, the average of the two methods can be used to estimate the fraction of fixed-route transit use at each of these locations.

**Table 15. Comparison of fixed-route and flexible route transit use between audit and survey**

| *Lot Name* | *Parked Vehicles (SURVEY)* | | | *Parked Vehicles (AUDIT)* | | |
|---|---|---|---|---|---|---|
| | **Fixed-Route Transit** | **Flexible Transit** | **Total Transit** | **Fixed-Route Transit** | **Flexible Transit** | **Total Transit** |
| **Auburn** | 92.2% | 1.9% | 94.2% | 96% | 3% | 99% |
| **Eastgate** | 88.0% | 9.1% | 97.1% | 96% | 1% | 97% |
| **Federal Way TC** | 98.7% | 0.0% | 98.7% | 92%** | 7% | 99% |
| **Issaquah Highlands** | 83.2% | 12.6% | 95.9% | 84% | 14% | 98% |
| **Issaquah TC** | 95.7% | 2.3% | 98.1% | 95% | 4% | 99% |
| **Kenmore** | 93.1% | 4.0% | 97.0% | --- | --- | --- |
| **Lynnwood TC** | 97.4% | 0.5% | 97.9% | 88%** | 10% | 98% |
| **Mercer Island** | 97.7% | 0.0% | 97.7% | 95% | 3% | 98% |
| **Overlake TC** | 86.0% | 0.0% | 86.0% | 99% | 0% | 99% |
| **Puyallup** | 90.4% | 0.9% | 91.2% | --- | --- | --- |
| **South Everett** | 99.1% | 0.0% | 99.1% | --- | --- | --- |
| **South Kirkland** | 94.5% | 3.7% | 98.2% | --- | --- | --- |
| **Sumner** | 95.4% | 2.3% | 97.7% | 88% | 10% | 98% |
| **Tacoma Dome** | 90.2% | 0.9% | 91.1% | --- | --- | --- |
| **Tukwila International Boulevard** | 94.2% | 0.7% | 95.0% | --- | --- | --- |
| **Tukwila P&R** | 96.3% | 0% | 96.3% | --- | --- | --- |
| **Tukwila Station** | 95.9% | 1.4% | 97.3% | --- | --- | --- |

A summary of exiting modes by facility type is provided in Table 16. These results suggest that the use of flexible transit is much higher at facilities that provide only bus service when compared to those facilities that provide some form of train service. Chi-square tests were performed to test that these differences were statistically significant. The tests found that the distribution of exit modes for all users and for parked vehicles

only were statistically different, with p-values less than 0.001. Thus, it appears that carpools and vanpools generally present less of a problem at facilities with train service than those with bus service only. This is consistent with the audit observations, which found that lots with train stations filled very shortly after the first available train service as those people hurried to get on the train.

**Table 16. Summary of exiting mode by transit use, by facility**

| *Lot Type* | *All Users* | | | *Parked Vehicles* | | |
|---|---|---|---|---|---|---|
| | **Fixed-Route Transit** | **Flexible Transit** | **Total Transit** | **Fixed-Route Transit** | **Flexible Transit** | **Total Transit** |
| **Train** | 92.5% | 1.5% | 93.9% | 93.4% | 1.4% | 94.8% |
| **Bus** | 92.8% | 4.1% | 96.9% | 92.6% | 4.6% | 97.2% |
| **Both** | 90.3% | 0.8% | 91.1% | 90.2% | 0.9% | 91.1% |

### Reactions to Potential Efficiency Improvement Strategies

The user intercept survey also contained several questions to assess user reaction to various strategies that might be considered by WSDOT and related agencies for parking management at park and rides in the future. One set of questions focused on willingness to pay for parking. Three questions were asked about pricing: (1) maximum amount willing to pay to park at the facility; (2) maximum amount willing to pay for a guaranteed space; and (3) maximum amount willing to pay for a guaranteed space a 10-15 minute walk off-site. Note that the last question was included to assess how much users might pay for parking spaces at multi-family developments near park and rides that are being piloted by WSDOT. If a user was not willing to pay anything, or not willing to park a 10-15 minute walk away, a value of $0.00 was used. The fraction of users willing to pay for the different types of parking is summarized in Table 17. Table 18 provides the average

willingness to pay from only those who would pay a non-zero amount, while Table 19 provides the average willingness to pay for all users.

**Table 17. Fraction willing to pay for parking**

| *Fraction willing to pay for…* | *Train* | *Bus* | *Both* | *All* |
|---|---|---|---|---|
| **Parking space** | 27.9% | 28.4% | 25.1% | 28.0% |
| **Guaranteed space at lot** | 43.4% | 46.8% | 43.4% | 45.7% |
| **Guaranteed space 10-15 min. walk away** | 29.9% | 27.5% | 21.4% | 27.6% |

Table 17 suggests that only about one-quarter of the users surveyed are willing pay a general parking fee. However, this number increases to just under one-half of users if the payment ensures a guaranteed parking space. This suggests that providing guaranteed spaces might be a good way to increase support for parking fees at park and ride facilities. The same number of users are willing to pay for a guaranteed space located a 10-15 minute walk away from the park and ride as those willing to pay a general parking fee at the park and ride. This also demonstrates the value that users place on guaranteed parking spaces at these overutilized facilities. Some differences are observed in these values across the different lot types, but these are relatively minor.

Table 18 shows that users willing to pay for parking are willing to pay an average of $1.50 for a general parking fee, and that the number increases to $1.83 if the parking fee would guarantee a space. Thus, it appears that while almost twice as many people are willing to pay for a guaranteed space, they are not willing to pay significantly more for these guaranteed spaces. Users are also willing to pay an average of $1.53 for a

guaranteed space a 10-15 minute walk away from the park and ride, which is about the same as for a general space at the park and ride. This once again highlights users' affinity for guaranteed parking spaces. The average willingness to pay for all users is presented in Table 19. As expected, the magnitudes are much smaller since they include the $0.00 values that are associated with those who are not willing to pay anything. However, the general trends are the same: users are willing to pay more for guaranteed parking spaces than the general parking fee, and they are willing to pay about the same for guaranteed spaces a 10-15 minute walk away from the park and ride as a general parking fee at the park and ride.

**Table 18. Summary statistics for willingness to pay for parking (those willing to pay)**

| *Willingness to pay for…* | *Train* | *Bus* | *Both* | *All*<br>*mean (st. dev)* |
|---|---|---|---|---|
| **Parking space** | $1.497 | $1.487 | $1.659 | $1.501<br>($0.960) |
| **Guaranteed space at lot** | $1.886 | $1.810 | $1.788 | $1.825<br>($1.264) |
| **Guaranteed space 10-15 min. walk away** | $1.518 | $1.527 | $1.611 | $1.530<br>($1.011) |

**Table 19. Summary statistics for willingness to pay for parking (all users)**

| *Willingness to pay for…* | *Train* | *Bus* | *Both* | *All*<br>*mean (st. dev)* |
|---|---|---|---|---|
| **Parking space** | $0.418 | $0.421 | $0.417 | $0.420<br>($0.845) |
| **Guaranteed space at lot** | $0.818 | $0.847 | $0.776 | $0.832<br>($1.25) |
| **Guaranteed space 10-15 min. walk away** | $0.472 | $0.389 | $0.304 | $0.402<br>($0.831) |

Another potential strategy to reduce SOV parking is to add bicycle lockers and/or to provide better bicycle and pedestrian access. Participants were asked if they would be more willing to bike/walk to the park and ride with these improvements, and the results are summarized in Table 20. Overall, the responses suggest that these improvement strategies are not promising: only 12% would be more willing to bike if bicycle lockers were provided, and only 17% would be more willing to bike/walk if better pedestrian/bicycle access were provided. A chi-square test was performed to determine if these values were statistically different across the individual facilities; even though the test was not appropriate due to low expected counts for individual categories (which would tend to exaggerate any differences), the test suggests that there is no statistically significant difference across the individual locations.

**Table 20. Summary statistics on bicycle/pedestrian related questions**

| ***More willing to bike/walk to park and ride if…*** | ***Yes*** | ***No*** | ***I currently use this mode*** |
|---|---|---|---|
| **More bicycle lockers installed** | 11.6% | 86.8% | 1.6% |
| **Better pedestrian/bicycle access** | 17.2% | 77.8% | 5.0% |

In addition, questions were asked on alternatives to avoid parking fees at the individual park and ride lots. These questions asked participants if they would be willing to: (1) carpool to a lot to avoid a parking fee; (2) carpool to obtain a guaranteed parking space; and (3) park 10-15 minutes away if a guaranteed free parking space were available there. The responses are summarized in Table 21. About one-quarter of respondents would be willing to consider carpooling to the park and ride if a fee were implemented and if the carpool users did not incur the parking fee. Another fifth of the respondents did not know if they would be willing to consider carpooling. A full half of the respondents, however,

indicated that they would not consider carpooling to avoid parking fees or obtain a guaranteed parking space. More respondents (about 40%) are willing to park at a satellite location to obtain a guaranteed space. This suggests that if increasing capacity at the park and ride itself is not an option, off-site capacity improvements nearby could be beneficial to accommodate overflow demand. It might be a good idea to entice single-occupant vehicles to park at these locations to free up carpool-only spots at the main lot.

**Table 21. Summary statistics on carpool and alternative parking questions**

| ***Willing to…*** | ***Yes*** | ***No*** | ***I currently do this*** | ***I don't know*** |
|---|---|---|---|---|
| **Carpool to avoid parking fee** | 24.2% | 52.1% | 4.7% | 19.1% |
| **Carpool to obtain guaranteed space** | 27.8% | 49.1% | 4.2% | 18.9% |
| **Park 10-15 min walk away to obtained guaranteed space** | 40.6% | 31.5% | 4.7% | 23.2% |

## Potential for Transit Access to Park-and-Ride Facilities

One potential strategy to improve the person efficiency of parking spaces at park and ride lots is to entice single-occupant vehicles to access the park and ride through local transit vehicles (e.g., buses). However, local buses may not be a feasible option for many travelers due to their trip origin and location of current local transit routes: if transit service is not available at their origin, they must drive (often alone) to the nearest park and ride to access transit service. Thus, the impact of promoting transit to access park and rides will depend heavily on the origins of the travelers using each park and ride facility.

To assess the potential for transit use to increase parking efficiency, maps of the set of origins of all single-occupant drivers to each park and ride facility were created using the

origin information from the user intercept survey. These maps are included in Appendix C. These maps provide vital information on how single-occupant drivers may be served by current transit services and how service can be modified to provide these drivers with a transit option. As an example, consider the origins for these vehicles at the Tukwila International Boulevard Station shown in Figure 3. Each unique origin is shown by the red marker on the figure, and the relevant portions of the local bus lines serving this facility are drawn on the map. A significant fraction of origin markers lie either directly on the transit lines or very close by—drivers at these locations could potentially be served by transit if bus stops along these lines were located near the origin markers. Several origins are isolated and located well away from the park and ride facility, e.g., the set of origins directly east of the park and ride marker; it would probably not be feasible to dedicate transit service to serve these origins. However, a set of origins exist near the park and ride for which it might be easy to modify existing transit service to cover; e.g., the set of origins to the west of the park and ride marker.

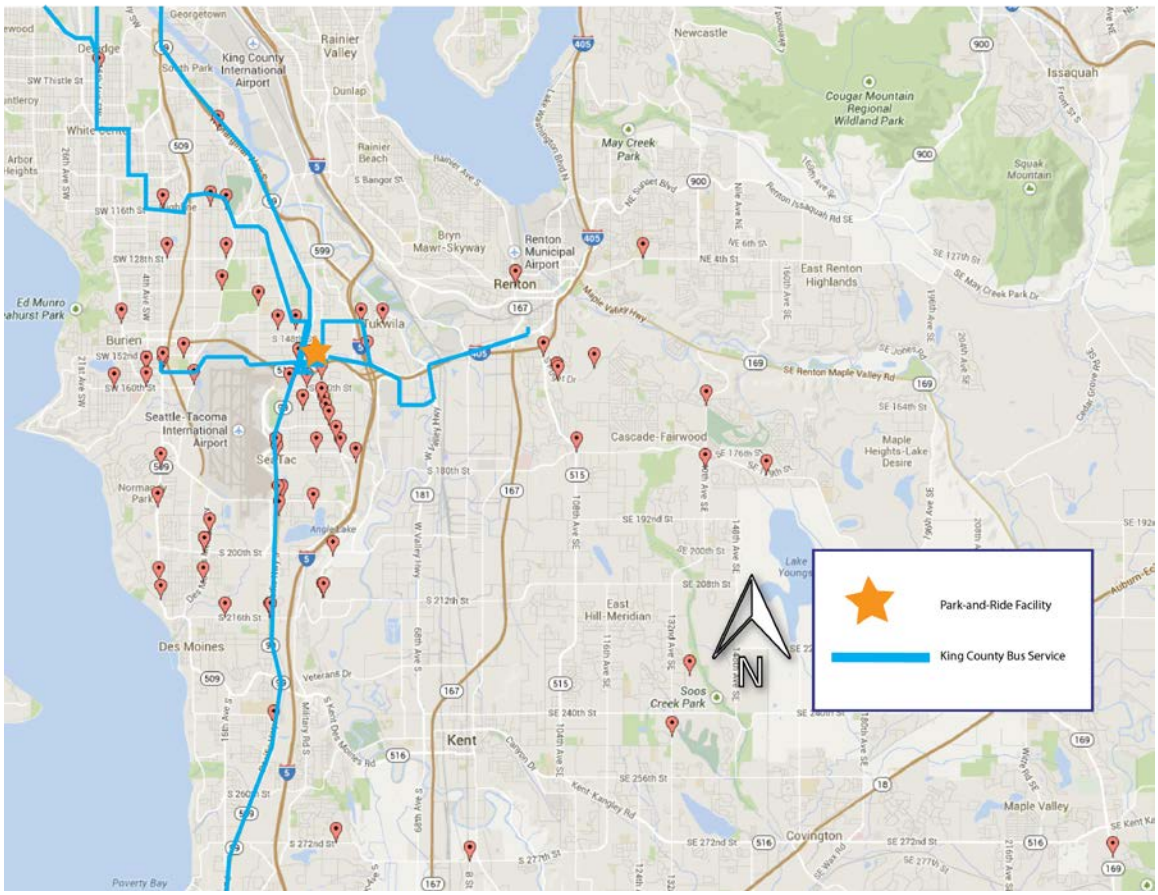



**Figure 3. Map of Tukwila International Boulevard Station with origins and transit routes**

For each of the maps provided in Appendix C, the number of origins near existing transit facilities was estimated and compared with the total number of origins available for drivers of single-occupant vehicles to those facilities. A summary of the results is provided in Table 22. Note that origin markers often overlap, since survey participants were only asked for the nearest major intersection to their origin; therefore, the number of origins listed in Table 22 is greater than the number of unique markers illustrated on the maps. Since each marker near a transit line was counted only once, the results in Table 22 are pessimistic, as multiple vehicle origins from a single marker location were counted only once. Furthermore, we only considered origins directly on transit routes or

immediately nearby. If travelers were willing to walk a short distance to access these transit lines, then even more origins could be served by existing transit routes.

**Table 22. Summary of origins with potential transit service**

| *Lot name* | *Number of unique origins* | *Number of origins along existing transit lines* | *Fraction with potential transit* |
|---|---|---|---|
| **Auburn** | 60 | 15 | 20.8% |
| **Eastgate** | 207 | 67 | 31.5% |
| **Federal Way TC** | 150 | 48 | 30.6% |
| **Issaquah Highlands** | 219 | 27 | 19.1% |
| **Issaquah TC** | 181 | 37 | 16.4% |
| **Kenmore** | 78 | 14 | 7.4% |
| **Lynnwood TC** | 135 | 24 | 29.6% |
| **Mercer Island** | 69 | 34 | 85.0% |
| **Overlake TC** | 37 | 18 | 20.7% |
| **Puyallup** | 86 | 23 | 24.7% |
| **South Everett** | 88 | 2 | 1.5% |
| **South Kirkland** | 126 | 38 | 63.3% |
| **Sumner** | 52 | 5 | 2.6% |
| **Tacoma Dome** | 162 | 33 | 36.3% |
| **Tukwila International Boulevard** | 90 | 20 | 44.4% |
| **Tukwila P&R** | 33 | 7 | 21.2% |
| **Tukwila Station** | 39 | 4 | 5.3% |

While these results are specific to the set of survey participants, there are some interesting insights. Several facilities have very high fractions of origins for which transit is possible. These include: Mercer Island, South Kirkland, and Tukwila International Boulevard Station. At these locations, the promotion of transit to access the park and rides may be a feasible way to improve park and ride efficiency. Furthermore, pricing strategies at these locations could be supplemented with transit map information to provide users with an alternative to avoid the parking fee and still use transit at the park and ride. Several other facilities have very little potential for transit as an alternative

access mode: Sumner, South Everett, Tukwila, and Kenmore. At these locations, pricing might be less palatable, as park and ride users do not have feasible transit alternatives to avoid paying the parking fee. Lastly, the maps provided in Appendix C might be useful when making changes to existing transit service to maximize the ability for drivers to access park and ride lots by transit.

## CONCLUSIONS AND RECOMMENDATIONS

Overall, this project collected and analyzed data at 17 of the busiest park and ride facilities in the Central Puget Sound Region, which help to provide a comprehensive understanding of how these facilities are used. There were a few major findings from this work. First, it appears that single-occupant vehicles tend to dominate parking spaces at these facilities. While this result is not unexpected, the empirical data provide a clear justification to implement strategies designed to improve the person efficiency of parking spaces at these lots. Second, people parking at the park and ride facilities tend to use the lots for transit purposes—very little non-transit use was noted. Of the transit uses, fixed-route transit (such as bus or train service) was dominant, although at several lots heavy carpool or vanpool use was noted. If these flexible transit uses are not desired, then steps will have to be taken to prohibit these uses. However, these informal uses still can lead to reduced amounts of car travel (and the associated reductions in negative car-related externalities), so alternative space should be provided for carpool and vanpool formations to occur if they are banned at the park and rides.

The responses to the user survey also revealed that park and ride users are generally not willing to pay to park. However, about a quarter of survey participants indicated that they would be willing to consider carpooling to avoid a parking fee, so pricing strategies may help to improve person efficiency at these lots if combined with a targeted carpool initiative. The survey data suggest that providing reserved carpool spaces and allowing carpools to avoid parking fees would generally have the same impact. Thus, providing these types of prioritization strategies at overcrowded lots should significantly improve

person occupancy of parking vehicles. Unfortunately, users did not indicate that improving bicycle and pedestrian access/facilities would significantly improve travel to the park and ride lots by these modes. Instead, it appears that resources to improve these facilities should be dedicated elsewhere if improved parking occupancy is the primary objective.

Another way to improve efficiency is to divert single-occupant vehicles to transit alternatives to access the park and ride. This would free up parking spaces at these overutilized locations, which can then be dedicated to carpool vehicles to provide them with priority. As suggested by the data here, there are significant fractions of single-occupant drivers who have feasible alternatives using existing transit routes. Minor modifications to these routes might be able to provide even further improvements.

The following recommendations are made to help improve person efficiency at overcrowded park and ride facilities as a result of this study:

1. Implement parking fees for single-occupant vehicles to disincentivize their use. As discussed here, more users are generally opposed to parking fees, so this strategy has the potential to engender a significant modal shift to multi-occupant vehicles. However, this strategy needs to be combined with the targeted promotion of carpooling as a means to avoid the parking fees. Furthermore, allowing park and ride users to pay these fees using their ORCA cards might make them more willing to pay, since a large fraction of users received some sort of ORCA card subsidy. By not allowing ORCA cards to be used for parking fees,

individual users would become more sensitive to the pricing strategy and might be more willing to carpool to avoid the fee. This option is relatively inexpensive to implement, given that it also provides a revenue stream for any costs that will be incurred.

2. Dedicate a portion of parking spaces at each lot for multi-occupant vehicle use only. At overcrowded facilities, the availability of spaces dedicated to carpool users will help to engender a modal shift. While the number of dedicated spaces needed at each lot will need to be determined, one strategy could be to set the number of dedicated carpool spaces in such a way so that there is always at least one carpool spot available at each lot. As more people start to carpool over time, this number would have to increase. This strategy could be implemented by having carpool users register ahead of time and providing them with a unique identifying marker (e.g., decal or hang tag). This would ensure that the strategy could be enforced in a feasible way. This strategy is also relatively inexpensive, although resources would be needed to implement the permit program and for enforcement. This strategy might work well with the parking fees, as the fees might provide a revenue stream for this strategy.
3. Implement parking permits that allow park and ride users (especially those in multi-occupant vehicles) to reserve parking spaces within the lots. This is similar to the previous strategy in that users could purchase or reserve permits for individual spots for parking spaces at each facility. To promote carpooling to the park and rides, the permits could be available for only multi-occupant vehicles or could be discounted for multiple-occupant vehicles. Enforcement would be

needed to make sure that only the permitted vehicles are allowed to park in the designated spaces. This strategy would require some monetary investment, but this could be recouped from fees to rent or purchase the parking permits.

4. Revise local transit service near these locations to increase the fraction of drivers that have feasible transit options to the park and rides. This type of strategy could easily be included in the annual transit service planning updates done for each transit agency. In most cases, existing routes would not need to be significantly modified. Instead, minor adjustments (such as adding new stops along the route) could have a large potential impact. However, this strategy needs to be combined with a targeted promotional plan to inform drivers of the new transit options. Combining this strategy with parking fees would magnify its impact. This strategy would be costly to implement on its own. However, consideration of park and ride access can be included in normal service planning.
5. Examine the use of parking at available lots near the park and ride facilities for overflow or single-occupant vehicle parking. Many of the park and rides are in dense suburban areas near large shopping malls or multi-family housing complexes with a surplus of empty parking spaces during the day. Since survey respondents indicated that they will not mind walking 10-15 minutes for a reserved parking spot, and would even be willing to pay for it, this is a strategy with potential to help free up spaces reserved for carpools at the main lots. This strategy would require significant resources to implement and enforce. Parking fees at the park and rides might not cover these costs alone. However, additional fees at the overflow lots could provide additional revenue for this type of strategy.

## REFERENCES


1. Allen, G.Q., Lipton, S.G., and Brooke, B. (1999), Unique voucher programs to increase alternative commuting. *Transportation Research Record*, No. 1669, pp. 136-142.
2. American Public Transportation Association (2012), *2012 Public Transportation Fact Book. Appendix A: Historical Tables*, Washington, DC.
3. Anderson, S. (2005), Gas prices encourage van-pooling in Texas. *TDM Review*, Vol. 8, No. 4, pp. 10-11.
4. Beroldo, S. (1990), Casual car-pooling in the San Francisco Bay Area. *Transportation Quarterly*, Vol. 44, No. 1, pp. 133-150.
5. 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.
6. 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.
7. Cassidy, M.J, Jang, K., and Daganzo, C.F. (2010), The smoothing effect of car-pool lanes on freeway bottlenecks. *Transportation Research Part A*, Vol. 44, No. 2, pp. 65-75.
8. Cassidy, M.J., Daganzo, C.F., Jang, K., and Chung, K. (2009), Spatiotemporal effects of segregating different vehicle classes on separate lanes. *Proceedings of the 18th International Symposium on Transportation and Traffic Theory*, pp. 57-74.

9. Cervero, R. (2002), Induced travel demand: Research design, empirical evidence, and normative policies. *Journal of Planning Literature*, Vol. 17, No. 1, pp. 3-20.
10. Chen, C., Varaiya, P., and Kwon, J. (2005), An empirical assessment of traffic operations. *Proceedings of the 16th International Symposium of Transportation and Traffic Theory*, pp. 1-36.
11. Concas, S., Winters, P., and Wambalaba, F.W. (2005), Fare pricing elasticity, subsidies, and demand for van-pool services. *Transportation Research Record*, No. 1924, pp. 215-223.
12. Dahlgren, J. (1998), High occupancy vehicle lanes: Not always more effective than general purpose lanes. *Transportation Research Part A*, Vol. 32, No. 2, pp. 99-114.
13. Guler, S.I., and Cassidy, M.J. (2012), Strategies for sharing bottleneck capacity among buses and cars. *Transportation Research Part B*, Vol. 46B, No. 1, pp. 1334-1345.
14. 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.
15. Hess, D.B. (2001), Effect of free parking on commuter mode choice. *Transportation Research Record*, No. 1753, pp. 35-42.
16. 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.

17. King County Metro Transit (2014), *Park-and-Ride Utilization Report*, First Quarter 2014. King County Department of Transportation.
18. Koppelman, F.S., Bhat, C.R., and Schofer, J.L. (1993), Market research evaluations of actions to reduce suburban traffic congestion: Commuter travel behavior and response to demand reduction actions. *Transportation Research Part A*, Vol. 27, No. 5, pp. 383-393.
19. Lovrich, N., Nice, D., and Weber, E. (1999), *Benefits and costs associated with the WSDOT CTR program*. Washington DOT Technical Report No. WA-RD 468.1.
20. Meek, S., Ison, S., and Enoch, M. (2008), Role of bus-based park and ride in the UK: A temporal and evaluative review. *Transport Reviews*, Vol. 28, No. 6, pp. 781-803.
21. 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.
22. Minett, P. (2013), *Flexible car-pooling to transit stations*. Transit Cooperative Research Program, Transit IDEA Project Report Number 61, Transportation Research Board, Washington, DC.
23. 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.
24. 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.

25. Rudjanakanoknad, J. (2011), Ridesharing in Bangkok: Situation, obstacles, and opportunity. *Proceedings of the 90th Annual Meeting of the Transportation Research Board*, Washington, D.C.
26. 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.
27. 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.
28. Taylor, K.W. and Gren, T. (2010), Construction traffic mitigation demand management evaluation: I-405 South Bellevue and Renton Stage 1, WSDOT Public Transportation Division Report.
29. Texas Transportation Institute (1998), *HOV systems manual*. NCHRP Report 414.
30. Turnbull, K. (1995), *Effective use of park and ride facilities*. NCHRP Synthesis of Highway Practice Report No. 213.
31. Ungemah, D.H., Rivers, M., and Anderson, S. (2006), The world can be flat: Case study of flat-rate pricing for van-pool operations. *Transportation Research Record*, No. 1956, pp. 30-33.
32. Valdez, R., and Arce, C. (1990), Comparison of travel behavior and attitudes of ridesharers, solo drivers, and the general commuter population. *Transportation Research Record*, No. 1285, pp. 105-108.

33. Viegas, J., and Lu, B. (2001), Widening the scope for bus priority with intermittent bus lanes. *Transportation Planning and Technology*, Vol. 24, No. 2, pp. 87-110.

34. Viegas, J., Roque, R., Lu, B., and Vieira, J. (2007), The intermittent bus lane system: Demonstration in Lisbon. *Proceedings of the 86th Annual Meeting of the Transportation Research Board, Washington, D.C.*

35. Washbrook, K., Haider, W., and Jaccard, M. (2006), Estimating commuter mode choice: A discrete choice analysis of the impact of road pricing and parking charges. *Transportation*, Vol. 33, pp. 621-639.

# APPENDICES

# APPENDIX A – USER INTERCEPT SURVEY

*Date*: _____ *Location*: _____

WSDOT, Sound Transit and King County Metro would like your help answering survey questions to improve park and ride lots in our state. The survey, being conducted by The Pennsylvania State University, contains questions about how, when, and why you use park and rides along with demographic questions, such as education and income level. We appreciate your assistance. Your participation is completely voluntary and your responses will be kept confidential. You may stop the survey at any point or skip questions you don't want to answer.

1. **Do you have an ORCA card?**
   ☐ Yes ☐ No

2. **Does your employer/school/other entity pay for some or all of your ORCA card or other alternative commuting methods?**
   ☐ Yes, they pay for all or most ☐ Yes, they pay for some ☐ No, they pay none

3. **Where did your current trip begin (before you got to the park and ride)?**
   Nearest main intersection: _____
   City: _____

4. **Where will your current trip end (after you leave the park and ride)?**
   Nearest main intersection: _____
   City: _____

5. **Approximately what time did you start your trip to the park and ride?** _____

6. **Approximately what time will you arrive at your final destination?** _____

7. **If you were to drive from your origin to destination directly, how long do you think it would take?**
   In no or light traffic: _____ minutes In rush-hour traffic: _____ minutes

8. **What is the purpose of this trip?**
   ☐ Work ☐ School ☐ Errands
   ☐ Shopping ☐ Appointment ☐ Other–Please specify: _____

9. **How did you get to this park and ride this morning?**
   ☐ Drove alone ☐ Vanpooled ☐ Carpooled (two or more people)
   ☐ Walked ☐ Bicycled ☐ Bus route: _____
   ☐ Train ☐ Dropped off ☐ Other–Please specify: _____

10. **How will you leave this park and ride this morning?**
    ☐ Drive alone ☐ Vanpool ☐ Carpool (two or more people)
    ☐ Walk ☐ Bicycle ☐ Bus route: _____
    ☐ Train ☐ Picked up ☐ Other–Please specify: _____

11. **In general, why do you use park and rides? CHECK ALL THAT APPLY!**
    ☐ No parking at destination ☐ To save money
    ☐ Driving takes too long ☐ I can work/relax while riding transit
    ☐ Environmental reasons
    ☐ Other–Please specify: _____

**12. Why do you use this specific park and ride? CHECK ALL THAT APPLY!**

☐ It is the closest park and ride ☐ It is the closest transit location
☐ Provides express transit ☐ Better security than others
☐ Better amenities than others
☐ No parking available at my preferred park and ride, which is: _____
☐ Other–Please specify: _____

**13. If parking at this park and ride was not available, what would you do instead?**

☐ Drive to destination ☐ Return home ☐ Not sure
☐ Use another park and ride, most likely: _____
☐ Park nearby (either on the street or parking lot that is not park and ride)
☐ Other–Please specify: _____

**14. If more bicycle lockers were available here, would you be more willing to bike to this park and ride?**

☐ Yes ☐ No ☐ I currently bike to the park and ride

**15. If better pedestrian and bicycle access was available here, would you be more willing to walk or bike to this park and ride?**

☐ Yes ☐ No ☐ I currently walk or bike to the park and ride

**16. Would you still park at this park and ride if a parking fee was implemented?**

☐ No Yes, I would pay: ☐ $1/day ☐ $2/day ☐ $3/day ☐ $4/day ☐ $5/day ☐ $ ____/day

**17. Would you consider carpooling to this park and ride if carpools did not have to pay the fee?**

☐ Yes ☐ No
☐ I already carpool to the park and ride ☐ I don't know

**18. Would you be willing to use another park and ride 10-15 minutes away with the same transit service to avoid paying a parking fee here?**

☐ Yes ☐ No ☐ I sometimes do

**19. What is the maximum amount that you would be willing to pay to GUARANTEE a parking space at this park and ride?**

☐ $0/day ☐ $1/day ☐ $2/day ☐ $3/day ☐ $4/day ☐ $5/day ☐ $ ____/day

**20. Would you consider carpooling to this park and ride if carpools were GUARANTEED a space at no charge?**

☐ Yes ☐ No
☐ I already carpool ☐ I don't know

**21. If you have trouble finding parking here, would you be willing to park a 5-10 minute walk away if GUARANTEED parking spaces were available there?**

☐ Yes ☐ No ☐ I already do ☐ I don't have trouble finding parking now

If so, what is the maximum you would be willing to pay for this GUARANTEED parking space?

☐ $1/day ☐ $2/day ☐ $3/day ☐ $4/day ☐ $5/day ☐ $ ____/day

**22. How many days a week do you use this park and ride?**

☐ 1 ☐ 2 ☐ 3 ☐ 4 ☐ 5+ ☐ Less than once per week

**23. How many working vehicles are in your household?**

☐ 0 ☐ 1 ☐ 2 ☐ 3+

**24. What is your age?**

☐ 18-24 ☐ 25-34 ☐ 35-44
☐ 45-54 ☐ 55+ ☐ No response

**25. What is your gender?**

☐ Male ☐ Female ☐ No response

**26. Including yourself, how many people are in your household?**

☐ 1 ☐ 2 ☐ 3 ☐ 4 ☐ 5 ☐ 6 ☐ 7+

**27. What is your total household income?**

☐ $0 - $29,999 ☐ $30,000 - $59,999 ☐ $60,000 - $89,999
☐ $90,000 - $119,999 ☐ $120,000 - $149,999 ☐ $150,000+
☐ No Response

**28. What is the highest level of education that you have achieved?**

☐ Less than high school ☐ High school diploma
☐ Some college ☐ Bachelor's degree
☐ Post Bachelor's degree ☐ No response

**29. Do you identify yourself as a member of any of the following minority groups; and if so, which?**

☐ No/No response ☐ Asian
☐ Black or African American ☐ Hispanic or Latino
☐ Native Hawaiian or Pacific Islander ☐ American Indian or Alaskan Native

Thank you for taking the survey! Your answers will help in our research efforts as we work to improve park and rides for the future.

Washington State Department of Transportation

SOUNDTRANSIT

King County

## APPENDIX B – SUMMARY STATISTICS OF SURVEY DATA

Question 1: "Do you have an ORCA card?"

| *Overall* | *Yes* | *No* | *Total* |
|---|---|---|---|
| **Frequency** | 3,070 | 196 | 3,266 |
| **Percent** | 94.00 | 6.00 | 100 |

| *By Mode* | *Yes* | *No* | *Total* |
|---|---|---|---|
| **Both** | 89.15 | 10.85 | 100 |
| **Bus** | 94.35 | 5.65 | 100 |
| **Train** | 94.58 | 5.42 | 100 |

| *By Location* | *Yes* | *No* |
|---|---|---|
| **Auburn** | 96.49 | 3.51 |
| **Eastgate** | 95.27 | 4.73 |
| **Federal Way TC** | 95.04 | 4.96 |
| **Issaquah Highlands** | 92.6 | 7.4 |
| **Issaquah TC** | 95.74 | 4.26 |
| **Kenmore** | 92.31 | 7.69 |
| **Lynnwood TC** | 96.03 | 3.97 |
| **Mercer Island** | 99.07 | 0.93 |
| **Overlake TC** | 91.14 | 8.86 |
| **Puyallup** | 95.03 | 4.97 |
| **South Everett** | 97.32 | 2.68 |
| **South Kirkland** | 88.99 | 11.01 |
| **Sumner** | 95.45 | 4.55 |
| **Tacoma Dome** | 89.15 | 10.85 |
| **Tukwila International Boulevard** | 92.46 | 7.54 |
| **Tukwila P&R** | 93.94 | 6.06 |
| **Tukwila Station** | 93.33 | 6.67 |
| **Total** | 94.00 | 6.00 |

Question 2: "Does your employer/school/other entity pay for some or all of your ORCA card or other alternative commuting methods?"

| *Overall* | *Pay all or most* | *Pay for Some* | *Pay None* | *Total* |
|---|---|---|---|---|
| **Freq.** | 1,841 | 704 | 740 | 3,285 |
| **Percent** | 56.04 | 21.43 | 22.53 | 100 |

| *By Mode* | *Pay all or most* | *Pay for Some* | *Pay None* | *Total* |
|---|---|---|---|---|
| **Both** | 56.76 | 20.46 | 22.78 | 100 |
| **Bus** | 55.95 | 21.5 | 22.55 | 100 |
| **Train** | 56.07 | 21.56 | 22.37 | 100 |
| **Total** | 56.04 | 21.43 | 22.53 | 100 |

| *By Location* | *Pay all or most* | *Pay for Some* | *Pay None* | *Total* |
|---|---|---|---|---|
| **Auburn** | 62.94 | 16.47 | 20.59 | 100 |
| **Eastgate** | 57.69 | 22.19 | 20.12 | 100 |
| **Federal Way TC** | 54.8 | 18.51 | 26.69 | 100 |
| **Issaquah Highlands** | 60.71 | 22.7 | 16.58 | 100 |
| **Issaquah TC** | 59.43 | 18.51 | 22.06 | 100 |
| **Kenmore** | 54.7 | 27.35 | 17.95 | 100 |
| **Lynnwood TC** | 52.16 | 20.93 | 26.91 | 100 |
| **Mercer Island** | 58.88 | 20.56 | 20.56 | 100 |
| **Overlake TC** | 53.16 | 21.52 | 25.32 | 100 |
| **Puyallup** | 58.13 | 20 | 21.88 | 100 |
| **South Everett** | 53.69 | 18.12 | 28.19 | 100 |
| **South Kirkland** | 49.54 | 25.46 | 25 | 100 |
| **Sumner** | 53.79 | 26.52 | 19.7 | 100 |
| **Tacoma Dome** | 56.76 | 20.46 | 22.78 | 100 |
| **Tukwila International Boulevard** | 44.9 | 25 | 30.1 | 100 |
| **Tukwila P&R** | 50.00 | 28.13 | 21.88 | 100 |
| **Tukwila Station** | 69.33 | 18.67 | 12.00 | 100 |
| **Total** | 56.13 | 21.37 | 22.51 | 100 |

Question 8: "What is the purpose of this trip?"

| *Overall* | *Work* | *School* | *Errands* | *Shopping* | *Appointment* | *Other* | *Total* |
|---|---|---|---|---|---|---|---|
| **Freq.** | 3,095 | 106 | 40 | 10 | 5 | 23 | 3,250 |
| **Percent** | 94.39 | 3.23 | 1.22 | 0.30 | 0.15 | 0.70 | 100 |

| *By Mode* | *Work* | *School* | *Errands* | *Shopping* | *Appointment* | *Other* |
|---|---|---|---|---|---|---|
| **Both** | 94.19 | 1.94 | 2.33 | 0.39 | 0 | 1.16 |
| **Bus** | 94.03 | 3.60 | 1.27 | 0.31 | 0.13 | 0.66 |
| **Train** | 95.56 | 2.56 | 0.67 | 0.27 | 0.27 | 0.67 |
| **Total** | 94.39 | 3.23 | 1.22 | 0.30 | 0.15 | 0.70 |

| *By Location* | *Work* | *School* | *Errands* | *Shopping* | *Appointment* | *Other* |
|---|---|---|---|---|---|---|
| **Auburn** | 97.04 | 1.78 | 0.59 | 0 | 0.59 | 0 |
| **Eastgate** | 95.56 | 2.37 | 1.48 | 0 | 0 | 0.59 |
| **Federal Way TC** | 96.06 | 2.15 | 1.43 | 0 | 0 | 0.36 |
| **Issaquah Highlands** | 96.71 | 2.28 | 0.51 | 0 | 0 | 0.51 |
| **Issaquah TC** | 97.52 | 1.06 | 0.71 | 0 | 0 | 0.71 |
| **Kenmore** | 93.22 | 0.85 | 4.24 | 0.85 | 0.85 | 0 |
| **Lynnwood TC** | 86.16 | 10.03 | 1.38 | 1.04 | 0.35 | 1.04 |
| **Mercer Island** | 94.29 | 2.86 | 1.9 | 0 | 0 | 0.95 |
| **Overlake TC** | 92.5 | 3.75 | 2.5 | 0 | 1.25 | 0 |
| **Puyallup** | 95.73 | 2.44 | 0.61 | 0 | 0.61 | 0.61 |
| **South Everett** | 96.53 | 2.78 | 0.69 | 0 | 0 | 0 |
| **South Kirkland** | 88.84 | 6.98 | 0.93 | 1.4 | 0 | 1.86 |
| **Sumner** | 97.79 | 2.21 | 0 | 0 | 0 | 0 |
| **Tacoma Dome** | 94.19 | 1.94 | 2.33 | 0.39 | 0 | 1.16 |
| **Tukwila International Boulevard** | 90.95 | 4.52 | 1.51 | 1.01 | 0 | 2.01 |
| **Tukwila P&R** | 96.97 | 3.03 | 0 | 0 | 0 | 0 |
| **Tukwila Station** | 100 | 0 | 0 | 0 | 0 | 0 |
| **Total** | 94.39 | 3.23 | 1.22 | 0.30 | 0.15 | 0.70 |

Question 9: "How did you get to this park and ride this morning?"

| *Overall* | *Freq.* | *Percent* |
|---|---|---|
| **Drive Alone** | 2,418 | 73.90 |
| **Walked** | 156 | 4.77 |
| **Train** | 4 | 0.12 |
| **Vanpooled** | 17 | 0.52 |
| **Bicycled** | 26 | 0.79 |
| **Dropped off** | 222 | 6.78 |
| **Carpooled** | 162 | 4.95 |
| **Bus** | 257 | 7.85 |
| **Other** | 10 | 0.31 |
| **Total** | 3,272 | 100 |

| *By Mode* | *Both* | *Bus* | *Train* | *Total* |
|---|---|---|---|---|
| **Drive Alone** | 84.11 | 76.17 | 63.44 | 73.90 |
| **Walked** | 0.00 | 5.02 | 5.65 | 4.77 |
| **Train** | 0.78 | 0.04 | 0.13 | 0.12 |
| **Vanpooled** | 0.39 | 0.62 | 0.27 | 0.52 |
| **Bicycled** | 1.16 | 0.75 | 0.81 | 0.79 |
| **Dropped off** | 5.81 | 5.86 | 9.95 | 6.78 |
| **Carpooled** | 2.71 | 4.93 | 5.78 | 4.95 |
| **Bus** | 4.26 | 6.43 | 13.44 | 7.85 |
| **Other** | 0.78 | 0.18 | 0.54 | 0.31 |

| *By Location* | *Drive Alone* | *Walked* | *Train* | *Vanpooled* | *Bicycled* | *Dropped off* | *Carpooled* | *Bus* | *Other* |
|---|---|---|---|---|---|---|---|---|---|
| **Auburn** | 55.29 | 5.29 | 0.59 | 0.59 | 0 | 10.59 | 4.71 | 22.35 | 0.59 |
| **Eastgate** | 75.37 | 2.08 | 0 | 1.48 | 0.59 | 5.34 | 5.34 | 9.79 | 0 |
| **Federal Way TC** | 77.34 | 2.52 | 0.36 | 0.36 | 0.72 | 7.19 | 5.4 | 5.04 | 1.08 |
| **Issaquah Highlands** | 80.41 | 7.89 | 0 | 1.53 | 0.76 | 3.82 | 4.58 | 1.02 | 0 |
| **Issaquah TC** | 87.9 | 2.14 | 0 | 0.36 | 0.36 | 3.56 | 3.91 | 1.78 | 0 |
| **Kenmore** | 78.99 | 5.88 | 0 | 0.84 | 0.84 | 5.88 | 5.04 | 2.52 | 0 |
| **Lynnwood TC** | 62.5 | 5.21 | 0 | 0 | 1.04 | 9.38 | 4.86 | 17.01 | 0 |
| **Mercer Island** | 76.64 | 11.21 | 0 | 0 | 0.93 | 3.74 | 5.61 | 1.87 | 0 |
| **Overlake TC** | 60 | 13.75 | 0 | 0 | 0 | 10 | 11.25 | 5 | 0 |
| **Puyallup** | 64.85 | 7.27 | 0 | 0.61 | 1.21 | 9.09 | 4.24 | 12.12 | 0.61 |
| **South Everett** | 77.62 | 6.99 | 0 | 0 | 2.1 | 9.09 | 2.8 | 1.4 | 0 |
| **South Kirkland** | 73.46 | 3.32 | 0 | 0 | 0.47 | 2.84 | 5.21 | 14.22 | 0.47 |
| **Sumner** | 54.07 | 4.44 | 0 | 0 | 1.48 | 9.63 | 10.37 | 19.26 | 0.74 |
| **Tacoma Dome** | 84.11 | 0 | 0.78 | 0.39 | 1.16 | 5.81 | 2.71 | 4.26 | 0.78 |
| **Tukwila International Boulevard** | 66.33 | 7.54 | 0 | 0 | 0.5 | 13.57 | 3.52 | 8.04 | 0.5 |
| **Tukwila P&R** | 81.82 | 3.03 | 0 | 0 | 0 | 15.15 | 0 | 0 | 0 |
| **Tukwila Station** | 88 | 0 | 0 | 0 | 1.33 | 1.33 | 9.33 | 0 | 0 |
| **Total** | 73.90 | 4.77 | 0.12 | 0.52 | 0.79 | 6.78 | 4.95 | 7.85 | 0.31 |

Question 10: "How will you leave this park and ride this morning?".

| *Overall* | *Freq.* | *Percent* |
|---|---|---|
| **Drive Alone** | 21 | 0.64 |
| **Walked** | 91 | 2.79 |
| **Train** | 663 | 20.35 |
| **Vanpooled** | 90 | 2.76 |
| **Bicycled** | 2 | 0.06 |
| **Dropped off** | 5 | 0.15 |
| **Carpooled** | 15 | 0.46 |
| **Bus** | 2.,351 | 72.16 |
| **Other** | 20 | 0.61 |
| **Total** | 3,258 | 100 |

| *By Mode* | *Both* | *Bus* | *Train* | *Total* |
|---|---|---|---|---|
| **Drive Alone** | 1.16 | 0.71 | 0.27 | 0.64 |
| **Walked** | 5.04 | 1.90 | 4.72 | 2.79 |
| **Train** | 15.12 | 0.13 | 83.81 | 20.35 |
| **Vanpooled** | 0.78 | 3.72 | 0.54 | 2.76 |
| **Bicycled** | 0 | 0.04 | 0.13 | 0.06 |
| **Dropped off** | 0 | 0.18 | 0.13 | 0.15 |
| **Carpooled** | 0 | 0.35 | 0.94 | 0.46 |
| **Bus** | 75.19 | 92.65 | 8.64 | 72.16 |
| **Other** | 2.71 | 0.31 | 0.81 | 0.61 |

| *By Location* | *Drive Alone* | *Walked* | *Train* | *Vanpooled* | *Bicycled* | *Picked Up* | *Carpooled* | *Bus* | *Other* |
|---|---|---|---|---|---|---|---|---|---|
| **Auburn** | 1.18 | 4.14 | 79.88 | 0.59 | 0 | 0 | 1.18 | 12.43 | 0.59 |
| **Eastgate** | 0.89 | 1.79 | 0.3 | 6.85 | 0 | 0 | 1.19 | 88.39 | 0.6 |
| **Federal Way TC** | 1.09 | 0.36 | 0 | 0 | 0 | 0.73 | 0 | 97.09 | 0.73 |
| **Issaquah Highlands** | 0.51 | 3.3 | 0.25 | 11.17 | 0 | 0.25 | 0 | 84.52 | 0 |
| **Issaquah TC** | 0 | 2.15 | 0 | 1.79 | 0 | 0 | 0.36 | 95.7 | 0 |
| **Kenmore** | 0 | 2.52 | 0 | 5.04 | 0 | 0 | 0 | 92.44 | 0 |
| **Lynnwood TC** | 0 | 1.76 | 0 | 0 | 0 | 0 | 0.35 | 97.54 | 0.35 |
| **Mercer Island** | 0 | 2.83 | 0 | 0 | 0 | 0 | 0 | 97.17 | 0 |
| **Overlake TC** | 5 | 5 | 1.25 | 0 | 0 | 0 | 0 | 87.5 | 1.25 |
| **Puyallup** | 0 | 7.32 | 81.1 | 1.22 | 0.61 | 0 | 0 | 9.15 | 0.61 |
| **South Everett** | 0.69 | 0 | 0 | 0 | 0 | 0.69 | 0 | 98.61 | 0 |
| **South Kirkland** | 1.44 | 0.48 | 0 | 2.39 | 0.48 | 0 | 0.96 | 94.26 | 0 |
| **Sumner** | 0 | 2.96 | 84.44 | 0.74 | 0 | 0 | 0.74 | 11.11 | 0 |
| **Tacoma Dome** | 1.16 | 5.04 | 15.12 | 0.78 | 0 | 0 | 0 | 75.19 | 2.71 |
| **Tukwila International Boulevard** | 0 | 5.03 | 87.94 | 0 | 0 | 0.5 | 1.51 | 3.02 | 2.01 |
| **Tukwila P&R** | 0 | 3.03 | 0 | 3.03 | 0 | 0 | 0 | 90.91 | 3.03 |
| **Tukwila Station** | 0 | 2.7 | 86.49 | 0 | 0 | 0 | 1.35 | 9.46 | 0 |
| **Total** | 0.64 | 2.79 | 20.35 | 2.76 | 0.06 | 0.15 | 0.46 | 72.16 | 0.61 |

Question 11: "In general, why do you use park and rides?"

| *Overall* | *# Responded with yes* | *% Responded with yes* |
|---|---|---|
| **No Parking** | 1,117 | 34.94 |
| **Driving Takes too long** | 1,435 | 44.89 |
| **Environmental** | 1,155 | 36.13 |
| **Save Money** | 2,462 | 77.06 |
| **Relax on Transit** | 1,902 | 59.56 |
| **Other** | 372 | 17.04 |

| *By Mode* | *No Parking* | *Driving Takes too long* | *Environmental* | *Save Money* | *Relax on Transit* | *Other* |
|---|---|---|---|---|---|---|
| **Both** | 37.31 | 40.38 | 37.31 | 82.69 | 62.69 | 10.97 |
| **Bus** | 35.71 | 46.45 | 36.25 | 76.72 | 59.84 | 17.72 |
| **Train** | 31.65 | 41.63 | 35.30 | 76.06 | 57.52 | 16.96 |
| **Total** | 34.94 | 44.89 | 36.13 | 77.06 | 59.56 | 17.04 |

| *By Location* | *No Parking* | *Driving Takes too long* | *Environmental* | *Save Money* | *Relax on Transit* | *Other* |
|---|---|---|---|---|---|---|
| **Auburn** | 34.76 | 39.02 | 39.02 | 76.83 | 60.98 | 13.99 |
| **Eastgate** | 39 | 48.39 | 37.83 | 76.54 | 60.7 | 15.56 |
| **Federal Way TC** | 34.07 | 36.67 | 38.89 | 80.37 | 59.26 | 19.13 |
| **Issaquah Highlands** | 33.93 | 45.66 | 36.73 | 80.56 | 61.99 | 15.38 |
| **Issaquah TC** | 38.16 | 54.77 | 40.28 | 77.03 | 65.37 | 10.43 |
| **Kenmore** | 40.83 | 50 | 30.83 | 75 | 65 | 10.29 |
| **Lynnwood TC** | 30.87 | 43.04 | 31.74 | 72.17 | 52.61 | 32.92 |
| **Mercer Island** | 35.19 | 47.22 | 27.78 | 72.22 | 51.85 | 11.11 |
| **Overlake TC** | 36.25 | 41.25 | 43.75 | 88.75 | 66.25 | 21.43 |
| **Puyallup** | 28.4 | 41.98 | 32.1 | 72.84 | 58.02 | 19.31 |
| **South Everett** | 39.6 | 52.35 | 38.93 | 75.84 | 59.73 | 16.92 |
| **South Kirkland** | 33.18 | 46.82 | 31.82 | 69.09 | 57.27 | 22.94 |
| **Sumner** | 29.93 | 50.36 | 34.31 | 80.88 | 54.01 | 13.01 |
| **Tacoma Dome** | 37.31 | 40.38 | 37.31 | 82.69 | 62.69 | 10.97 |
| **Tukwila International Boulevard** | 33.14 | 36.05 | 36.05 | 73.26 | 59.3 | 21.01 |
| **Tukwila P&R** | 30.30 | 36.36 | 36.36 | 78.79 | 42.42 | 29.03 |
| **Tukwila Station** | 31.58 | 43.42 | 34.21 | 78.95 | 51.32 | 17.24 |
| **Total** | 34.94 | 44.89 | 36.13 | 77.06 | 59.56 | 17.04 |

Question 12: "Why do you use this specific park and ride?"

| *Overall* | *# Responded with yes* | *% Responded with yes* |
|---|---|---|
| **Closest Park and Ride** | 1,849 | 64.31 |
| **Express Transit** | 1,125 | 39.16 |
| **Better Amenities** | 209 | 7.28 |
| **No parking available** | 130 | 4.53 |
| **Closest transit location** | 744 | 25.91 |
| **Better Security** | 244 | 8.51 |
| **Other** | 451 | 15.89 |

| *By Mode* | *Closest Park and Ride* | *Express Transit* | *Better Amenities* | *No parking available* | *Closest transit location* | *Better Security* | *Other* |
|---|---|---|---|---|---|---|---|
| Both | 60.78 | 47.84 | 11.21 | 4.31 | 27.59 | 12.17 | 15.52 |
| Bus | 64.25 | 38.64 | 7.33 | 4.85 | 25.77 | 8.30 | 16.02 |
| Train | 65.76 | 37.67 | 5.75 | 3.63 | 25.72 | 7.87 | 15.63 |
| Total | 64.31 | 39.16 | 7.28 | 4.53 | 25.91 | 8.51 | 15.89 |

| *By Location* | *Closest Park and Ride* | *Express Transit* | *Better Amenities* | *No parking available* | *Closest transit location* | *Better Security* | *Other* |
|---|---|---|---|---|---|---|---|
| **Auburn** | 68.13 | 42.5 | 5.63 | 5 | 24.38 | 6.88 | 15.72 |
| **Eastgate** | 64.19 | 39.48 | 6.8 | 5.19 | 24.6 | 8.09 | 16.34 |
| **Federal Way TC** | 67.39 | 43.91 | 9.13 | 4.35 | 23.91 | 10.87 | 16.81 |
| **Issaquah Highlands** | 62.22 | 41.94 | 7.5 | 4.72 | 28.89 | 8.36 | 13.06 |
| **Issaquah TC** | 62.41 | 38.35 | 9.4 | 4.89 | 24.81 | 8.65 | 18.11 |
| **Kenmore** | 67.59 | 40.74 | 8.33 | 8.33 | 32.41 | 7.41 | 13.08 |
| **Lynnwood TC** | 61.72 | 30.48 | 7.62 | 6.19 | 23.81 | 5.29 | 23.56 |
| **Mercer Island** | 63.44 | 32.61 | 4.35 | 1.1 | 20.88 | 5.49 | 13.64 |
| **Overlake TC** | 71.83 | 45.07 | 8.45 | 0 | 19.72 | 11.27 | 11.59 |
| **Puyallup** | 60.42 | 36.81 | 8.33 | 2.08 | 25 | 9.72 | 14.69 |
| **South Everett** | 66.15 | 37.98 | 4.69 | 3.88 | 24.03 | 10.08 | 13.49 |
| **South Kirkland** | 65.22 | 33.88 | 4.92 | 4.92 | 30.6 | 8.2 | 12.57 |
| **Sumner** | 67.48 | 30.08 | 4.88 | 2.44 | 30.89 | 6.5 | 17.07 |
| **Tacoma Dome** | 60.78 | 47.84 | 11.21 | 4.31 | 27.59 | 12.17 | 15.52 |
| **Tukwila International Boulevard** | 67.68 | 33.54 | 5.49 | 4.88 | 26.83 | 7.93 | 19.51 |
| **Tukwila P&R** | 54.55 | 36.36 | 4.55 | 13.64 | 18.18 | 4.55 | 60.00 |
| **Tukwila Station** | 63.77 | 51.43 | 2.86 | 2.86 | 18.57 | 8.57 | 5.71 |
| **Total** | 64.31 | 39.16 | 7.28 | 4.53 | 25.91 | 8.51 | 15.89 |

Question 13: "If parking at this park and ride was not available, what would you do instead?"

| *Overall* | *# Responded with yes* | *% Responded with yes* |
|---|---|---|
| **Drive to Destination** | 834 | 29.47 |
| **Use another P&R** | 890 | 31.4 |
| **Park Nearby** | 557 | 19.68 |
| **Return Home** | 56 | 1.98 |
| **Not Sure** | 352 | 12.44 |
| **Other** | 261 | 9.22 |

| *By Mode* | *Drive to Destination* | *Use another P&R* | *Park Nearby* | *Return Home* | *Not Sure* | *Other* |
|---|---|---|---|---|---|---|
| **Both** | 27.75 | 34.80 | 18.94 | 1.32 | 13.66 | 5.73 |
| **Bus** | 29.87 | 31.61 | 20.13 | 1.54 | 12.14 | 9.89 |
| **Train** | 28.88 | 29.80 | 18.59 | 3.53 | 12.90 | 8.45 |
| **Total** | 29.47 | 31.45 | 19.68 | 1.98 | 12.44 | 9.22 |

| *By Location* | *Drive to Destination* | *Use another P&R* | *Park Nearby* | *Return Home* | *Not Sure* | *Other* |
|---|---|---|---|---|---|---|
| **Auburn** | 25.47 | 24.22 | 20.5 | 3.73 | 11.18 | 11.8 |
| **Eastgate** | 29.8 | 32.45 | 23.18 | 0.99 | 8.61 | 8.94 |
| **Federal Way TC** | 29.78 | 29.78 | 20 | 1.33 | 13.33 | 8.89 |
| **Issaquah Highlands** | 30.36 | 31.75 | 22.56 | 1.67 | 10.03 | 9.19 |
| **Issaquah TC** | 28.63 | 30.53 | 15.65 | 1.91 | 15.27 | 12.6 |
| **Kenmore** | 23.58 | 34.91 | 27.36 | 1.89 | 11.32 | 8.49 |
| **Lynnwood TC** | 30.19 | 29.72 | 16.51 | 1.42 | 10.38 | 15.57 |
| **Mercer Island** | 30.77 | 30.77 | 17.58 | 2.2 | 16.48 | 8.79 |
| **Overlake TC** | 25.71 | 45.71 | 20 | 0 | 10 | 4.29 |
| **Puyallup** | 28.26 | 34.06 | 15.22 | 2.9 | 17.39 | 7.97 |
| **South Everett** | 32.8 | 35.2 | 16.8 | 0 | 14.4 | 7.2 |
| **South Kirkland** | 36.52 | 25.84 | 17.98 | 2.81 | 14.61 | 9.55 |
| **Sumner** | 37.5 | 28.33 | 15.83 | 3.33 | 14.17 | 5.83 |
| **Tacoma Dome** | 27.75 | 34.8 | 18.94 | 1.32 | 13.66 | 5.73 |
| **Tukwila International Boulevard** | 28.22 | 28.22 | 21.47 | 2.45 | 11.66 | 9.2 |
| **Tukwila P&R** | 4.55 | 36.36 | 40.91 | 4.55 | 22.73 | 4.55 |
| **Tukwila Station** | 24.64 | 40.58 | 18.84 | 7.25 | 8.70 | 4.35 |
| **Total** | 29.47 | 31.45 | 19.68 | 1.98 | 12.44 | 9.22 |

Question 14: "If more bicycle lockers were available here, would you be more willing to bike to this park and ride?"

| *Overall* | *Freq.* | *Percent* |
|---|---|---|
| **Yes** | 322 | 11.62 |
| **No** | 2,406 | 86.80 |
| **I already bike** | 44 | 1.59 |
| **Total** | 2,772 | 100 |

| *By Mode* | *Yes* | *No* | *I already bike* |
|---|---|---|---|
| **Both** | 10.57 | 88.11 | 1.32 |
| **Bus** | 11.26 | 87.01 | 1.73 |
| **Train** | 13.05 | 85.69 | 1.26 |
| **Total** | 11.62 | 86.80 | 1.59 |

| *By Location* | *Yes* | *No* | *I already bike* |
|---|---|---|---|
| **Auburn** | 14.74 | 83.97 | 1.28 |
| **Eastgate** | 13.33 | 86 | 0.67 |
| **Federal Way TC** | 10.76 | 85.65 | 3.59 |
| **Issaquah Highlands** | 11.59 | 86.96 | 1.45 |
| **Issaquah TC** | 9.88 | 88.54 | 1.58 |
| **Kenmore** | 5.66 | 91.51 | 2.83 |
| **Lynnwood TC** | 10.19 | 88.83 | 0.97 |
| **Mercer Island** | 9.09 | 90.91 | 0 |
| **Overlake TC** | 12.12 | 86.36 | 1.52 |
| **Puyallup** | 16.55 | 82.73 | 0.72 |
| **South Everett** | 8.06 | 89.52 | 2.42 |
| **South Kirkland** | 18.18 | 78.98 | 2.84 |
| **Sumner** | 7.76 | 89.66 | 2.59 |
| **Tacoma Dome** | 10.57 | 88.11 | 1.32 |
| **Tukwila International Boulevard** | 13.75 | 85 | 1.25 |
| **Tukwila P&R** | 4.55 | 95.45 | 0 |
| **Tukwila Station** | 9.23 | 90.77 | 0 |
| **Total** | 11.62 | 86.80 | 1.59 |

Question 15: "If better pedestrian and bicycle access was available here, would you be more willing to walk or bike to this park and ride?"

| *Overall* | *Freq.* | *Percent* |
|---|---|---|
| **Yes** | 475 | 17.23 |
| **No** | 2,144 | 77.77 |
| **I currently walk or bike** | 138 | 5.01 |
| **Total** | 2,757 | 100 |

| *By mode* | *Yes* | *No* | *I currently walk or bike* | *Total* |
|---|---|---|---|---|
| **Both** | 18.02 | 78.38 | 3.6 | 100 |
| **Bus** | 16.52 | 78.27 | 5.21 | 100 |
| **Train** | 19.09 | 76.03 | 4.89 | 100 |
| **Total** | 17.23 | 77.77 | 5.01 | 100 |

| *By Location* | *Yes* | *No* | *I currently walk or bike* | *Total* |
|---|---|---|---|---|
| **Auburn** | 18.06 | 74.19 | 7.74 | 100 |
| **Eastgate** | 17.17 | 76.09 | 6.73 | 100 |
| **Federal Way TC** | 13.76 | 78.9 | 7.34 | 100 |
| **Issaquah Highlands** | 16.76 | 77.75 | 5.49 | 100 |
| **Issaquah TC** | 12.75 | 84.46 | 2.79 | 100 |
| **Kenmore** | 10.48 | 83.81 | 5.71 | 100 |
| **Lynnwood TC** | 19.71 | 75.96 | 4.33 | 100 |
| **Mercer Island** | 18.39 | 78.16 | 3.45 | 100 |
| **Overlake TC** | 14.71 | 79.41 | 5.88 | 100 |
| **Puyallup** | 21.58 | 72.66 | 5.76 | 100 |
| **South Everett** | 19.01 | 78.51 | 2.48 | 100 |
| **South Kirkland** | 23.03 | 70.22 | 6.74 | 100 |
| **Sumner** | 15.79 | 78.95 | 5.26 | 100 |
| **Tacoma Dome** | 18.02 | 78.38 | 3.6 | 100 |
| **Tukwila International Boulevard** | 20.86 | 77.3 | 1.84 | 100 |
| **Tukwila P&R** | 4.55 | 95.45 | 0 | 100 |
| **Tukwila Station** | 17.46 | 79.37 | 3.17 | 100 |
| **Total** | 17.23 | 77.77 | 5.01 | 100 |

Question 16: "Would you still park at this park and ride if a parking fee was implemented?"

| *Overall* | *Observations* | *Mean* | *Std. Dev.* | *Min* | *Max* |
|---|---|---|---|---|---|
| General Parking Fee | 2740 | 0.4202847 | 0.844013 | 0 | 5 |

| *Overall* | *Freq.* | *Percent* |
|---|---|---|
| **$0** | 1,973 | 73.16 |
| **$1** | 465 | 17.24 |
| **$2** | 173 | 6.41 |
| **$3** | 51 | 1.89 |
| **$4** | 8 | 0.3 |
| **$5** | 27 | 1.00 |
| **Total** | 2,679 | 100 |

| *By Mode* | *Mean* | *Std. Dev.* | *Freq.* |
|---|---|---|---|
| **Both** | 0.416667 | 0.926277 | 219 |
| **Bus** | 0.421473 | 0.837387 | 1887 |
| **Train** | 0.417997 | 0.835244 | 634 |
| **Total** | 0.420284 | 0.844013 | 2740 |

| *By Mode* | *$0* | *$1* | *$2* | *$3* | *$4* | *$5* | *Total* |
|---|---|---|---|---|---|---|---|
| **Both** | 164 | 34 | 12 | 3 | 1 | 4 | 218 |
| **Bus** | 1,352 | 330 | 115 | 37 | 6 | 17 | 1,835 |
| **Train** | 457 | 101 | 46 | 11 | 1 | 6 | 626 |
| **Total** | 1,973 | 465 | 173 | 51 | 8 | 27 | 2,679 |

| *% Willing to Pay* | *Percentage* |
|---|---|
| **Both** | 25.11% |
| **Bus** | 28.35% |
| **Train** | 27.92% |
| **Total** | 27.99% |

| *By Location* | *Mean* | *Std Dev.* | *Freq.* |
|---|---|---|---|
| **Auburn** | 0.48125 | 0.888231 | 160 |
| **Eastgate** | 0.40301 | 0.76454 | 299 |
| **Federal Way TC** | 0.486758 | 0.923375 | 219 |
| **Issaquah Highlands** | 0.482387 | 0.890382 | 331 |
| **Issaquah TC** | 0.39881 | 0.886024 | 252 |
| **Kenmore** | 0.379048 | 0.748581 | 105 |
| **Lynnwood TC** | 0.3375 | 0.734048 | 220 |
| **Mercer Island** | 0.388235 | 0.691687 | 85 |
| **Overlake TC** | 0.421875 | 0.887384 | 64 |
| **Puyallup** | 0.314394 | 0.782454 | 132 |
| **South Everett** | 0.512712 | 0.983761 | 118 |
| **South Kirkland** | 0.357558 | 0.712299 | 172 |
| **Sumner** | 0.446429 | 0.808477 | 112 |
| **Tacoma Dome** | 0.416667 | 0.926277 | 219 |
| **Tukwila International Boulevard** | 0.400061 | 0.777316 | 165 |
| **Tukwila P&R** | 0.545455 | 1.2238609 | 22 |
| **Tukwila Station** | 0.514493 | 1.104706 | 69 |
| **Total** | 0.4202847 | 0.844013 | 2722 |

| *By Location* | ***$0*** | ***$1*** | ***$2*** | ***$3*** | ***$4*** | ***$5*** | ***Total*** |
|---|---|---|---|---|---|---|---|
| **Auburn** | 114 | 20 | 18 | 5 | 0 | 1 | 158 |
| **Eastgate** | 213 | 58 | 19 | 4 | 0 | 2 | 296 |
| **Federal Way TC** | 151 | 38 | 18 | 4 | 1 | 3 | 215 |
| **Issaquah Highlands** | 225 | 61 | 29 | 5 | 1 | 4 | 325 |
| **Issaquah TC** | 187 | 38 | 11 | 6 | 0 | 4 | 246 |
| **Kenmore** | 77 | 17 | 5 | 4 | 0 | 0 | 103 |
| **Lynnwood TC** | 167 | 35 | 6 | 5 | 2 | 0 | 215 |
| **Mercer Island** | 61 | 16 | 7 | 1 | 0 | 0 | 85 |
| **Overlake TC** | 47 | 11 | 4 | 1 | 0 | 1 | 64 |
| **Puyallup** | 106 | 15 | 7 | 1 | 1 | 1 | 131 |
| **South Everett** | 83 | 19 | 8 | 4 | 2 | 1 | 117 |
| **South Kirkland** | 125 | 33 | 8 | 2 | 0 | 1 | 169 |
| **Sumner** | 74 | 23 | 7 | 2 | 0 | 1 | 107 |
| **Tacoma Dome** | 164 | 34 | 12 | 3 | 1 | 4 | 218 |
| **Tukwila International Boulevard** | 118 | 29 | 11 | 3 | 0 | 1 | 162 |
| **Tukwila P&R** | 16 | 4 | 0 | 1 | 0 | 1 | 22 |
| **Tukwila Station** | 45 | 14 | 3 | 0 | 0 | 2 | 65 |
| **Total** | 1,973 | 465 | 173 | 51 | 8 | 27 | 2,740 |

| *Location* | *Percent willing to pay for parking* |
|---|---|
| **Auburn** | 28.75% |
| **Eastgate** | 28.76% |
| **Federal Way TC** | 31.05% |
| **Issaquah Highlands** | 32.02% |
| **Issaquah TC** | 25.79% |
| **Kenmore** | 26.67% |
| **Lynnwood TC** | 24.09% |
| **Mercer Island** | 28.24% |
| **Overlake TC** | 26.56% |
| **Puyallup** | 19.70% |
| **South Everett** | 29.66% |
| **South Kirkland** | 27.33% |
| **Sumner** | 33.93% |
| **Tacoma Dome** | 25.11% |
| **Tukwila International Boulevard** | 28.48% |
| **Tukwila P&R** | 27.27% |
| **Tukwila Station** | 30.77% |
| **Total** | 27.99% |

Question 17: "Would you consider carpooling to this park and ride if carpools did not have to pay the fee?"

| *Overall* | *Freq.* | *Percent* |
|---|---|---|
| **Yes** | 661 | 24.22 |
| **No** | 1,421 | 52.07 |
| **I already do** | 127 | 4.65 |
| **I don't know** | 520 | 19.05 |
| **Total** | 2,729 | 100 |

| *By mode* | *Yes* | *No* | *I already do* | *I don't know* |
|---|---|---|---|---|
| **Both** | 26.91 | 49.33 | 3.59 | 20.18 |
| **Bus** | 23.58 | 51.89 | 4.95 | 19.58 |
| **Train** | 25.20 | 53.59 | 4.15 | 17.07 |
| **Total** | 24.22 | 52.07 | 4.65 | 19.05 |

Question 18: "Would you be willing to use another park and ride 10-15 minutes away with the same transit service to avoid paying a parking fee here?"

| *Overall* | *Freq.* | *Percent* |
|---|---|---|
| **Yes** | 1,450 | 54.12 |
| **No** | 1,112 | 41.51 |
| **I sometimes do** | 117 | 4.37 |
| **Total** | 2,679 | 100 |

| *By Mode* | *Both* | *Bus* | *Train* | *Total* |
|---|---|---|---|---|
| **Yes** | 56.42 | 53.68 | 54.62 | 54.12 |
| **No** | 37.61 | 42.06 | 41.24 | 41.51 |
| **I sometimes do** | 5.96 | 4.26 | 4.14 | 4.37 |
| **Total** | 100 | 100 | 100 | 100 |

| *By Location* | *Yes* | *No* | *I sometimes do* | *Total* |
|---|---|---|---|---|
| **Auburn** | 54.19 | 42.58 | 3.23 | 100 |
| **Eastgate** | 53.63 | 43.6 | 2.77 | 100 |
| **Federal Way TC** | 50.97 | 43.69 | 5.34 | 100 |
| **Issaquah Highlands** | 56.57 | 37.31 | 6.12 | 100 |
| **Issaquah TC** | 52.21 | 44.98 | 2.81 | 100 |
| **Kenmore** | 61.54 | 33.65 | 4.81 | 100 |
| **Lynnwood TC** | 47.29 | 48.77 | 3.94 | 100 |
| **Mercer Island** | 47.56 | 47.56 | 4.88 | 100 |
| **Overlake TC** | 58.82 | 33.82 | 7.35 | 100 |
| **Puyallup** | 55.97 | 40.3 | 3.73 | 100 |
| **South Everett** | 61.54 | 35.04 | 3.42 | 100 |
| **South Kirkland** | 50 | 46.39 | 3.61 | 100 |
| **Sumner** | 54.78 | 38.26 | 6.96 | 100 |
| **Tacoma Dome** | 56.42 | 37.61 | 5.96 | 100 |
| **Tukwila International Boulevard** | 51.25 | 44.38 | 4.38 | 100 |
| **Tukwila P&R** | 68.18 | 31.82 | 0.00 | 100 |
| **Tukwila Station** | 60.94 | 37.50 | 1.56 | 100 |
| **Total** | 54.04 | 41.56 | 4.4 | 100 |

Question 19: "What is the maximum amount you would be willing to pay to guarantee a parking space at this park and ride?"

| *Variable* | *Observations* | *Mean* | *S.D.* | *Min* | *Max* |
|---|---|---|---|---|---|
| Guaranteed Spot | 2572 | 0.834635 | 1.24791 | 0 | 10 |

| *Overall* | *Freq.* | *Percent* |
|---|---|---|
| **$0** | 1,396 | 55.20% |
| **$1** | 600 | 23.72% |
| **$2** | 294 | 11.63% |
| **$3** | 118 | 4.67% |
| **$4** | 36 | 1.42% |
| **$5** | 81 | 3.20% |
| **$8** | 1 | 0.04% |
| **$9** | 1 | 0.04% |
| **$10** | 2 | 0.08% |
| **Total** | 2,529 | 100 |

| *By Mode* | *Mean* | *S.D* | *Freq.* |
|---|---|---|---|
| **Both** | 0.775943 | 1.296381 | 212 |
| **Bus** | 0.847420 | 1.249877 | 1756 |
| **Train** | 0.818063 | 1.225961 | 604 |
| **Total** | 0.834634 | 1.247906 | 2572 |

| *By Mode* | *$0* | *$1* | *$2* | *$3* | *$4* | *$5* | *$8* | *$9* | *$10* | *Total* |
|---|---|---|---|---|---|---|---|---|---|---|
| **Both** | 120 | 53 | 25 | 4 | 3 | 4 | 1 | 1 | 0 | 212 |
| **Bus** | 934 | 423 | 200 | 80 | 25 | 58 | 0 | 0 | 2 | 1,756 |
| **Train** | 342 | 124 | 69 | 34 | 8 | 19 | 0 | 0 | 0 | 604 |
| **Total** | 1,396 | 600 | 294 | 118 | 36 | 81 | 1 | 1 | 2 | 2,572 |

| *Mode* | *Percent willing to pay* |
|---|---|
| **Both** | 43.40% |
| **Bus** | 46.81% |
| **Train** | 43.38% |
| **Total** | 45.72% |

| *By Location* | *Mean* | *S.D* | *Freq.* |
|---|---|---|---|
| **Auburn** | 0.924342 | 1.372338 | 152 |
| **Eastgate** | 0.839531 | 1.153593 | 277 |
| **Federal Way TC** | 0.893333 | 1.223527 | 195 |

| | | | |
|---|---|---|---|
| **Issaquah Highlands** | 0.927825 | 1.373203 | 308 |
| **Issaquah TC** | 0.845436 | 1.348695 | 241 |
| **Kenmore** | 0.738 | 1.321541 | 100 |
| **Lynnwood TC** | 0.761307 | 1.241714 | 199 |
| **Mercer Island** | 0.833333 | 1.210524 | 78 |
| **Overlake TC** | 0.690476 | 1.086681 | 63 |
| **Puyallup** | 0.670543 | 1.054188 | 129 |
| **South Everett** | 0.962963 | 1.309034 | 108 |
| **South Kirkland** | 0.763636 | 0.979304 | 165 |
| **Sumner** | 0.982727 | 1.365624 | 110 |
| **Tacoma Dome** | 0.775943 | 1.296381 | 212 |
| **Tukwila International Boulevard** | 0.710067 | 1.038264 | 150 |
| **Tukwila P&R** | 1.272727 | 1.548634 | 22 |
| **Tukwila Station** | 0.833333 | 1.310627 | 63 |
| **Total** | 0.834634 | 1.247906 | 2572 |

| *By Location* | *$0* | *$1* | *$2* | *$3* | *$4* | *$5* | *$8* | *$9* | *$10* | *Total* |
|---|---|---|---|---|---|---|---|---|---|---|
| **Auburn** | 89 | 21 | 20 | 11 | 4 | 6 | 0 | 0 | 0 | 151 |
| **Eastgate** | 141 | 69 | 34 | 11 | 8 | 5 | 0 | 0 | 0 | 268 |
| **Federal Way TC** | 103 | 43 | 26 | 14 | 3 | 5 | 0 | 0 | 0 | 194 |
| **Issaquah Highlands** | 154 | 76 | 38 | 13 | 3 | 14 | 0 | 0 | 1 | 299 |
| **Issaquah TC** | 135 | 51 | 27 | 13 | 2 | 8 | 0 | 0 | 1 | 237 |
| **Kenmore** | 64 | 15 | 11 | 2 | 0 | 6 | 0 | 0 | 0 | 98 |
| **Lynnwood TC** | 117 | 42 | 19 | 6 | 3 | 8 | 0 | 0 | 0 | 195 |
| **Mercer Island** | 44 | 16 | 10 | 5 | 1 | 2 | 0 | 0 | 0 | 78 |
| **Overlake TC** | 38 | 14 | 3 | 5 | 2 | 0 | 0 | 0 | 0 | 62 |
| **Puyallup** | 79 | 26 | 13 | 8 | 0 | 2 | 0 | 0 | 0 | 128 |
| **South Everett** | 51 | 32 | 10 | 6 | 2 | 5 | 0 | 0 | 0 | 106 |
| **South Kirkland** | 79 | 57 | 19 | 5 | 0 | 3 | 0 | 0 | 0 | 163 |
| **Sumner** | 54 | 26 | 14 | 5 | 2 | 6 | 0 | 0 | 0 | 107 |
| **Tacoma Dome** | 120 | 53 | 25 | 4 | 3 | 4 | 1 | 1 | 0 | 211 |
| **Tukwila International Boulevard** | 87 | 31 | 19 | 8 | 2 | 1 | 0 | 0 | 0 | 148 |

| | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| **Tukwila P&R** | 8 | 8 | 3 | 0 | 1 | 2 | 0 | 0 | 0 | 22 |
| **Tukwila Station** | 33 | 20 | 3 | 2 | 0 | 4 | 0 | 0 | 0 | 62 |
| **Total** | 1,389 | 594 | 291 | 118 | 35 | 80 | 1 | 1 | 2 | 2,529 |

| *Location* | *Percent willing to pay* |
|---|---|
| **Auburn** | 41.06% |
| **Eastgate** | 47.39% |
| **Federal Way TC** | 46.91% |
| **Issaquah Highlands** | 48.49% |
| **Issaquah TC** | 43.04% |
| **Kenmore** | 34.69% |
| **Lynnwood TC** | 40.00% |
| **Mercer Island** | 43.59% |
| **Overlake TC** | 38.71% |
| **Puyallup** | 38.28% |
| **South Everett** | 51.89% |
| **South Kirkland** | 51.89% |
| **Sumner** | 49.53% |
| **Tacoma Dome** | 43.13% |
| **Tukwila International Boulevard** | 41.22% |
| **Tukwila P&R** | 63.63% |
| **Tukwila Station** | 47.62% |
| **Total** | 45.72% |

Question 20: "Would you consider carpooling to this park and ride if carpools were guaranteed a space at no charge?"

| *Overall* | *Freq.* | *Percent* |
|---|---|---|
| **Yes** | 737 | 27.81 |
| **No** | 1,302 | 49.13 |
| **I already carpool** | 110 | 4.15 |
| **I don't know** | 501 | 18.91 |
| **Total** | 2,650 | 100 |

| *By Mode* | *Yes* | *No* | *I already carpool* | *I don't know* | *Total* |
|---|---|---|---|---|---|
| **Both** | 28.84 | 46.05 | 3.72 | 21.4 | 100 |
| **Bus** | 26.60 | 50.28 | 4.46 | 18.67 | 100 |
| **Train** | 31.02 | 46.85 | 3.39 | 18.74 | 100 |
| **Total** | 27.81 | 49.13 | 4.15 | 18.91 | 100 |

| *By Location* | *Yes* | *No* | *I already carpool* | *I don't know* |
|---|---|---|---|---|
| **Auburn** | 27.1 | 46.45 | 1.94 | 24.52 |
| **Eastgate** | 29.72 | 47.9 | 4.9 | 17.48 |
| **Federal Way TC** | 19.02 | 56.59 | 1.46 | 22.93 |
| **Issaquah Highlands** | 27.78 | 47.84 | 6.48 | 17.9 |
| **Issaquah TC** | 26.51 | 49.4 | 3.21 | 20.88 |
| **Kenmore** | 21.15 | 48.08 | 7.69 | 23.08 |
| **Lynnwood TC** | 22.28 | 52.97 | 6.44 | 18.32 |
| **Mercer Island** | 35 | 46.25 | 2.5 | 16.25 |
| **Overlake TC** | 26.87 | 62.69 | 1.49 | 8.96 |
| **Puyallup** | 41.22 | 38.93 | 3.05 | 16.79 |
| **South Everett** | 29.09 | 49.09 | 5.45 | 16.36 |
| **South Kirkland** | 31.14 | 47.9 | 2.99 | 17.96 |
| **Sumner** | 30.97 | 49.56 | 1.77 | 17.7 |
| **Tacoma Dome** | 28.84 | 46.05 | 3.72 | 21.4 |
| **Tukwila International Boulevard** | 27.04 | 49.06 | 6.29 | 17.61 |
| **Tukwila P&R** | 27.27 | 54.55 | 0.00 | 18.18 |
| **Tukwila Station** | 29.51 | 54.10 | 3.28 | 13.11 |
| **Total** | 27.81 | 49.13 | 4.15 | 18.91 |

Question 21: "If you have trouble finding parking here, would you be willing to park a 5-10 minute walk away if guaranteed parking spaces were available there?"

| *Overall* | *Freq.* | *Percent* |
|---|---|---|
| **Yes** | 1,049 | 40.60 |
| **No** | 815 | 31.54 |
| **I already do** | 121 | 4.68 |
| **I don't have trouble finding parking** | 599 | 23.18 |
| **Total** | 2,584 | 100 |

| *By Mode* | *Yes* | *No* | *I already do* | *I don't have trouble finding parking* |
|---|---|---|---|---|
| **Both** | 37.62 | 30.95 | 4.29 | 27.14 |
| **Bus** | 40.31 | 32.05 | 5.48 | 22.16 |
| **Train** | 42.48 | 30.25 | 2.48 | 24.79 |
| **Total** | 40.60 | 31.54 | 4.68 | 23.18 |

| *By Location* | *Yes* | *No* | *I already do* | *I don't have trouble finding parking* |
|---|---|---|---|---|
| **Auburn** | 38.82 | 29.61 | 3.95 | 27.63 |
| **Eastgate** | 42.24 | 29.6 | 4.69 | 23.47 |
| **Federal Way TC** | 40 | 34 | 4 | 22 |
| **Issaquah Highlands** | 44.76 | 29.52 | 5.08 | 20.63 |
| **Issaquah TC** | 41.15 | 33.33 | 2.47 | 23.05 |
| **Kenmore** | 35.29 | 27.45 | 4.9 | 32.35 |
| **Lynnwood TC** | 27.78 | 39.9 | 8.59 | 23.74 |
| **Mercer Island** | 39.74 | 33.33 | 8.97 | 17.95 |
| **Overlake TC** | 44.62 | 32.31 | 3.08 | 20 |
| **Puyallup** | 44.19 | 28.68 | 1.55 | 25.58 |
| **South Everett** | 39.62 | 36.79 | 5.66 | 17.92 |
| **South Kirkland** | 47.24 | 25.15 | 9.82 | 17.79 |
| **Sumner** | 44.14 | 32.43 | 1.8 | 21.62 |
| **Tacoma Dome** | 37.62 | 30.95 | 4.29 | 27.14 |
| **Tukwila International Boulevard** | 38.71 | 31.61 | 3.23 | 26.45 |
| **Tukwila P&R** | 22.73 | 40.91 | 4.55 | 31.82 |
| **Tukwila Station** | 55.17 | 27.59 | 0 | 17.24 |
| **Total** | 40.60 | 31.54 | 4.68 | 23.18 |

Question 21.1: Offsite parking pricing information - Only those that responded "yes" to question 21 are included in these statistics

| *Variable* | *Obs* | *Mean* | *Std. Dev* | *Min* | *Max* |
|---|---|---|---|---|---|
| Offsite Parking | 1089 | 1.003343 | 1.095199 | 0 | 8 |

| *Overall* | *Freq.* | *Percent* |
|---|---|---|
| $0 | 375 | 35.92 |
| $1 | 452 | 43.30 |
| $2 | 150 | 14.37 |
| $3 | 46 | 4.41 |
| $4 | 16 | 1.53 |
| $5 | 23 | 2.20 |
| Total | 1,044 | 100 |

| *By Mode* | *Mean* | *Std. Dev* | *Freq.* |
|---|---|---|---|
| **Both** | 1.050725 | 1.328823 | 69 |
| **Bus** | 0.997845 | 1.079582 | 747 |
| **Train** | 1.006410 | 1.076660 | 273 |
| **Total** | 1.003343 | 1.095199 | 1089 |

| *By Mode* | *$0* | *$1* | *$2* | *$3* | *$4* | *$5* | *Total* |
|---|---|---|---|---|---|---|---|
| **Both** | 35.82 | 46.27 | 8.96 | 5.97 | 1.49 | 1.49 | 100 |
| **Bus** | 35.67 | 41.46 | 15.01 | 4.13 | 1.65 | 2.07 | 100 |
| **Train** | 34.20 | 44.61 | 13.01 | 4.46 | 1.12 | 2.60 | 100 |
| **Total** | 35.31 | 42.56 | 14.12 | 4.33 | 1.51 | 2.17 | 100 |

| *By Location* | *Mean* | *Std. Dev* | *Freq.* |
|---|---|---|---|
| **Auburn** | 0.871212 | 1.046278 | 66 |
| **Eastgate** | 0.892149 | 0.979052 | 121 |
| **Federal Way TC** | 0.96131 | 0.970572 | 84 |
| **Issaquah Highlands** | 1.041824 | 1.107597 | 148 |
| **Issaquah TC** | 0.997573 | 1.211918 | 103 |
| **Kenmore** | 0.947368 | 1.038382 | 38 |
| **Lynnwood TC** | 0.768293 | 1.042892 | 82 |
| **Mercer Island** | 1.15625 | 1.194325 | 32 |

| | | | |
|---|---|---|---|
| **Overlake TC** | 1.075 | 0.921598 | 20 |
| **Puyallup** | 0.95614 | 1.119154 | 57 |
| **South Everett** | 0.972222 | 1.081959 | 36 |
| **South Kirkland** | 0.940476 | 0.836075 | 63 |
| **Sumner** | 1.116379 | 1.199612 | 58 |
| **Tacoma Dome** | 1.050725 | 1.328823 | 69 |
| **Tukwila International Boulevard** | 1.074627 | 0.926274 | 67 |
| **Tukwila P&R** | 2.4 | 1.1876558 | 20 |
| **Tukwila Station** | 1.04 | 1.1718931 | 25 |
| **Total** | 1.003343 | 1.095199 | 1089 |

| *By Location* | *$0* | *$1* | *$2* | *$3* | *$4* | *$5* | *Total* |
|---|---|---|---|---|---|---|---|
| **Auburn** | 43.08 | 38.46 | 10.77 | 4.62 | 1.54 | 1.54 | 100 |
| **Eastgate** | 35.9 | 47.01 | 11.97 | 1.71 | 1.71 | 1.71 | 100 |
| **Federal Way TC** | 37.5 | 36.25 | 17.5 | 7.5 | 1.25 | 0 | 100 |
| **Issaquah Highlands** | 34.51 | 39.44 | 16.9 | 5.63 | 0.7 | 2.82 | 100 |
| **Issaquah TC** | 38 | 42 | 14 | 2 | 0 | 4 | 100 |
| **Kenmore** | 36.84 | 44.74 | 10.53 | 2.63 | 5.26 | 0 | 100 |
| **Lynnwood TC** | 50 | 33.75 | 10 | 3.75 | 0 | 2.5 | 100 |
| **Mercer Island** | 25 | 53.13 | 15.63 | 0 | 0 | 6.25 | 100 |
| **Overlake TC** | 26.32 | 47.37 | 15.79 | 10.53 | 0 | 0 | 100 |
| **Puyallup** | 39.29 | 39.29 | 14.29 | 3.57 | 0 | 3.57 | 100 |
| **South Everett** | 38.89 | 36.11 | 19.44 | 2.78 | 0 | 2.78 | 100 |
| **South Kirkland** | 30.65 | 50 | 12.9 | 6.45 | 0 | 0 | 100 |
| **Sumner** | 28.57 | 51.79 | 7.14 | 5.36 | 3.57 | 3.57 | 100 |
| **Tacoma Dome** | 35.82 | 46.27 | 8.96 | 5.97 | 1.49 | 1.49 | 100 |
| **Tukwila International Boulevard** | 25.37 | 50.75 | 17.91 | 4.48 | 0 | 1.49 | 100 |
| **Tukwila P&R** | 0.00 | 25.00 | 40.00 | 5.00 | 30.00 | 0.00 | 100 |
| **Tukwila Station** | 36.00 | 40.00 | 16.00 | 4.00 | 0.00 | 4.00 | 100 |
| **Total** | 35.31 | 42.56 | 14.12 | 4.33 | 1.51 | 2.17 | 100 |

Question 22: "How many days a week do you use this park and ride?"

| *Overall* | *Freq.* | *Percent* |
|---|---|---|
| **Less than 1** | 89 | 3.43 |
| **1** | 35 | 1.35 |
| **2** | 52 | 2.01 |
| **3** | 154 | 5.94 |
| **4** | 394 | 15.20 |
| **5** | 1,868 | 72.07 |
| **Total** | 2,592 | 100 |

| *By Mode* | *Less than 1* | *1* | *2* | *3* | *4* | *5* |
|---|---|---|---|---|---|---|
| **Both** | 2.38 | 1.43 | 3.33 | 4.76 | 19.05 | 69.05 |
| **Bus** | 3.39 | 1.36 | 1.75 | 6.56 | 15.55 | 71.40 |
| **Train** | 3.92 | 1.31 | 2.28 | 4.57 | 12.89 | 75.04 |
| **Total** | 3.43 | 1.35 | 2.01 | 5.94 | 15.20 | 72.07 |

| *By Location* | *Less than 1* | *1* | *2* | *3* | *4* | *5* |
|---|---|---|---|---|---|---|
| **Auburn** | 2.56 | 1.28 | 3.85 | 5.13 | 12.18 | 75 |
| **Eastgate** | 3.58 | 1.79 | 1.08 | 4.3 | 17.56 | 71.68 |
| **Federal Way TC** | 4.02 | 0.5 | 3.02 | 7.54 | 15.58 | 69.35 |
| **Issaquah Highlands** | 4.06 | 0.63 | 0.63 | 6.25 | 15 | 73.44 |
| **Issaquah TC** | 2.87 | 1.23 | 2.87 | 8.2 | 13.93 | 70.9 |
| **Kenmore** | 1.01 | 2.02 | 1.01 | 8.08 | 15.15 | 72.73 |
| **Lynnwood TC** | 3.48 | 1.49 | 3.48 | 8.46 | 13.93 | 69.15 |
| **Mercer Island** | 2.6 | 0 | 1.3 | 6.49 | 12.99 | 76.62 |
| **Overlake TC** | 4.69 | 1.56 | 1.56 | 10.94 | 15.63 | 65.63 |
| **Puyallup** | 4.62 | 2.31 | 3.85 | 3.85 | 14.62 | 70.77 |
| **South Everett** | 1.9 | 1.9 | 0.95 | 2.86 | 18.1 | 74.29 |
| **South Kirkland** | 4.4 | 3.14 | 1.26 | 5.03 | 16.35 | 69.81 |
| **Sumner** | 5.45 | 1.82 | 0.91 | 2.73 | 10 | 79.09 |
| **Tacoma Dome** | 2.38 | 1.43 | 3.33 | 4.76 | 19.05 | 69.05 |
| **Tukwila International Boulevard** | 3.8 | 0.63 | 1.27 | 5.06 | 14.56 | 74.68 |
| **Tukwila P&R** | 0.00 | 0.00 | 0.00 | 4.55 | 22.73 | 72.73 |
| **Tukwila Station** | 3.39 | 0 | 0 | 6.78 | 11.86 | 77.97 |
| **Total** | 3.43 | 1.35 | 2.01 | 5.94 | 15.20 | 72.07 |

Question 23: "How many working vehicles are in your household?"

| *Overall* | *Freq.* | *Percent* |
|---|---|---|
| **0** | 39 | 1.61 |
| **1** | 310 | 12.80 |
| **2** | 884 | 36.51 |
| **3** | 923 | 38.12 |
| **4** | 264 | 10.90 |
| **5** | 1 | 0.04 |
| **Total** | 2,421 | 100 |

| *By Mode* | *0* | *1* | *2* | *3* | *4* | *5* |
|---|---|---|---|---|---|---|
| **Both** | 1.52 | 15.23 | 36.04 | 40.1 | 7.11 | 0.00 |
| **Bus** | 1.33 | 12.55 | 36.87 | 39.11 | 10.07 | 0.06 |
| **Train** | 2.43 | 12.70 | 35.65 | 34.61 | 14.61 | 0.00 |
| **Total** | 1.61 | 12.80 | 36351 | 38.12 | 10.90 | 0.04 |

| *By Location* | *0* | *1* | *2* | *3* | *4* | *5* |
|---|---|---|---|---|---|---|
| **Auburn** | 0 | 7.28 | 35.76 | 35.76 | 21.19 | 0 |
| **Eastgate** | 2.79 | 11.95 | 37.45 | 37.45 | 10.36 | 0 |
| **Federal Way TC** | 1.6 | 8.02 | 31.55 | 45.45 | 13.37 | 0 |
| **Issaquah Highlands** | 0.33 | 11.07 | 33.88 | 43.65 | 11.07 | 0 |
| **Issaquah TC** | 0.87 | 11.79 | 34.5 | 44.1 | 8.73 | 0 |
| **Kenmore** | 0 | 7.69 | 37.36 | 40.66 | 14.29 | 0 |
| **Lynnwood TC** | 1.6 | 8.56 | 33.16 | 41.18 | 15.51 | 0 |
| **Mercer Island** | 3.17 | 17.46 | 42.86 | 33.33 | 3.17 | 0 |
| **Overlake TC** | 0 | 24.59 | 40.98 | 29.51 | 4.92 | 0 |
| **Puyallup** | 4.24 | 23.73 | 38.98 | 26.27 | 6.78 | 0 |
| **South Everett** | 3.19 | 21.28 | 44.68 | 26.6 | 4.26 | 0 |
| **South Kirkland** | 0.68 | 15.07 | 47.95 | 28.77 | 6.85 | 0.68 |
| **Sumner** | 4.21 | 16.84 | 34.74 | 36.84 | 7.37 | 0 |
| **Tacoma Dome** | 1.52 | 15.23 | 36.04 | 40.1 | 7.11 | 0 |
| **Tukwila International Boulevard** | 1.89 | 6.92 | 30.19 | 40.88 | 20.13 | 0 |
| **Tukwila P&R** | 0 | 30.30 | 36.36 | 33.33 | 0.00 | 0 |
| **Tukwila Station** | 3.85 | 13.46 | 46.15 | 26.92 | 9.62 | 0 |
| **Total** | 1.61 | 12.80 | 36351 | 38.12 | 10.90 | 0.04 |

Question 24: "What is your age?"

| *Overall* | *Freq.* | *Percent* |
|---|---|---|
| **18-24** | 155 | 6.32 |
| **25-34** | 536 | 21.87 |
| **35-44** | 617 | 25.17 |
| **45-54** | 576 | 23.50 |
| **55+** | 528 | 21.54 |
| **No Response** | 39 | 1.59 |
| **Total** | 2,451 | 100 |

| *By Mode* | *18-24* | *25-34* | *35-44* | *45-54* | *55+* | *No Response* |
|---|---|---|---|---|---|---|
| **Both** | 4.04 | 23.23 | 27.27 | 24.75 | 19.7 | 1.01 |
| **Bus** | 5.87 | 21.27 | 24.87 | 23.73 | 22.47 | 1.80 |
| **Train** | 8.39 | 23.12 | 25.34 | 22.43 | 19.52 | 1.20 |
| **Total** | 6.32 | 21.87 | 25.17 | 23.50 | 21.54 | 1.59 |

| *By Location* | *18-24* | *25-34* | *35-44* | *45-54* | *55+* | *No Response* |
|---|---|---|---|---|---|---|
| **Auburn** | 7.28 | 25.83 | 23.18 | 19.87 | 23.18 | 0.66 |
| **Eastgate** | 5.38 | 23.08 | 23.08 | 28.46 | 18.46 | 1.54 |
| **Federal Way TC** | 8.38 | 19.37 | 21.47 | 23.56 | 24.08 | 3.14 |
| **Issaquah Highlands** | 5.88 | 23.86 | 23.2 | 20.92 | 23.86 | 2.29 |
| **Issaquah TC** | 5.11 | 21.28 | 27.66 | 23.4 | 21.28 | 1.28 |
| **Kenmore** | 8.79 | 16.48 | 24.18 | 21.98 | 26.37 | 2.2 |
| **Lynnwood TC** | 5.35 | 17.11 | 29.41 | 22.46 | 24.06 | 1.6 |
| **Mercer Island** | 7.69 | 30.77 | 27.69 | 15.38 | 18.46 | 0 |
| **Overlake TC** | 1.61 | 20.97 | 24.19 | 24.19 | 25.81 | 3.23 |
| **Puyallup** | 15.57 | 21.31 | 28.69 | 21.31 | 13.11 | 0 |
| **South Everett** | 6.32 | 14.74 | 29.47 | 26.32 | 21.05 | 2.11 |
| **South Kirkland** | 2.78 | 24.31 | 23.61 | 28.47 | 20.14 | 0.69 |
| **Sumner** | 6.06 | 28.28 | 19.19 | 22.22 | 21.21 | 3.03 |
| **Tacoma Dome** | 4.04 | 23.23 | 27.27 | 24.75 | 19.7 | 1.01 |
| **Tukwila International Boulevard** | 5 | 20.63 | 26.88 | 25 | 21.25 | 1.25 |
| **Tukwila P&R** | 12.12 | 18.18 | 18.18 | 15.15 | 36.36 | 0 |
| **Tukwila Station** | 9.62 | 17.31 | 30.77 | 25.00 | 15.38 | 1.92 |
| **Total** | 6.32 | 21.87 | 25.17 | 23.50 | 21.54 | 1.59 |

Question 25: "What is your gender?"

| *Overall* | *Freq.* | *Percent* |
|---|---|---|
| **Male** | 1,212 | 49.63 |
| **Female** | 1,180 | 48.32 |
| **No response** | 50 | 2.05 |
| **Total** | 2,442 | 100 |

| *By Mode* | *Male* | *Female* | *No response* |
|---|---|---|---|
| **Both** | 48.24 | 51.26 | 0.5 |
| **Bus** | 49.43 | 48.29 | 2.29 |
| **Train** | 50.69 | 47.41 | 1.90 |
| **Total** | 49.63 | 48.32 | 2.05 |

| *By Location* | *Male* | *Female* | *No response* | *Total* |
|---|---|---|---|---|
| **Auburn** | 51.33 | 48.67 | 0 | 100 |
| **Eastgate** | 48.26 | 50.19 | 1.54 | 100 |
| **Federal Way TC** | 49.74 | 47.62 | 2.65 | 100 |
| **Issaquah Highlands** | 52.12 | 44.63 | 3.26 | 100 |
| **Issaquah TC** | 50 | 47.86 | 2.14 | 100 |
| **Kenmore** | 48.35 | 48.35 | 3.3 | 100 |
| **Lynnwood TC** | 51.08 | 47.31 | 1.61 | 100 |
| **Mercer Island** | 37.88 | 59.09 | 3.03 | 100 |
| **Overlake TC** | 62.9 | 33.87 | 3.23 | 100 |
| **Puyallup** | 49.18 | 50 | 0.82 | 100 |
| **South Everett** | 48.42 | 48.42 | 3.16 | 100 |
| **South Kirkland** | 51.77 | 48.23 | 0 | 100 |
| **Sumner** | 46.88 | 51.04 | 2.08 | 100 |
| **Tacoma Dome** | 48.24 | 51.26 | 0.5 | 100 |
| **Tukwila International Boulevard** | 53.13 | 43.13 | 3.75 | 100 |
| **Tukwila P&R** | 12.12 | 84.85 | 3.03 | 100 |
| **Tukwila Station** | 51.92 | 44.23 | 3.85 | 100 |
| **Total** | 49.63 | 48.32 | 2.05 | 100 |

Question 26: "Including yourself, how many people are in your household?"

| *Overall* | *Freq.* | *Percent* |
|---|---|---|
| **1** | 323 | 13.27 |
| **2** | 903 | 37.10 |
| **3** | 491 | 20.17 |
| **4** | 471 | 19.35 |
| **5** | 168 | 6.90 |
| **6** | 59 | 2.42 |
| **7** | 19 | 0.78 |
| **Total** | 2,434 | 100 |

| *By Mode* | *1* | *2* | *3* | *4* | *5* | *6* | *7* |
|---|---|---|---|---|---|---|---|
| **Both** | 13.71 | 35.03 | 22.34 | 16.75 | 9.64 | 2.03 | 0.51 |
| **Bus** | 13.22 | 37.48 | 20.16 | 19.55 | 6.52 | 2.17 | 0.91 |
| **Train** | 13.28 | 36.72 | 19.48 | 19.66 | 7.07 | 3.28 | 0.52 |
| **Total** | 13.27 | 37.10 | 20.17 | 19.35 | 6.90 | 2.42 | 0.78 |

| *By Location* | *1* | *2* | *3* | *4* | *5* | *6* | *7* |
|---|---|---|---|---|---|---|---|
| **Auburn** | 12.75 | 41.61 | 20.81 | 14.09 | 8.72 | 2.01 | 0 |
| **Eastgate** | 14.79 | 33.85 | 21.79 | 16.34 | 9.73 | 3.11 | 0.39 |
| **Federal Way TC** | 10.53 | 37.37 | 26.32 | 20 | 3.16 | 2.11 | 0.53 |
| **Issaquah Highlands** | 12.54 | 38.61 | 17.82 | 21.45 | 6.6 | 1.65 | 1.32 |
| **Issaquah TC** | 12.45 | 39.06 | 18.88 | 20.17 | 5.58 | 2.58 | 1.29 |
| **Kenmore** | 10.99 | 43.96 | 18.68 | 18.68 | 5.49 | 2.2 | 0 |
| **Lynnwood TC** | 13.44 | 36.56 | 20.97 | 18.28 | 7.53 | 2.15 | 1.08 |
| **Mercer Island** | 16.92 | 33.85 | 21.54 | 16.92 | 9.23 | 1.54 | 0 |
| **Overlake TC** | 20.97 | 30.65 | 17.74 | 19.35 | 8.06 | 1.61 | 1.61 |
| **Puyallup** | 11.38 | 34.15 | 21.14 | 23.58 | 4.88 | 4.07 | 0.81 |
| **South Everett** | 17.89 | 40 | 11.58 | 23.16 | 4.21 | 2.11 | 1.05 |
| **South Kirkland** | 9.86 | 37.32 | 21.83 | 23.24 | 4.23 | 2.11 | 1.41 |
| **Sumner** | 20.83 | 38.54 | 12.5 | 14.58 | 10.42 | 3.13 | 0 |
| **Tacoma Dome** | 13.71 | 35.03 | 22.34 | 16.75 | 9.64 | 2.03 | 0.51 |
| **Tukwila International Boulevard** | 10.56 | 35.4 | 22.98 | 22.36 | 3.11 | 4.35 | 1.24 |
| **Tukwila P&R** | 12.12 | 45.45 | 21.21 | 9.09 | 12.12 | 0 | 0 |
| **Tukwila Station** | 13.73 | 29.41 | 13.73 | 27.45 | 13.73 | 1.96 | 0 |

Question 27: "What is your total household income?"

| *Overall* | *Freq.* | *Percent* |
|---|---|---|
| **$0-$29,999** | 77 | 3.34 |
| **$30,000-$59,999** | 340 | 14.77 |
| **$60,000-$89,999** | 437 | 18.98 |
| **$90,000-$119,999** | 419 | 18.20 |
| **$120,000-$149,999** | 351 | 15.25 |
| **$150,000+** | 450 | 19.55 |
| **No Response** | 228 | 9.90 |
| **Total** | 2,302 | 100 |

| *By Mode* | *$0-29,999* | *$30,000-59,999* | *$60,000-89,999* | *$90,000-119,999* | *$120,000-149,999* | *$150,000+* | *No Response* |
|---|---|---|---|---|---|---|---|
| **Both** | 2.12 | 17.99 | 18.52 | 15.34 | 14.81 | 20.63 | 10.58 |
| **Bus** | 2.94 | 14.38 | 17.83 | 19.49 | 15.65 | 19.42 | 10.29 |
| **Train** | 4.93 | 14.78 | 22.45 | 15.51 | 14.23 | 19.53 | 8.58 |
| **Total** | 3.34 | 14.77 | 18.98 | 18.20 | 15.25 | 19.55 | 9.90 |

| *By Location* | *$0-29,999* | *$30,000-59,999* | *$60,000-89,999* | *$90,000-119,999* | *$120,000-149,999* | *$150,000+* | *No Response* |
|---|---|---|---|---|---|---|---|
| **Auburn** | 2.17 | 11.59 | 21.74 | 15.94 | 22.46 | 22.46 | 3.62 |
| **Eastgate** | 2.46 | 16.39 | 18.03 | 20.08 | 16.8 | 16.39 | 9.84 |
| **Federal Way TC** | 3.33 | 9.44 | 14.44 | 16.67 | 18.33 | 28.33 | 9.44 |
| **Issaquah Highlands** | 1.74 | 15.63 | 19.44 | 26.39 | 11.81 | 19.44 | 5.56 |
| **Issaquah TC** | 5.05 | 13.76 | 15.14 | 19.27 | 17.89 | 20.64 | 8.26 |
| **Kenmore** | 1.23 | 13.58 | 25.93 | 20.99 | 14.81 | 18.52 | 4.94 |
| **Lynnwood TC** | 2.26 | 19.77 | 12.99 | 16.95 | 19.77 | 18.64 | 9.6 |
| **Mercer Island** | 3.17 | 14.29 | 19.05 | 17.46 | 19.05 | 12.7 | 14.29 |
| **Overlake TC** | 3.33 | 8.33 | 16.67 | 18.33 | 8.33 | 28.33 | 16.67 |
| **Puyallup** | 11.97 | 14.53 | 23.08 | 11.97 | 5.98 | 17.09 | 15.38 |
| **South Everett** | 2.27 | 11.36 | 18.18 | 13.64 | 12.5 | 18.18 | 23.86 |
| **South Kirkland** | 3.73 | 12.69 | 20.15 | 14.18 | 14.93 | 17.16 | 17.16 |
| **Sumner** | 2.22 | 28.89 | 23.33 | 8.89 | 12.22 | 14.44 | 10 |
| **Tacoma Dome** | 2.12 | 17.99 | 18.52 | 15.34 | 14.81 | 20.63 | 10.58 |
| **Tukwila International Boulevard** | 3.95 | 10.53 | 21.71 | 21.05 | 14.47 | 22.37 | 5.92 |
| **Tukwila P&R** | 6.25 | 18.75 | 34.38 | 25.00 | 9.38 | 0 | 6.25 |
| **Tukwila Station** | 3.92 | 11.76 | 23.53 | 17.65 | 13.73 | 17.65 | 11.76 |
| **Total** | 3.34 | 14.77 | 18.98 | 18.20 | 15.25 | 19.55 | 9.90 |

Question 28: "What is the highest level of education that you have achieved?"

| *Overall* | *Freq.* | *Percent* |
|---|---|---|
| **Less than High School** | 12 | 0.5 |
| **High School Diploma** | 138 | 5.72 |
| **Some College** | 559 | 23.19 |
| **Bachelor's Degree** | 1,024 | 42.47 |
| **Post Bachelor's Degree** | 593 | 24.60 |
| **No Response** | 85 | 3.53 |
| **Total** | 2,411 | 100 |

| *By Mode* | *Less than High School* | *High School Diploma* | *Some College* | *Bachelor's Degree* | *Post Bachelor's Degree* | *No Response* |
|---|---|---|---|---|---|---|
| **Both** | 0 | 5.56 | 24.24 | 42.42 | 23.74 | 4.04 |
| **Bus** | 0.55 | 5.80 | 23.37 | 42.34 | 23.92 | 4.03 |
| **Train** | 0.52 | 5.57 | 22.30 | 42.86 | 26.83 | 1.92 |
| **Total** | 0.5 | 5.72 | 23.19 | 42.47 | 24.60 | 3.53 |

| *By location* | *Less than High School* | *High School Diploma* | *Some College* | *Bachelor's Degree* | *Post Bachelor's Degree* | *No Response* |
|---|---|---|---|---|---|---|
| **Auburn** | 0.67 | 4.03 | 18.79 | 45.64 | 30.2 | 0.67 |
| **Eastgate** | 0.78 | 5.1 | 23.14 | 45.88 | 23.53 | 1.57 |
| **Federal Way TC** | 1.06 | 4.26 | 22.87 | 43.09 | 23.94 | 4.79 |
| **Issaquah Highlands** | 0 | 4.98 | 25.58 | 41.86 | 23.92 | 3.65 |
| **Issaquah TC** | 0.44 | 4.8 | 21.83 | 41.92 | 26.64 | 4.37 |
| **Kenmore** | 0 | 3.37 | 29.21 | 44.94 | 16.85 | 5.62 |
| **Lynnwood TC** | 0.55 | 6.04 | 21.98 | 42.31 | 24.18 | 4.95 |
| **Mercer Island** | 1.54 | 9.23 | 24.62 | 46.15 | 16.92 | 1.54 |
| **Overlake TC** | 0 | 8.06 | 12.9 | 38.71 | 35.48 | 4.84 |
| **Puyallup** | 0.82 | 8.2 | 27.05 | 43.44 | 19.67 | 0.82 |
| **South Everett** | 0 | 9.68 | 23.66 | 30.11 | 27.96 | 8.6 |
| **South Kirkland** | 1.41 | 7.04 | 21.13 | 41.55 | 24.65 | 4.23 |
| **Sumner** | 0 | 6.32 | 24.21 | 44.21 | 22.11 | 3.16 |
| **Tacoma Dome** | 0 | 5.56 | 24.24 | 42.42 | 23.74 | 4.04 |
| **Tukwila International Boulevard** | 0.63 | 5.06 | 21.52 | 37.34 | 34.18 | 1.27 |
| **Tukwila P&R** | 0 | 12.12 | 36.36 | 48.48 | 3.03 | 0 |
| **Tukwila Station** | 0 | 4.00 | 20.00 | 48.00 | 20.00 | 8.00 |
| **Total** | 0.5 | 5.72 | 23.19 | 42.47 | 24.60 | 3.53 |

Question 29: "Do you identify yourself as a member of any of the following minority groups; and if so, which?"

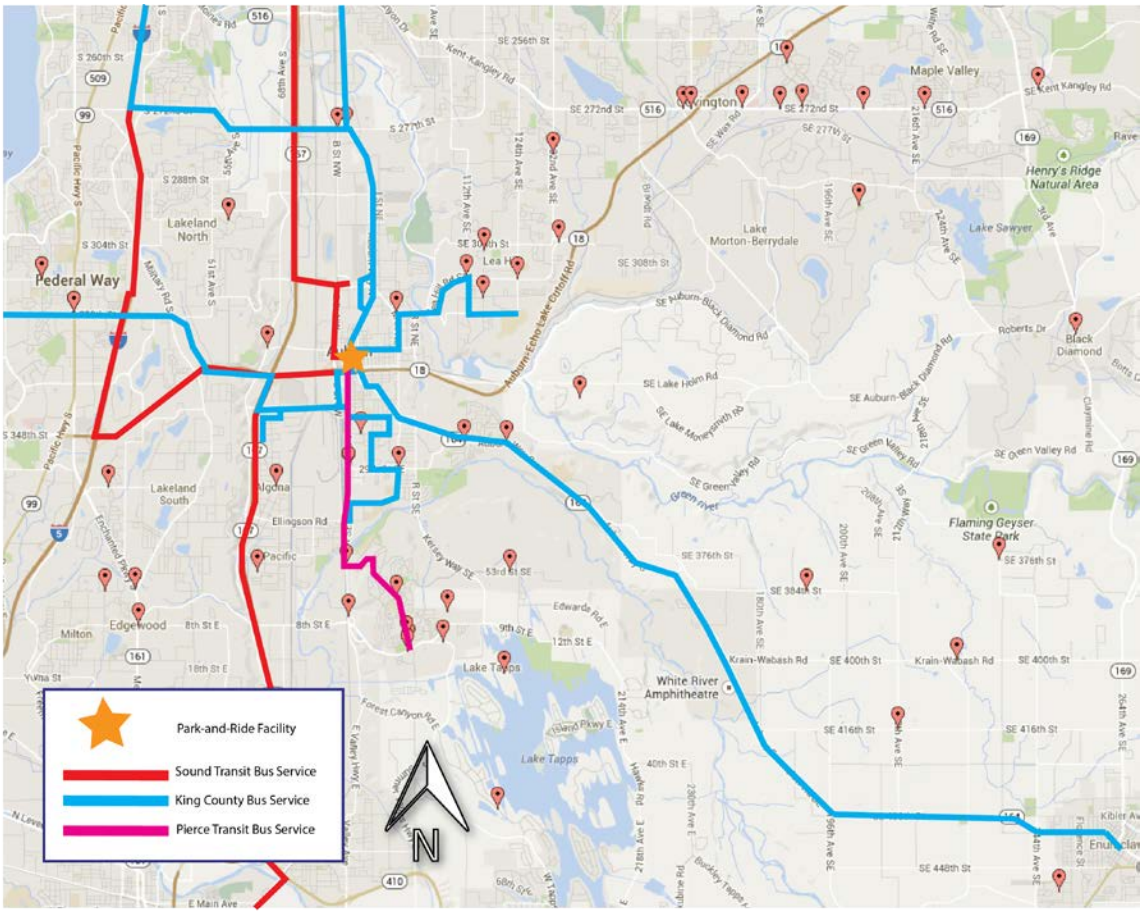
| *Overall* | *Freq.* | *Percent* |
|---|---|---|
| **No/No Response** | 1,843 | 78.16 |
| **Black or African American** | 86 | 3.65 |
| **Native Hawaiian or Pacific Islander** | 34 | 1.44 |
| **Asian** | 296 | 12.55 |
| **Hispanic or Latino** | 76 | 3.22 |
| **American Indian or Alaskan Native** | 23 | 0.98 |
| **Total** | 2,358 | 100 |

| *By Mode* | *No/No Response* | *Black or African American* | *Native Hawaiian or Pacific Islander* | *Asian* | *Hispanic or Latino* | *American Indian or Alaskan Native* |
|---|---|---|---|---|---|---|
| **Both** | 76.41 | 4.1 | 2.56 | 13.85 | 2.56 | 0.51 |
| **Bus** | 79.63 | 3.85 | 1.49 | 11.30 | 2.73 | 0.99 |
| **Train** | 74.50 | 2.89 | 0.90 | 15.73 | 4.88 | 1.08 |
| **Total** | 78.16 | 3.65 | 1.44 | 12.55 | 3.22 | 0.98 |

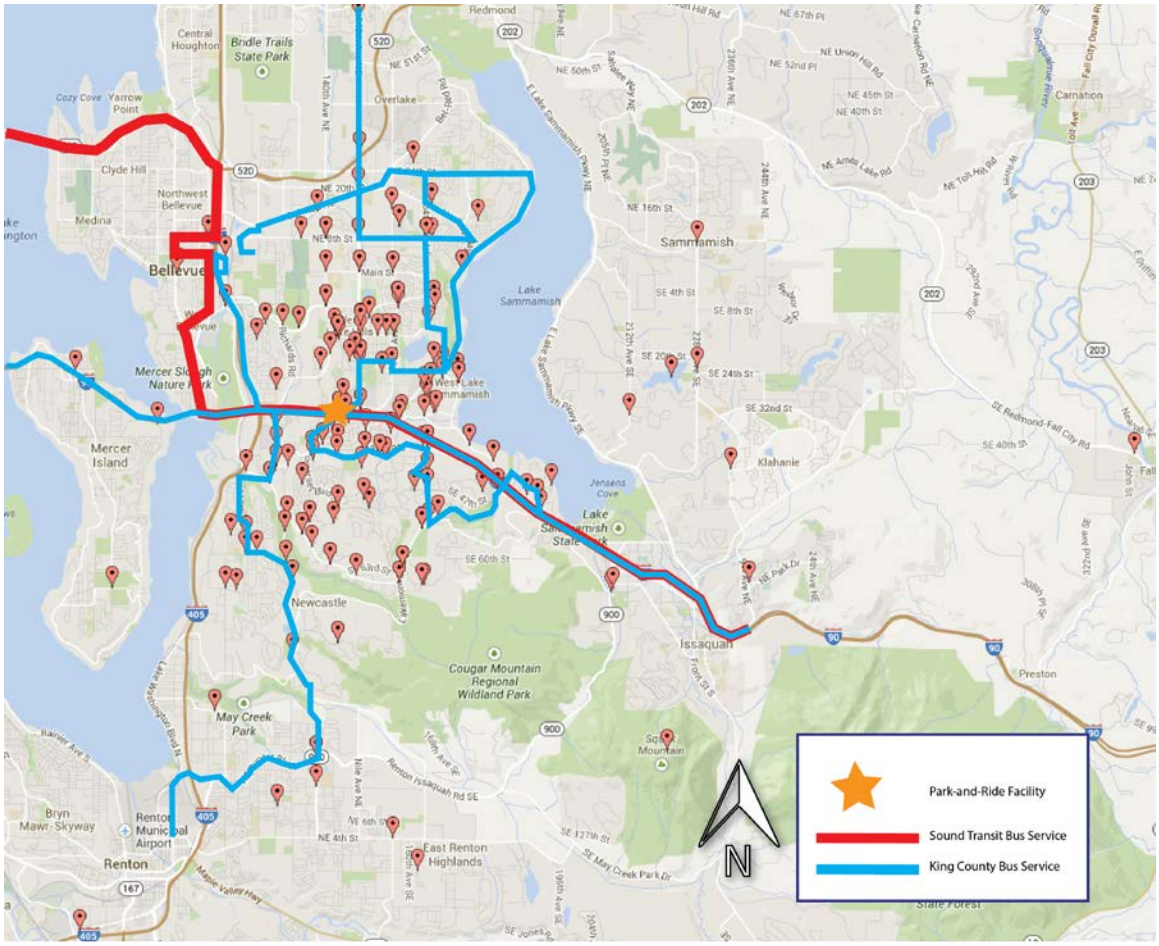
| *By Location* | *No/No Response* | *Black or African American* | *Native Hawaiian or Pacific Islander* | *Asian* | *Hispanic or Latino* | *American Indian or Alaskan Native* |
|---|---|---|---|---|---|---|
| **Auburn** | 72.86 | 3.57 | 0.71 | 17.86 | 5 | 0 |
| **Eastgate** | 76.19 | 5.16 | 1.19 | 13.89 | 3.57 | 0 |
| **Federal Way TC** | 84.07 | 4.4 | 0.55 | 9.34 | 1.65 | 0 |
| **Issaquah Highlands** | 81.48 | 3.03 | 1.35 | 11.45 | 2.02 | 0.67 |
| **Issaquah TC** | 79.82 | 4.04 | 1.35 | 11.21 | 3.14 | 0.45 |
| **Kenmore** | 83.72 | 1.16 | 1.16 | 10.47 | 1.16 | 2.33 |
| **Lynnwood TC** | 77.35 | 4.42 | 2.21 | 8.29 | 3.31 | 4.42 |
| **Mercer Island** | 84.62 | 4.62 | 1.54 | 7.69 | 1.54 | 0 |
| **Overlake TC** | 78.69 | 4.92 | 3.28 | 11.48 | 1.64 | 0 |
| **Puyallup** | 77.12 | 1.69 | 3.39 | 11.02 | 5.08 | 1.69 |
| **South Everett** | 81.72 | 3.23 | 2.15 | 12.9 | 0 | 0 |
| **South Kirkland** | 77.37 | 2.92 | 1.46 | 8.76 | 7.3 | 2.19 |
| **Sumner** | 73.63 | 4.4 | 0 | 12.09 | 9.89 | 0 |
| **Tacoma Dome** | 76.41 | 4.1 | 2.56 | 13.85 | 2.56 | 0.51 |
| **Tukwila International Boulevard** | 76.47 | 1.96 | 0 | 16.99 | 2.61 | 1.96 |
| **Tukwila P&R** | 60.61 | 3.03 | 3.03 | 33.33 | 0 | 0.00 |
| **Tukwila Station** | 68.63 | 3.92 | 0.00 | 23.53 | 1.96 | 1.96 |
| **Total** | 78.16 | 3.65 | 1.44 | 12.55 | 3.22 | 0.98 |

## APPENDIX C – ORIGIN MAPS FOR PARK-AND-RIDE LOTS

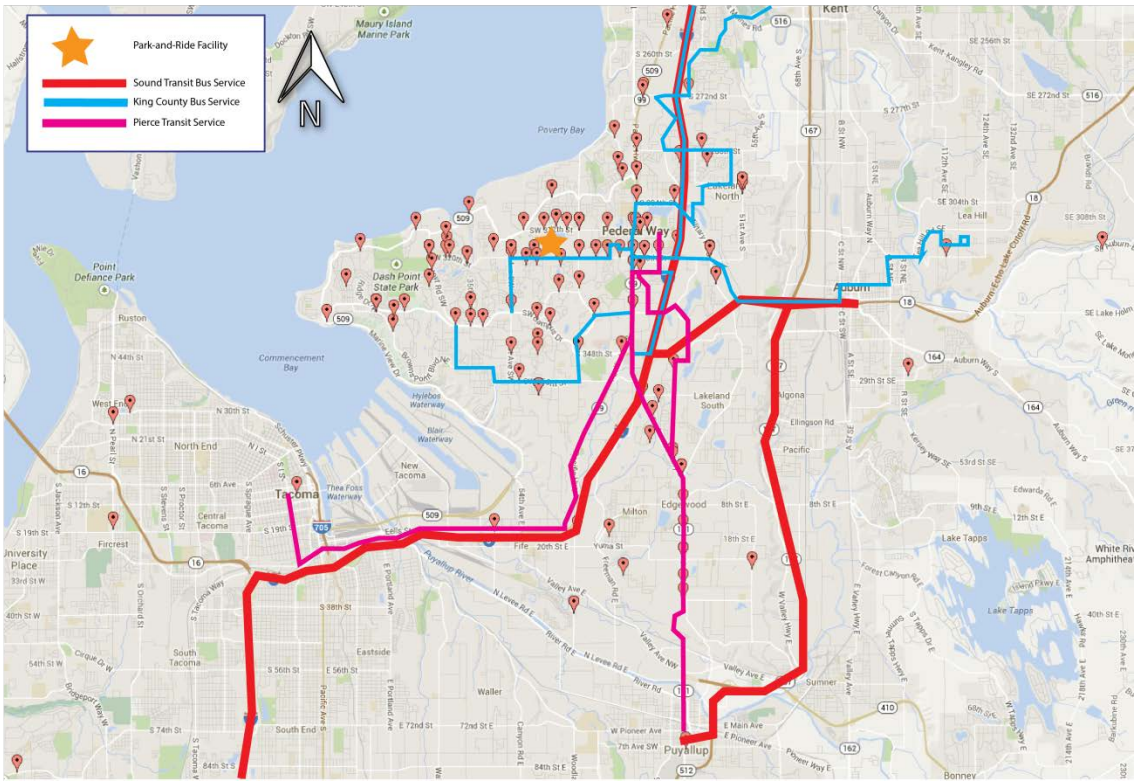
## Auburn Station



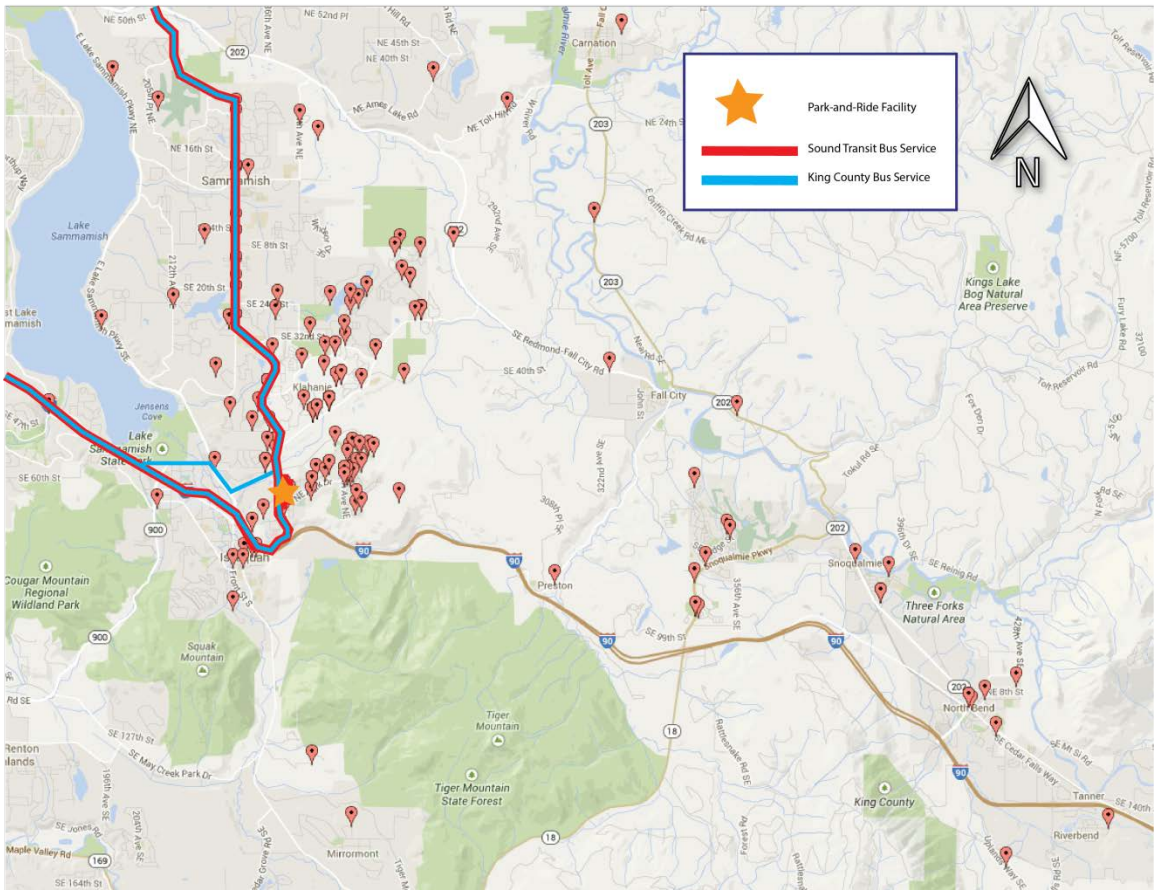
## Eastgate Transit Center



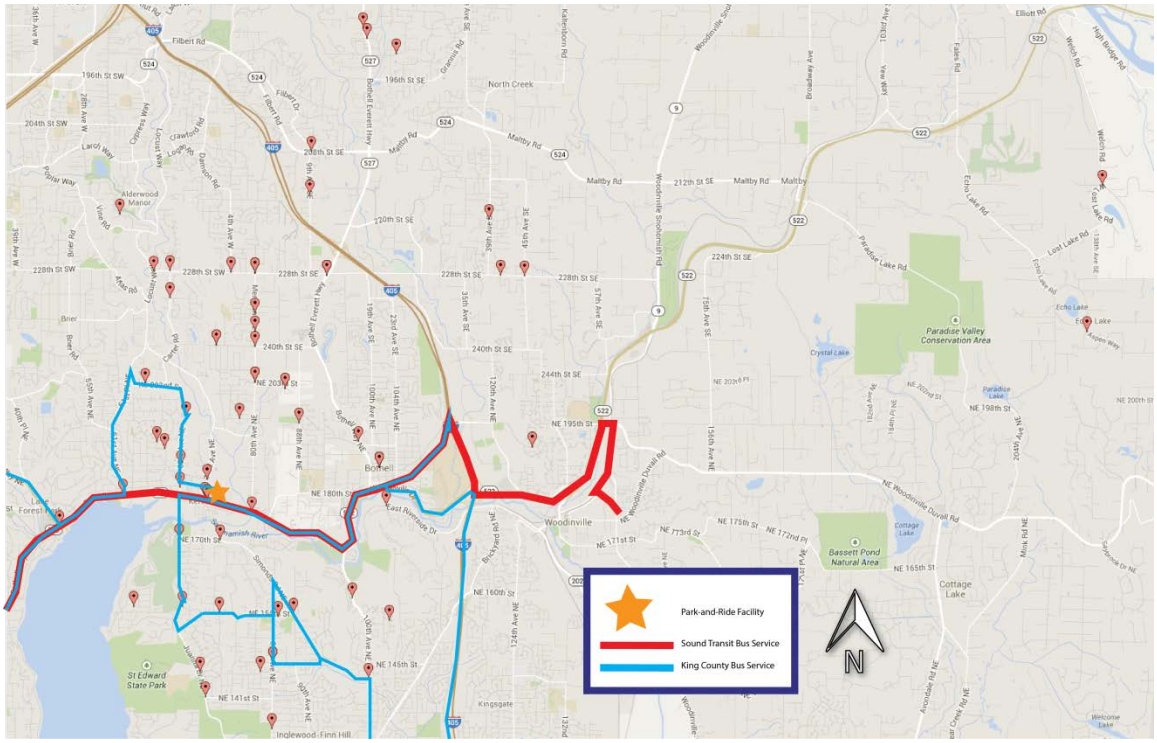
# Federal Way Transit Center



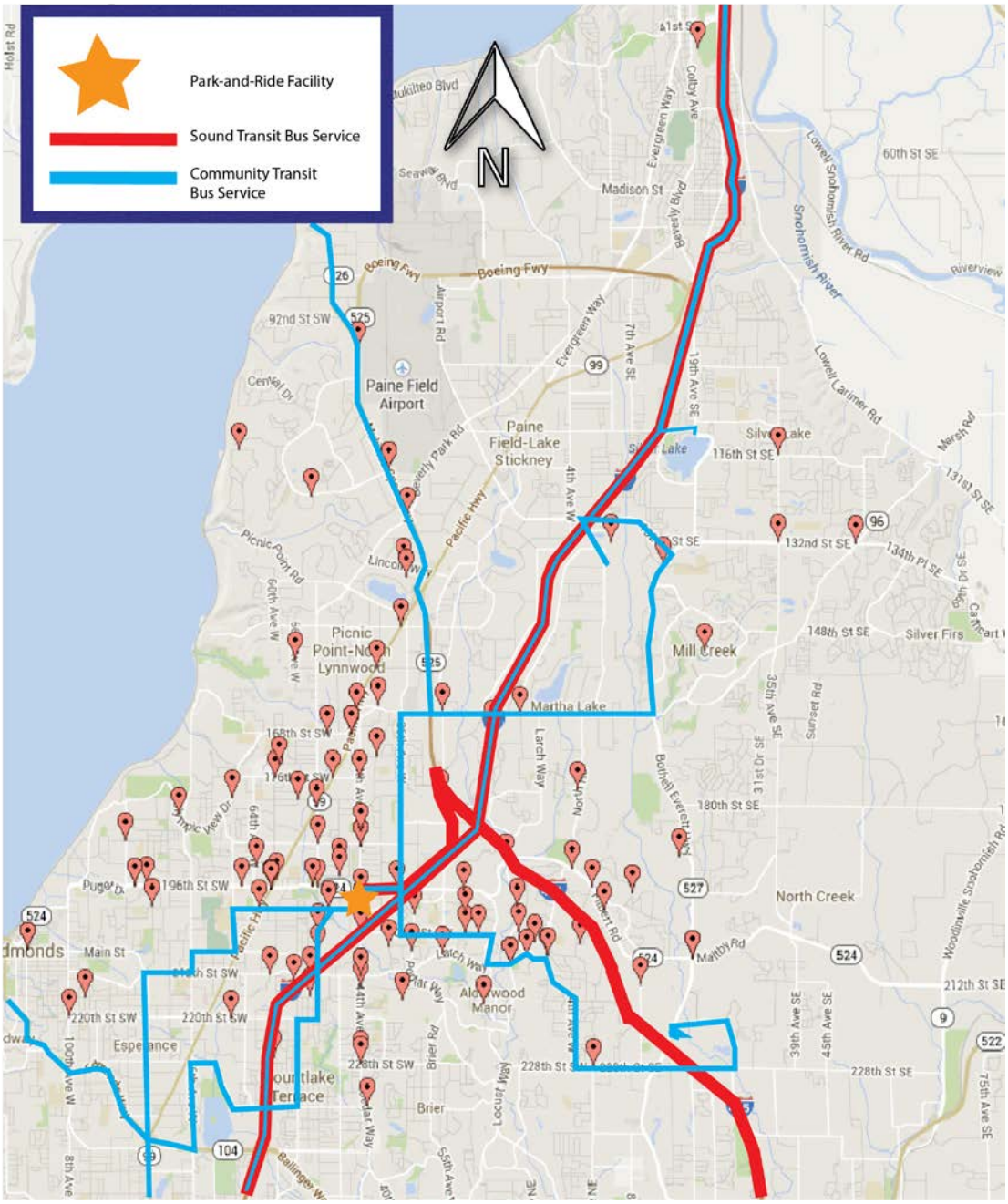
## Issaquah Highlands Park-and-Ride



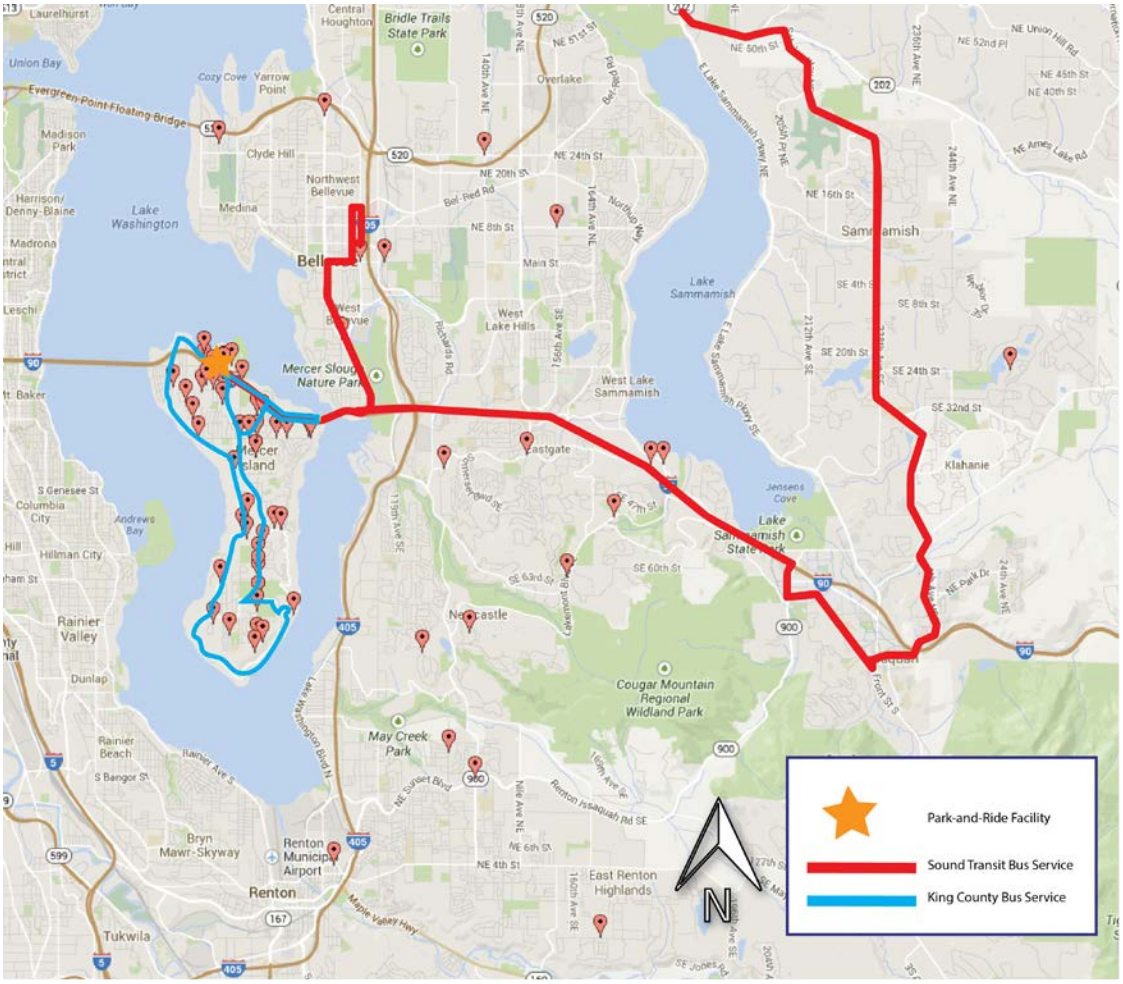
## Kenmore Park-and-Ride



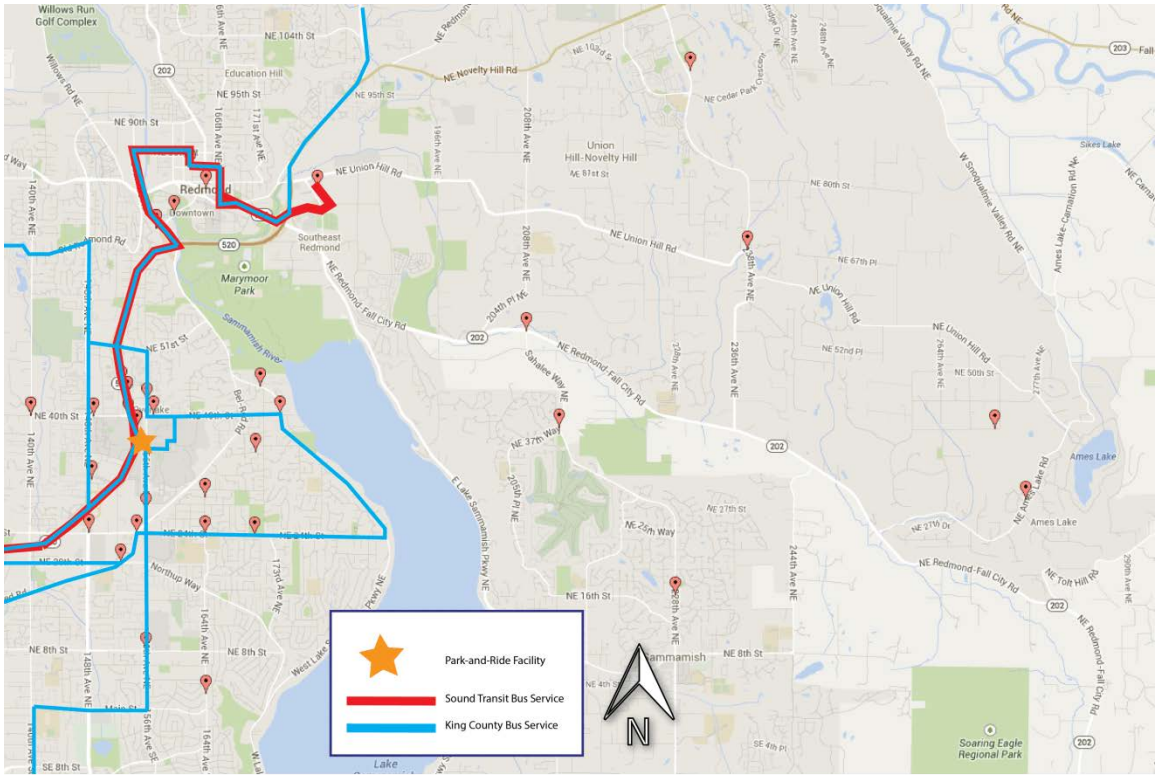
## Lynnwood Transit Center



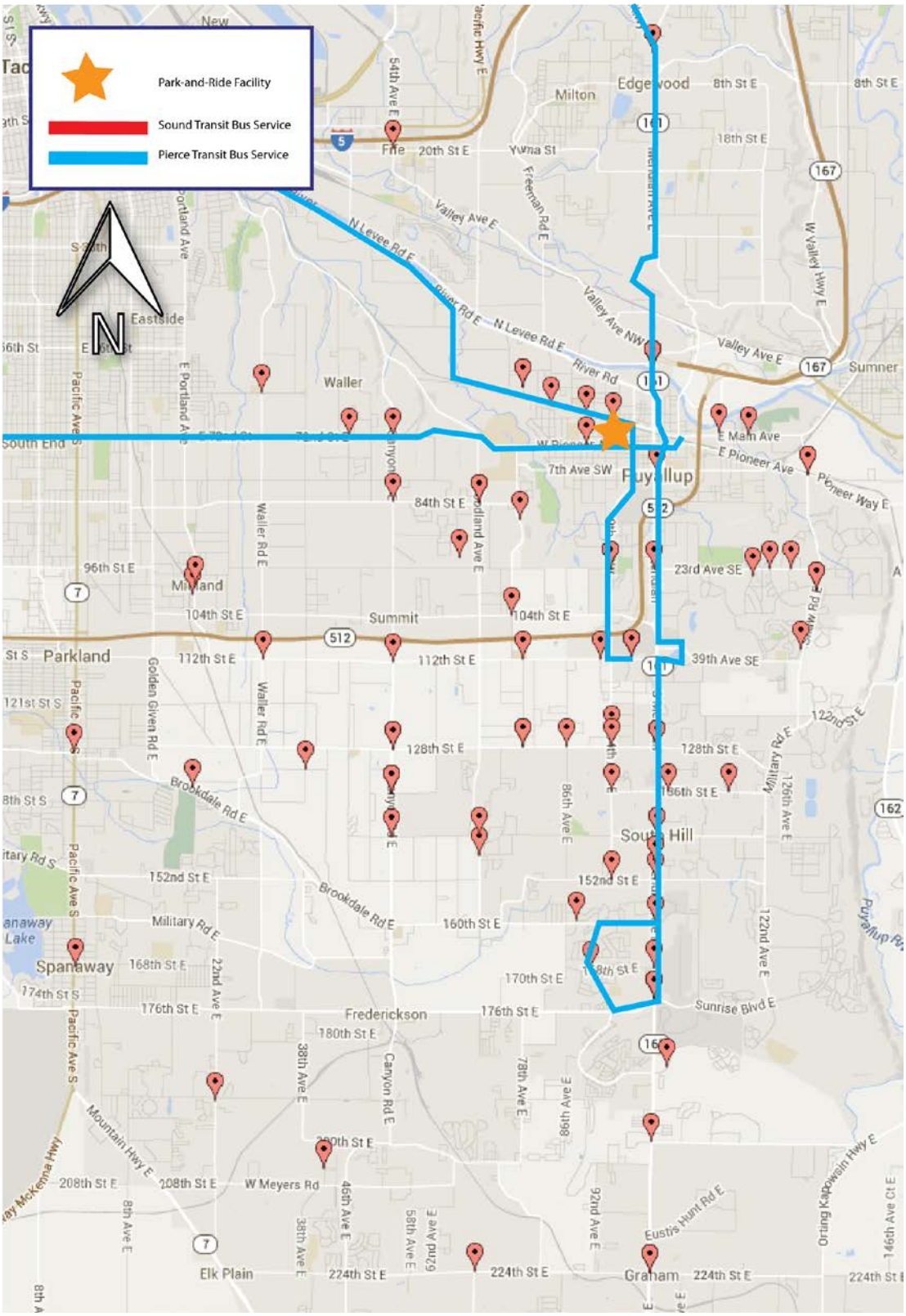
## Mercer Island Park-and-Ride



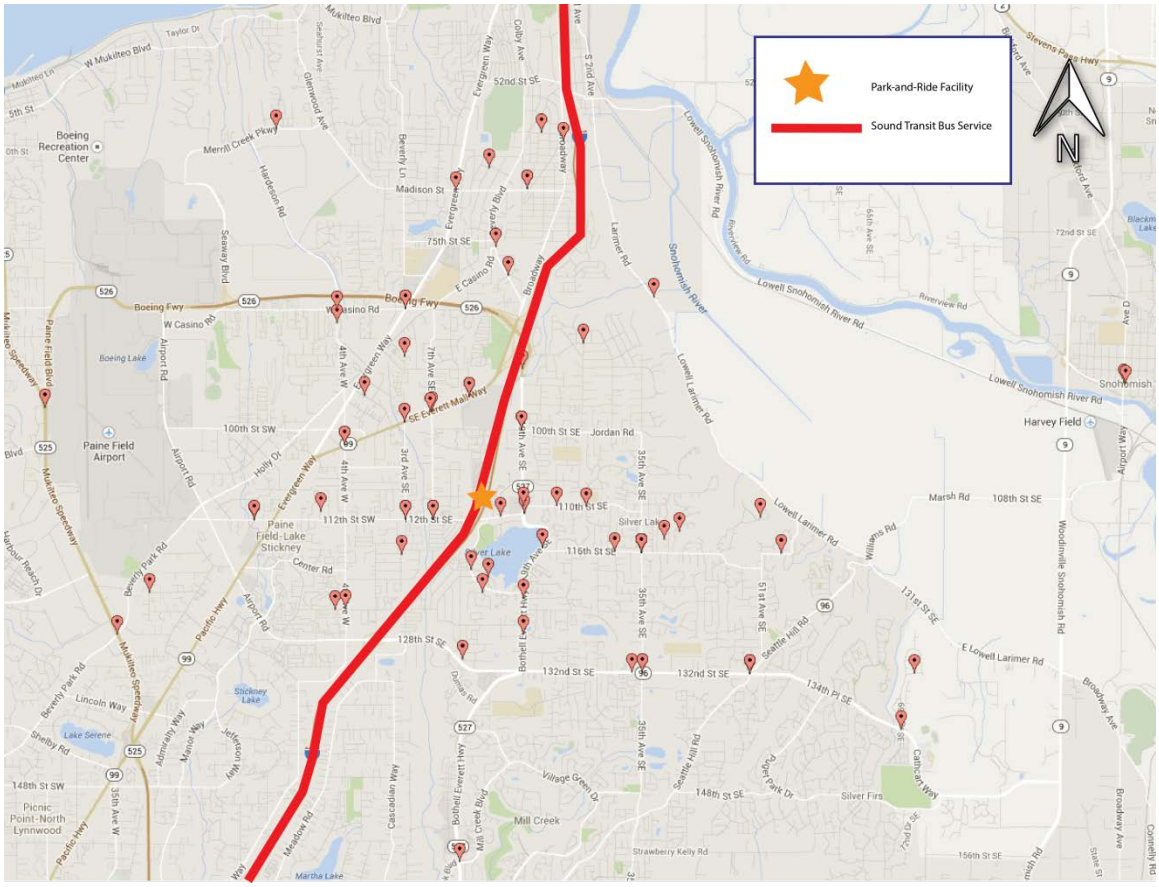
# Overlake Transit Center



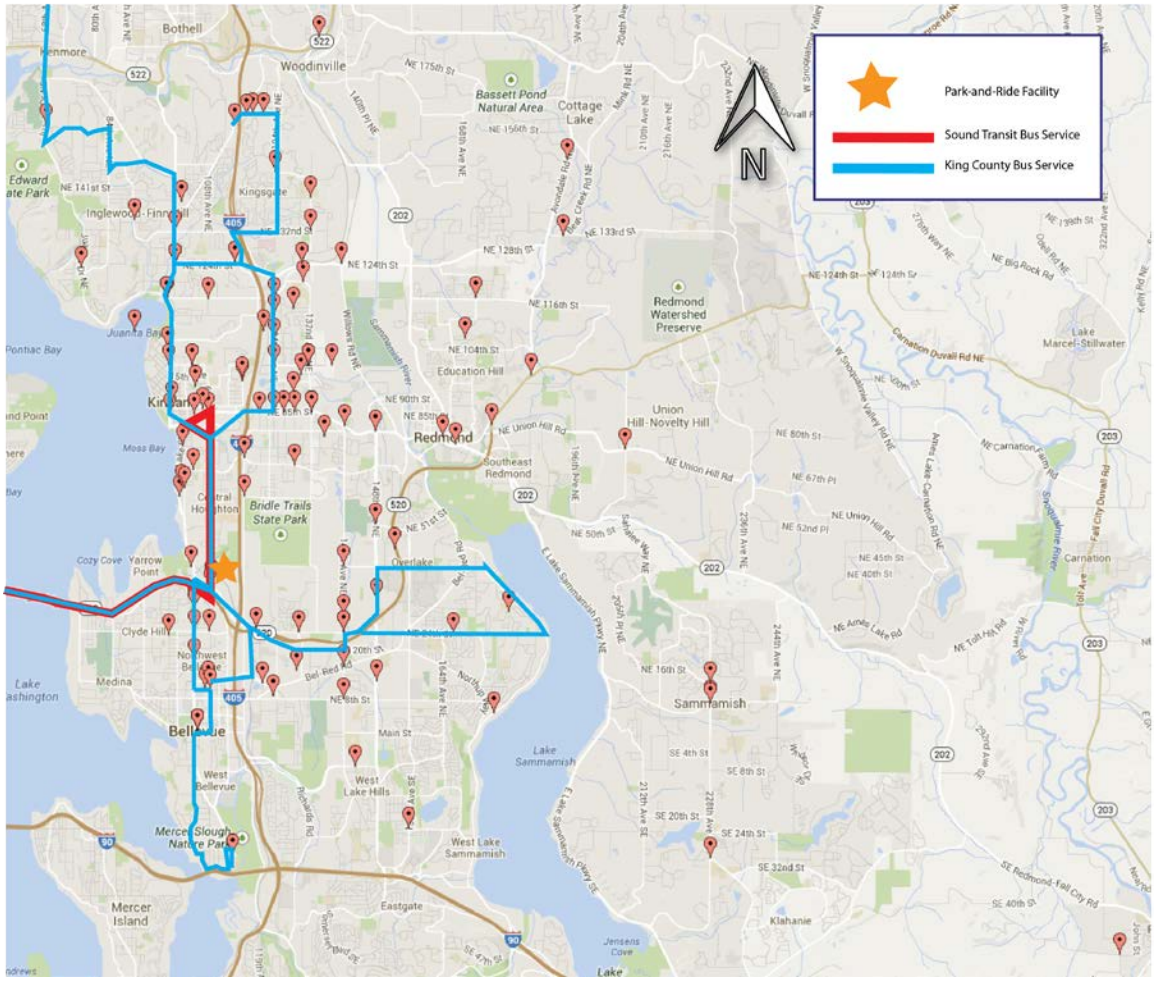
## Puyallup Station



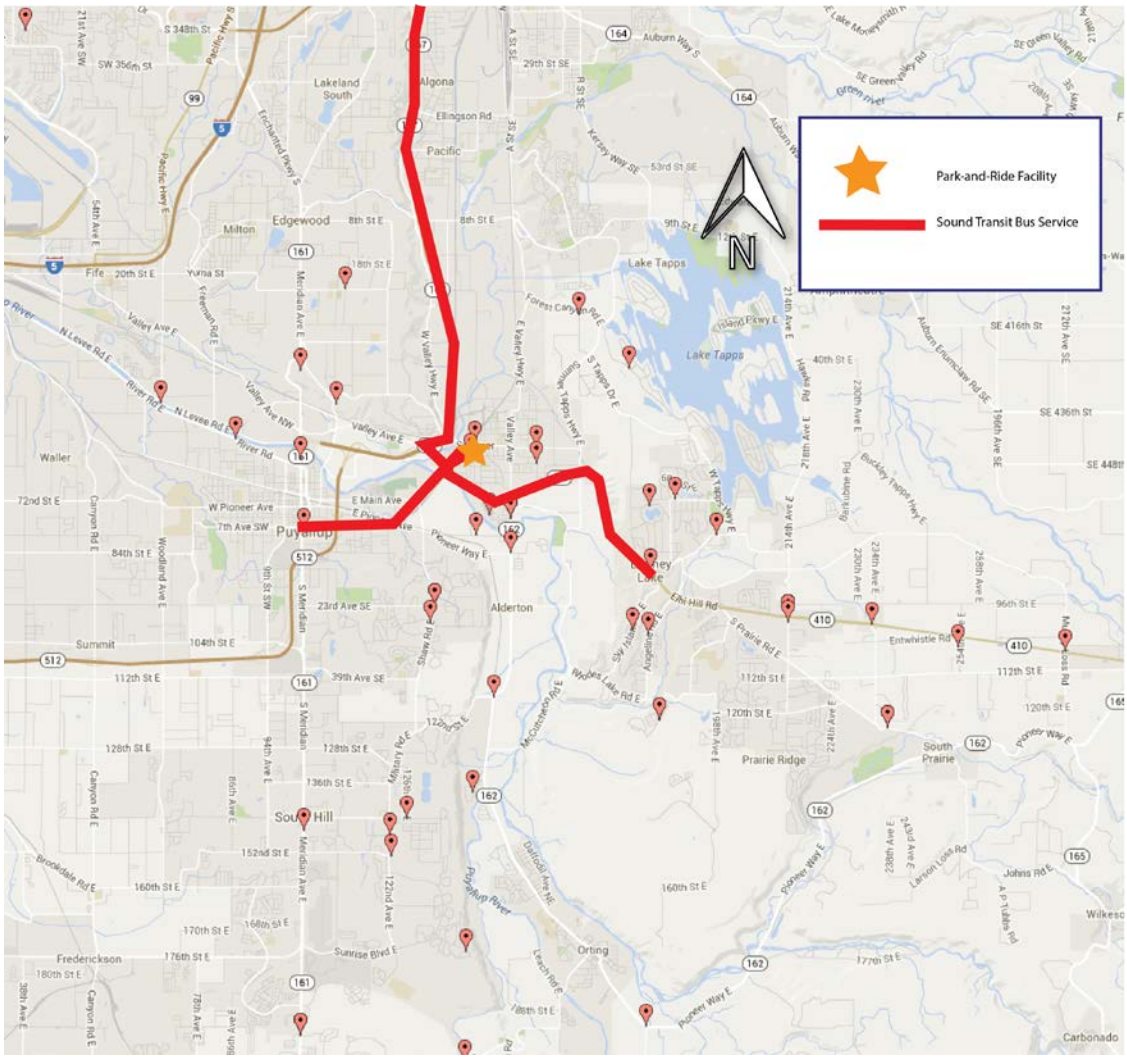
# South Everett Freeway Station



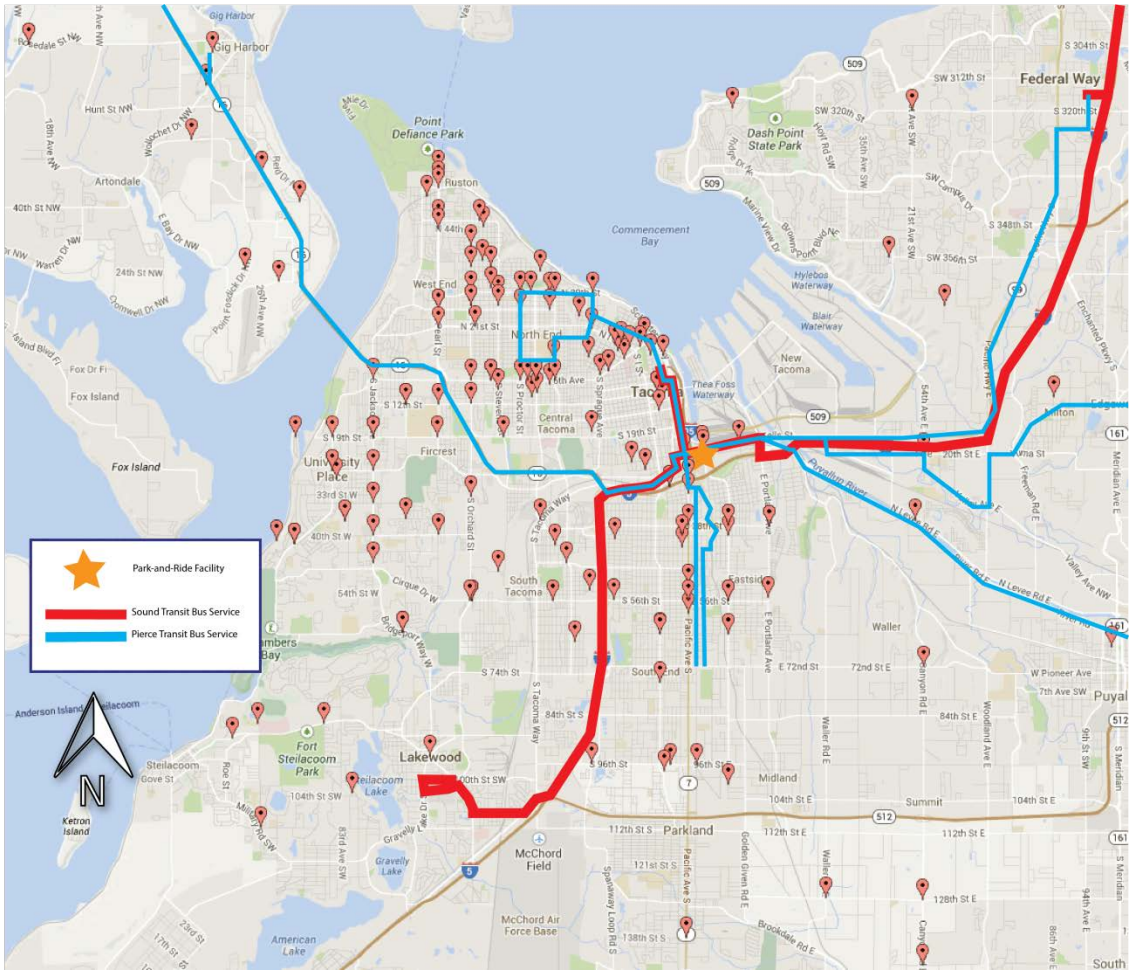
## South Kirkland Park-and-Ride



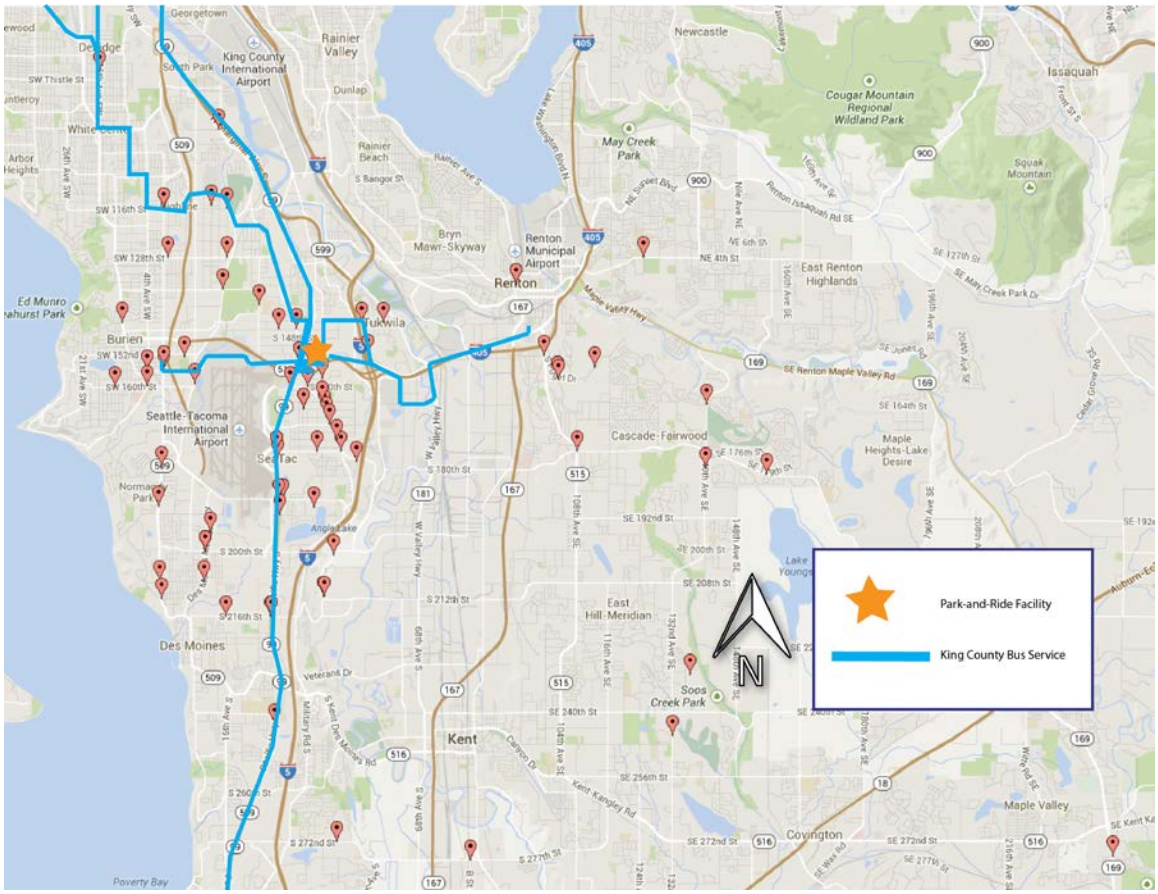
## Sumner Station



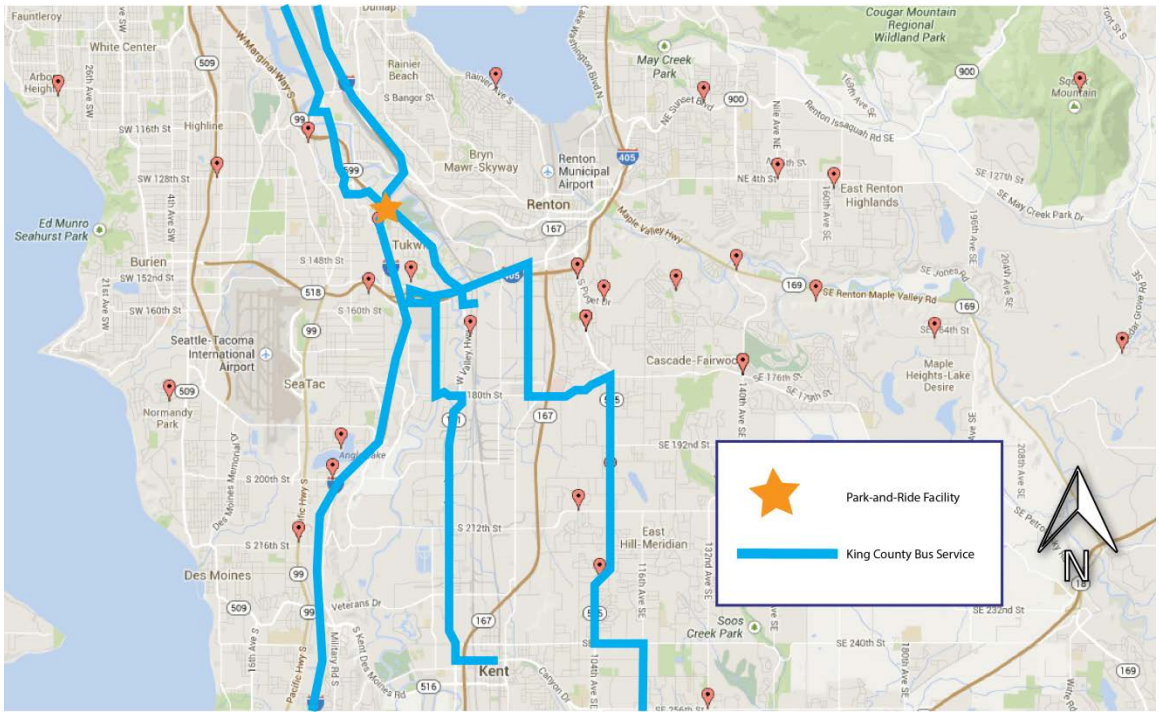
## Tacoma Dome Station



## Tukwila International Boulevard Station



Tukwila Park and Ride



## Tukwila Station