



2013 PARK-AND-RIDE SURVEY FINAL REPORT

December 2013

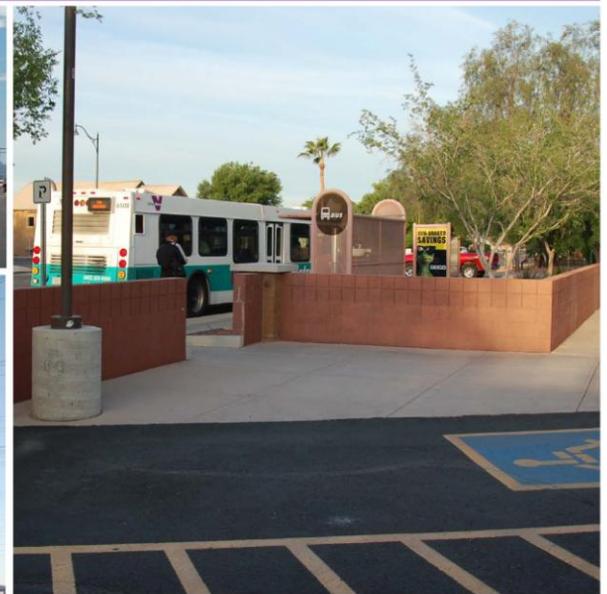


TABLE OF CONTENTS

Page

EXECUTIVE SUMMARY	ES-1
1.0 INTRODUCTION.....	1-1
1.1 Overview	1-1
1.2 PNR Facilities Surveyed.....	1-1
2.0 APPROACH AND METHODOLOGY	2-1
2.1 Park-and-Ride Inventories and Utilization.....	2-1
2.2 Bus and Light Rail Rider Survey	2-2
2.3 Vanpool Survey	2-6
2.4 Quality Control.....	2-7
3.0 SUMMARY OF OVERALL FINDINGS FOR ALL PNRs	3-1
3.1 Transit Serving the PNRs	3-1
3.2 Overall Rider Survey Results of the PNRs	3-3
3.3 PNR’s – Utilization and Existing Amenities.....	3-10
3.4 Vanpool Survey Results PNR’s	3-17
4.0 ANALYSIS	4-1
4.1 Relationship Between Number of Vehicles Parked in PNRs And Distance from Riders’ Points or Origin and Destination.....	4-1
4.2 Relationship Between Number of Vehicles Parked in PNRs And Express and RAPID Bus Service Levels	4-7
5.0 CONCLUSIONS.....	5-1
5.1 General	5-1
5.2 Express and RAPID Bus PNRs	5-4
5.3 Light Rail PNRs	5-4
5.4 Vanpools	5-5
5.5 Lessons Learned	5-6

APPENDIX (Separate Volume)

- A Survey Instruments
- B Detailed Findings for Each PNR Surveyed
- C Data Dictionary

LIST OF FIGURES

- Figure 1-1. Park-and-Ride Locations
- Figure 3-1. PNRs Surveyed and Inventoried
- Figure 3-2. Which Route Are You Taking from the PNR Today?
- Figure 3-3. Which Transit Mode Are You Taking from the PNR Today?
- Figure 3-4. How Did You Get to the PNR?
- Figure 3-5. If You Drove, Was Adequate Parking Available?
- Figure 3-6. What is the Main Purpose of Your Trip?
- Figure 3-7. On Average, How Often Do You Use this PNR?
- Figure 3-8. What Time Did You Arrive at the PNR Today?
- Figure 3-9. What Time Do You Expect to Return to the PNR?
- Figure 3-10. How Far Did You Drive, Ride, Walk, or Bicycle to this PNR?
- Figure 3-11. Why Did You Use This PNR?
- Figure 3-12. Are There Improvements That Should Be Added to the PNR?
- Figure 4-1A. Relationship Between Numbers of Vehicles Parking in Light Rail PNRs to Distance to Downtown Phoenix
- Figure 4-1B. Relationship Between Parking Utilization in Light Rail PNRs to Distance to Downtown Phoenix
- Figure 4-2A. Relationship Between Number of Vehicles Parking in Light Rail PNRs to Distance to ASU in Tempe
- Figure 4-2B. Relationship Between Parking Utilization in Light Rail PNRs to Distance to ASU in Tempe
- Figure 4-3A. Relationship Between Numbers of Vehicles Parking in Bus PNRs to Distance to Downtown Phoenix
- Figure 4-3B. Relationship Between Parking Utilization in Bus PNRs to Distance to Downtown Phoenix
- Figure 4-4A. Relationship Between Numbers of Vehicles Parking in All Light Rail PNRs to Distances from Origin to PNRs
- Figure 4-4B. Relationship Between Parking Utilization in All Light Rail PNRs to Distances from Origin to PNRs
- Figure 4-5A. Relationship Between Numbers of Vehicles Parking in Bus PNRs to Distances From Origin To PNRs

Figure 4-5B. Relationship Between Parking Utilization in Bus PNRs to Distances From Origin to PNRs

Figure 4-6A. Relationship Between Numbers of Vehicles Parking in All Bus PNRs to Bus Service Levels

Figure 4-6B. Relationship Between Parking Utilization in All Bus PNRs to Bus Service Levels

Figure 4-7A. Relationship Between Numbers of Vehicles Parking in RAPID Bus PNRs to Service Levels

Figure 4-7B. Relationship Between Parking Utilization in RAPID Bus PNRs to Service Levels

Figure 4-8A. Relationship Between the Number of Vehicles Parking in Express Bus PNRs to Service Levels

Figure 4-8B. Relationship Between Parking Utilization in Express Bus PNRs to Service Levels

LIST OF TABLES

- Table 1-1. PNR Facilities Surveyed
- Table 2-1. Rider Survey Confidence Levels by PNR
- Table 3-1. Transit Service to the PNRs
- Table 3-2. PNRs by Capacity
- Table 3-3. PNRs by Percent Parking Utilization
- Table 3-4. Existing Amenities and Utilization for All PNRs
- Table 3-5. Park-and-Ride Additional Amenities
- Table 3-6. PNRs by Percent Covered Parking
- Table 3-7. Summary of Vanpool Results by PNR
- Table 3-8. How Did You Get to the PNR?
- Table 3-9. Why Did You Use This PNR?
- Table 3-10. Does Your Van Park Overnight at the PNR?
- Table 3-11. Why Does the Van Not Park Overnight?
- Table 3-12. Are There Improvements That Should be Added to the PNR?
- Table 5-1. PNRs Served by Transit Mode

EXECUTIVE SUMMARY

This 2013 Park-and-Ride (PNR) survey is the first comprehensive study of the public PNR facilities in the Valley Metro transit service area. The purpose of the survey is to help Valley Metro and other PNR stakeholders better understand:

- The main modes used by transit riders and vanpool commuters to get to each PNR
- Trip origination(s) and destination(s) of PNR users
- Trip purpose of PNR users
- Frequency of use by PNR users
- Utilization levels of individual PNRs
- Amenities available at each PNR
- PNR improvements desired by PNR users

The 29 PNRs studied are presented in **Table ES-1 and Figure ES-1**. They include the region's publicly owned facilities. Other PNRs, such as those provided in existing shopping center lots were excluded from this study. Surveys of express and RAPID bus riders, light rail riders, and Valley Metro vanpool commuters using PNRs were conducted on weekdays during the AM peak period between April 2013 and June 2013. In addition, the PNRs were also inventoried for the specific amenities offered within each facility, and vehicle counts were recorded to determine the extent of utilization of each PNR.

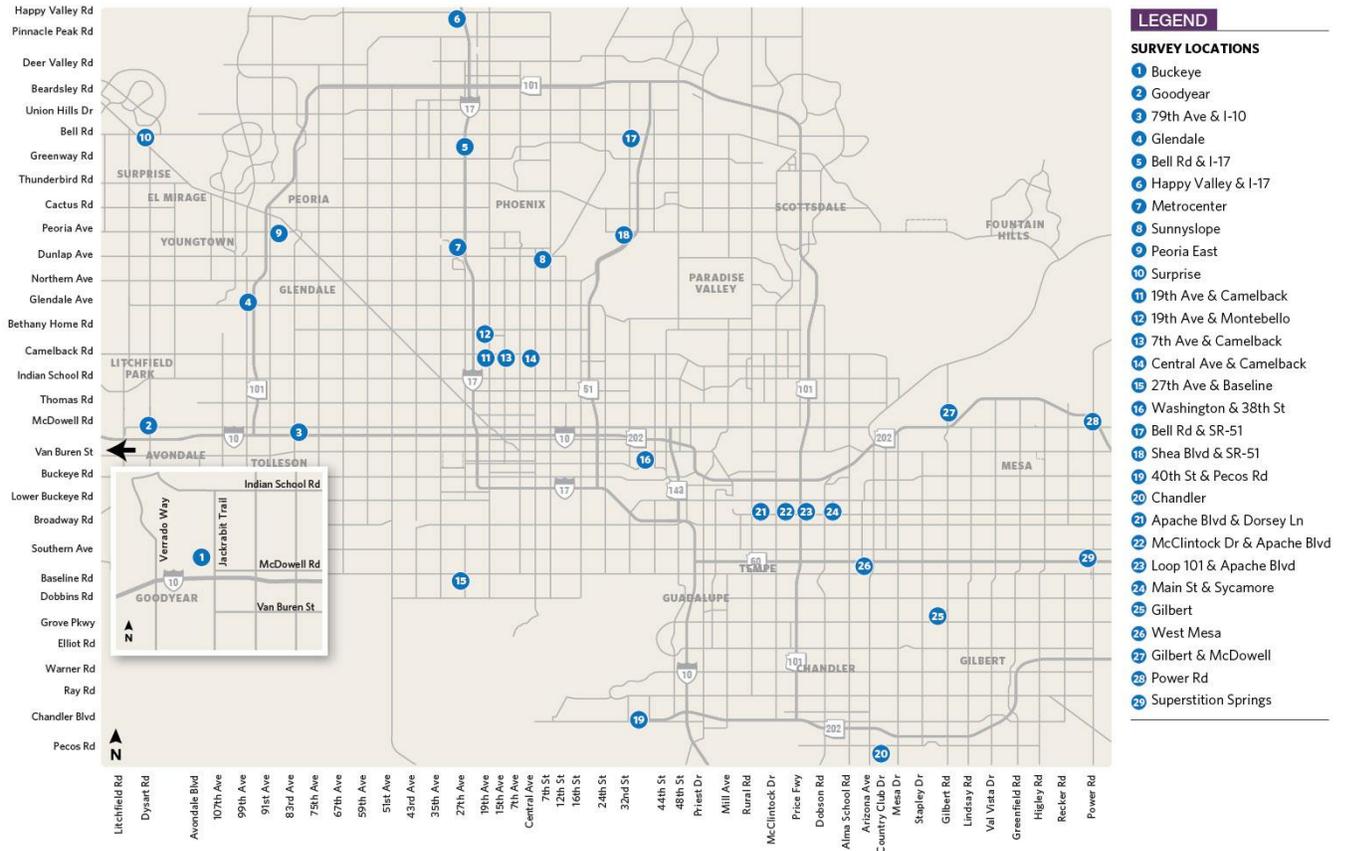
Table ES-1. Park-and-Rides Surveyed and Inventoried (Listed by City)¹

PNR Facility	City	ID ²	PNR Facility	City	ID ²
Buckeye	Buckeye	1	79 th Ave. & I-10	Phoenix	3
Chandler	Chandler	20	7th Ave. & Camelback Rd.	Phoenix	13
Gilbert	Gilbert	25	Bell Rd. & I-17	Phoenix	5
Glendale	Glendale	4	Bell Rd. & SR-51	Phoenix	17
Goodyear	Goodyear	2	Central Ave. & Camelback Rd.	Phoenix	14
Gilbert Rd. & McDowell Rd.	Mesa	27	Happy Valley Rd. & I-17	Phoenix	6
Main St. & Sycamore	Mesa	24	Metrocenter	Phoenix	7
Power Rd.	Mesa	28	Shea Blvd. & SR-51	Phoenix	18
Superstition Springs	Mesa	29	Sunnyslope	Phoenix	8
West Mesa	Mesa	26	Washington St. & 38th St.	Phoenix	16
Peoria East	Peoria	9	Surprise	Surprise	10
19th Ave. & Camelback Rd.	Phoenix	11	Apache Blvd. & Dorsey Ln.	Tempe	21
19th Ave. & Montebello	Phoenix	12	Loop 101 and Apache Blvd.	Tempe	23
27 th Ave. & Baseline Rd.	Phoenix	15	McClintock Dr. & Apache Blvd.	Tempe	22
40 th St. & Pecos Rd.	Phoenix	19			

¹PNRs in italics and bold denote those served by light rail service. All other PNRs, except Sunnyslope, are served by express or RAPID buses. The Sunnyslope PNR is served by local buses only. This PNR facility was inventoried but no rider surveys were conducted.

²ID corresponds to survey location number in Figure ES-1.

Figure ES-1 Park-and-Rides Surveyed and Inventoried



As a result of the extensive data-gathering effort and subsequent analysis of the data, several conclusions were drawn. These conclusions, some of which are summarized below, provide insight into the variables that contribute to the utilization of the region’s publicly owned PNR facilities and user patterns. Information from this summary effort is valuable for understanding differences between bus, light rail, and vanpool PNR users, preferences for choosing a PNR, distance passengers are willing to travel to a PNR, amenities desired, utilization of existing facilities, and variables that affect PNR usage.

Bus and Light Rail Conclusions

PNRs with express or RAPID bus service serve different travel markets than light rail PNRs.

- Bus PNRs primarily serve work trips (98 percent of total trips) while light rail PNRs tend to serve fewer work trips (53 percent) and more college or university trips (39 percent).

Light rail PNRs experience higher parking utilization rates than bus PNRs.

- Light rail PNRs have a 56 percent parking utilization rate compared to bus PNRs with a 46 percent utilization rate.

Bus, light rail and vanpool PNR users predominantly access their PNRs by driving alone. However, light rail and vanpool PNR users drive alone at a higher rate.

- The survey found that 89 percent of vanpool PNR users and 87 percent of light rail PNR users drove alone, while 76 percent of bus PNR users drove alone.

A correlation between the number of cars parked at a light rail PNR and the distance to downtown Phoenix is demonstrated by the survey data.

- Analysis showed an almost direct 1:1 relationship between numbers of vehicles parked in light rail PNR facilities and light rail PNR distance to downtown Phoenix.

On average, light rail PNR users travel further distances to their PNR than express and RAPID bus PNR users and vanpool users.

- For light rail PNR users, the average distance between their trip origin and PNR is 5.1 miles while that distance is only 4.2 miles for vanpool PNR users and 3.9 miles for bus PNR users.

PNR facilities within 1.5 miles of a freeway are more utilized than those further away. This typically results in the travel market sheds for PNRs near freeways to be larger.

- PNRs within 1.5 miles of a freeway averaged a 53 percent utilization rate while those at further distances averaged only a 28 percent utilization rate.
- PNR users drive longer distances (4.3 miles) to PNRs within 1.5 miles of a freeway than to PNRs further from freeways (3.1 miles).

Proximity to users' homes is the primary reason stated for choosing a PNR, while the transit route that serves the PNR facility is the second most common reason.

Survey respondents could select as many reasons for using their PNR as applied.

- 75 percent of responses for users of all PNRs indicated that being close to home was a major reason. Bus PNR users were more likely to list this as a reason (81 percent of responses) than light rail PNR users (59 percent of responses).
- 43 percent of responses for users of all PNRs indicated that a major reason was because their transit route serves it.

The most-requested PNR improvement is for covered parking followed by real-time transit information.

- Survey respondents could select up to two improvements they would most like to see. Approximately 25% of respondents requested covered parking, while just over 21% requested real-time transit information.

A higher level of RAPID bus service correlates with a higher number of cars parked in a PNR.

- An almost direct 1:1 relationship exists between the number of daily inbound RAPID trips (HOV based RAPID service only) to the number of cars parked at a bus PNR.

Light rail PNR users are 20 times more likely to be going to a university/college than bus PNR users.

- College/university trips comprise an average 39 percent of all trips for light rail PNR users. For the four light rail PNRs closest to ASU and GateWay Community College, this trip purpose is much higher ranging between 43 percent and 65 percent of all trips. In contrast, college/university trips comprise less than 2 percent of all trips for bus PNR users.
- An explanation of these results may be the expense of parking on the Arizona State University (ASU) campus. The two PNRs closest to ASU have 69 percent and 92 percent utilization ranking them the two most highly utilized of the light rail PNRs.

Availability of covered parking at light rail PNRs near university or college campuses with parking fees may be less important than the availability of free parking and ease of access to the campus.

- Of the four PNRs closest to ASU or GateWay Community College, only one PNR offers covered parking. Since a large proportion of students do not attend school during the hot summer months when covered parking is most desired, this may further bolster the statement that the provision of covered parking is less important near these campuses.

Vanpool Conclusions

Vanpool use at PNRs is greatest at highly visible PNRs adjacent to freeways.

- Five PNRs adjacent to the freeway have the highest vanpool utilization with five to eight vanpools (out of 45 vanpools responding to the survey) regularly using each.
- Vanpools used only 16 of the 29 PNRs surveyed. Limited utilization by vanpool commuters could be a result of PNR geographic locations being inconsistent with trip origins; knowledge of PNR facility locations and/or low visibility of PNR facilities, and knowledge of authorization to use the PNR facilities.

The reason vanpool commuters most often chose their PNR is because it is close to home. Other top reasons included availability of covered parking and being close to a freeway. The results indicate that convenience is a high priority for them.

When asked why vanpool commuters used their particular PNR, survey respondents could select as many reasons for using their PNR as applied.

- Being close to home comprised 71 percent of responses; availability of covered parking comprised 53 percent of responses; and being close to a freeway comprised 44 percent of responses.

Vanpool commuters tend to be satisfied with the amenities currently offered at their PNRs.

- When asked about what improvements they would like for the PNR itself, only 21 percent of the responses requested covered parking while other amenities such as shelters and benches were infrequently requested.

1.0 INTRODUCTION

1.1 Overview

This 2013 Valley Metro Park-and-Ride (PNR) Survey is the first comprehensive study of the public PNR facilities in the region. Surveys were conducted of PNR users which included the following: express and RAPID bus riders; light rail riders; and Valley Metro vanpool commuters. In addition, the PNR facilities were inventoried to document information about the specific amenities offered within each PNR. Finally, vehicle counts were conducted at each facility to determine the extent of utilization.

The purpose of the survey is to help Valley Metro and other stakeholders to better understand:

- The main modes transit riders and vanpool commuters use to get to each PNR
- The trip origination(s) and destination(s) of PNR users
- The usage levels of individual PNRs based on characteristics such as:
 - Numbers of routes served and associated service levels
 - Proximity to freeway(s)
 - Distance from major activity centers served
 - Availability of covered parking and other amenities.

This information will be useful in providing insight into each PNR with respect to:

- Identifying the passenger market travel shed
- Identifying and prioritizing types of amenities to be provided at each PNR
- Determining whether existing parking capacities are adequate at each PNR
- Planning for future PNR locations.

The bus and light rail surveys, park-and-ride inventories and vehicle counts were carried out during the AM peak period on Tuesdays, Wednesdays, and Thursdays. This was done so that information could be captured from riders using transit during the most typical morning commute times and days of the week. The vehicle counts were taken after the last AM express or RAPID bus departed each PNR served by bus, or in the case of PNRs serving light rail stations, after the AM peak travel time. Valley Metro distributed surveys to the drivers of vans which use the PNRs and requested the drivers distribute the surveys to all riders in their vanpools to complete and submit to Valley Metro.

1.2 PNR Facilities Surveyed

A total of 29 PNRs across the region were included in the survey. Each of these facilities is publicly owned and serves either bus, light rail or both. **Table 1-1** provides a complete list of the facilities surveyed, while **Figure 1-1** illustrates each facility's location in relation to each other and to the regional transit network.

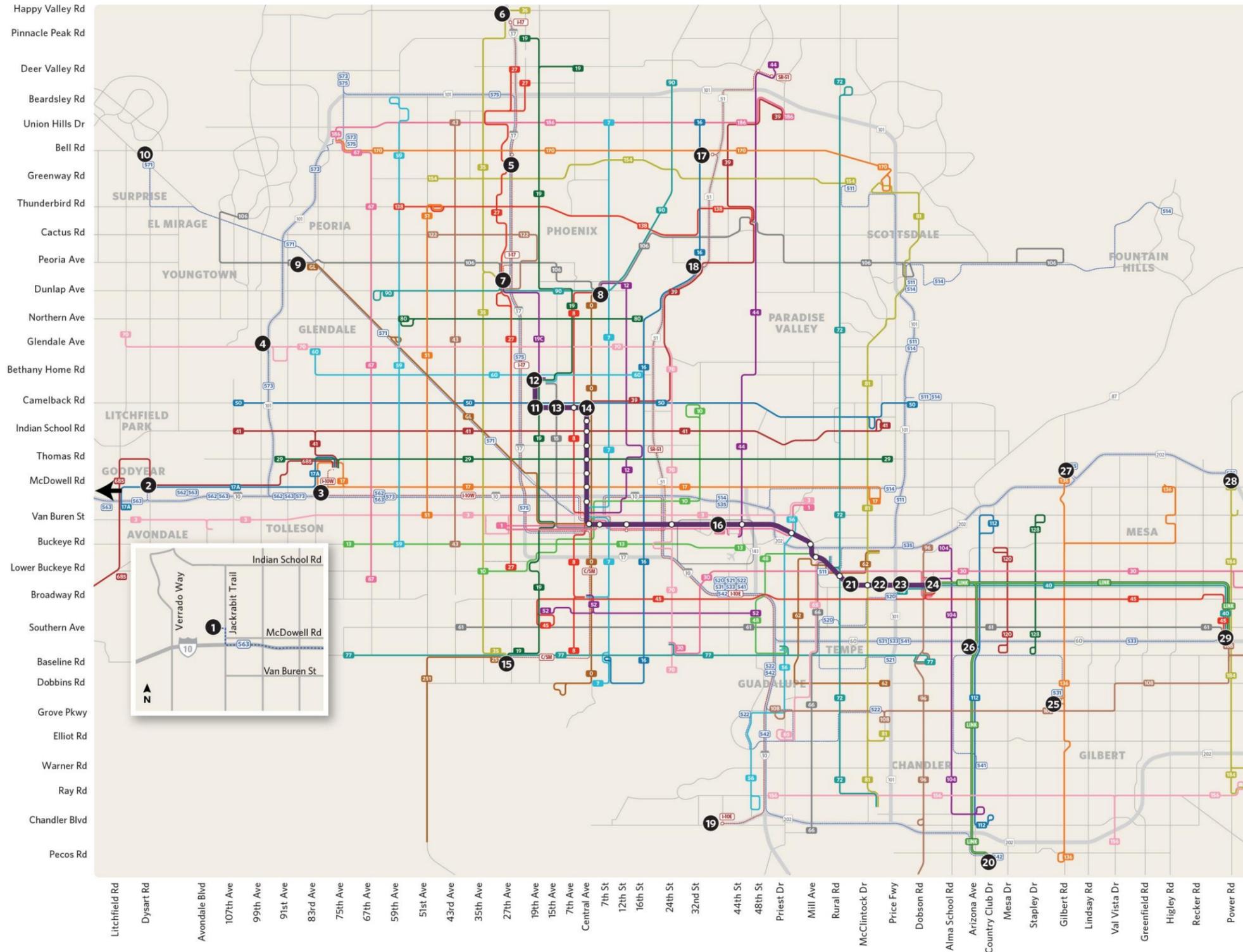


Table 1-1. PNR Facilities Surveyed

PNR Facility	Location	City	No. Parking Spaces	ID ¹
Buckeye	Jackrabbit Trail and Palm Ln.	Buckeye	250	1
Chandler	Hamilton and Germann (Arizona Ave./Loop 202)	Chandler	460	20
Gilbert	Oak St. and Page Ave.	Gilbert	250	25
Glendale	99 th Ave. and Glendale Ave.	Glendale	388	4
Goodyear	Cornerstone Blvd. and Dysart Rd.	Goodyear	400	2
Gilbert Rd. & McDowell Rd.	Gilbert Rd. and Loop 202	Mesa	220	27
Main St. & Sycamore	Main St. and Sycamore	Mesa	802	24
Power Rd.	Power Rd. and Loop 202	Mesa	194	28
Superstition Springs	Power Rd. and US-60	Mesa	297	29
West Mesa	Country Club Dr. and Juanita	Mesa	305	26
Peoria East	Jefferson St. and 84 th Ave.	Peoria	82	9
19 th Ave. & Camelback Rd.	19 th Ave. and Camelback Rd.	Phoenix	410	11
19 th Ave. & Montebello	19 th Ave. and Montebello	Phoenix	794	12
27 th Ave. & Baseline Rd.	27 th Ave. and Baseline Rd.	Phoenix	200	15
40 th St. & Pecos Rd.	Pecos Rd. and 40 th St.	Phoenix	906	19
79 th Ave. & I-10	79 th Ave. and I-10	Phoenix	607	3
7 th Ave. & Camelback Rd.	7 th Ave. and Camelback Rd.	Phoenix	123	13
Bell Rd. & I-17	Bell Rd. and I-17	Phoenix	350	5
Bell Rd. & SR-51	SR-51 and Bell Rd.	Phoenix	377	17
Central Ave. & Camelback Rd.	Central Ave. and Camelback Rd.	Phoenix	135	14
Happy Valley Rd. & I-17	Happy Valley Rd. and I-17	Phoenix	512	6
Metrocenter	Metrocenter Pkwy (Metrocenter Mall parking lot)	Phoenix	215	7
Shea Blvd. & SR-51	Shea Blvd. and SR-51	Phoenix	370	18
Sunnyslope	3 rd St. and Dunlap Ave.	Phoenix	45	8
Washington St. & 38 th St.	Washington St. and 38 th St.	Phoenix	189	16
Surprise	Bell Rd. and 134 th Dr.	Surprise	230	10
Apache Blvd. & Dorsey Ln.	Apache Blvd. and Dorsey Ln.	Tempe	190	21
Loop 101 and Apache Blvd.	Loop 101 and Apache Blvd.	Tempe	693	23
McClintock Dr. & Apache Blvd.	McClintock Dr. and Apache Blvd.	Tempe	300	22

¹ID corresponds to survey location number in Figure 1-1.

Figure 1-1. Park-and-Ride Locations



LEGEND

SURVEY LOCATIONS

- | | |
|----------------------------|--------------------------------|
| 1 Buckeye | 16 Washington & 38th St |
| 2 Goodyear | 17 Bell Rd & SR-51 |
| 3 79th Ave & I-10 | 18 Shea Blvd & SR-51 |
| 4 Glendale | 19 40th St & Pecos Rd |
| 5 Bell Rd & I-17 | 20 Chandler |
| 6 Happy Valley & I-17 | 21 Apache Blvd & Dorsey Ln |
| 7 Metrocenter | 22 McClintock Dr & Apache Blvd |
| 8 Sunnyslope | 23 Loop 101 & Apache Blvd |
| 9 Peoria East | 24 Main St & Sycamore |
| 10 Surprise | 25 Gilbert |
| 11 19th Ave & Camelback | 26 West Mesa |
| 12 19th Ave & Montebello | 27 Gilbert & McDowell |
| 13 7th Ave & Camelback | 28 Power Rd |
| 14 Central Ave & Camelback | 29 Superstition Springs |

ROUTES

- Light rail
 - LINK bus
- Express bus**
no stops on freeway
- 511 Tempe/Scottsdale Airport
 - 514 Scottsdale/Fountain Hills
 - 520 Tempe
 - 521 Tempe
 - 522 Tempe
 - 531 Mesa/Gilbert
 - 533 Mesa
 - 535 Northeast Mesa
 - 541 Chandler
 - 542 Chandler
 - 562 Goodyear
 - 563 Buckeye
 - 571 Surprise
 - 573 Northwest Valley
 - 575 Northwest Valley
- RAPID bus**
- [H0E] I-10 East RAPID
 - [H0W] I-10 West RAPID
 - [I17] I-17 RAPID
 - [SR-51] SR-51 RAPID
 - [C/SM] Central/South Mountain RAPID
- Local buses**
- 0 Central Ave
 - 1 Washington St/Jefferson St
 - 2 Van Buren St
 - 3 7th St
 - 4 7th Ave
 - 5 Roosevelt St/Grant St
 - 6 12th St
 - 7 Buckeye Rd
 - 8 15th Ave
 - 9 16th St
 - 10 McDowell Rd
 - 11 Avondale
 - 12 19th Ave
 - 13 19th Ave Connector
 - 14 27th Ave
 - 15 University Dr
 - 16 35th Ave
 - 17 40th St
 - 18 Apache Blvd/Main St
 - 19 Indian School Rd
 - 20 43rd Ave
 - 21 44th St/Tatum Blvd
 - 22 Broadway Rd
 - 23 48th St/Rio Salado Pkwy
 - 24 Camelback Rd
 - 25 51st Ave
 - 26 Roeser Rd
 - 27 Priest Dr
 - 28 59th Ave
 - 60 Bethany Home Rd
 - 61 Southern Ave
 - 62 Hardy Dr/Guadalupe Rd
 - 63 Mill Ave/Kyrene Rd
 - 64 Mill Ave/Kyrene Rd
 - 65 67th Ave
 - 66 Glendale Ave/24th St
 - 67 Scottsdale Rd/Rural Rd
 - 68 Baseline Rd
 - 69 Northern Ave
 - 70 Hayden Rd/McClintock Dr
 - 71 Dunlap Ave/Cave Creek Rd
 - 72 Dobson Rd
 - 73 Alma School Rd
 - 74 Peoria Ave/Shea Blvd
 - 75 Elliot Rd
 - 76 Country Club Dr/Arizona Ave
 - 77 Mesa Dr
 - 78 Cactus Rd
 - 79 Stapley Dr
 - 80 Gilbert Rd
 - 81 Thunderbird Rd
 - 82 Greenway Rd
 - 83 Chandler Blvd
 - 84 Bell Rd
 - 85 Power Rd
 - 86 Union Hills Dr
 - 87 51st Ave
 - 88 Gila Bend Connector
 - 89 Grand Ave Limited

2.0 APPROACH AND METHODOLOGY

This chapter presents the approach and methodology used to conduct the survey. It also includes the quality control (QC) process implemented to minimize database errors. The park-and-ride inventories and rider surveys were conducted from April 2 through May 9, 2013. The vanpool surveys were conducted in May and June 2013 in conjunction with Valley Metro's van inspection program.

2.1 Park-and-Ride Inventories and Utilization

The PNR inventory process included an inventory of amenities provided and an inventory of cars parked at each facility. Using the PNR existing amenities form displayed in Appendix A (Survey Instruments), each of the 29 PNRs were inventoried. Facility amenities such as covered parking, bicycle storage, trash cans, shelters, seating, and real-time transit information were documented.

Vehicle counts were conducted at each PNR on two separate days to validate the reasonableness of the data collected. Using the inventory of parked vehicles, utilization rates were calculated based on the average of the two counts.

For two of the PNRs (Happy Valley Road & I-17 and Dorsey Lane & Apache Boulevard), the differences in the two initial counts were found to be in excess of 10 percent. Therefore, a third count was taken at these PNRs. The third count taken at Happy Valley Road & I-17 was similar to a previous count so it was used in estimating the percent utilization.

The third count taken at Dorsey Lane & Apache Boulevard was significantly lower than the other two counts previously taken. The major users of the Dorsey Lane & Apache Boulevard PNR are Arizona State University (ASU) students, faculty, and staff. It was not possible to conduct the third count until after ASU's spring session was completed which likely explains the reason for the lower count obtained. Since the majority of ASU students do not attend school in the summer, no additional counts were taken, and the two earlier counts were averaged to obtain a parking utilization rate for that PNR.

License plate numbers were recorded to obtain vehicle registration zip code information from the Arizona Motor Vehicle Division. The purpose of collecting this information was to ascertain where PNR users of each PNR originated their trip. The zip code information provided by ADOT can be found in Appendix B. Maps show the zip code areas and numbers of vehicles for those zip codes.

Note there are a few limitations on the use of the zip code data. The zip code provided by ADOT is that of the person who registered the vehicle. Because the PNR user is not always the registrant, the point of origin of the PNR user could differ from what the license plate zip code indicates. There were a number of cases where the zip code of the license plate was from a different part of the state or region. There are several reasons this could occur. One example would be if an ASU student uses a car owned by his or her parents who do not live at the same residence. Another case may be where a person may not have notified the Motor Vehicle Division of a change of address.

2.2 Bus and Light Rail Rider Survey

A survey of bus and light rail riders was developed and provided in both English and Spanish languages. A data dictionary for the survey and for use in the data collection and analysis is provided in Appendix C.



The rider survey instrument was developed to obtain as much information as possible in a short time period so that bus and rail riders would be more likely to complete the survey. Valley Metro, the City of Phoenix, and Maricopa Association of Governments (MAG) provided input on the survey instrument. Completion of the entire survey and specific rider address information were determined to be keys to the success of the study. Addresses are important to determine where people live in relation to the PNRs they use. To encourage riders to complete the surveys, they were offered an opportunity to participate in a gift card drawing¹ if they

completed the survey. Incentives, such as gift cards, are typically offered for similar types of major surveys. The allocated grant money for this study included the purchase of the gift cards awarded through the drawings.

RAPID, express bus and light rail riders were surveyed during the morning commute hours from each of the PNRs, with the exception of two PNRs. Field surveys on two different days at the 7th Avenue & Camelback Road PNR revealed that parking utilization was too low, approximately one percent, to attempt to capture surveys from those PNR users. Two vehicles utilized the lot on day one and one vehicle on day two. Riders from the Sunnyslope PNR were not surveyed since only local buses serve the PNR, and no RAPID, express bus or light rail serves that PNR. Finding sufficient riders using this small PNR would have been a time-consuming task that did not fit into the limited budget available for this work.

For the PNRs served by RAPID and express buses, surveyors boarded selected buses during the AM peak and distributed surveys to each bus rider who consented to filling out the survey. The bus trips selected for survey were generally those that arrived at their destination between 7:30 and 8:00 AM since those trips are typically the ones with the most riders, thus increasing the likelihood of obtaining more completed valid surveys.

Surveyors explained to riders the survey purpose and provided instructions for completion. The completed surveys were collected by the surveyors prior to the riders alighting the bus. All surveys were reviewed to determine their validity. All valid surveys were then entered into a master database for later retrieval of information needed to report the survey results.

¹ Five gift card random drawings were held during the conduct of the rider and vanpool surveys. A total of 64 cards were awarded with winnings totaling \$1,500.

The data collected in the rider survey is presented in Appendix A (Survey Instruments), and was designed to respond to the goals and objectives of the survey itself as described earlier in Section 1.1. Questions asked mainly concerned the following:

- Mode of access to PNR
- Trip origination/destination points
- Trip purpose
- Arrival/return times to PNR
- Frequency of PNR use
- Why rider uses PNR
- PNR improvements desired

2.2.1 Survey Sample Size

Purpose

To ensure that a valid number of surveys were collected for each PNR, and to maximize the effectiveness of project resources available for the survey, the number of surveys required to meet an 85 to 90 percent confidence level was calculated, with preference being given to attainment of a 90 percent confidence level where practical, given budget constraints. The confidence level is based on a number of factors, including extent of parking utilization, as more fully detailed in the methodology section below. Because parking utilization for a particular PNR was not yet known when the rider surveys were conducted for it, initial estimates were developed to provide the surveyors a sense of the quantity of completed surveys that should be collected to meet the desired confidence level at each PNR. Estimates were developed assuming 80 percent utilization for all PNRs. The actual numbers of surveys needed were later adjusted up or down depending on the actual utilization determined after the PNR vehicle counts were completed.



For those PNRs that did not meet the confidence level goal after the first day of survey for a specific PNR, additional surveys on other days were conducted in an attempt to obtain sufficient valid surveys based on actual parking utilization for that PNR. The specific confidence levels obtained by PNR are presented in **Table 2-1**.

Only five PNRs surveyed have slightly less than a 90 percent confidence level: Buckeye, Glendale, 38th Street & Washington, Apache Boulevard & Dorsey Lane, and McClintock Drive & Apache Boulevard. The levels for those five PNRs ranged between 87.7 percent and 89.4 percent, which, although not at the preferred 90 percent level, are still within the acceptable range between 85 and 90 percent; thus the overall survey results can be used to make valid conclusions from the data collected. As previously mentioned, two PNRs were not surveyed. The confidence levels for the other 22 PNRs either met or exceeded the desired 90 percent goal ranging between 90.1 percent and 100.0 percent.

Table 2-1. Rider Survey Confidence Levels by PNR

PNR Facility	City	Surveys Collected	Number Surveys Needed for 90% Confidence Level	Confidence Level (%)	ID ¹
Buckeye	Buckeye	31	32	88.4% ²	1
Chandler	Chandler	77	54	96.1%	20
Gilbert	Gilbert	46	40	93.9%	25
Glendale	Glendale	52	53	89.4% ²	4
Goodyear	Goodyear	103	56	98.6%	2
Gilbert Rd. & McDowell Rd.	Mesa	47	42	92.7%	27
Main St. & Sycamore	Mesa	58	56	90.8%	24
Power Rd.	Mesa	41	39	91.5%	28
Superstition Springs	Mesa	91	50	97.9%	29
West Mesa	Mesa	49	42	93.9%	26
Peoria East	Peoria	27	11	100.0%	9
19 th Ave. & Camelback Rd.	Phoenix	37	35	91.6%	11
19 th Ave. & Montebello	Phoenix	43	42	90.3%	12
27 th Ave. & Baseline Rd.	Phoenix	25	22	96.4%	15
40 th St. & Pecos Rd.	Phoenix	65	60	91.4%	19
79 th Ave. & I-10	Phoenix	60	59	90.4%	3
7 th Ave. & Camelback Rd.	Phoenix	0	1	N.S. ³	13
Bell Rd. & I-17	Phoenix	70	57	93.8%	5
Bell Rd. & SR-51	Phoenix	69	53	93.3%	17
Central Ave. & Camelback Rd.	Phoenix	37	36	90.4%	14
Happy Valley Rd. & I-17	Phoenix	68	55	93.9%	6
Metrocenter	Phoenix	52	45	93.1%	7
Shea Blvd. & SR-51	Phoenix	54	50	91.8%	18
Sunnyslope	Phoenix	0	17	N.S. ³	8
Washington St. & 38 th St.	Phoenix	43	45	88.9% ²	16
Surprise	Surprise	35	28	97.5%	10
Apache Blvd. & Dorsey Ln.	Tempe	47	49	89.0% ²	21
Loop 101 and Apache Blvd.	Tempe	55	55	90.1%	23
McClintock Dr. & Apache Blvd.	Tempe	44	48	87.7% ²	22
	Average	1,426	1,232	91.2%	

¹ID corresponds to the PNR number shown in Figure 1-1.

²Confidence level is less than the goal of 90% but is within the acceptable range.

³N.S. = Not surveyed for the reasons discussed in the text.

Methodology

The methodology used to determine the confidence level is presented here. The methodology was developed, reviewed and approved by a qualified economist.

To calculate the minimum number of completed surveys needed to satisfy the desired 85 to 90 percent confidence level goal, the following equation was used.

$$n = \frac{\frac{z^2 PQ}{d^2}}{1 + \frac{1}{N} \left(\frac{z^2 PQ}{d^2} - 1 \right)}$$

Where:

n = the number of samples necessary

N = the parking space utilization

z = the confidence level (1.645 is the z score associated with a 90 percent confidence level)

d = the margin of error (10 percent)

P = the response distribution (a conservative value of 0.5 was applied)

$Q = (1-P)$

The calculated number of samples necessary (n) represents the number of complete surveys required to satisfy the desired confidence level. Individual questions left unanswered or surveys that are only partially completed do not count towards the number of samples necessary.

To illustrate the methodology, an example of how the number of surveys required to satisfy the desired 85 to 90 percent confidence level at the 19th Avenue & Camelback Road PNR is shown below:

The 19th Avenue & Camelback Road PNR has a total of 410 spaces. As a result of the two vehicle counts obtained, the average daily utilization of spaces used in the facility was 17 percent. This equates to 70 spaces that were regularly used (N). The utilization percentage is factored into the estimate of surveys needed to satisfy the desired confidence level. The methodology assumes that as the number of parking spaces used in a PNR increases, the number of surveys necessary to satisfy the desired confidence level also increases.

The confidence level goal for the study is converted to a standard statistical z -factor for calculation purposes. The margin of error (d) for this study was assumed to be ten percent.

A response distribution factor (P) is used to optimize the survey in order to account for the predicted results. For example, if a simple random sample of ten people asks whether they like donuts, and nine respondents reply "Yes", then the prediction that is made about the general population is different had the results indicated that five respondents had said "Yes" and five others had said "No." Setting the response distribution to 50 percent is the most conservative assumption, and was used in this survey. The value for Q in the above equation is simply $(1-P)$.

Collectively, the inputs result in a total of 35 surveys (n) being necessary to satisfy the desired confidence level at the 19th Avenue & Camelback Road PNR.

Applying the numerical values from the example described above in the confidence level formula, the number of surveys required to meet a 90% confidence level is calculated as follows:

$$z^2 PQ / d^2 = (1.645^2 * 0.5 * (1-.5)) / (.10^2) = \mathbf{67.6503}$$

$$1 + 1/N * ((z^2 PQ / d^2) - 1) = 1 + 1/70 * (67.6503 - 1) = \mathbf{1.9522}$$

$$n = 67.6503 / 1.9522 = \mathbf{\sim 35 \text{ surveys required for 90\% confidence level}}$$

2.3 Vanpool Survey

A separate vanpool survey instrument was developed for vanpool commuters using PNR facilities (see Appendix A, Survey Instruments). The survey was generally structured to address many of the same questions as the rider survey, but also asked whether the vans were parked overnight at the PNR and if not, why they were not parked overnight. Trip purpose was not asked because all vanpool riders commute to and from work. The survey was provided in both English and Spanish languages.

Valley Metro’s vanpool staff held FTA’s required biannual van inventory on three Saturdays during the months of May and June 2013. Valley Metro vanpool drivers were required to participate by bringing the vans to a specified location on one of the Saturdays for Valley Metro inspection. As a part of the inventory, vanpool drivers were asked if they used any of the PNR facilities. If the response was yes, the driver was given a packet of surveys, and Valley Metro requested the vanpool group’s participation in completing the survey. This helped to obtain the maximum vanpool participation in the survey. Due to 53 vans being new, there was no requirement to inventory them. Therefore, to have those 53 vanpools participate in the survey Valley Metro vanpool staff contacted those drivers and asked them whether their vanpool group used PNRs.



Out of approximately 95 vanpool drivers given survey packages, 45 vanpool groups using one or more public PNRs returned completed surveys. Vanpool participants who responded indicated they used 17 of the 29 PNRs surveyed. Several of the PNRs used by the vanpools were not included in the 29 PNRs surveyed for this study. The other park-and-rides used by vanpools are informal, non-publicly owned facilities such as parking lots at shopping centers or churches. Based on Valley Metro vanpool staff discussions with vanpool drivers, Valley Metro estimates that approximately 25 percent of the vanpool groups use a PNR.

Similar to the bus and light rail rider survey an entry into a gift card drawing was used as an incentive for completing the vanpool and rider surveys. In addition to the gift card drawing incentive, the Valley Metro Transportation Demand Group offered an additional incentive

drawing to encourage vanpool commuters to complete the PNR survey. To be eligible for the additional incentive drawing, at least 80 percent of the vanpool group needed to complete the survey, and the completed surveys had to be returned within two weeks of distribution. The vanpool group winners for the additional incentive drawings were awarded free fares for one month, while the second place winners were given a \$100 Starbucks gift card to be shared among the group.

2.4 Quality Control

Quality control measures were incorporated into the PNR survey process to provide a high level of accuracy for the data collected and reported. Quality control procedures were implemented to verify the validity and quality of field surveys, database entry and output reports, and survey geocoding.

Field Surveys

Accurate and complete field surveys were essential to meeting the minimum number of surveys collected to achieve the 85% to 90% confidence level goal for each PNR. Field surveys were reviewed individually prior to being input to the survey database. The quality control reviews included verifying complete responses to required questions and valid responses to these questions. Surveys that were incomplete or contained invalid responses (e.g. origination location entered as McDowell Rd with no cross street or address number) were filed as invalid and not included in the survey database.

Additionally, quality control measures were established for validating PNR vehicle counts. The quality control procedures included conducting counts on two consecutive survey collection days to verify if vehicle count results were consistent (within a 10% variance). If vehicle counts were found to be inconsistent, the survey team conducted a third vehicle count to verify “typical” utilization.

Data Entry and Output Reports

The PNR survey data was reviewed to confirm the accuracy of the data input to the database and to determine if the queries prepared within the database provide accurate data tallies. Values for each field were screened through a custom “group-by” query to identify any data attributes that were inconsistent with the expected range of entries, misspellings, or unexpected null values. This first level of screening was performed primarily to identify data entry errors, which could impact query results. For example, for the question related to time of arrival at the surveyed PNR, if a response in the data field for a bus only PNR indicated a PM time (e.g., 6:45PM), the data was reviewed on the actual survey (using the assigned serial number) to determine if the data was entered in error by the data entry clerk. A minimal number of data entry errors were discovered and corrected.

The second level of data quality control was conducted on the summary queries developed within the MS Access database to identify accurate data tallies. To conduct this review, all individual values for each question were filtered, reviewed for consistency (e.g. security versus securite), and totaled by response category using a custom temporary query within the database. Results of the temporary query were compared to the values reported in each survey

question summary report. If the values did not match, a query debug process, employing a step-analysis (review of each step of the query logic), was used to determine the source of the data error. Similar to the level 1 quality control measure, a minimal number of data entry errors were discovered and corrected.

Survey Geocoding

The PNR Survey included geographically addressable data for three questions: 3) where did you come from, 8) what is your destination, and 14) address. ArcGIS was used to geocode, or map, each of these questions. Potentially invalid addresses or intersections were screened as part of the field survey review process; however, some invalid addresses were not discoverable during the survey review process. Using ArcGISs internal geocoding tool, survey address data (including intersections) were processed to map the locations provided. ArcGISs geocoding tool includes an address match accuracy rating. All addressable data attributes receiving a score less than an 80% match were reviewed to identify potential errors. Examples of errors include a survey response of an east-west roadway with a north-south directional prefix (e.g. N McDowell Road and N 32nd Street). Where these and similar errors existed, the ArcGIS operator corrected data to reflect an accurate representation of the provided address or intersection.

3.0 SUMMARY OF OVERALL FINDINGS FOR ALL PNRs

This chapter presents the findings of the major characteristics of all 29 PNRs surveyed and inventoried (**Figure 3-1**). The detailed findings for each of the 29 PNRs can be found in Appendix B. This chapter begins by listing the express/RAPID bus and light rail routes serving the PNRs. The aggregated results of the rider surveys are then presented. The chapter continues with a comparison of the PNR capacities, utilizations and existing features and amenities. The chapter concludes with a summary of the results from the vanpool survey.

3.1 Transit Serving the PNRs

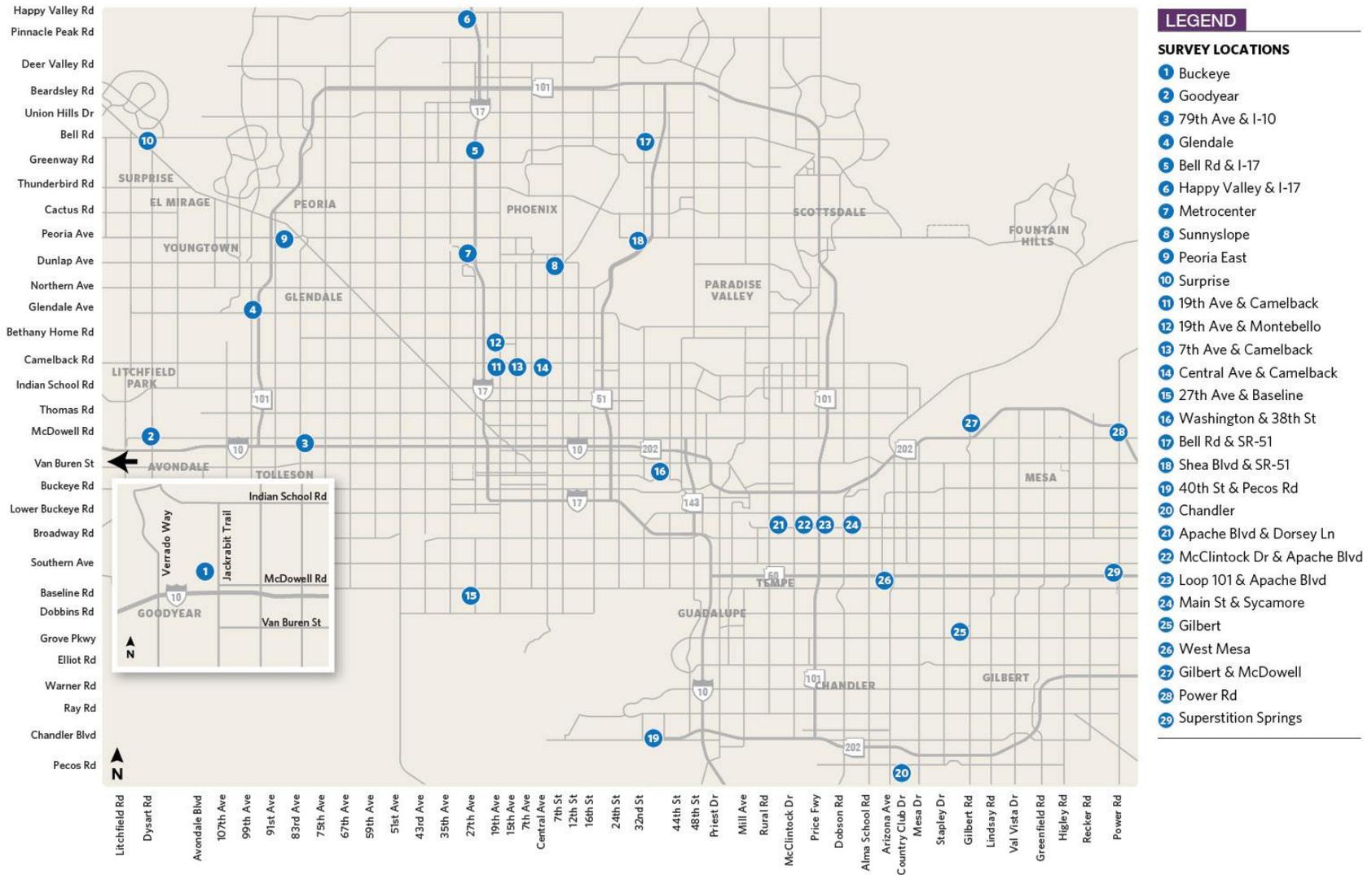
A total of 16 different transit routes (express/RAPID bus route or light rail service) serve the 29 publicly owned PNRs. Six routes, including light rail, serve multiple facilities. A complete list of all the routes that serve each PNR facility is provided in **Table 3-1**.

Table 3-1. Transit Service to the PNRs

Express/RAPID Route Or Light Rail Service ¹	PNRs Served
Route 531	Gilbert West Mesa
Route 533	Superstition Springs
Route 535	Power Rd. Gilbert Rd. & McDowell Rd.
Route 541	West Mesa
Route 542	Chandler
Route 562	Goodyear
Route 563	Buckeye Goodyear
Route 571	Surprise
Route 573	Glendale
Central/South Mountain RAPID	27 th Ave. & Baseline Rd.
Grand Avenue Limited	Peoria East
I-10 East RAPID	40 th St. & Pecos Rd.
I-10 West RAPID	79 th Ave. & I-10
I-17 RAPID	Happy Valley Rd. & I-17 Bell Rd. & I-17 Metrocenter
SR-51 RAPID	Bell Rd. & SR-51 Shea Blvd. & SR-51
METRO Light Rail	19 th Ave. & Montebello 19 th Ave. & Camelback Rd. 7 th Ave. & Camelback Rd. Washington St. & 38 th St. Apache Blvd. & Dorsey Ln. McClintock Dr. & Apache Blvd. Loop 101 & Apache Blvd. Main St. & Sycamore

¹For a listing of the transit routes serving the individual PNRs, refer to Appendix B.

Figure 3-1. PNRs Surveyed and Inventoried



3.2 Overall Rider Survey Results of the PNRs

The aggregated responses obtained for all PNRs are summarized herein. A total of 1,426 completed valid surveys were received from riders using the 29 PNRs.

3.2.1 Which Route/Transit Mode Are You Taking from the PNR Today?

Riders were surveyed on ten express bus routes, five RAPID routes, and METRO LRT (Figure 3-2). Approximately one in four (26 percent) survey responses were from a light rail rider, while 74 percent of the surveys received were from express bus or RAPID riders (Figure 3-3).

Figure 3-2. Which Route Are You Taking from the PNR Today?

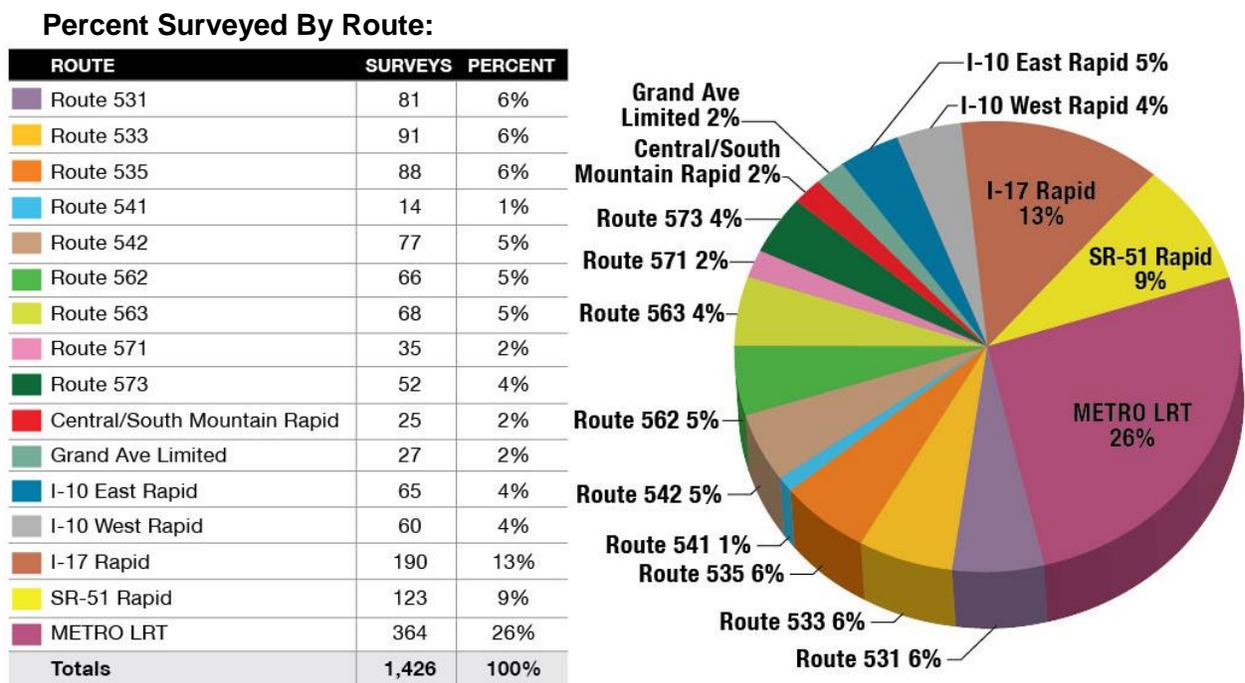
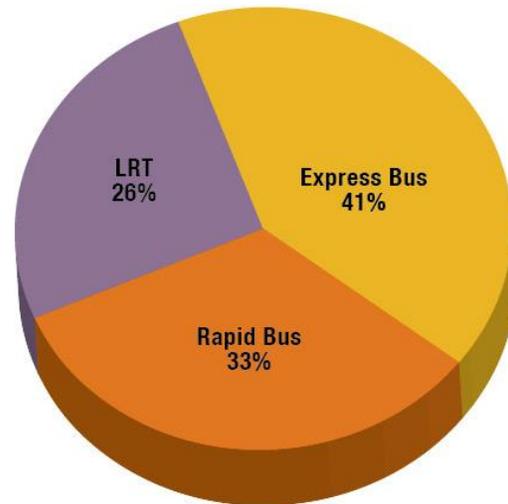


Figure 3-3. Which Transit Mode Are You Taking from the PNR Today?

Percent Surveyed by Transit Mode:

ROUTE	SURVEYS	PERCENT
LRT	364	26%
Express Bus	599	41%
Rapid Bus	463	33%
Totals	1,426	100%

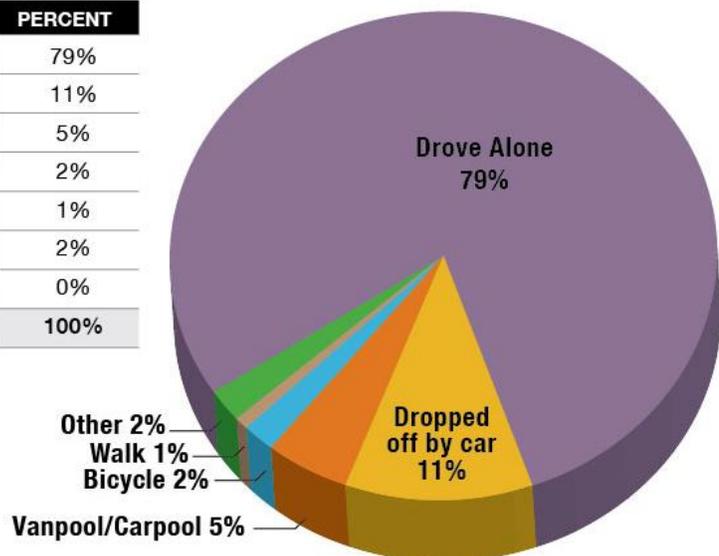


3.2.2 How Did You Get to the PNR?

Figure 3-4 shows that the vast majority (90 percent) of respondents accessing the PNRs got there either by driving alone (79 percent) or were dropped off by car (11 percent).

Figure 3-4. How Did You Get to the PNR?

MODE	NUMBER	PERCENT
Drove alone	123	79%
Dropped off by car	160	11%
Vanpool/Carpool	66	5%
Bicycle	31	2%
Walk	18	1%
Other	25	2%
No Response	3	0%
Totals	1,426	100%

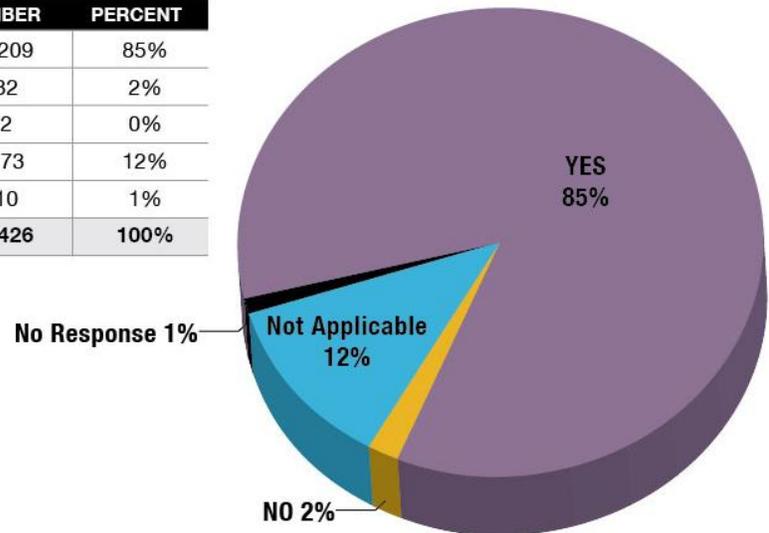


3.2.3 If You Drove, Was Adequate Parking Available?

Only two percent of the total respondents indicated that adequate parking was not available at their PNR (Figure 3-5).

Figure 3-5. If You Drove, Was Adequate Parking Available?

RESPONSE	NUMBER	PERCENT
Yes	1,209	85%
No	32	2%
Sometimes	2	0%
Not Applicable	173	12%
No Response	10	1%
Totals	1,426	100%

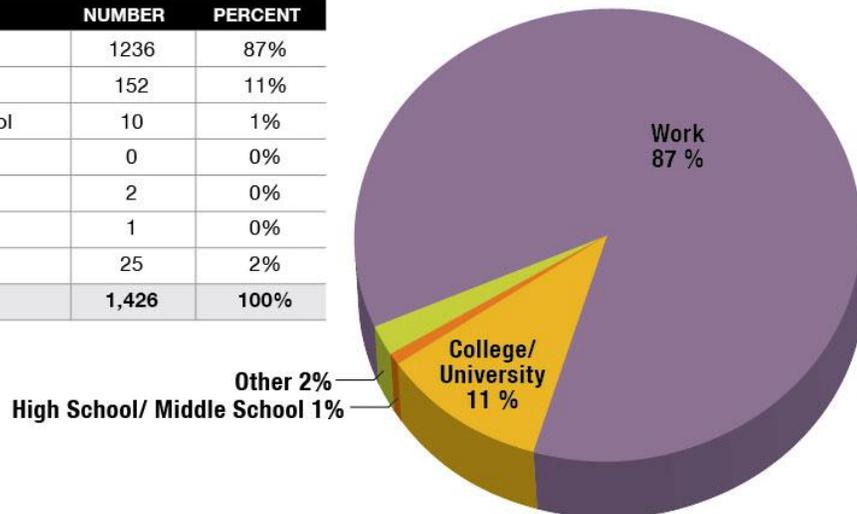


3.2.4 What is the Main Purpose of Your Trip?

Figure 3-6 indicates that nearly all those surveyed responded that the purpose for their trip was either for work (87 percent) or to get to a college or university (11 percent).

Figure 3-6. What is the Main Purpose of Your Trip?

PURPOSE	NUMBER	PERCENT
Work	1236	87%
College/University	152	11%
High School/Middle School	10	1%
Shopping	0	0%
Leisure	2	0%
Medical Visit	1	0%
Other	25	2%
Totals	1,426	100%



3.2.5 On Average, How Often Do You Use this PNR?

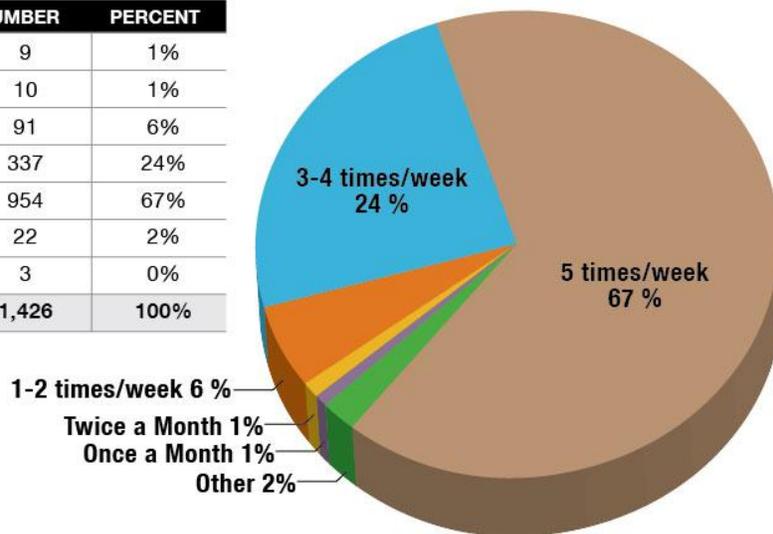
A total of 91 percent of those responding said they used the PNR at least three times per week with 67 percent regularly using the PNR five times per week and 24 percent stating they used it three to four times per week (Figure 3-7). For the seven light rail PNRs most heavily used by

college or university students, faculty, and staff, the percentage responding that they use their PNRs at least three times per week drops as shown below:

- 19th Ave. & Montebello – 72%
- Central Ave. & Camelback Rd. – 81%
- Washington St. & 38th St. – 79%
- Apache Blvd. & Dorsey Lane – 64%
- McClintock Dr. & Apache Blvd. – 66%
- Loop 101 & Apache Blvd. – 73%
- Main St. & Sycamore – 74%

Figure 3-7. On Average, How Often Do You Use this PNR?

FREQUENCY	NUMBER	PERCENT
Once a Month	9	1%
Twice a Month	10	1%
1-2 times/week	91	6%
3-4 times/week	337	24%
5 times/week	954	67%
Other	22	2%
No Response	3	0%
Totals	1,426	100%

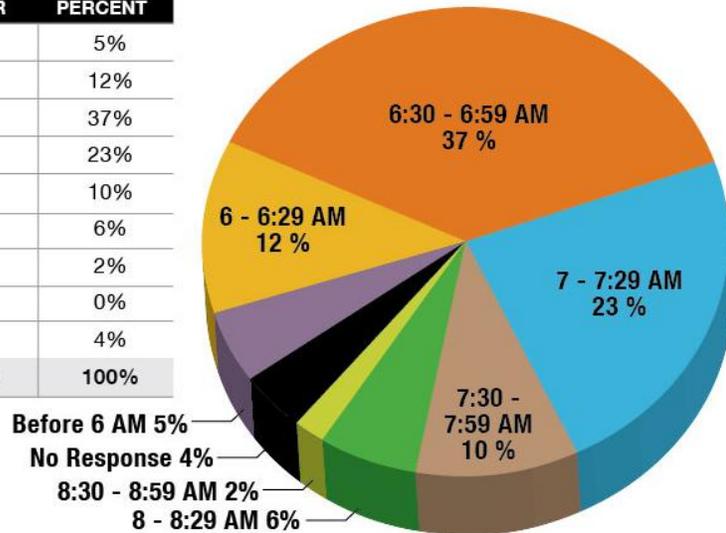


3.2.6 What Time Did You Arrive at the PNR Today?

The majority of riders responding to the survey (60 percent) stated they arrive at the PNR in the hour between 6:30 AM and 7:29 AM (**Figure 3-8**).

Figure 3-8. What Time Did You Arrive at the PNR Today?

TIME CATEGORIES	NUMBER	PERCENT
Before 6 AM	71	5%
6 - 6:29 AM	177	12%
6:30 - 6:59 AM	524	37%
7 - 7:29 AM	334	23%
7:30 - 7:59 AM	136	10%
8 - 8:29 AM	92	6%
8:30 - 8:59 AM	31	2%
9 AM or Later	7	0%
No Response	54	4%
Totals	1,426	100%

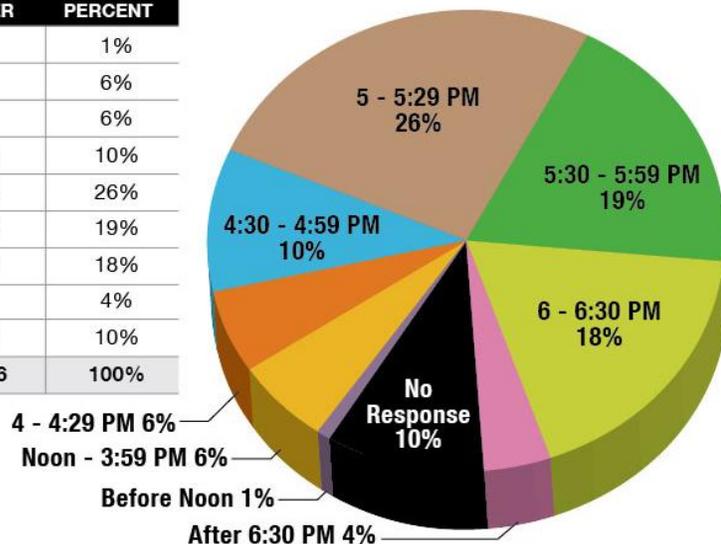


3.2.7 What Time Do You Expect to Return to the PNR?

The time of return to the PNR for the majority of respondents was more dispersed than arrival time with 63 percent returning between 5:00 PM and 6:30 PM (Figure 3-9).

Figure 3-9. What Time Do You Expect to Return to the PNR?

TIME CATEGORIES	NUMBER	PERCENT
Before Noon	16	1%
Noon - 3:59 PM	88	6%
4 - 4:29 PM	88	6%
4:30 - 4:59 PM	138	10%
5 - 5:29 PM	365	26%
5:30 - 5:59 PM	273	19%
6 - 6:30 PM	262	18%
After 6:30 PM	57	4%
No Response	139	10%
Totals	1,426	100%



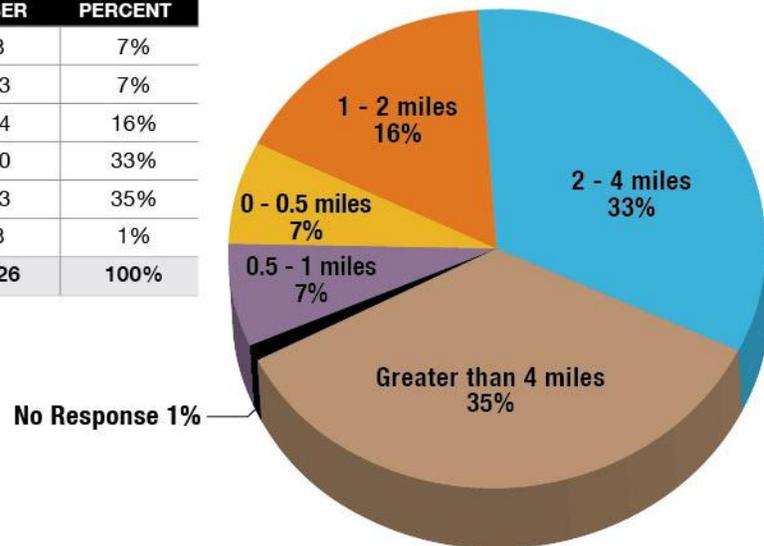
3.2.8 How Far Did You Drive, Ride, Walk, or Bicycle to this PNR?

The majority of survey respondents (68 percent) originated their trip to the PNR from at least two miles from the PNR (Figure 3-10). Of those, 33 percent indicated their origination point

was between two and four miles, and 35 percent stated they originated their trip from a distance greater than four miles.

Figure 3-10. How Far Did You Drive, Ride, Walk, or Bicycle to this PNR?

DISTANCE	NUMBER	PERCENT
0 - 0.5 miles	98	7%
0.5 - 1 miles	103	7%
1 - 2 miles	234	16%
2 - 4 miles	470	33%
Greater than 4 miles	503	35%
No Response	18	1%
Totals	1,426	100%



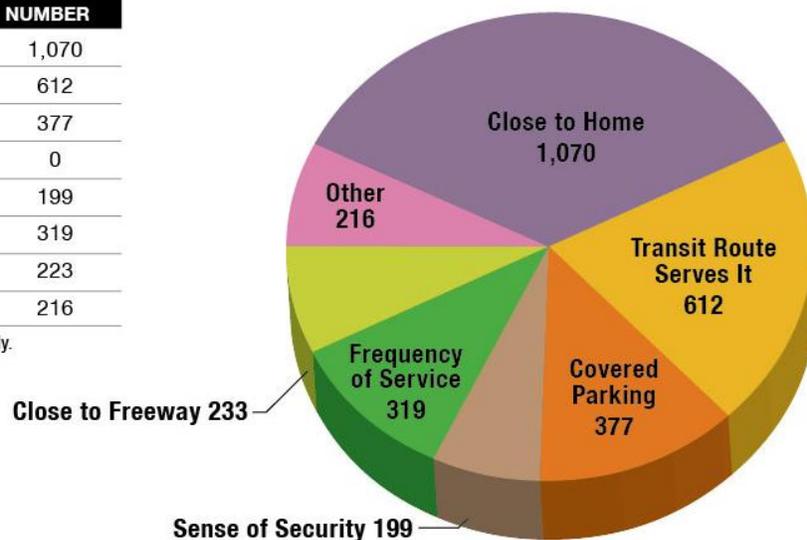
3.2.9 Why Did You Use this PNR?

Respondents were asked why they used the PNR, and they could select as many reasons as applied (Figure 3-11). The top two responses were because the PNR was close to home (1,070 responses, or 75 percent), and the transit route serves the PNR (612 responses or 43 percent).

Figure 3-11. Why Did You Use this PNR?

WHY	NUMBER
Close to Home	1,070
Transit Route Serves It	612
Covered Parking	377
Did not Use PNR	0
Sense of Security	199
Frequency of Service	319
Close to Freeway	223
Other	216

Note: Respondents could select all reasons that apply.



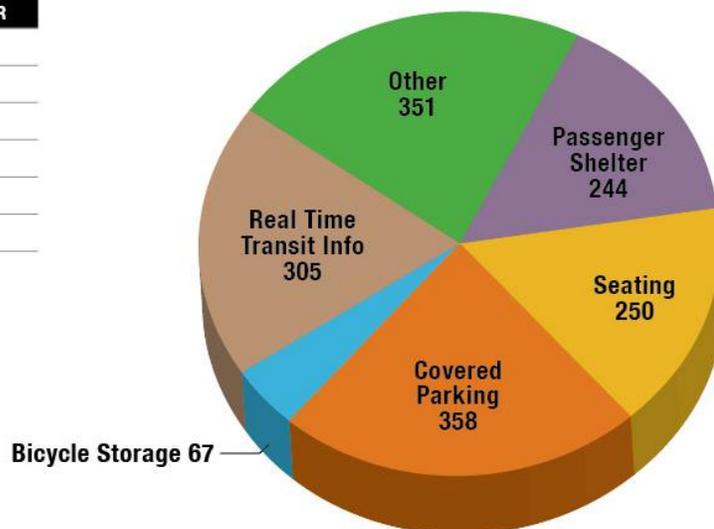
Respondents were asked about what improvements they would most like to see added to their PNR, with up to two improvements allowed for selection (**Figure 3-12**). The most requested improvement was for additional covered parking (358 responses or 25 percent). Of the specific improvements listed on the survey, the next most requested was real time transit information (305 responses or 21 percent).

A total of 351 responses, or 25 percent, requested “Other” improvements not included in the survey list. Many had to do with need for improved transit service rather than improvements to the PNR itself. The most common “Other” PNR improvements requested (not related to improved transit service) included additional security, restrooms, and fare vending machines. Refer to Appendix B and the separate rider survey database for specific information about “Other” improvements requested at each PNR.

Figure 3-12. Are There Improvements That Should Be Added to the PNR?

IMPROVEMENT	NUMBER
Passenger Shelter	244
Seating	250
Covered Parking	358
Bicycle Storage	67
Real Time Transit Info	305
Other	351

Note: Respondents could select up to 2 improvements.



3.3 PNRs—Utilization and Existing Amenities

Collectively, the 29 PNRs that were inventoried provide a total of 10,294 spaces. The 40th Street & Pecos Road PNR offers the largest number of spaces (906) while Sunnyslope accommodates the fewest vehicles with 45 spaces. The PNRs are listed in order of capacity in **Table 3-2**.

The average parking utilization of all the PNRs is about 50 percent (**Table 3-3**). Bell Road & I-17 and Superstition Springs have the highest utilization with 99 percent and 94 percent, respectively. Each of the five lowest utilized PNRs (listed below) have utilization rates of less than 20 percent:

- 19th Avenue & Camelback Road (17 percent)
- 27th Avenue & Baseline Road (16 percent)
- Peoria East (15 percent)
- 19th Avenue & Montebello (14 percent)
- 7th Avenue & Camelback Road (1 percent)

Three of these PNRs (19th Avenue & Camelback Road, 19th Avenue & Montebello, and 7th Avenue & Camelback) serve light rail and are located in close proximity of each other (1.75 miles), potentially creating a surplus of parking in the area served. Peoria East and 27th Avenue and Baseline Road are served by relatively low-frequency non-freeway based bus services.

Table 3-2. PNRs by Capacity

PNR Facility	City	Capacity	Percent Utilization	Covered Parking	Percent Covered Parking	¹ ID
40th St. & Pecos Rd,	Phoenix	906	60%	906	100%	19
Main St. & Sycamore	Mesa	802	38%	0	0%	24
19th Ave. & Montebello	Phoenix	794	14%	0	0%	12
Loop 101 & Apache Blvd.	Tempe	693	40%	0	0%	23
79th Ave. & I-10	Phoenix	607	72%	607	100%	3
Happy Valley Rd. & I-17	Phoenix	512	56%	512	100%	6
Chandler	Chandler	460	59%	157	34%	20
19th Ave. & Camelback Rd.	Phoenix	410	17%	287	70%	11
Goodyear	Goodyear	400	80%	328	82%	2
Glendale	Glendale	388	64%	344	89%	4
Bell Rd. & SR-51	Phoenix	377	62%	377	100%	17
Shea Blvd. & SR-51	Phoenix	370	50%	344	93%	18
Bell Rd. & I-17	Phoenix	350	99%	341	97%	5
West Mesa	Mesa	305	36%	0	0%	26
McClintock Dr. & Apache Blvd.	Tempe	300	55%	300	100%	22
Superstition Springs	Mesa	297	94%	0	0%	29
Buckeye	Buckeye	250	24%	79	32%	1
Gilbert	Gilbert	250	38%	85	34%	25
Surprise	Surprise	230	21%	216	94%	10
Gilbert Rd. & McDowell Rd.	Mesa	220	50%	0	0%	27
Metrocenter	Phoenix	215	63%	193	90%	7
27th Ave. & Baseline Rd.	Phoenix	200	16%	200	100%	15
Power Rd.	Mesa	194	46%	24	12%	28
Apache Blvd. & Dorsey Ln.	Tempe	190	92%	0	0%	21
Washington St. & 38th St.	Phoenix	189	69%	0	0%	16
Central Ave. & Camelback Rd.	Phoenix	135	57%	90	67%	14
7th Ave. & Camelback Rd.	Phoenix	123	1%	77	63%	13
Peoria East	Peoria	82	15%	0	0%	9
Sunnyslope	Phoenix	45	48%	45	100%	8
Summary Totals/Averages		10,294	50%	5,512	54%	

¹ID corresponds to the PNR number shown in Figure 3-1.

Table 3-3. PNRs by Percent Parking Utilization

PNR Facility	City	Capacity	Percent Utilization	Covered Parking	Percent Covered Parking	¹ ID
Bell Rd. & I-17	Phoenix	350	99%	341	97%	5
Superstition Springs	Mesa	297	94%	0	0%	29
Apache Blvd. & Dorsey Ln.	Tempe	190	92%	0	0%	21
Goodyear	Goodyear	400	80%	328	82%	2
79th Ave. & I-10	Phoenix	607	72%	607	100%	3
Washington St. & 38th St.	Phoenix	189	69%	0	0%	16
Glendale	Glendale	388	64%	344	89%	4
Metrocenter	Phoenix	215	63%	193	90%	7
Bell Rd. & SR-51	Phoenix	377	62%	377	100%	17
40th St. & Pecos Rd,	Phoenix	906	60%	906	100%	19
Chandler	Chandler	460	59%	157	34%	20
Central Ave. & Camelback Rd.	Phoenix	135	57%	90	67%	14
Happy Valley Rd. & I-17	Phoenix	512	56%	512	100%	6
McClintock Dr. & Apache Blvd.	Tempe	300	55%	300	100%	22
Gilbert Rd. & McDowell Rd.	Mesa	220	50%	0	0%	27
Shea Blvd. & SR-51	Phoenix	370	50%	344	93%	18
Sunnyslope	Phoenix	45	48%	45	100%	8
Power Rd.	Mesa	194	46%	24	12%	28
Loop 101 & Apache Blvd.	Tempe	693	40%	0	0%	23
Gilbert	Gilbert	250	38%	85	34%	25
Main St. & Sycamore	Mesa	802	38%	0	0%	24
West Mesa	Mesa	305	36%	0	0%	26
Buckeye	Buckeye	250	24%	79	32%	1
Surprise	Surprise	230	21%	216	94%	10
19th Ave. & Camelback Rd.	Phoenix	410	17%	287	70%	11
27th Ave. & Baseline Rd.	Phoenix	200	16%	200	100%	15
Peoria East	Peoria	82	15%	0	0%	9
19th Ave. & Montebello	Phoenix	794	14%	0	0%	12
7th Ave. & Camelback Rd.	Phoenix	123	1%	77	63%	13
Summary Totals/Averages		10,294	50%	5,512	54%	

¹ID corresponds to the PNR number shown in Figure 3-1.

The major findings of the inventory of amenities at each PNR are summarized in **Table 3-4**. To capture all amenities provided at each PNR, **Table 3-5** lists miscellaneous additional amenities not specifically identified in the inventory in Table 3-1.

Seventeen PNRs offer digital passenger information signs (**Table 3-4**). However, the equipment was undergoing maintenance at three PNRs at the time of survey: Bell Road & SR 51; Shea Boulevard & SR 51; and 40th Street & Pecos Road. The digital passenger information sign at Superstition Springs was not operational at the time of survey.

All PNRs (bus and light rail) offer passenger seating and, with the exception of Peoria East, offer passenger shade shelters (**Table 3-4**). All PNRs, with the exception of 7th Avenue & Camelback Road and 27th Avenue & Baseline Road, contain trash cans either in the passenger waiting area, parking area, or both.

Covered parking provides passengers with the convenience of protecting their vehicles from the outdoor elements, while providing a more comfortable return home after a hot summer day. The availability and quantity of covered parking at each PNR varies. **Table 3-6** lists the PNRs in order by percentage of the total available covered parking spaces.

Table 3-4. Existing Amenities and Utilization for All PNRs

PNR Facility	City	Capacity	Percent Utilization	Covered Parking	Percent Covered Parking	Bicycle Storage	Bicycle Storage Qty.	Trash Cans in Parking Area	Trash Cans in Passenger Waiting	Shaded Shelter Passenger Waiting	Seating Available Passenger Waiting	Digital Passenger Information Sign	ID ¹
Buckeye	Buckeye	250	24%	79	32%	None	0		●	●	●		1
Chandler	Chandler	460	59%	157	34%	Racks & Lockers	11		●	●	●	●	20
Gilbert	Gilbert	250	38%	85	34%	Racks & Lockers	16		●	●	●		25
Glendale	Glendale	388	64%	344	89%	Racks	4	●	●	●	●		4
Goodyear	Goodyear	400	80%	328	82%	Lockers	8	●	●	●	●		2
Gilbert Rd. & McDowell Rd.	Mesa	220	50%	0	0%	Racks & Lockers	48		●	●	●		27
Main St. & Sycamore	Mesa	802	38%	0	0%	Racks & Lockers	28	●	●	●	●	●	24
Power Rd.	Mesa	194	46%	24	12%	Racks & Lockers	27		●	●	●		28
Superstition Springs	Mesa	297	94%	0	0%	Racks & Lockers	16		●	●	●	● ²	29
West Mesa	Mesa	305	36%	0	0%	Racks & Lockers	32		●	●	●		26
Peoria East	Peoria	82	15%	0	0%	Racks	12		●		●		9
19th Ave. & Camelback Rd.	Phoenix	410	17%	287	70%	Racks	4	●	●	●	●	●	11
19th Ave. & Montebello	Phoenix	794	14%	0	0%	Racks	4	●	●	●	●	●	12
27th Ave. & Baseline Rd.	Phoenix	200	16%	200	100%	Lockers	8			●	●		15
40th St. & Pecos Rd,	Phoenix	906	60%	906	100%	Lockers	12		●	●	●	● ²	19
79th Ave. & I-10	Phoenix	607	72%	607	100%	Racks & Lockers	12	●	●	●	●	●	3
7th Ave. & Camelback Rd.	Phoenix	123	1%	77	63%	Racks	4			●	●	●	13
Bell Rd. & I-17	Phoenix	350	99%	341	97%	Racks & Lockers	30	●	●	●	●	●	5
Bell Rd. & SR-51	Phoenix	377	62%	377	100%	Lockers	10		●	●	●	● ²	17
Central Ave. & Camelback Rd.	Phoenix	135	57%	90	67%	Racks	8	●	●	●	●	●	14
Happy Valley Rd. & I-17	Phoenix	512	56%	512	100%	Lockers	8		●	●	●	●	6
Metrocenter	Phoenix	215	63%	193	90%	Lockers	8		●	●	●		7
Shea Blvd. & SR-51	Phoenix	370	50%	344	93%	Racks & Lockers	20		●	●	●	● ²	18
Sunnyslope	Phoenix	45	48%	45	100%	Lockers	8		●	●	●		8
Washington St. & 38th St.	Phoenix	189	69%	0	0%	Racks	4		●	●	●	●	16
Surprise	Surprise	230	21%	216	94%	Racks	6		●	●	●		10
Apache Blvd. & Dorsey Ln.	Tempe	190	92%	0	0%	Racks	16		●	●	●	●	21
Loop 101 & Apache Blvd.	Tempe	693	40%	0	0%	Racks	12	●	●	●	●	●	23
McClintock Dr. & Apache Blvd.	Tempe	300	55%	300	100%	Racks	78		●	●	●	●	22
Summary Totals/Averages		10,294	50%	5,512	54%	28	15.7	9	27	28	29	17	

¹ID corresponds to location number displayed in Figure 3-1.

²Equipment is provided but was either undergoing maintenance or not working at the time of the survey.

Table 3-5. Park-and-Ride Additional Amenities

PNR Facility	City	Capacity	Additional Amenities	ID ¹
Buckeye	Buckeye	250	None	1
Chandler	Chandler	460	Fare vending machines, water fountains, system map, security booth	20
Gilbert	Gilbert	250	Water fountains, restrooms	25
Glendale	Glendale	388	Water fountains	4
Goodyear	Goodyear	400	Water fountains, restrooms, enclosed waiting area	2
Gilbert Rd. & McDowell Rd.	Mesa	220	Water fountains, emergency call box, motorcycle parking	27
Main St. & Sycamore	Mesa	802	Restrooms, water fountains, emergency call box, security building	24
Power Rd.	Mesa	194	Water fountains, emergency call box, motorcycle parking	28
Superstition Springs	Mesa	297	Fare vending machines (not operational)	29
West Mesa	Mesa	305	Fare vending machines (not operational), emergency call box	26
Peoria East	Peoria	82	None	9
19th Ave. & Camelback Rd.	Phoenix	410	Water fountains	11
19th Ave. & Montebello	Phoenix	794	Water fountains	12
27th Ave. & Baseline Rd.	Phoenix	200	Security booth	15
40th St. & Pecos Rd.	Phoenix	906	Security booth, water fountains	19
79th Ave. & I-10	Phoenix	607	Water fountains, radio shelter	3
7th Ave. & Camelback Rd.	Phoenix	123	Emergency call box	13
Bell Rd. & I-17	Phoenix	350	Water fountains	5
Bell Rd. & SR-51	Phoenix	377	Security booth	17
Central Ave. & Camelback Rd.	Phoenix	135	Kiss and ride roundabout, emergency callbox	14
Happy Valley Rd. & I-17	Phoenix	512	Water fountains	6
Metrocenter	Phoenix	215	Water fountains	7
Shea Boulevard & SR-51	Phoenix	370	Water fountains	18
Sunnyslope	Phoenix	45	Water fountains	8
Washington St. & 38th St	Phoenix	189	Emergency call box	16
Surprise	Surprise	230	Water fountains	10
Apache Blvd. & Dorsey Ln.	Tempe	190	Emergency call box	21
Loop 101 & Apache Blvd.	Tempe	693	Fare vending machines, emergency call box	23
McClintock Dr. & Apache Blvd.	Tempe	300	Emergency call box, security station	22

¹ID corresponds to location number displayed in Figure 3-1.

Table 3-6. PNRs by Percent Covered Parking

PNR Facility	City	Capacity	Covered Parking	Percent Covered Parking	¹ ID
27th Ave. & Baseline Rd.	Phoenix	200	200	100%	15
40th St. & Pecos Rd,	Phoenix	906	906	100%	19
79th Ave. & I-10	Phoenix	607	607	100%	3
Bell Rd. & SR-51	Phoenix	377	377	100%	17
Happy Valley Rd. & I-17	Phoenix	512	512	100%	6
McClintock Dr. & Apache Blvd.	Tempe	300	300	100%	22
Sunnyslope	Phoenix	45	45	100%	8
Bell Rd. & I-17	Phoenix	350	341	97%	5
Surprise	Surprise	230	216	94%	10
Shea Blvd. & SR-51	Phoenix	370	344	93%	18
Metrocenter	Phoenix	215	193	90%	7
Glendale	Glendale	388	344	89%	4
Goodyear	Goodyear	400	328	82%	2
19th Ave. & Camelback Rd.	Phoenix	410	287	70%	11
Central Ave. & Camelback Rd.	Phoenix	135	90	67%	14
7th Ave. & Camelback Rd.	Phoenix	123	77	63%	13
Chandler	Chandler	460	157	34%	20
Gilbert	Gilbert	250	85	34%	25
Buckeye	Buckeye	250	79	32%	1
Power Rd.	Mesa	194	24	12%	28
19th Ave. & Montebello	Phoenix	794	0	0%	12
Apache Blvd. & Dorsey Ln.	Tempe	190	0	0%	21
Gilbert Rd. & McDowell Rd.	Mesa	220	0	0%	27
Loop 101 & Apache Blvd.	Tempe	693	0	0%	23
Main St. & Sycamore	Mesa	802	0	0%	24
Peoria East	Peoria	82	0	0%	9
Superstition Springs	Mesa	297	0	0%	29
Washington St. & 38th St.	Phoenix	189	0	0%	16
West Mesa	Mesa	305	0	0%	26
Summary Totals/Averages		10,294	5,512	54%	

¹ID corresponds to the PNR number shown in Figure 3-1.

All parking spaces are covered at seven PNRs:

- 79th Avenue & I-10
- Happy Valley Road & I-10
- Sunnyslope
- 27th Avenue & Baseline Road
- Bell Road & SR-51
- 40th Street & Pecos Road
- McClintock Drive & Apache Boulevard

Nine PNRs have no covered parking:

- Peoria East
- 19th Avenue & Montebello
- Washington Street & 38th Street
- Apache Boulevard & Dorsey Lane
- Loop 101 & Apache Boulevard
- Main Street & Sycamore
- West Mesa
- Gilbert Road & McDowell Road
- Superstition Springs

3.4 Vanpool Survey Results

Valley Metro received 388 completed and valid surveys from Valley Metro commuters using 57 vanpools throughout the region. The surveys were received from riders using the publicly owned PNRs studied in this report as well as several informal PNRs located in places such as shopping centers. Of these totals, surveys were received from 45 vanpools serving 17 of the 29 publicly owned PNRs. A total of 270 surveys were received. This report focuses on the results of the surveys obtained from users of the 17 PNRs.

Based on the responses received, **Table 3-7** shows that the PNRs with the highest vanpool use are those located near freeways. They include:

- 79th Avenue & I-10
- Bell Road & I-17
- 40th Street & Pecos Road
- Goodyear
- Gilbert Road & McDowell Road

Table 3-7. Summary of Vanpool Results by PNR¹

PNR Facility	City	No. Vanpools	Valley Metro Vanpool No.	No. Riders Completing Surveys	No. Riders Responding That Van Parks Overnight at PNR	Most Requested PNR Improvement	ID ²
Buckeye	Buckeye	0	N/A	N/A	N/A	N/A	1
Chandler	Chandler	4	27960 27973 32098 32108	25	17	Covered Parking	20
Gilbert	Gilbert	4	24451 26477 26683 34012	18	17	Passenger Shelter	25
Glendale	Glendale	3	26670 30784 31602	14	2	Other	4
Goodyear	Goodyear	5	28685 30776 34045 34594 34623	30	28	Real Time Transit Information	2
Gilbert Rd. & McDowell Rd.	Mesa	5	26677 29237 32091 34578 35713	19	0	Covered Parking	27
Main St. & Sycamore	Mesa	0	N/A	N/A	N/A	N/A	24
Power Rd.	Mesa	3	29237 32091 32092	10	1	Covered Parking	28
Superstition Springs	Mesa	1	34607	10	10	Covered Parking	29
West Mesa	Mesa	1	27972	1	0	No responses received	26
Peoria East	Peoria	0	N/A	N/A	N/A	N/A	9
19 th Ave. & Camelback Rd.	Phoenix	0	N/A	N/A	N/A	N/A	11

PNR Facility	City	No. Vanpools	Valley Metro Vanpool No.	No. Riders Completing Surveys	No. Riders Responding That Van Parks Overnight at PNR	Most Requested PNR Improvement	ID ²
19 th Ave. & Montebello	Phoenix	0	N/A	N/A	N/A	N/A	12
27 th Ave. & Baseline Rd.	Phoenix	0	N/A	N/A	N/A	N/A	15
40th St. & Pecos Rd.	Phoenix	5	27176 27960 34570 35718 36034	23	22	Bicycle Storage	19
79th Ave. & I-10	Phoenix	8	26664 26685 30776 30784 32116 34616 34625 36012	48	40	Passenger Shelter	3
7 th Ave. & Camelback Rd.	Phoenix	0	N/A	N/A	N/A	N/A	13
Bell Rd. & I-17	Phoenix	7	27964 29540 30695 34593 36006 36010 36018	45	23	Other	5
Bell Rd. & SR-51	Phoenix	1	34023	2	0	Other	17
Central Ave. & Camelback Rd.	Phoenix	0	N/A	N/A	N/A	N/A	14
Happy Valley Rd. & I-17	Phoenix	1	36018	2	0	No responses received	6
Metrocenter	Phoenix	1	29540	3	3	Passenger Shelter/ Covered Parking	7
Shea Blvd. & SR-51	Phoenix	1	34023	4	2	No responses received	18
Sunnyslope	Phoenix	0	N/A	N/A	N/A	N/A	8



PNR Facility	City	No. Vanpools	Valley Metro Vanpool No.	No. Riders Completing Surveys	No. Riders Responding That Van Parks Overnight at PNR	Most Requested PNR Improvement	ID ²
Washington St. & 38 th St.	Phoenix	0	N/A	N/A	N/A	N/A	16
<i>Surprise</i>	<i>Surprise</i>	2	29222 30703	12	8	<i>Other</i>	10
Apache Blvd. & Dorsey Ln.	Tempe	0	N/A	N/A	N/A	N/A	21
<i>Loop 101 and Apache Blvd.</i>	<i>Tempe</i>	1	29239	4	0	<i>Covered Parking</i>	23
McClintock Dr. & Apache Blvd.	Tempe	0	N/A	N/A	N/A	N/A	22
Totals		45³		270	173		

¹Bolded and italicized entries indicate that Valley Metro vanpools use PNR. For additional information about a specific PNR, refer to Appendix B and the separate vanpool database.

²ID indicates PNR location as shown on Figure 3-1.

³Total reflects total number of vanpools and does not double-count those vanpools serving more than one PNR.

The aggregated responses for several of the questions asked in the survey instrument are summarized herein. For information on specific PNRs, refer to Appendix B.

3.3.1 How Did You Get to the PNR?

When asked how commuters got to their PNR, the most common response was that they drove alone (**Table 3-8**) with nearly nine out of ten stating this as their mode of access.

Table 3-8. How Did You Get to the PNR?

Mode	Number	Percent
Bicycle	1	0.4%
Bus	1	0.4%
Drive alone	240	88.9%
Drop off by car	15	5.6%
Other	11	4.1%
Walk	2	0.7%
Totals	270	100%

It is interesting to note that vanpool commuters appear to be the most likely to have a choice between riding transit or driving alone. Of those responding, 89 percent reported they arrive at their PNR by driving alone and leaving their personal vehicle parked all day. This compares to 87 percent for light rail riders and 76 percent for express or RAPID bus riders.

3.3.2 Why Did You Use this PNR?

Nearly three out of four responses cited being close to home as a reason commuters used their PNR (**Table 3-9**). The next two most common responses were that the PNR provides covered parking (receiving just over half or 53 percent of the total responses) followed by being close to a freeway (slightly under half or 44 percent of the total responses).

Table 3-9. Why Did You Use this PNR?

Why	Number	Percent
Close to Home	193	71.5%
Allows Overnight Parking	65	24.1%
Covered Parking	143	53.0%
Sense of Security	81	30.0%
Frequency of Service	45	16.7%
Close to Freeway	118	43.7%
Other	49	18.1%

Note: Respondents could select all reasons that apply.

The high rates of responses for the most common reasons for using the PNR point to vanpool users desiring convenience in their selection of a PNR.

3.3.3 Does Your Van Park Overnight at the PNR?

Table 3-10 shows that nearly two-thirds of the respondents stated that their van parks overnight at the PNR.

Table 3-10. Does Your Van Park Overnight at the PNR?

Vanpool No.	Number	Percent
Yes	171	63.3%
No	92	34.1%
No Response	7	2.6%
Totals	270	100.0%

For those whose vans did not park overnight there, the most frequent reason cited was “Other” (**Table 3-11**). More than half of the “Other” responses (59.5 percent) were because the driver parks the van at home. Nearly one quarter (24.3 percent) of those responses indicated that the van served additional destinations beyond the PNR. Respondents did not provide any particular reason for the remainder of the “Other” responses. Other major reasons cited for not parking overnight included inconvenience and the potential for vandalism or theft.

Table 3-11. Why Does the Van Not Park Overnight?

Why	Number	Percent
Inconvenient	27	29.3%
Overnight Parking Not Permitted	3	3.3%
Potential for Vandalism/Theft	27	29.3%
Other	37	40.2%

Note: Respondents could select all reasons that apply.

3.3.4 Are There Improvements That Should Be Added to the PNR?

When asked if improvements should be added to their PNR, the overall response rate from vanpool commuters was low (**Table 3-12**). Only 21 percent of the responses requested covered parking, while other amenities were infrequently requested. The low response rate indicates that vanpool commuters appear to be generally satisfied with the amenities currently offered at their PNRs.

Table 3-12. Are There Improvements That Should be Added to the PNR?

Improvement	Number	Percent
Passenger Shelter	18	6.7%
Seating	18	6.7%
Covered Parking	58	21.5%
Bicycle Storage	15	5.6%
Real Time Transit Information	12	4.4%
Other	61	22.6%

Note: Respondents could select up to 2 improvements

4.0 ANALYSIS

The PNR survey and inventory collected an extensive amount of information about the publicly owned PNR facilities in the region and how transit riders and vanpool commuters use these facilities. This chapter analyzes data collected and explores relationships between the level of vehicle parking usage of the PNRs and two other distinct variables:

- PNR users points of origination and destination
- Express/RAPID bus service levels

The findings of the analysis presented in this chapter were used to develop the conclusions and observations presented in Chapter 5.

To determine how strong a relationship is between two variables, R-squared values of variables were calculated and charted. R-squared values range between 0 and 1. Values near 0 mean there is no correlation while a value of 1.0 indicates a direct 1:1 relationship. Therefore, the closer the value is to 1.0, the stronger the relationship between the values being compared. Conversely, the closer the value is to 0, the weaker the relationship.

4.1 Relationship Between Number of Vehicles Parked in PNRs and Distance From Riders' Points of Origin and Destination

The relationship between the number of parked cars in PNRs and the distance from a rider's point of origin or destination was explored separately for users of PNRs served by light rail and for PNRs served by express and RAPID buses.

4.1.1 Correlation of Numbers of Cars Parked vs. Trip Destination Distance

Light Rail

As shown in **Figure 4-1**, the R-squared value of the number of vehicles parked in light rail PNR facilities vs. light rail PNR distance to downtown Phoenix is 0.8 indicating a nearly direct 1:1 relationship between the two variables. In addition, this relationship was evaluated for light rail PNR users destined for the ASU Tempe campus, a major activity center served by light rail. The R-squared value of 0.49 indicates little correlation between the two variables (**Figure 4-2**).

Express and RAPID Bus

The R-squared value for vehicles parked in bus PNRs to the PNRs' distances to downtown Phoenix is only 0.008 (**Figure 4-3**), showing that there is no correlation between these variables.



Figure 4-1A. Relationship Between Numbers of Vehicles Parking in Light Rail PNRs to Distance to Downtown Phoenix

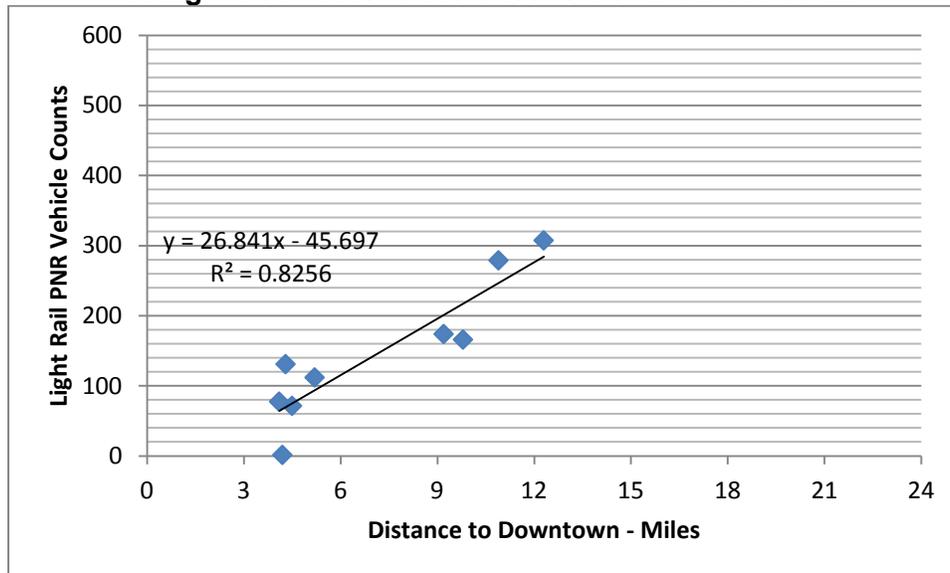


Figure 4-1B. Relationship Between Parking Utilization in Light Rail PNRs to Distance to Downtown Phoenix

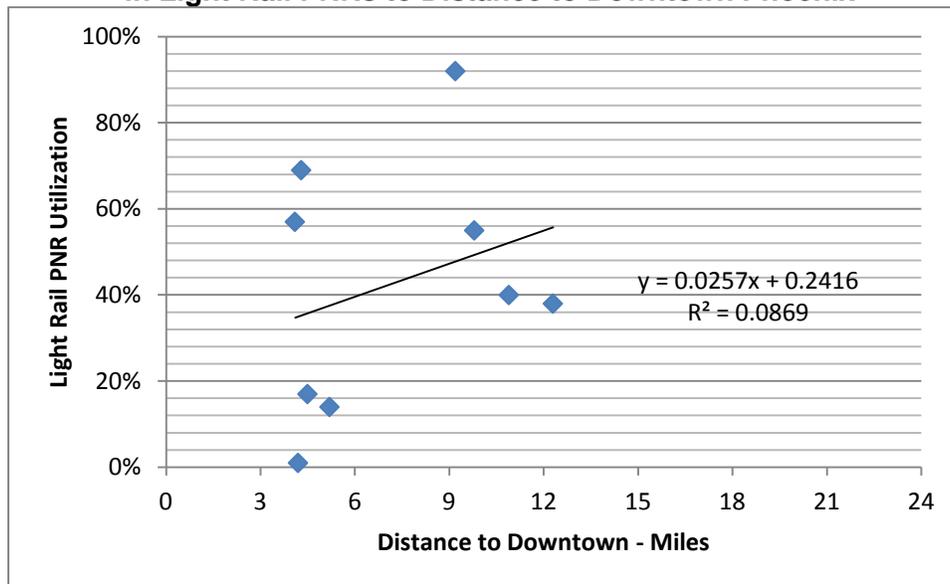


Figure 4-2A. Relationship Between Number of Vehicles Parking in Light Rail PNRs to Distance to ASU in Tempe

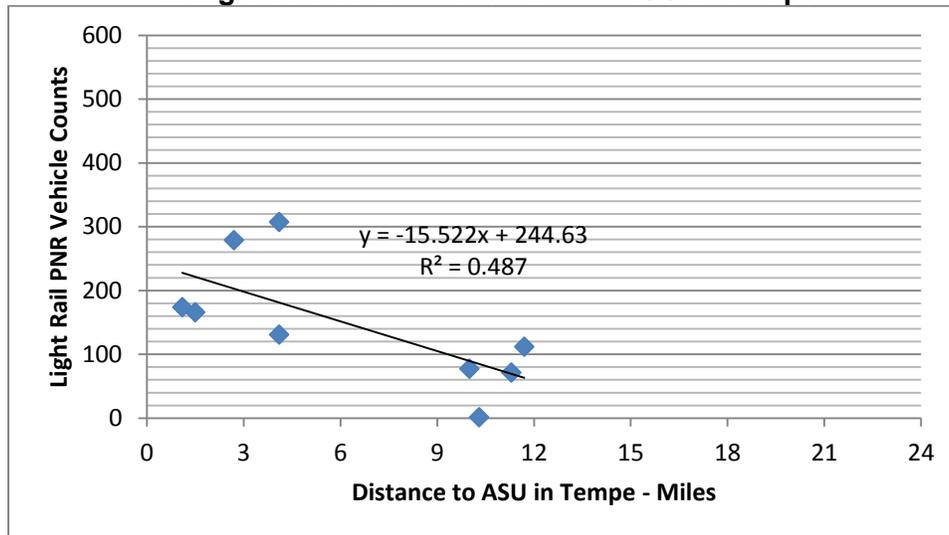


Figure 4-2B. Relationship Between Parking Utilization in Light Rail PNRs to Distance to ASU in Tempe

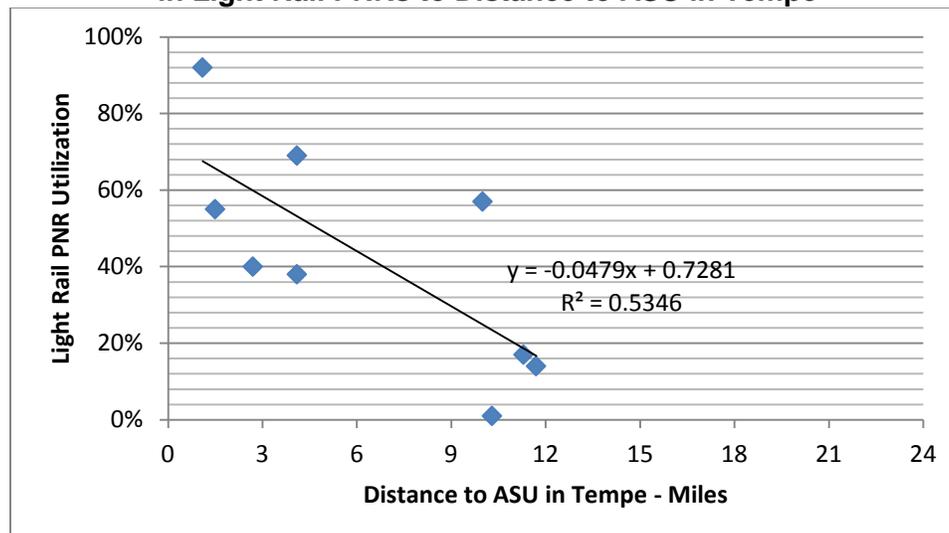


Figure 4-3A. Relationship Between Numbers of Vehicles Parking in Bus PNRs to Distance to Downtown Phoenix

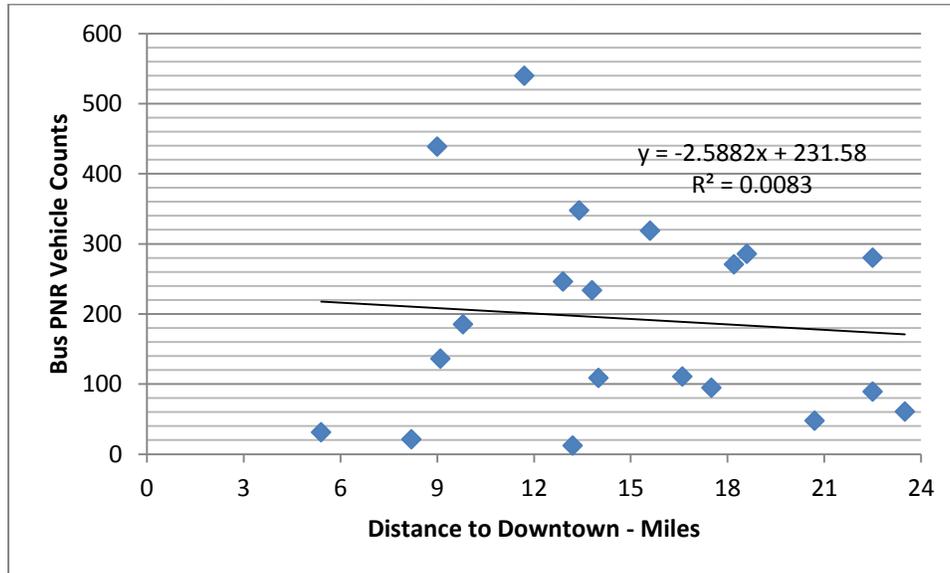
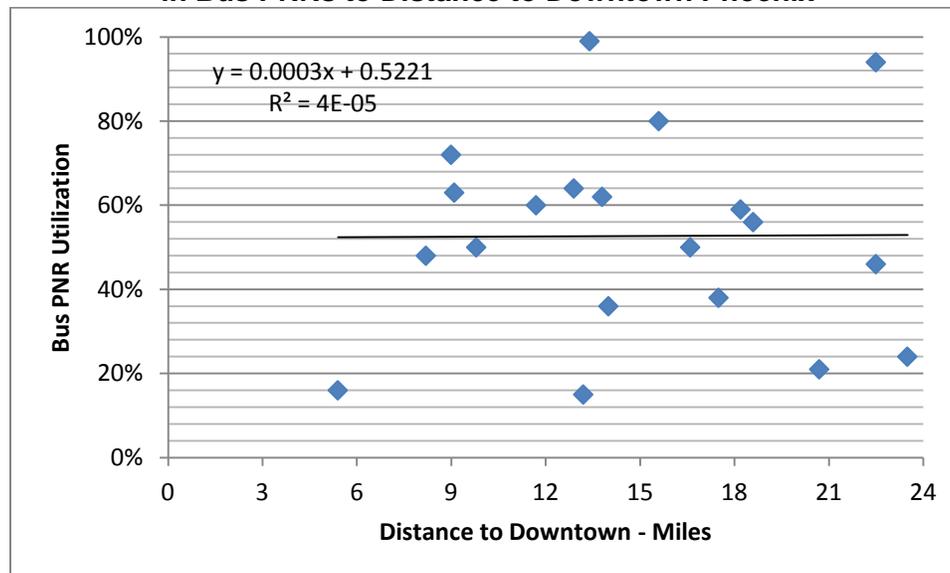


Figure 4-3B. Relationship Between Parking Utilization in Bus PNRs to Distance to Downtown Phoenix



4.1.2 Correlation of Number of Vehicles Parked vs. Trip Origination Distance

Light Rail

When considering all light rail PNRs, **Figure 4-4A** illustrates a low correlation (R-squared value= ~ 0.55) between the light rail PNR users' distances from origination to their PNRs and numbers of vehicles parked.

Figure 4-4A. Relationship Between Number of Vehicles Parking in All Light Rail PNRs to Distances from Origin to PNRs

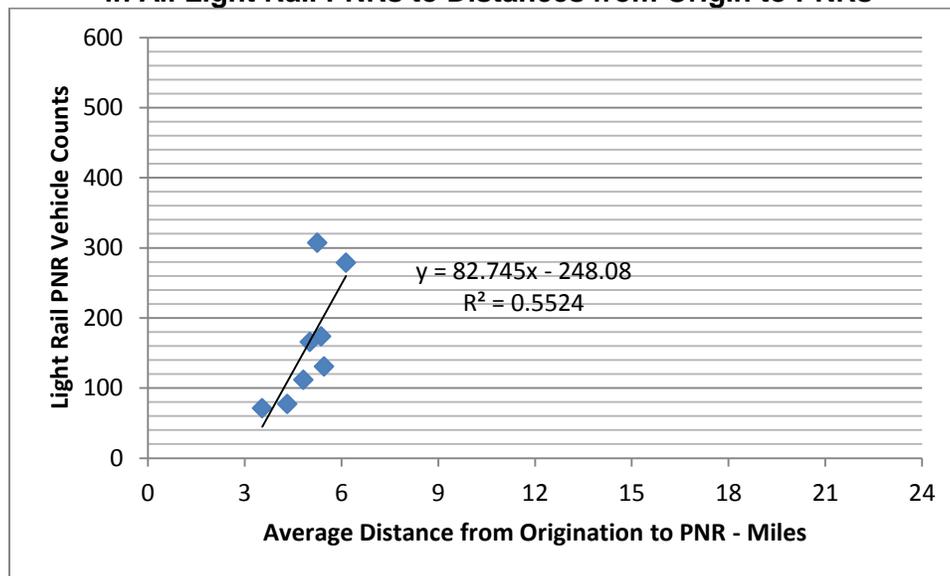
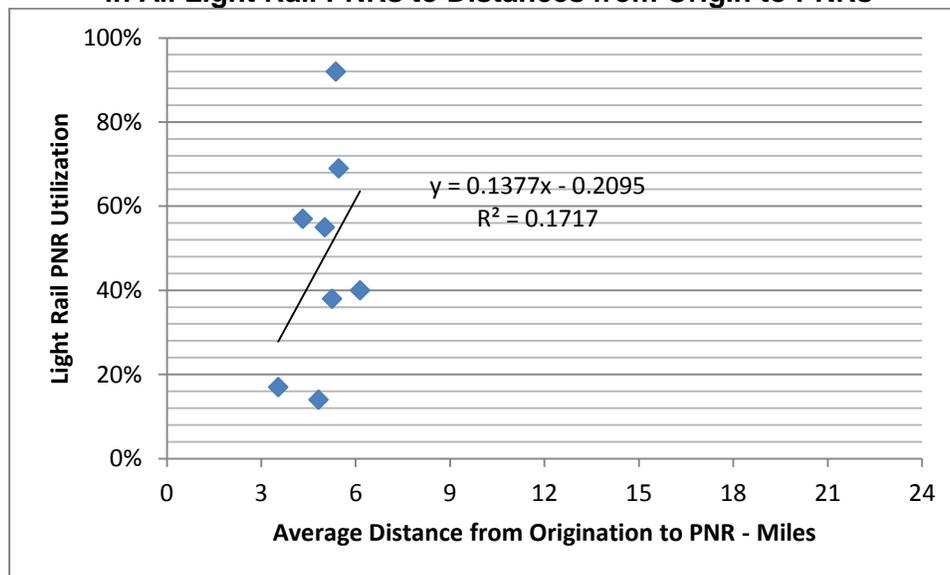


Figure 4-4B. Relationship Between Parking Utilization in All Light Rail PNRs to Distances from Origin to PNRs



Express and RAPID Bus

As shown in **Figure 4-5A**, there is a low correlation (R-squared value=0.57) between bus PNR users' distances from the user's origination to the PNR and total number of vehicles parked.

Figure 4-5A. Relationship Between Numbers of Vehicles Parking in Bus PNRs to Distances from Origin to PNRs

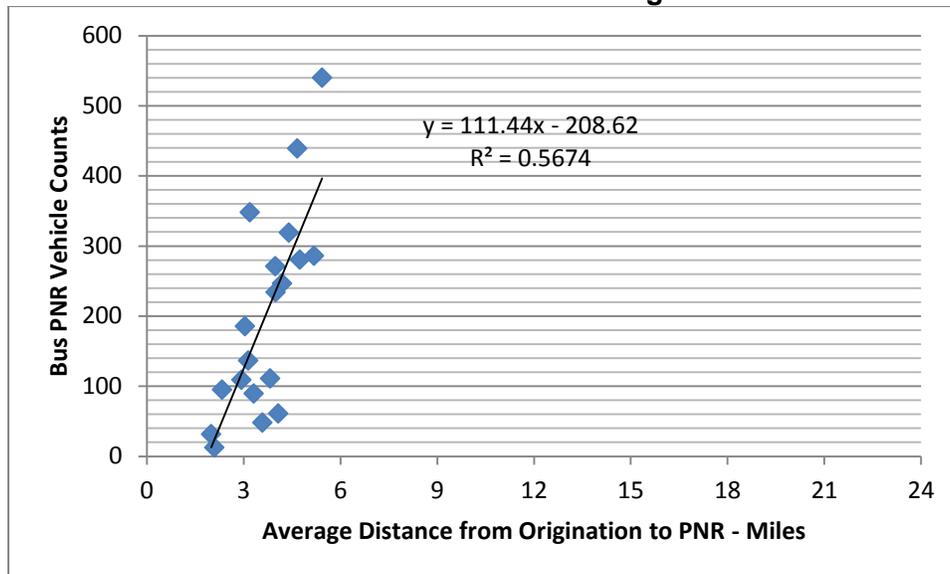
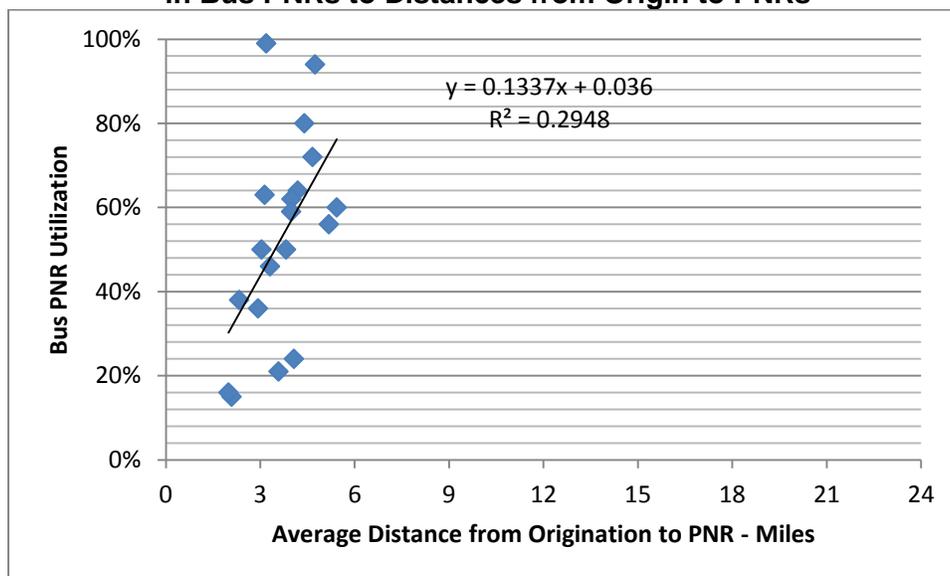


Figure 4-5B. Relationship Between Parking Utilization in Bus PNRs to Distances from Origin to PNRs



4.2 Relationship Between Number of Vehicles Parked in PNRs and Express and RAPID Bus Service Levels

The relationship between the number of vehicles parked in PNRs and express and RAPID bus service levels was explored for all bus PNRs and then separately for RAPID bus and express bus.

Express Bus and RAPID

When comparing bus service levels (daily inbound express/RAPID trips) to the number of parked cars at all 19 bus-only PNR facilities, the relationship results in an R-squared value of 0.34 indicating little or no correlation (**Figure 4-6A**).

Figure 4-6A. Relationship Between Numbers of Vehicles Parking in All Bus PNRs to Bus Service Levels

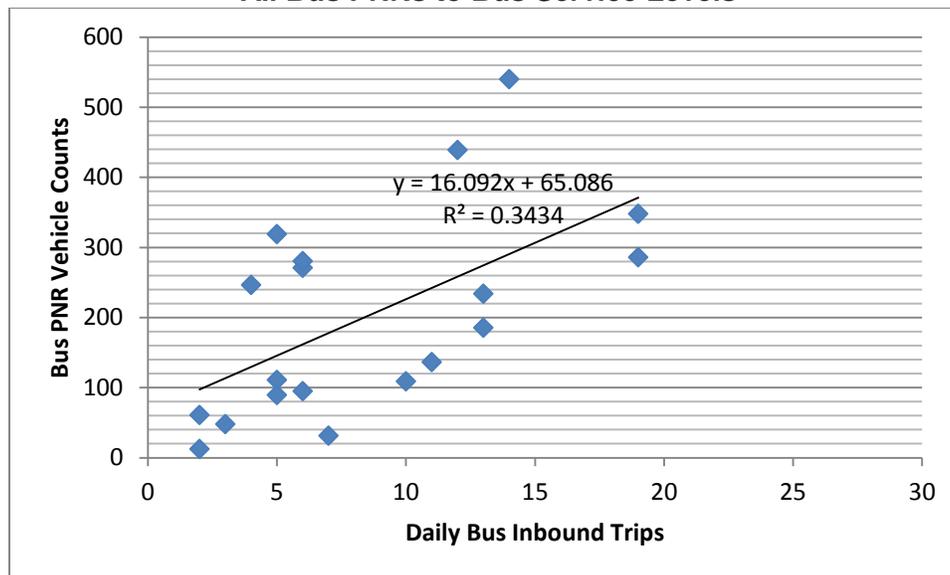
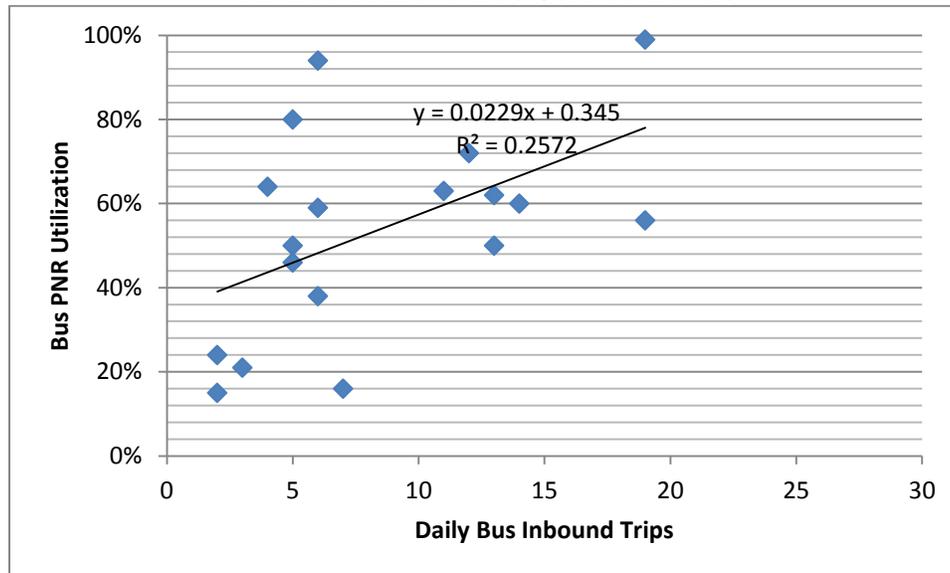


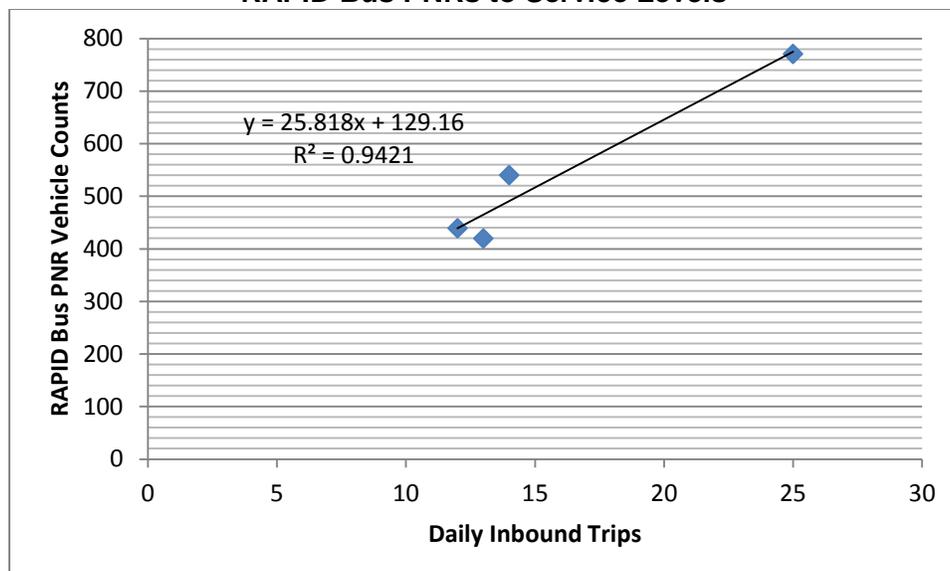
Figure 4-6B. Relationship Between Parking Utilization in All Bus PNRs to Bus Service Levels



RAPID Bus

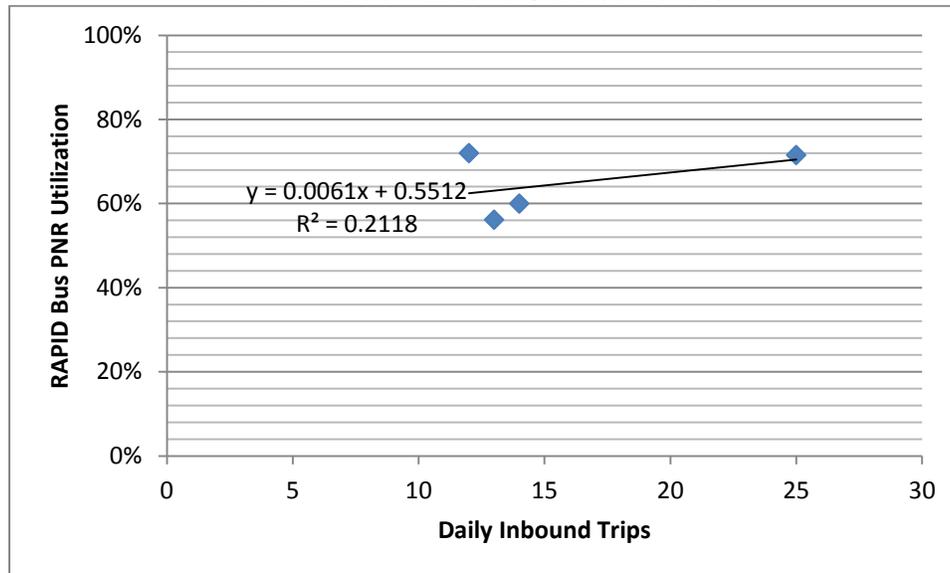
There is an even more direct relationship between the number of vehicles parking in RAPID bus PNRs and service levels. When comparing the service level (number of daily scheduled inbound trips) in each corridor to the total number of vehicles parked in each corridor. The R-squared value of this relationship for RAPID buses is 0.94 (Figure 4-7A).

Figure 4-7A. Relationship Between Numbers of Vehicles Parking in RAPID Bus PNRs to Service Levels¹



¹Excludes 27th Ave/Baseline PNR because it does not serve a regional freeway or operate in a semi-exclusive guideway (HOV) as the other RAPID routes do)

Figure 4-7B. Relationship Between Parking Utilization in RAPID Bus PNRs to Service Levels¹

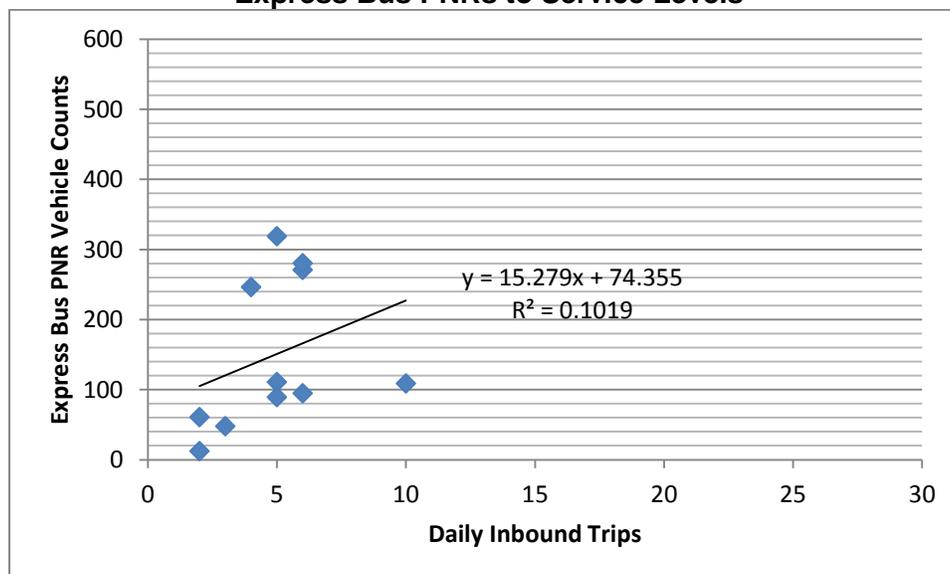


¹Excludes 27th Ave/Baseline PNR because it does not serve a regional freeway or operate in a semi-exclusive guideway (HOV) as the other RAPID routes do

Express Bus

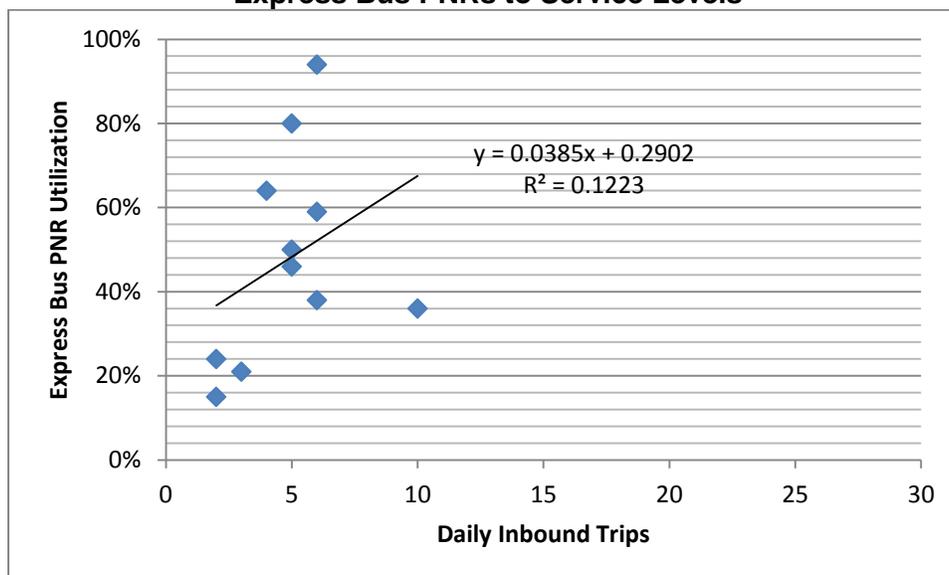
A weaker correlation exists for PNRs served by express bus. The R-squared value is only 0.6 (Figure 4-8A).

Figure 4-8A. Relationship Between the Number of Vehicles Parking in Express Bus PNRs to Service Levels



¹Excludes 27th Ave/Baseline PNR because it does not serve a regional freeway or operate in a semi-exclusive guideway (HOV) as the other RAPID routes do

Figure 4-8B. Relationship Between Parking Utilization in Express Bus PNRs to Service Levels



¹Excludes 27th Ave/Baseline PNR because it does not serve a regional freeway or operate in a semi-exclusive guideway (HOV) as the other RAPID routes do)

5.0 CONCLUSIONS

This chapter provides conclusions about the commute habits and preferences of PNR users based on the data collection and analysis discussed in the preceding chapters and the extensive data presented for each individual PNR in Appendix B. The chapter is organized into four sections:

- General survey conclusions
- Express and RAPID bus PNR conclusions
- Light rail PNR conclusions
- Summary of lessons learned for consideration in administering future surveys.

5.1 General

PNRs with express or RAPID bus service and PNRs with light rail service serve two different travel markets.

Bus PNRs primarily serve work trips while light rail PNRs tend to serve fewer work trips and more college or university trips. Ninety-eight (98) percent of bus PNR users surveyed indicated they were travelling to work, while only 53 percent of light rail PNR trips were work related. However, light rail PNR users had a high rate (compared to bus PNR users) of college or university trips at 39 percent. **Table 5-1** displays the PNRs categorized by whether express/RAPID bus or light rail serves them.

Overall Light rail PNRs experience higher parking utilization rates than bus PNRs.

Light Rail PNRs have a 56 percent utilization rate compared to bus PNRs (46 percent). This could potentially be explained by the comparatively higher utilization rates (43 to 65 percent as discussed in Section 5.3) observed at light rail PNR facilities serving ASU.

Both bus and light rail PNR users predominantly access their PNR by driving alone, but light rail PNR users drive alone at a higher rate.

Eighty-seven (87) percent and 76 percent of light rail and bus PNR users respectively, access their PNR by driving alone. Approximately 7 percent of light rail PNR users arrived at their PNR by carpool or vanpool, while 14 percent of bus PNR riders were dropped off at their PNR.

A direct correlation between the number of vehicles parked at a light rail PNR and the distance to downtown Phoenix is demonstrated by the survey data. However, the data does not indicate that the same relationship exists for light rail PNR users destined for ASU's Tempe campus or bus PNR users destined for downtown Phoenix.

As explained in Section 4.1, for light rail PNRs, there is an almost direct 1:1 relationship between the number of vehicles parked and distance to downtown Phoenix (R-squared value = 0.83). This relationship was also evaluated for light rail PNR users destined for the ASU Tempe campus, which is a major activity center served by light rail. However, the analysis found little correlation between the two variables (R-squared value = 0.49). The survey data collected also

reveals that there is no direct correlation between the number of vehicles parked in bus PNRs to the PNRs' distances to downtown Phoenix (R-squared value = 0.00).

Table 5-1. PNRs Served by Transit Mode

PNR Facility	City	Capacity	Served By		ID ¹
			Express or RAPID Bus	Served by Light Rail	
Buckeye	Buckeye	250	●		1
Chandler	Chandler	460	●		20
Gilbert	Gilbert	250	●		25
Glendale	Glendale	388	●		4
Goodyear	Goodyear	400	●		2
Power Rd.	Mesa	194	●		28
Gilbert Rd. & McDowell Rd.	Mesa	220	●		27
Superstition Springs	Mesa	297	●		29
West Mesa	Mesa	305	●		26
Peoria East	Peoria	82	●		9
27th Ave. & Baseline Rd.	Phoenix	200	●		15
40th St. & Pecos Rd,	Phoenix	906	●		19
79th Ave. & I-10	Phoenix	607	●		3
Bell Rd. & SR-51	Phoenix	377	●		17
Happy Valley Rd. & I-17	Phoenix	512	●		6
Sunnyslope	Phoenix	45	●		8
Bell Rd. & I-17	Phoenix	350	●		5
Shea Blvd. & SR-51	Phoenix	370	●		18
Metrocenter	Phoenix	215	●		7
Surprise	Surprise	230	●		10
Main St. & Sycamore	Mesa	802		●	24
19th Ave. & Camelback Rd.	Phoenix	410		●	11
Central Ave. & Camelback Rd.	Phoenix	135		●	14
7th Ave. & Camelback Rd.	Phoenix	123		●	13
19th Ave. & Montebello	Phoenix	794		●	12
Washington St. & 38th St.	Phoenix	189		●	16
McClintock Dr. & Apache Blvd.	Tempe	300		●	22
Apache Blvd. & Dorsey Ln.	Tempe	190		●	21
Loop 101 & Apache Blvd.	Tempe	693		●	23
Summary Total		10,294			

¹ID corresponds to the PNR number shown in Figure 3-1.

Light rail PNR users tend to travel further distances to their PNR than express and RAPID bus PNR users.

Based on the on-board survey light rail PNR users travel an average distance of 5.1 miles between their trip origin and PNR, that distance is only 3.9 miles for bus PNR users. The license plate survey data, which includes all PNR users (carpool, vanpool, other) not just express/RAPID bus and light rail users, indicates that the average distance travelled to a PNR (regardless of type) is 6.8 miles. Distance was calculated from the license plate survey by plotting the vehicle registration zip code (provided by Arizona Department of Transportation) in GIS.

PNR facilities within 1.5 miles of a freeway are more utilized than those further away from a freeway.

A comparison of parking utilization for PNRs indicates that facilities within 1.5 miles of a freeway have a 53 percent utilization rate, while PNRs greater than 1.5 miles from a freeway have only a 28 percent utilization rate. Proximity to freeways provides greater regional access to transit services and reduced overall transit travel times for buses operating on freeways. Approximately 90 percent of the system-wide parking capacity is located within 1.5 miles of a freeway

The market shed for PNRs close to freeways is larger than that of PNRs further away from freeways.

On average, people drive longer distances from their trip origin to PNRs close to freeways (within 1.5 miles) than to PNRs further from freeways (greater than 1.5 miles). Based on the on-board survey results, the average distance from origination to a PNR located close to a freeway is 4.3 miles, compared to an average distance of only 3.1 miles for PNRs located greater than 1.5 miles from a freeway.

Proximity to users residence is the primary reason stated for choosing a PNR, while the transit route that serves the PNR facility is the second most common reason.

Survey respondents could select as many reasons for using their PNR as applied. Of the total numbers of responses received, 75 percent stated proximity to home was a primary reason while 43 percent stated that they used their PNR because the transit route serves the facility. Bus PNR users (81 percent) were more likely to select “PNR is Close to Home” as a reason for use of their PNR than light rail PNR users (59 percent).

The lowest number of responses received were for proximity to a freeway (16 percent) and sense of security (14 percent). While proximity to a freeway was infrequently cited as a reason for choosing a PNR facility, PNRs located near freeways have a higher level of utilization.

Covered parking and real-time transit information are the most desired facility improvements requested by the survey respondents.

Survey respondents could select up to two improvements they would most like to see. About one in four respondents requested covered parking, while approximately one in five respondents requested real-time transit information.

Eleven of the PNR facilities had an above average response rate for requests for covered parking. Nine of these PNRs currently have no covered parking, and two offer only a limited number of covered spaces. The Power Road PNR has only 12 percent of its spaces covered, and the cover is provided by a freeway overpass structure which affords some shade. The Chandler PNR has about 34 percent of its spaces covered. Facilities with a limited quantity of covered parking spaces had higher request rates covered parking than those facilities that have a relatively high percentage of parking spaces. Regionally, 54 percent of all publicly owned PNR spaces are covered.

5.2 Express and RAPID Bus PNRs

A higher level of bus service results in a higher number of vehicleless parked in a PNR. The correlation of these two variables is much stronger for PNRs served by RAPID buses than for express bus PNRs.

When comparing bus service levels (daily inbound express/RAPID trips) to the number of parked vehicles at all 19 bus-only PNR facilities, the analysis found little or no correlation (R-squared value = 0.34). However, the analysis found a strong correlation between the two variables for RAPID bus PNRs. When comparing the service level (number of daily scheduled inbound trips) in each corridor to the total number of vehicles parked in each corridor. The R-squared value of this relationship for RAPID services is 0.94.

5.3 Light Rail PNRs

College/university students are using light rail PNR facilities at high rates.

This is likely due to the high expense of parking on the ASU campus. Survey results indicate that some students indicated that they drove and parked at a light rail PNR to avoid paying ASU parking fees. The PNR facilities located closest to the ASU Tempe campus from the east (Apache Boulevard & Dorsey Lane) and west (Washington Street & 38th Street) have the highest light rail PNR utilization rates at 92 percent and 69 percent respectively. However, with an overall system PNR capacity at an average of 354 spaces, both of these lots are two of the smaller facilities in the system with only 190 spaces and 189 spaces respectively.

As stated earlier, college/university trips from light rail PNRs make up a much more substantial portion of total trips than bus PNRs, where 39 percent of light rail PNR trips are college/university trips and only 2 percent of bus PNR trips are college/university trips.

Note that the light rail PNRs closest to ASU's Tempe campus have a higher percentage of trips attributed to college or university purposes than the overall survey average:

- Washington Street & 38th Street = 47 percent
- Apache Boulevard & Dorsey Lane= 43 percent
- McClintock Drive & Apache Boulevard = 52 percent
- Loop 101 & Apache Boulevard = 65 percent

Availability of covered parking at light rail PNRs near university or college campuses with parking fees may be less important than the availability of free parking and ease of access to the campus.

Of the four PNRs listed above which are closest to ASU or GateWay Community College, the only PNR offering covered parking is the McClintock Drive & Apache Boulevard PNR. Since a large proportion of students do not attend school during the hot summer months when covered parking is most desired, this may further bolster the statement that provision of covered parking is less important near these campuses.

5.4 Vanpools

Vanpool use at PNRs is greatest at highly visible PNRs adjacent to freeways.

Based on the results of vanpool commuters who responded to the survey, the 79th Avenue & I-10 and Bell Road & I-17 PNRs experienced the highest level of vanpool use with eight and seven vanpools respectively. Five vanpools use each of the PNRs located at 40th Street & Pecos Road, Goodyear, and Gilbert Road & McDowell Road. All of these PNRs are in highly visible locations adjacent to freeways.

Of those surveyed, vanpools used only 16 of the 29 formal Valley Metro PNRs studied for this report. Valley Metro also received completed surveys from vanpool commuters using some informal PNRs such as shopping center parking lots, but these were not included in the results for this report. Limited use of the PNR facilities by vanpool users could be a result of PNR geographic locations being inconsistent with trip origins; knowledge of PNR facility locations and/or low visibility of PNR facilities, and knowledge of authorization to use the PNR facilities.

Like other PNR users, a majority of vanpool commuters have a choice between riding transit or driving alone.

Of those responding to the survey, 89 percent reported that they arrive at their PNR by driving alone and leaving their personal vehicle parked all day. This compares to 87 percent for light rail riders and 76 percent for express or RAPID bus riders.

Vanpool commuters most often chose their PNR because of its proximity to home, while the availability of covered parking was chosen second. These results indicate that convenience is a high priority for vanpool commuters.

Respondents were asked why they use their particular PNR. They could select as many reasons as applied. The following received the highest occurrence of responses:

- Close to Home = 71 Percent
- Availability of Covered Parking = 53 Percent
- Close to Freeway = 44 Percent
- Sense of Security = 30 Percent

The high rate of responses indicating that a PNR was selected because it is close to home, offers covered parking, and is close to a freeway points to vanpool PNR users desiring convenience in their selection of a PNR.

Most vanpool commuters are satisfied with the amenities currently offered at their PNRs.

When asked about PNR improvements, vanpool commuters felt that their PNRs already offer adequate amenities. Only 21 percent of the responses requested covered parking, while other amenities such as shelters and benches were infrequently requested.

5.5 Lessons Learned

Every survey conducted is unique and provides an opportunity to reflect on potential considerations for future survey work. The information outlined in this section is provided solely to help improve future surveys and has no adverse effect on the overall outcome of the survey for this PNR study. Several items for consideration include the following:

- Efficiency Improvements – Use of electronic tablets for field data entry where direct interviews are required may make data collection more efficient and reduce errors resulting from handwriting legibility. Additionally, with tablets there would be no need to re-enter collected data into an electronic database, thus time and budget can be saved and opportunities for errors reduced. When it is necessary to conduct multiple surveys in a short period of time, paper-based surveys may prove to be more efficient.
- Safety Issues – Surveying PNRs requires some early morning trips to areas where surveyors did not always feel safe. Working in teams of three, the team leader was often left alone to perform the vehicle counts and license plate and amenities surveys once the other two team members boarded buses to survey riders. A strategy for future surveys to minimize safety concerns would be to add one member to each team to work with the team's leader to conduct the vehicle counts and inventory so the leader would not be left alone at the PNR
- Surveyor Organization – Handing out and collecting surveys and writing utensils aboard buses can be a cumbersome task. Surveyors should be as organized as possible with either multi-pocketed aprons or another organization system for successfully handing out and collecting the multiple survey items.

- Response Rate – If a response rate is desired, surveyors should be prepared to count either number of riders or number of surveys handed out so this figure can be generated. At light rail stations, this would require surveyors to keep track of every respondent who declined to take the survey as well as those that did.
- Dedicated Staff for Survey Collection – Where possible, dedicated staff, instead of a combination of staff and volunteers, should be assigned to conduct the survey. This would help to maximize accuracy and consistency in conducting the survey. The sole use of staff dedicated to the task would minimize the potential for scheduling conflicts and likely lead to increased organization of the survey efforts.
- Scheduling Surveys to Coincide With Arizona State University (ASU) School Sessions – Valley Metro did not initiate the surveys until April, and ASU’s spring session ended in early May. The short time frame allowed to complete all of the surveys did not provide scheduling flexibility in the event that surveys needed to be redone or supplemented. The survey was scheduled to avoid this conflict to the extent possible given the short amount of time provided. However, like all the other PNRs, two vehicle counts were conducted at the Apache Boulevard & Dorsey Lane PNR which experiences heavy ASU use. Because the two counts varied by somewhat more than ten percent, a third count was scheduled but could not be completed until after ASU’s regular session ended. That count was substantially lower than the previous two counts, so it could not be used to help calculate a parking utilization rate. Therefore, parking utilization was calculated based on the average of the two earlier counts. Although this did not have a negative effect on the overall results of the survey, coordination of future survey schedules with ASU school sessions should be a consideration when obtaining information from ASU students, faculty, and staff is important.
- Capture More of the Common PNR Amenities – The inventory form used to record existing amenities (Appendix A) in each PNR contained six major categories of amenities for inventory with one additional category to record all “Other” types of amenities found in the PNRs. A few additional categories should have been added to record additional amenities such as water fountains and security facilities, which turned out to be fairly common amenities found in many of the PNRs inventoried.