City of Portland Parking Impacts for New TOD Along Portland Inner Corridors

Parking Study

DAVID EVANS AND ASSOCIATES INC.

Prepared for:

Bureau of Planning and Sustainability
Innovation. Collaboration. Practical Solutions.

November 2012

CITY OF PORTLAND

PARKING IMPACTS FOR NEW TOD ALONG PORTLAND INNER CORRIDORS

PARKING STUDY

Prepared for

City of Portland

Bureau of Planning and Sustainability

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EXECUTIVE SUMMARY

WHY IS THE STUDY NEEDED?

Upcoming apartment construction with little to no on-site parking in the City of Portland's inner neighborhoods has raised concerns about the potential for on-street parking congestion and overall negative impacts on adjacent low-density residential areas and commercial districts. The purpose of this study is to evaluate use and ownership of vehicles at eight locations (Project Locations) that have little or no off-street parking. Opportunities for and barriers to encouraging alternatives to motorized vehicle ownership are also evaluated

WHAT DATA ARE YOU USING TO EVALUATING PARKING?

The four main sources of data for this study are:

- Documented research/literature review
- Parking inventory and utilization at each Project Location
- Tenant surveys at each Project Location
- Stakeholder and tenant interviews at each Project Location

WHAT LOCATIONS ARE YOU EVALUATING?

Each of the Project Locations has different features that contribute to the parking supply and utilization, but all have the common attribute of being on or near a commercial street, with both businesses and residences in the surrounding area. Each Project Location has a study area boundary of approximately two blocks around each building, determined by its unique roadway network. The eight Project Locations (which were provided by BPS) were chosen based on their limited on-site parking supply and proximity to commercial streets. The Project Locations are:

- Patton Park Apartments – 5272 N Interstate Ave., Portland, OR 97217
- ecoFLATS Apartments – 3951 N Williams Ave., Portland, OR 97227
- Shaver Green Apartments – 375 NE Shaver St., Portland, OR 97212
- Irvington Garden Apartments – 1516 NE Hancock St., Portland, OR 97212
- The 20 on Hawthorne – 1550 SE 20th Ave., Portland, OR 97214
- Andria Condominiums – 910 SE 42nd Ave., Portland, OR 97215
- 3810 SE Division Apartments – 3810 SE Division St., Portland, OR 97202
- 43 Division Micro-Units – 4300 block of SE Division St., Portland, OR 97206

WHAT DOES PUBLISHED RESEARCH SAY ABOUT BUILDING WITH LITTLE OR NO ON-SITE PARKING?

The literature review conducted through this study suggests that the unbundling of parking and rent lowers rental costs. This literature suggests that density and carsharing reduce personal motorized

vehicle ownership rates, and dense neighborhoods with strong transit and active transportation options reduce driving. According to the Forinash et al. research, carsharing can dramatically decrease the need to own a private vehicle. However, of the eight Project Locations studied, few have designated carsharing parking spots in the immediate vicinity. Developers and the City may consider designating prime parking locations for carshare in a designated space (i.e. zip car to incentivize their use.

WHAT IS PARKING LIKE AROUND THE LOCATIONS EVALUATED?

The on-street parking observations found that all eight project locations have peak period parking utilization below 85 percent of the existing capacity, which indicates that there is adequate parking within a two block walking distance of each project location. Even though the average utilization is below 85 percent, all locations have areas with high parking demand with one or more blocks at capacity during peak periods. All locations also have other existing businesses and apartments with little or no on-site parking in addition to the project location studied. Irvington Gardens and The 20 on Hawthorne are the most utilized of the eight project locations as shown in **Table 1**. None of the project locations have a clear pattern of high on-street parking demand around the project buildings.

TABLE 1. UTILIZATION SUMMARY

Project Location	On-Street Parking Capacity[1]	Peak Utilization[2]	
		Weekday	Weekend
Patton Park Apartments	528	40%	41%
ecoFLATS Apartments	544	61%	59%
Shaver Green Apartments	653	50%	42%
Irvington Garden Apartments	752	66%	69%
The 20 on Hawthorne	451	61%	75%
Andria Condominiums	394	48%	51%
3810 SE Division Apartments	400	45%	45%
43 Division Micro-Units	415	28%	32%

Notes:

1. Capacity for each project location is based on an area within a two-block walkable radius, as outlined in the Methodology section of this report.

HOW MUCH PARKING DO TENANTS NEED?

In general, the survey results do not suggest a relationship between on-site parking and vehicle ownership. Survey responses indicate that residents at both types of buildings (those with on-site parking and those without on-site parking) have similar trends in motorized vehicle ownership. The range of vehicles per unit determined in the statistical analysis varies from a low of 0.2 vehicles to a high of 2.0 vehicles per unit as shown in **Table 2**.

TABLE 2. VEHICLES PER LIVING UNIT

Project Location	Number of Residential Units	On-Site Parking Spaces	Survey Responses from Project Location	Average Cars per Unit	Cars per Unit (95% Confidence Interval)
Patton Park Apartments	54	33	13	0.8	0.3 – 1.2
ecoFLATS Apartments	18	None	6	1.2	0.4 – 2.0
Shaver Green Apartments	85	32	26	0.5	0.3 – 0.7
Irvington Garden Apartments	50	None	12	0.9	0.6 – 1.2
The 20 on Hawthorne	51	34	15	1.0	0.6 – 1.4
Andria Condominiums	27	15	10	1.2	0.9 – 1.5
3810 SE Division Apartments	23	None	23	1.1	0.8 – 1.4
43 Division Micro-Units	29	None	10	0.6	0.2 – 1.0

WHAT ARE OPPORTUNITIES AND BARRIERS TO ENCOURAGING ALTERNATIVES TO MOTORIZED VEHICLE OWNERSHIP?

Twenty eight percent of all the households surveyed as part of this project study do not own or lease a car. The remaining 72 percent do own or lease at least one car, and two-thirds (67 percent) of them indicated that they park on the street. Survey responses indicate that the primary mode of transportation for commuter trips is spread between 20 percent of people biking to work, 9 percent walking, 23 percent riding public transit, 3 percent carpooling, and 36 percent driving a vehicle alone. For non-work travel, 16 percent ride their bikes, while 20 percent walk, 3 percent use a carsharing service, 6 percent carpool, 4 percent ride public transit, and 44 percent drive their vehicles. This shows that while residents use multiple forms of non-motorized vehicles for transportation, they also own cars for occasional use. So, though many of the responders bike, walk, take transit, and use carsharing services for many of their daily trips (to commute, run errands, etc.), they still feel the need for a vehicle and are reluctant to become completely car free. One of the questions the survey asked was what amenities would reduce the respondent's need for motorized vehicle ownership. Many people stated that there were no amenities that would reduce their need for a vehicle. Of those who would consider to live car-free, the most commonly needed amenities were easy access to transit and services such as stores and restaurants; however, the following responses were also given:

- More secure bicycle parking that is convenient to residences
- Transit that travels to my place of work/school
- More carsharing options
- Affordable, high quality daycare in the area

To better understand what the concerns about parking were truly based on, many of the survey questions were specific to those who owned vehicles. Responses to these questions varied from concerns about convenience, to safety concerns, to a few responses that indicated that the person did

not feel parking was a problem now, but they were concerned it would be in the future. Business owners and Neighborhood association representatives were also concerned about the cumulative effect of multiple buildings being developed with little or no on-site parking. Many of the responses were concerned with neighborhood character and amenities, rather than about the amount of available parking.

BACKGROUND AND PROJECT PURPOSE

Several planned and recently constructed apartment buildings along transit lines in Portland's inner neighborhoods provide little or no on-site parking, raising concerns from adjacent neighborhoods about the potential for on-street parking congestion and overall negative impacts on adjacent low-density residential areas and commercial districts. The public has voiced concerns about how new housing, mixed-use projects, and retail developments are changing, and will continue to change, the character of their neighborhoods, intensifying the need to complete a parking study. The Portland Bureau of Planning and Sustainability (BPS) has undertaken this parking study to determine the supply and demand for parking in the vicinity of recently constructed apartment buildings with limited on-site parking to identify if the units have an adverse effect on residential and commercial parking availability and to identify whether or not further action is necessary to accommodate future development.

The study evaluates on-street parking utilization within a two-block area of eight locations (Project Locations) that have little or no off-street parking. The study has collected and evaluated the following:

- Estimate of existing on-street parking supply
- Inventory of facilities for long-term (resident use) bicycle parking
- Estimate of weekday and weekend on-street parking utilization
- Use and ownership of vehicles by residents of Project Locations
- Alternative transportation use by residents of Project Locations
- Opportunities and barriers to encouraging alternatives to motorized vehicle ownership
- Parking impacts of developments without dedicated off-street parking

STUDY AREA

The study area is composed of eight Project Locations, as shown in **Figure 1**. Each of the Project Locations has different features that contribute to the parking supply and utilization, but all have the common attribute of being on or near a commercial street, with both businesses and residences in the surrounding area. Each Project Location has a study area boundary of approximately two blocks around each building, determined by its unique roadway network. The eight Project Locations (which were provided by BPS) were chosen based on their limited on-site parking supply and proximity to commercial streets. The Project Locations are:

- Patton Park Apartments – 5272 N Interstate Ave., Portland, OR 97217
- ecoFLATS Apartments – 3951 N Williams Ave., Portland, OR 97227
- Shaver Green Apartments – 375 NE Shaver St., Portland, OR 97212
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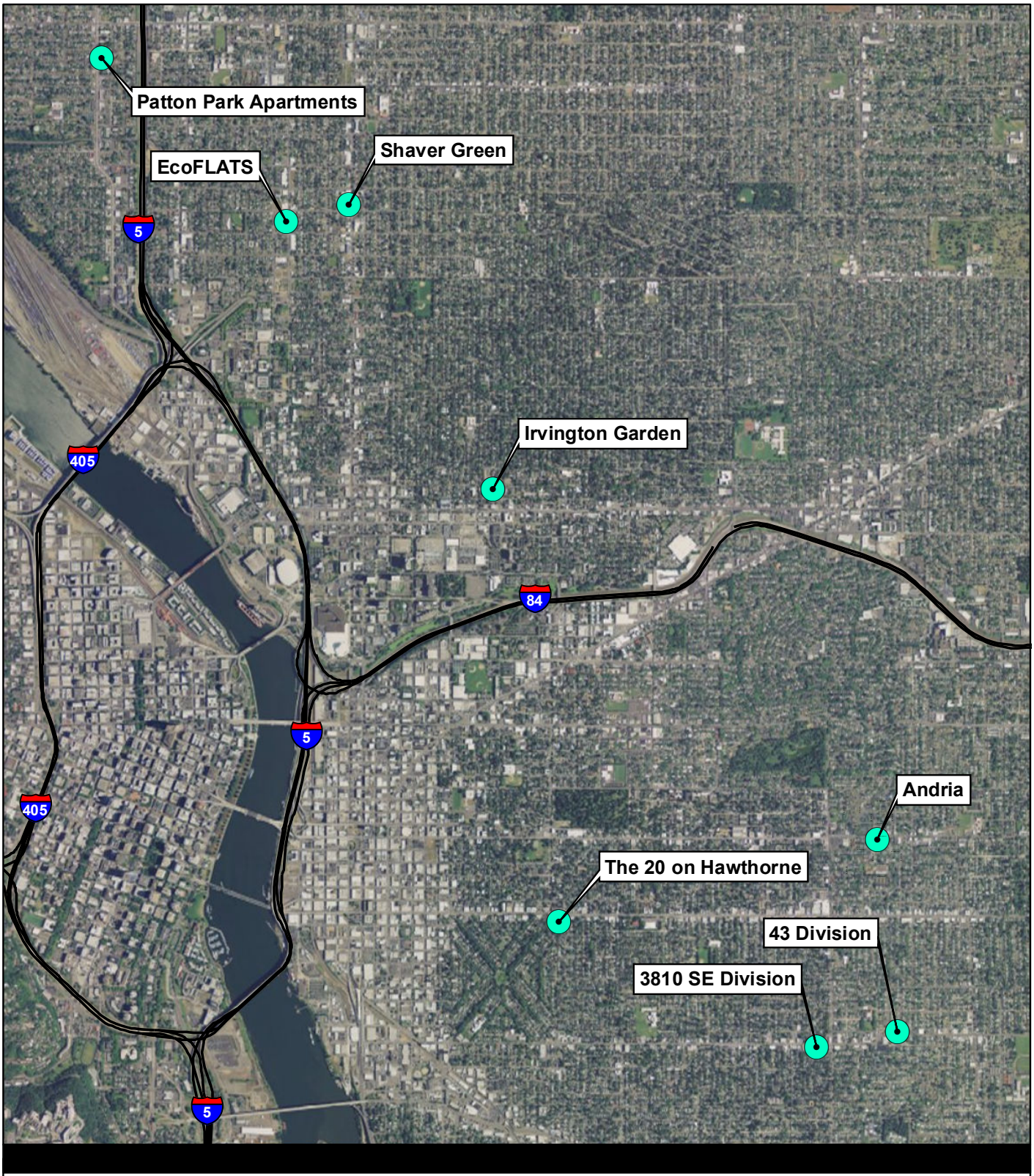
- 3810 SE Division Apartments – 3810 SE Division St., Portland, OR 97202
- 43 Division Micro-Units – 4300 block of SE Division St., Portland, OR 97206



LEGEND

Project Locations

Figure 1
Study Area
Project Locations

DRAFT

RLIS Data. 2012. Portland, Oregon.
ESRI, ArcGIS Online, World Imagery. Aerials Express (AEX). 2009. Portland, Oregon.

N 0 1 Miles

METHODOLOGY

The project team collected and reviewed the following data to better understand and evaluate the unique parking patterns of residential building with little to no on-site parking:

- Document research/literature review
- Parking inventory and utilization at each Project Location
- Tenant surveys at each Project Location
- Stakeholder and tenant interviews at each Project Location

DOCUMENT RESEARCH/LITERATURE REVIEW

Online research from scholarly sources was conducted to look at parking and travel behavior of apartment residents to determine the degree to which building amenities, such as secure bike parking or required carshare membership, influence car ownership rates as well as how social and cultural dynamics can factor into car ownership and use. Initially, only articles in peer-reviewed journals were used, but the search was broadened due to the limited number of available articles. This report summarizes the salient information from this research along with additional analysis that contextualizes research findings to fit Portland and the eight Project Locations.

PARKING INVENTORY AND UTILIZATION

The study of parking impacts along Portland inner corridors included data collection efforts within the project study area to assess on-street parking, available bike parking, and current parking restrictions. The parking data considered utilization and turnover by location and time of day. The data collection techniques and analysis follow the methodology outlined in *Parking Management Made Easy: A Guide to Taming the Downtown Parking Beast*[1].

DATA COLLECTION

The project team inventoried all on-street parking within the study area (an approximately two-block walkable radius) at each of the eight Project Locations. Because of the differing roadway networks throughout the study area, the two-block walkable radius is a unique collection area for each location. BPS provided information about the amount and location of on-site parking for each Project Location for vehicles and bicycles to the project team. Data collection was performed at each Project Location for one weekday and one weekend day. The weekday data was collected for five time periods starting at: 6:30 a.m., 9:30 a.m., 12:30 p.m., 3:30 p.m., and 6:30 p.m. The weekend day data was also collected for five time periods starting at: 9:30 a.m., 12:30 p.m., 3:30 p.m., 6:30 p.m., and 9:30 p.m.

[1] Oregon Downtown Development Association, "Parking Management Made Easy: A Guide to Taming the Downtown Parking Beast" (2001): 1-12. Oregon Dept. of Transportation and Dept. of land Conservation and Development. Web. <http://www.oregon.gov/LCD/docs/publications/parkingguide.pdf>

Observation time periods were chosen to coincide with key activity times. The weekday data collection started at 6:30 a.m. in order to capture work week commuters. For the weekend, the data collection needed to capture the later evening times when people are more likely to be staying out at the restaurants and bars along the commercial streets. Beginning weekend data collection at 9:30 a.m. captures the weekend brunch traffic and provides enough overlapping time periods to compare weekdays to weekend days.

Table 3 lists the date of data collection for each Project Location. Before the data collection days, the Project Locations were mapped, aerials were visually assessed, and data collection templates were created.

TABLE 3. DATA COLLECTION DATES

Project Location	Weekday	Weekend
Patton Park Apartments	Thursday, 9/27/2012	Saturday, 9/29/2012
ecoFLATS Apartments	Tuesday, 8/28/2012	Saturday, 9/29/2012
Shaver Green Apartments	Tuesday, 8/21/2012	Saturday, 9/29/2012
Irvington Garden Apartments	Tuesday, 8/21/2012	Saturday, 10/6/2012
The 20 on Hawthorne	Tuesday, 8/28/2012	Saturday, 10/6/2012
Andria Condominiums	Thursday, 9/27/2012	Saturday, 9/29/2012
3810 SE Division Apartments	Wednesday, 8/29/2012	Saturday, 9/29/2012
43 Division Micro-Units	Wednesday, 8/29/2012	Saturday, 9/29/2012

CAPACITY, UTILIZATION, AND TURNOVER

Weekday data collection at the Project Locations included documentation of the last three digits of vehicle license plates to determine utilization, turnover, and length of stay. Weekend data collection at the Project Locations included only vehicle counts to determine utilization. No license plate information was collected on the weekend, thus turnover information is not available for the weekend.

Utilization is assumed to be the percentage of spaces that are occupied within a specific section of the study area (block face, Project Location, etc.) at any moment.

Turnover is assumed to be the number of different vehicles parked in a given parking space or area during the observed time periods. A parking space that was not utilized at any point during observed time periods is not included in the turnover calculation. Turnover is a good indicator of how well the demand, in terms of duration of stay, for a particular parking space aligns with the intended use of the parking space. The bulk of the project study area has no parking restrictions, and for these areas we can use the turnover rate to gauge how long vehicles are staying parked in one spot. Normally, higher turnover is expected along the commercial streets, and longer-term parking is expected in the residential areas surrounding the commercial streets.

An estimate of the total number of on-street parking spaces (capacity) within the study area was determined from the data collection, though this value is difficult to determine since there is no indication of specific spot location (paint or markings). To estimate the on-street parking capacity per block, the following procedure was used:

1. Measure the block, via aerial;
2. Conduct parking availability assessment: consider yellow ("No Parking") paint, "No Parking" signs, and driveways that impede the ability to park along a stretch of roadway;
3. Reduce block length based on parking availability (step 2);
4. Assume a parking space length of 15 feet;
5. Divide reduced block length by 15 feet per space (step 3); and
6. Confirm, or if needed, adjust approximate capacity by visual assessment during on-site data collection.

Based on capacities estimated using the methodology outlined above, utilization was then determined for each block face at the Project Locations.

85 PERCENT RULE

Though capacities were estimated, the reality is that once parking use reaches approximately 85 percent of the available parking spaces, it becomes difficult to find an open parking space.[2] As a result, drivers are often required to circle the block or blocks, which impacts traffic flow and creates delay for drivers looking for parking. The goal of efficient parking management is to provide enough spaces so that excessive circling is not required, yet not reserve more land for parking than is needed. This report defines 85 percent of capacity as the effective capacity threshold. To help assess locations within the study area that are approaching the effective parking threshold (85 percent), a secondary criteria of 60 percent is used. Qualitative assessment of parking supplies has been assigned based on the following utilization thresholds:

- 60 percent or less utilization is considered underutilized parking supply
- 60 percent to 85 percent utilization is considered adequate parking supply
- 85 percent or more utilization is considered deficient parking supply

MAILER AND ON-LINE TENANT SURVEYS

In addition to collecting data on parking inventory and utilization, a mailer and an on-line survey were sent out to tenants of the Project Locations. David Evans and Associates developed a 23-question survey to collect data on the use and ownership of personal vehicles and bicycles among residents of the Project Locations, as well as on the use of membership programs that offer alternatives to vehicles ownership, such as carsharing, transit use, walking, and bicycling to meet transportation needs.

[2] Weinberger, Rachel, John Kaeney, and Matthew Rufo. "U.S. Parking Policies: An Overview of Management Strategies." *Institute of Transportation and Development Policy* (2010). Web. <http://www.itdp.org/documents/ITDP_US_Parking_Report.pdf>

Once the data was collected, the results were summarized and further analyzed to determine whether there is a measurable correlation between car ownership and residences with limited on-site parking.

STAKEHOLDER AND RESIDENT INTERVIEWS

As a follow-up to the mailer and on-line surveys, David Evans and Associates developed a set of questions for residents who indicated an interest in participating in a phone interview. Additional sets of interview questions were created that catered to business owners, neighborhood association leaders, and developers. Nineteen residents, three developers, two business owners, and one neighborhood association member were interviewed.

LITERATURE REVIEW

Currently, limited research exists about the provision of dense residential units with little to no off-street parking. The following four articles discuss parking requirements, the provision of bicycle parking, and access to carsharing vehicles. Their key points are summarized below.

SUMMARY OF ARTICLES

SMART GROWTH ALTERNATIVES TO MINIMUM PARKING REQUIREMENTS (2003)[3]

This article delves into the possibilities of encouraging new development that offers smaller, more walkable neighborhoods and mixed-use zoning. Such "smart growth" is attainable through on-street parking management and changing the minimum parking requirements. According to Holtzclaw et al. (2003, as cited in Forinash et al.), "Each time residential density doubles, auto ownership falls by 32 to 40 percent"; as destinations are closer together, more places can be accessed without a car. Therefore, to lower car ownership it is imperative to focus on smart land development that encourages density.

Some of the factors that are correlated with lower motorized vehicle ownership in urban areas are:

- Small household sizes,
- Frequent transit service,
- Lower incomes,
- Higher proportion of seniors, and
- Rental housing.

The report identifies several techniques that can be applied to achieve smart growth, such as:

- Transit zoning overlays (incorporating good transit service into zoning changes)
- New zoning or specific area plans (to bypass or lower the minimum number of parking spaces required for developers)
- Parking freezes (capping the total number of parking spaces supplied within a district)
- Parking reductions for affordable and senior housing (because these populations are less likely to own vehicles, it is costly and unnecessary to over-build parking capacity)
- Case-by-case evaluation (context-specific analysis)
- Land banking and landscape reserves (setting land aside that can be converted to parking if demand is higher than anticipated)

The authors discuss the benefits of using carsharing programs to decrease parking demand; carsharing can dramatically decrease the need to own a private vehicle. For example, in San Francisco almost 60 percent of those who owned a vehicle before joining a carsharing service had given up one of their cars within a year, and another 13 percent were considering selling their cars.[4] This shows that carsharing

[3] Forinash, Christopher V., Adam Millard-Ball, Charlotte Doughtery, and Jeffrey Tumlin. "Smart Growth Alternatives to Minimum Parking Requirements." Transportation Research Board (2003): 12p. Online.

[4] Nelson/Nygaard Consulting Associates, 2002, as cited in Forinash et al., 2003 (ibid.).

services can be particularly effective in reducing motorized vehicle ownership. The authors do note that developers may need to contribute to set-up costs and/or provide parking spaces near their buildings to ensure that carsharing is part of their project.

THE EVIDENCE BASE FOR PARKING POLICIES – A REVIEW (2006)[5]

This article broadly covers the history of parking restrictions and residential parking issues in both North America and Great Britain. Most notably, the author, Greg Marsden, discusses how the costs associated with requiring off-street parking are sometimes paid by non-car-owning households.[6] This happens because parking costs are often bundled into the costs of renting or owning. By separating parking and rent costs, only those who pay for parking directly will have access to it, and people who do not need to park at all will not be paying for something unnecessary. The United Kingdom now recommends a maximum level of off-street parking for new houses at 1.5 spaces per household, while houses in areas with better transit access should have a lower requirement.[7]

Balcome and York (1993)[8] examined the parking patterns at eight sites in southern England that were experiencing parking problems. With at least 10 percent of car owners parking their vehicles more than 50 meters from their homes, they found the following three trends:

- The distance that vehicles were parked from the home was deterring the purchase of better vehicles for fear of vandalism.
- The inconvenience of losing a parking spot and searching for a new one deterred people from using their car for short trips (people either walked or took public transit rather than driving).
- Increased parking congestion led some residents to look into reducing the number of cars owned and others to look into relocating to areas with better parking provisions.[9]

Marsden states, “Supply restrictions (reducing minimum parking requirements) have benefits for the design of more compact and livable urban developments. However, by themselves they appear to be an ineffective tool as they can generate substantial overspill on-street parking problems that detract from the quality of the local street environment.” It is also possible that parking restrictions potentially act as a contributing factor in people’s decisions to relocate to areas where parking is less of an issue. Marsden argues that parking restraint policies should be coupled with demand restrictions, such as parking permits and time-restraint parking. The two primary barriers to these policies, however, are the enforcement costs and community resistance.

[5] Marsden, Greg. "The Evidence Base for Parking Policies—A Review." *Transport Policy* 13.6 (2006): 447-57. Print.

[6] Shoup, 1995; Jia and Wachs, 1999; Litman, 2004; as cited in Marsden, 2006.

[7] Marsden, Greg. "The Evidence Base for Parking Policies—A Review." *Transport Policy* 13.6 (2006): 447-57. Print.

[8] As cited in Marsden, 2006.

[9] It was also noted in the article that while some residents were looking to reduce the number of vehicles owned by the household, “elsewhere in the interviews at least 10% of residents were, at the time of survey, considering acquiring an extra vehicle” (page 15). The authors did not explain the reasons offered for wanting to own another vehicle, nor did they delve into this inconsistency any further.

Marsden concludes by stating that "Residential parking suffers from the biggest dearth of research evidence" and will benefit from more study.

CARSHARING: ESTABLISHING ITS ROLE IN THE PARKING DEMAND MANAGEMENT TOOLBOX (2006)[10]

This master's thesis by Gina Filosa explores the concepts of urban parking and carsharing as a parking demand management strategy while determining its viability. Questions answered include:

1. How does carsharing impact parking demand?
2. How is carsharing incorporated in today's current developments?
3. What are the obstacles to using carsharing as a parking demand management strategy?
4. How best to promote carsharing?

Filosa explains how carsharing and personal motorized vehicle ownership offer different incentives and costs per use. Because of this, carsharing is not only a good way to more efficiently use vehicles and have fewer cars that require parking space, but it can also reduce vehicle miles traveled. She says:

> With private vehicles, the majority of costs are fixed, i.e. purchase price, depreciation, financing, registration and insurance. As a result, private vehicles are expensive to own but cheap to drive, providing an incentive for owners to maximize usage (Litman, 1999, as cited in Filosa). In contrast, the majority of costs associated with carsharing are variable, which provides members with an incentive to drive less and use alternative transportation more.

Additionally, carsharing provides "more efficient vehicle usage, a reduction in the space devoted to transportation infrastructure, and the benefits of gained space as the result of vehicles being used more intensively in parking lots at transit spots, workplaces, and schools" (Sperling, Shaheen, and Wagner, 1999, as cited in Filosa).

Filosa cites an empirical example of how reducing both the demand and supply for parking can lead to an increase in urban density. The following example of development specifications shows that lowered development parking requirements coupled with increased participation in carsharing programs would lower parking demand:

- Housing development of 34 units (assume that 1.5 adults occupy each unit for a total of 51 adults).
- Zoning requires 1.5 parking spaces per dwelling, for a total of 51 parking spaces.
- Participation rate in the carsharing program among residents is 20 percent, or 10 adults.
- If upon joining the carshare program these 10 people were to give up their personal vehicle and no longer need a private parking space, then the parking spaces per dwelling would be reduced from 1.5 spaces to 1.2 spaces per dwelling.

[10] Filosa, Gina. "Carsharing: Establishing Its Role in the Parking Demand Management Toolbox." (2006): 1-64. Urban and Environmental Policy and Planning, Tufts University. Web. <http://67.205.121.233/images/filosa_carsharing.pdf>.

Although this example assumes that the 20 percent of adults using the carsharing service completely give up access to their personal vehicles (a generous assumption), it still shows that if even 5 percent of people give up their personal vehicle, there would be a decrease in parking demand.

RESIDENTIAL OFF-STREET PARKING IMPACTS ON CAR OWNERSHIP, VEHICLE MILES TRAVELED, AND RELATED CARBON EMISSIONS (2009)[11]

This paper details a pilot study to explore parking in two New York City neighborhoods: Jackson Heights, Queens, and Park Slope (Brooklyn). Jackson Heights has a total of over 256 percent more off-street parking choices than Park Slope (3,633 spots versus 1,416), such that is has approximately 1.14 off-street parking spaces per dwelling, while Park Slope has 0.06. The authors calculated the number of parking spaces (both on- and off-street), the number of cars owned, and commuter patterns. Researchers found that "[w]hile the finding of the pilot study cannot be generalized to larger geographic areas...it strongly points to off-street parking as tipping the utility in favor of driving when other viable alternatives exist."[12] This is because the annoyance of finding on-street parking is such that people will typically choose transit over driving (which is why Jackson Heights residents drove more than Park Slope residents).

This New York City pilot study finds that "[p]arking supply affects driving demand by changing the underlying cost structure associated with mode choice decisions."[13] The authors explain that when parking is relatively scarce (and therefore more expensive), cities have higher transit usage, though there is no previous literature on residential parking requirements and personal vehicle usage. Finally, "the evidence suggests that households with on-site, off-street parking [garages, driveways] are inclined to drive more than their neighbors are."[14]

KEY TAKEAWAYS

The literature review shows that the unbundling of parking and rent lowers rental costs. Density and carsharing reduce personal motorized vehicle ownership rates, and dense neighborhoods with strong transit and active transportation options reduce driving. Although 28 percent of all the households surveyed as part of this project study do not own or lease a car, roughly 72 percent do own or lease at least one car, and two-thirds (67 percent) of them indicated that they park on the street. This shows that while residents use multiple forms of non-motorized vehicles for transportation, they also own cars for occasional use. Survey responses indicate that the primary mode of transportation for commuter trips is spread between 20 percent of people biking to work, 9 percent walking, 23 percent riding public transit, 3 percent carpooling, and only 36 percent driving a vehicle alone. For non-work travel, 16

[11] Weinberger, Rachel, Mark Seaman, and Carolyn Johnson. "Residential Off-Street Parking Impacts on Car Ownership, Vehicle Miles Traveled, and Related Carbon Emissions." *Transportation Research Record: Journal of the Transportation Research Board* 2118.-1 (2009): 24-30. Print.
[12] Ibid.
[13] Ibid.
[14] Ibid.

percent ride their bikes, while 20 percent walk, 3 percent use a carsharing service, 6 percent carpool, 4 percent ride public transit, and 44 percent drive their vehicles. So, though many of the responders bike, walk, take transit, and use carsharing services for many of their daily trips (to commute, run errands, etc.), they still need parking space.

The Weinberger, et al (2009) research finds that parking supply affects driving demand such that when parking is relatively scarce (and therefore more expensive), cities have higher transit usage. The research also "[…]suggests that households with on-site, off-street parking [garages, driveways] are inclined to drive more than their neighbors are."[15]

According to the Forinash et al. research, carsharing can dramatically decrease the need to own a private vehicle. The San Francisco example shows that nearly 60 percent of those who owned a vehicle before joining a carsharing service had given up one of their cars within a year.[16] If Portland were to follow a similar pattern, it could see that a significant reduction in motorized vehicle ownership if a more robust carsharing system and education were available. Of the 19 residents interviewed, 7 of them have used a carsharing service and 3 more have recently considered using a carsharing service.

Of the eight Project Locations studied, few have designated carsharing parking spots in the immediate vicinity. Developers and the City may consider designating prime parking locations for carshare in a designated space (i.e. zip car to incentivize their use.

[15] Ibid.
[16] Nelson/Nygaard Consulting Associates, 2002, as cited in Forinash et al., 2003.

PARKING INVENTORY AND UTILIZATION

PARKING INVENTORY

The following sections present the utilization rates observed during the data collection as well as the land use characteristics associated with areas of higher parking utilization at each Project Location. Parking capacity varies by block due to the varying instances of driveways, parking restrictions, bus stops, and other facilities that reduce space for on-street parking. The reported utilization considers the available parking per block, with existing driveways and restrictions in place. **Table 4** summarizes the parking supply for each Project Location, and **Figure 2** through **Figure 9** show the peak observed utilization as well as a summary of each time period for the approximate two-block walking distance around each Project Location.

TABLE 4. PARKING INVENTORY

Project Location	Number of Residential Units	On-Site Parking Spaces	On-Street Parking Capacity[1]	Bicycle Parking[2]	
				Short-term	Long-Term
Patton Park Apartments	54	33	528	0 (Bike Fund)	13
ecoFLATS Apartments	18	None	544	10	12
Shaver Green Apartments	85	32	653	5	22
Irvington Garden Apartments	50	None	752	5	64
The 20 on Hawthorne	51	34	451	5	16
Andria Condominiums	27	15	394	4	10
3810 SE Division Apartments	23	None	400	3	26
43 Division Micro-Units	29	None	415	3	32

Notes:
1. Capacity for each project location is based on an area within a two-block walkable radius, as outlined in the Methodology section of this report.
2. Bicycle parking information provided by BPS.

There are three carsharing companies that serve the eight Project Locations, with two of the three carsharing companies (Car2go and Zipcar) using on-street parking for their vehicles. Car2go is a one-way (or "point to point") carsharing service. Car2Go has a defined “home area” which is a geographic zone in which you can park the car and end a rental. The vehicles do not have to be reserved to rent (you can just find one on the street and swipe your card to begin) and the charge is per minute (at the moment, it’s 38 cents/minute). The price covers fuel and insurance.

Zipcar is a round-trip carsharing model in which vehicles (cars and trucks) and assigned to a specific location either on street or in private lots. Zipcar members (there is an annual membership fee) can rent vehicles up to a year in advance and pay per hour. The prices generally range from $7-$15 depending on the vehicle and include fuel and insurance.

Getaround is a peer-to-peer carsharing network. Individuals can "sign up" their vehicle by registering at Getaround.com and then others (who have also registered and in doing so have gotten their driving record checked) can sign up to rent vehicles. Vehicle owners set their own hourly, daily and weekly rate and can choose to accept or deny rental requests at will. The retal price covers insurance – it is up to the renter to pay for fuel.

PARKING UTILIZATION

PATTON PARK APARTMENTS

The Patton Park Apartments is a multi-family affordable housing development located in North Portland on N Interstate Avenue in the Overlook neighborhood. Interstate Avenue in the study area carries TriMet's Yellow MAX Line and has extremely limited on-street parking. Off of N Interstate Avenue, the local streets serve mainly the residential neighborhood, because the majority of businesses in the study area have parking lots to serve their customers and employees. **Figure 2** shows a graphical representation of the observed on-street parking utilization during the peak observation period, and a chart of the variation in on-street parking use throughout the observed weekday and weekend day.

WEEKDAY DATA

The weekday data for this location indicates that on-street parking supply is underutilized. All of the collection periods observed an average utilization well below the 85 percent effective capacity, with all time periods below 40 percent utilized. The blocks with the highest utilization (65 to 85 percent) mainly result from the lack of parking spaces rather than high demand, and are located closer to the main streets within the study area (Interstate Avenue and Killingsworth Street). As a driver, one rarely, if ever, has to circle the block to find a parking space within a one-block walking distance to Patton Park Apartments.

During the week, most of the blocks surveyed had very little turnover, with most of the observed parking spaces having one or two vehicles parked in a spot over the course of the day. Of the 45 block faces surveyed that had available parking, 20 blocks (44 percent) had at least two vehicles parked for the entirety of the observed time periods (at least 12 hours). The area with the highest turnover was in the northeast corner of the Project Location study area on Maryland Street.

WEEKEND DATA

Similar to the weekday, weekend data indicates that on-street parking supply is sufficient, with the average utilization of this Project Location's study area slightly higher than on the weekday, but still below 50 percent. Weekend utilization peaked during the 9:30 p.m. collection period, which was also the overall peak utilization period at Patton Park Apartments. The block faces bordering Patton Park Apartments were below 85 percent utilization for all time periods except the peak, when two block faces reached 85 percent. There was still ample parking within a one-block walking distance.

ECOFLATS APARTMENTS

The ecoFLATS building is a mixed-use commercial building shared by apartments and a bike-centric restaurant/bar located in North Portland on Williams Avenue. Williams Avenue in the Project Location study area is a designated bike route, and has a combination of non-restricted and time-restricted on-street parking. Off of Williams Avenue, the local streets serve mainly the residential neighborhood, though there may be spillover from patrons of businesses in the study area. **Figure 3** shows a graphical representation of the observed on-street parking utilization during the peak observation period, and a chart of the variation in on-street parking use throughout the observed weekday and weekend day.

WEEKDAY DATA

The weekday data for this Project Location indicates that on-street parking supply is underutilized. All of the data collection time periods observed an average utilization well below the 85 percent effective capacity—utilization ranged from 37 to 61 percent. The peak utilization for this location was during the week, at the 6:30 p.m. observation time period. A few block faces near, and on, Williams Avenue reached capacity, which is a real parking concern and is likely the cause of spillover into the residential neighborhoods. Because of the presence of time restrictions for parking along sections of Williams Avenue, the parking is likely from business patrons who need to park for longer than the time restrictions allow.

During the week, Williams Avenue and adjacent blocks experienced frequent turnover, with most of the observed parking spaces having more than two vehicles parked in a spot over the course of the day (which is expected due to the presence of time restrictions and businesses). Of the 41 block faces surveyed that had available parking and no time restrictions, 13 blocks (32 percent) had at least two vehicles parked for the entirety of the data collection period (at least 12 hours).

WEEKEND DATA

Similar to the weekday, weekend data indicates that on-street parking supply is sufficient off of Williams Avenue, with the average utilization of the study area at this Project Location ranging from 44 to 60 percent. Weekend utilization peaked during the 12:30 p.m. data collection time period, which coincides with the weekend lunch and brunch crowd. More block faces reached capacity during the weekend peak, but the outlier block faces had lower utilization.

SHAVER GREEN APARTMENTS

Shaver Green Apartments is a low-income housing building in North Portland on the corner of Shaver Street and Martin Luther King (MLK) Boulevard. MLK Boulevard is a state highway (OR 99E) and has only a handful of on-street parking spaces available within the study area. Off of MLK Boulevard, the local streets serve mainly the residential neighborhood, and the many of the businesses in this area have parking lots for their patrons. **Figure 4** shows a graphical representation of the observed on-street

parking utilization during the peak observation period, and a chart of the variation in on-street parking use throughout the observed weekday and weekend day.

WEEKDAY DATA

The weekday data for this Project Location indicates that on-street parking supply is underutilized. All of the data collection time periods observed an average utilization well below the 85 percent effective capacity—utilization ranged from 29 to 58 percent. The peak utilization for this location was during the week, at the 9:30 a.m. observation time period. Block faces near Shaver Green Apartments were below the 85 percent effective capacity, though Failing Street and MLK Boulevard reached capacity. However, there are only nine total spaces on those two block faces.

During the week, the study area for this Project Location experienced little turnover, with most of the observed parking spaces having between one and two vehicles parked in a spot over the course of the day. Of the 54 block faces surveyed that had available parking, 25 blocks (46 percent) had at least two vehicles parked for the entirety of the data collection time period (at least 12 hours). Some residents may leave their car parked for an extended period of time, although any long-term parking does not appear to be from the Shaver Green Apartments, or does not have a measureable impact on parking use.

WEEKEND DATA

Similar to the weekday, weekend data indicates that on-street parking supply is sufficient, with the average utilization of the study area at this Project Location ranging from 36 to 42 percent. Weekend utilization peaked during the 9:30 a.m. data collection time period. Two block faces adjacent to Shaver Green reached capacity during the weekend peak; although a block away, there is ample parking.

IRVINGTON GARDEN APARTMENTS

The Irvington Garden Apartments building is located in the Irvington neighborhood in northeast Portland, several blocks north of Broadway. This Project Location is the most utilized of the eight locations in regard to parking. Broadway is a commercial street in the study area that is home to several businesses, with limited off-street parking and time-restricted on-street parking. Off of Broadway, the local streets serve mainly the residential neighborhood, though there is spillover from patrons of the Broadway area. **Figure 5** shows a graphical representation of the observed on-street parking utilization during the peak observation period, and a chart of the variation in on-street parking use throughout the observed weekday and weekend day.

WEEKDAY DATA

The weekday data for this Project Location indicates that on-street parking supply is adequate if the utilization for the two-block walkable area is averaged, but it is insufficient on many of the blocks emanating from Broadway. All of the data collection time periods observed an average utilization below

the 85 percent effective capacity—utilization ranged from 61 to 66 percent. The majority of the blocks that reached capacity had less than eight available spaces to begin with, and several had only three. As a resident of Irvington Garden Apartments, one rarely, if ever, must circle the block to find a parking space within a one-block walking distance of the apartments, even if the streets directly bordering it are at capacity. It becomes much more difficult if you want to park nearer to Broadway.

During the week, most of the blocks surveyed had very little turnover, especially north of Hancock Street, where there are no time restrictions. Most of the observed parking spaces had only one or two vehicles parked in a spot over the course of the day. Because of the presence of time restrictions along Broadway and the adjacent side streets, turnover was more frequent in those areas. However, some vehicles were observed to be parked in the same spot for the entirety of the data collection period (at least 12 hours). What this tells us is that between Broadway and Hancock Street, residents and/or employees are competing for the same parking.

WEEKEND DATA

The weekend day is worse for parking than the weekday, with average utilization still below the effective 85 percent capacity threshold, but ranging from 67 to 72 percent. Weekend utilization peaked during the 6:30 p.m. collection period, which was also the overall peak utilization period at the Irvington Garden Apartments Project Location. Similar to the weekday, many block faces reached capacity (and the 85 percent effective capacity).

THE 20 ON HAWTHORNE

The 20 on Hawthorne is located in southeast Portland on Hawthorne Boulevard on the northeast border of Ladd's Addition. The building was designed and built to a LEED Gold Certification standard and promotes sustainability. In this Project Location study area, Hawthorne Boulevard is a commercial street that is home to a few businesses, with limited off-street parking and mostly time-restricted on-street parking. Off of Hawthorne Boulevard, the local streets are mostly without parking time restrictions. There are two designated car share spaces on 20th Street bordering the 20 on Hawthorne building. **Figure 6** shows a graphical representation of the observed on-street parking utilization during the peak observation period, and a chart of the variation in on-street parking use throughout the observed weekday and weekend day.

WEEKDAY DATA

The weekday data for this Project Location indicates that on-street parking supply is underutilized. All of the collection periods observed an average utilization below the 85 percent effective capacity—utilization ranged from 52 to 61 Percent, with peak utilization observed at 6:30 p.m. A few block faces reached capacity during the weekday peak, only one of which is adjacent to the 20 on Hawthorne (and that block face has a capacity of only five vehicles).

During the week, the study area experienced little turnover, with most of the observed parking spaces having between one and two vehicles parked in a spot over the course of the day. Block faces north of and bordering Hawthorne Boulevard experienced the most turnover and also had higher utilization, most likely due to their proximity to businesses.

WEEKEND DATA

The weekend day average utilization also peaked during the 6:30 p.m. data collection time period, but it was higher overall than the weekday utilization. Average utilization was still below the effective 85 percent capacity threshold—utilization ranged from 61 to 75 percent. Similar to the weekday, many block faces reached capacity, with several more exceeding the 85 percent effective capacity than on the weekday. Many people visit the area for dinner and movies on the weekend evenings, contributing to the additional block faces reaching capacity.

ANDRIA CONDOMINIUMS

Andria Condominiums is located on Belmont Street in southeast Portland and has on-site parking that was included in the cost of the residential unit. A collection of food carts are located adjacent to the building, and no parking is provided for these. Belmont Street through the study area at this Project Location has a mixture of unrestricted and time restricted on-street parking. **Figure 7** shows a graphical representation of the observed on-street parking utilization during the peak observation period, and a chart of the variation in on-street parking use throughout the observed weekday and weekend day.

WEEKDAY DATA

The weekday data for this Project Location indicates that on-street parking supply is underutilized. All of the data collection time periods observed an average utilization well below the 85 percent effective capacity—utilization ranged from 38 to 48 percent. Two block faces exceed the 85 percent effective capacity; both are on Belmont Street. The block that reached capacity had only three available spaces. As a driver, one rarely, if ever, has to circle the block on a weekday to find a parking space near Andria Condominiums.

During the week, most of the blocks surveyed had minimal turnover, with most of the observed parking spaces off of Belmont Street having one or two vehicles parked in a spot over the course of the day. Of the block faces off of Belmont Street, 75 percent had at least one car parked there for the entirety of the data collection period (at least 12 hours). Areas with parking time restrictions or near the businesses on Belmont Street experienced higher turnover, which is to be expected.

WEEKEND DATA

Similar to the weekday, weekend data indicates that on-street parking supply is sufficient, with the average utilization of the study area at this Project Location ranging from 39 to 51 percent. However, block faces along Belmont Street reach capacity during the 9:30 a.m. data collection period, coinciding

with the weekend brunch crowd. Similar to the weekday patterns, drivers should easily be able to find parking within a block of their destination at this Project Location.

3810 SE DIVISION APARTMENTS

Located in southeast Portland on Division Street, 3810 SE Division Apartments is a mixed-use building that has been built to a LEED Platinum Certification standard and is located in a transit-oriented retail corridor. In the study area, Division Street has limited off-street parking, bike corrals, bus stops, and sporadic time-restricted on-street parking. Off of Division Street, the local streets serve the residential neighborhoods. **Figure 8** shows a graphical representation of the observed on-street parking utilization during the peak observation period, and a chart of the variation in on-street parking use throughout the observed weekday and weekend day.

WEEKDAY DATA

The weekday data for this Project Location indicates that on-street parking supply is underutilized. All of the collection periods observed an average utilization below the 85 percent effective capacity—utilization ranged from 29 to 45 percent. The weekday utilization peaked during the 6:30 p.m. data collection time period, at which time two block faces exceeded the 85 percent effective capacity and one reached capacity. Both of these block faces were on Division Street, and the block that reached capacity had only four available spaces.

During the week, the study area at this Project Location experienced little turnover, with most of the observed parking spaces having between one and two vehicles parked in a spot over the course of the day. Of the 32 block faces surveyed that had available parking, 15 of them (46 percent) had at least two vehicles parked for the entirety of the data collection time period (at least 12 hours). Although any long-term parking does not appear to be specific to 3810 SE Division and current weekday utilization does not indicate consistent parking concerns, additional housing or businesses could strain the available parking in the area near 37th Avenue and Division Street.

WEEKEND DATA

The weekend average utilization was fairly consistent throughout the day, ranging from 41 to 45 percent and peaking during the 9:30 a.m. data collection period. Average utilization was still below the 85 percent effective capacity threshold, even though three block faces reached capacity, two of which were near 3810 SE Division. However, since the block face directly in front of the building on Division Street did not reach even the 85 percent effective capacity, it is not likely that the apartment is causing measurable parking problems.

43 DIVISION MICRO-UNITS

Located in southeast Portland, 43 Division is a community of micro-homes occupying the corner of SE 42nd Avenue and Division Street. This location is only five blocks away from the 3810 SE Division project

location, though the character of Division Street at the 43 Division Project Location is slightly different in that it has less on-street parking and fewer businesses. **Figure 9** shows a graphical representation of the observed on-street parking utilization during the peak observation period, and a chart of the variation in on-street parking use throughout the observed weekday and weekend day.

WEEKDAY DATA

The weekday data for this Project Location indicates that on-street parking supply is underutilized. All of the collection periods observed an average utilization well below the 85 percent effective capacity, ranging from 26 to 28 percent, with the peak occurring at 9:30 a.m. This is the lowest peak utilization observed for any of the eight Project Locations. Only one block exceeds the 85 percent effective capacity for any of the observed time periods, and that block is south of 43 Division, across Division Street. Because there is ample parking available on the same side of Division Street as the micro-homes, the parking causing this block to exceed the effective capacity is likely not spillover from 43 Division. Available parking is more than sufficient in the 43 Division Project Location study area on the weekday.

During the week, most of the blocks surveyed had very little turnover, with most of the observed parking spaces having one or two vehicles parked in a spot over the course of the day, although generally there were fewer vehicles observed parked on the street than at other Project Locations. The area with the highest turnover was on Division Street near a popular coffee shop.

WEEKEND DATA

Similar to the weekday, weekend data indicates that on-street parking supply is sufficient, with the average utilization of the study area at this Project Location ranging from 26 to 32 percent. The peak utilization occurred at the 12:30 p.m. data collection period, which coincides with the weekend lunch and brunch crowd. However, there was still ample parking available on Division Street and in the surrounding neighborhood.

UTILIZATION SUMMARY

Table 5 provides a summary of the peak observed utilization of on-street parking within a two block walking distance of each project location.

TABLE 5. UTILIZATION SUMMARY

Project Location	On-Street Parking Capacity[1]	Peak Utilization[2]	
		Weekday	Weekend
Patton Park Apartments	528	40%	41%
ecoFLATS Apartments	544	61%	59%
Shaver Green Apartments	653	50%	42%
Irvington Garden Apartments	752	66%	69%
The 20 on Hawthorne	451	61%	75%
Andria Condominiums	394	48%	51%
3810 SE Division Apartments	400	45%	45%
43 Division Micro-Units	415	28%	32%

Notes:
1. Capacity for each project location is based on an area within a two-block walkable radius, as outlined in the Methodology section of this report.
2. Peak utilization is the highest average utilization for the entire parking supply at a project location.

As shown in Figures 2 through 9 the variation in parking utilization is fairly consistent throughout the day o the weekday and weekend. **Table 6** provides a summary of the parking that is available based on an 85 percent effective capacity and the peak weekday and weekend parking utilization within the two block walking distance around each project location.

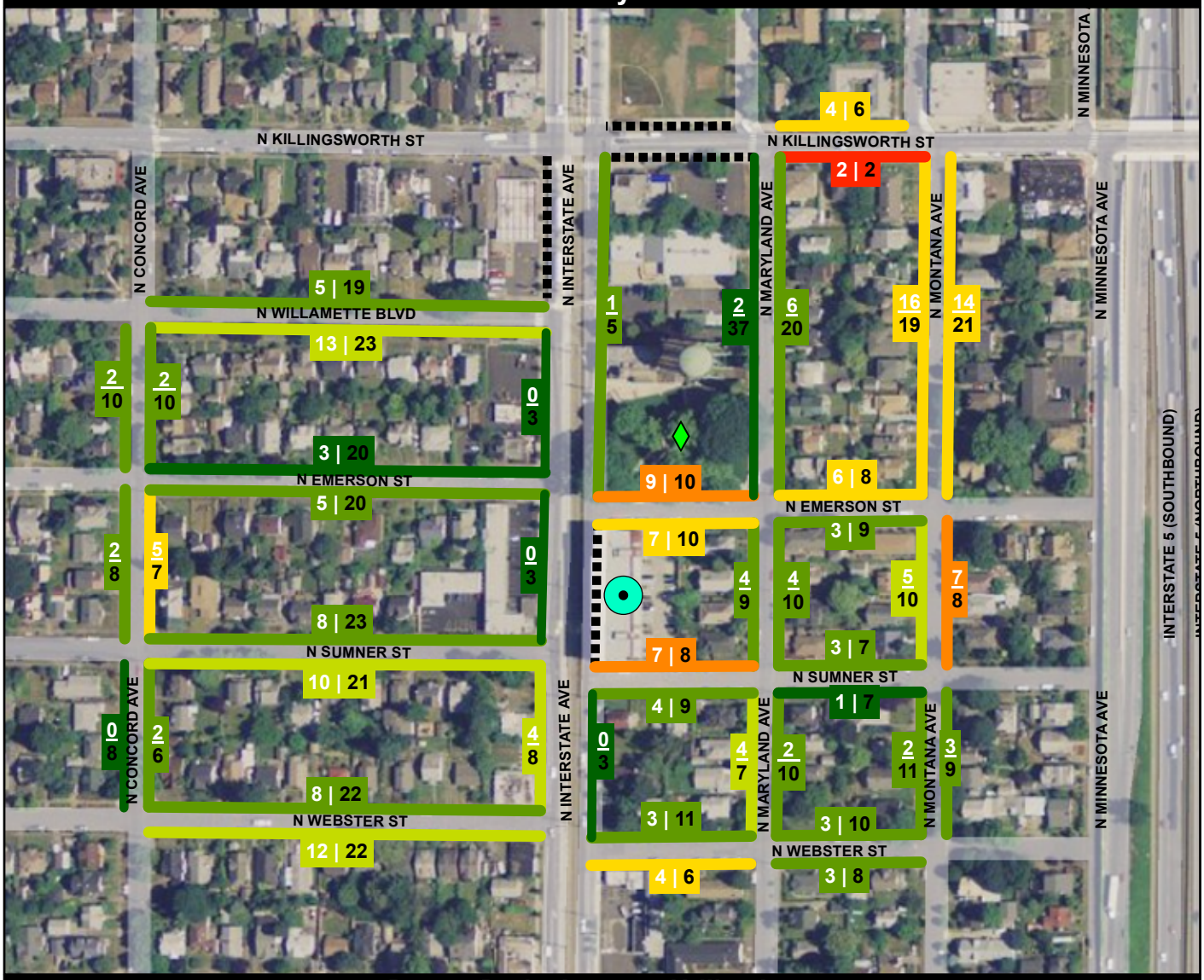
TABLE 6. AVAILABLE PARKING

Project Location	On-Street Parking Capacity[1]	Effective On-Street Capacity[2]	Effective Parking Available[3]	
			Weekday	Weekend
Patton Park Apartments	528	449	53%	52%
ecoFLATS Apartments	544	462	28%	31%
Shaver Green Apartments	653	555	41%	51%
Irvington Garden Apartments	752	639	22%	19%
The 20 on Hawthorne	451	383	28%	12%
Andria Condominiums	394	335	44%	40%
3810 SE Division Apartments	400	340	47%	47%
43 Division Micro-Units	415	353	67%	62%

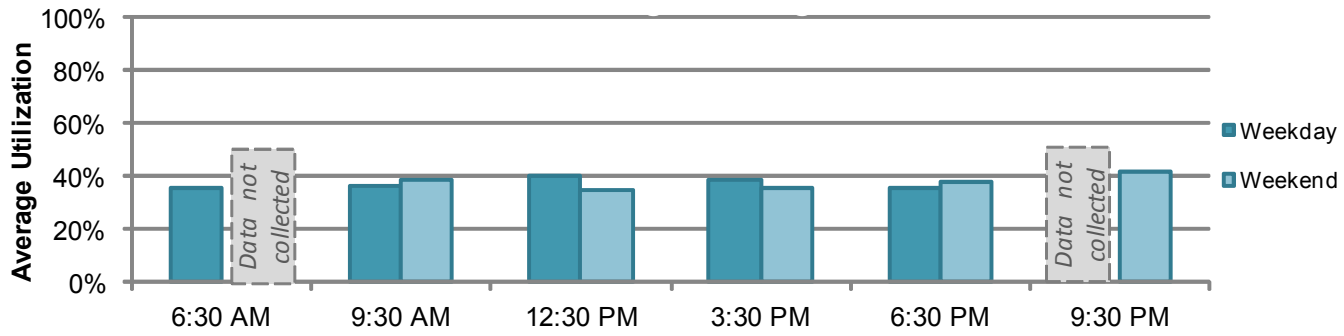
Notes:
1. Capacity for each project location is based on an area within a two-block walkable radius, as outlined in the Methodology section of this report.
2. Effective capacity is 85% of the total available on-street parking spaces.
3. The effective parking is the percentage of spaces available before reaching the effective capacity (85% of capacity).

Detailed parking utilization data is in **Appendix A**.

Patton Park: Peak Utilization By Block - Weekend 9:30 PM



Patton Park: Average Utilization



LEGEND

- Patton Park
- City Park
- No Parking
- Peak Use / Capacity

Parking Utilization by Block

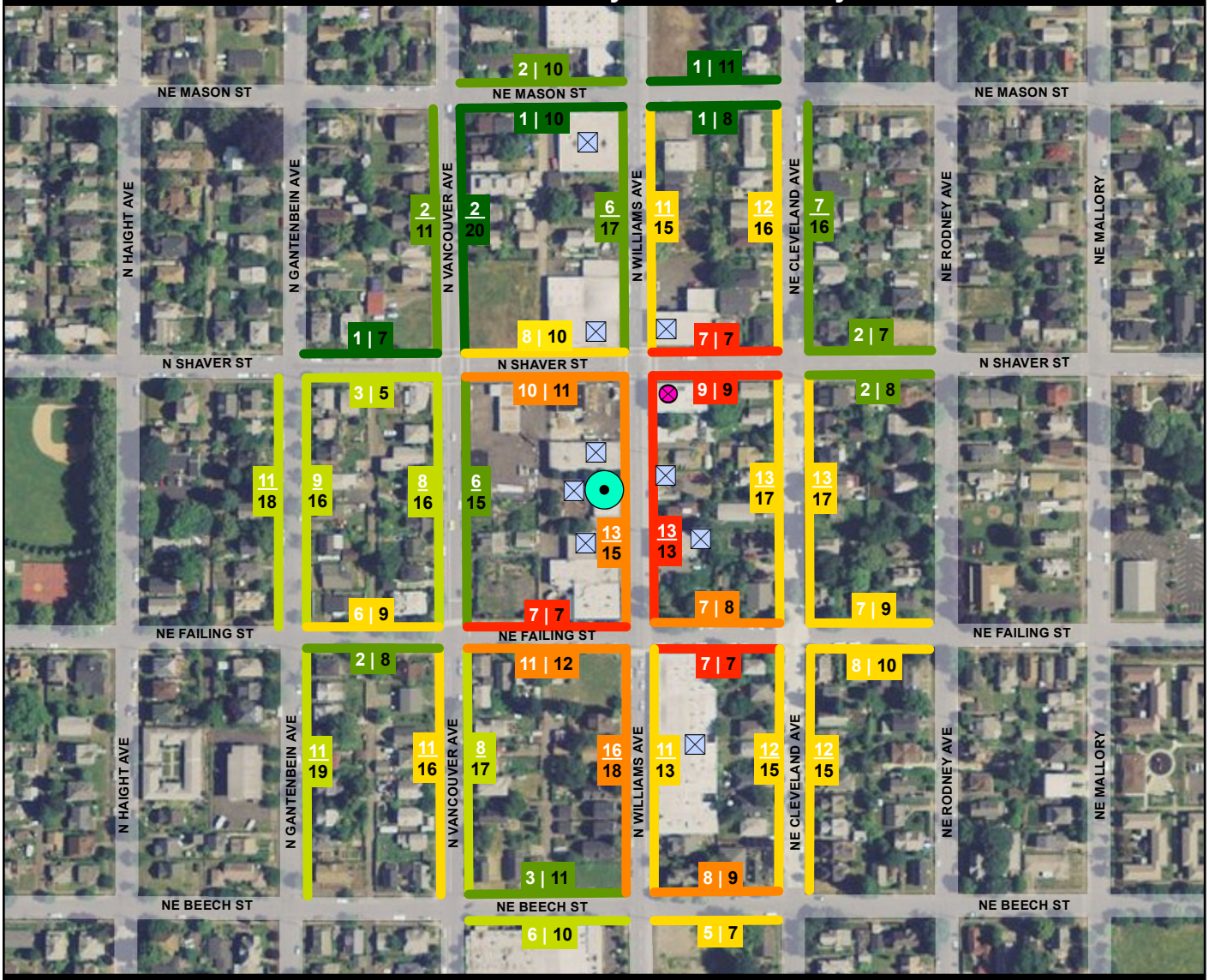
- < 15%
- 15 - 45%
- 45 -65%
- 65 - 85%
- 85 - 99%
- 100%

DRAFT Figure 2
Patton Park Apartments
Parking Utilization

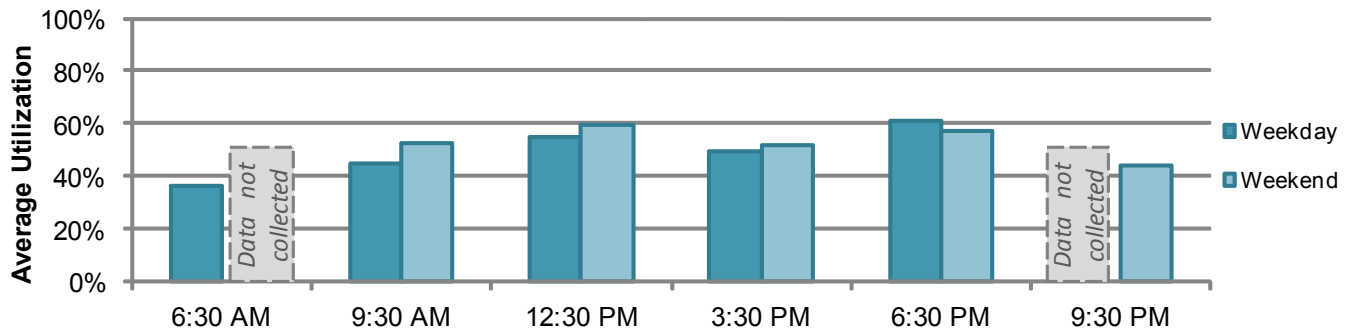
N 0 400 Feet

RLIS Data. 2012. Portland, Oregon.
ESRI, ArcGIS Online, World Imagery. Aerials Express (AEX). 2009. Portland, Oregon.

ecoFLATS: Peak Utilization By Block - Weekday 6:30 PM



ecoFLATS: Average Utilization



LEGEND

ecoFLATS

Peak Use Capacity

Existing Apt. (No On-Site Parking)

Existing Apt. (Limited On-Site Parking)

Existing Business (No On-Site Parking)

Parking Utilization by Block

- < 15%
- 15 - 45%
- 45 - 65%
- 65 - 85%
- 85 - 99%
- 100%

N

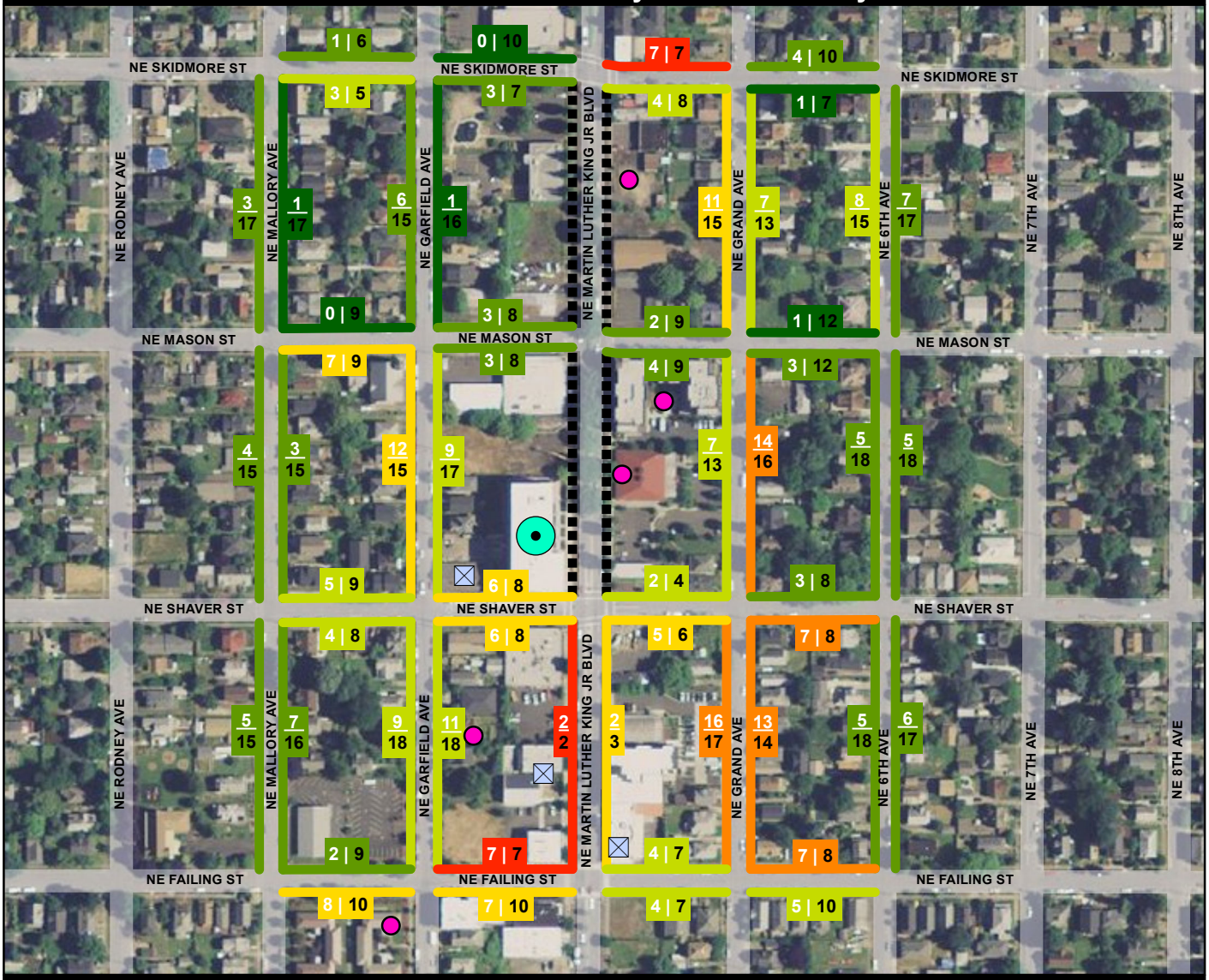
0 400 Feet

DRAFT Figure 3

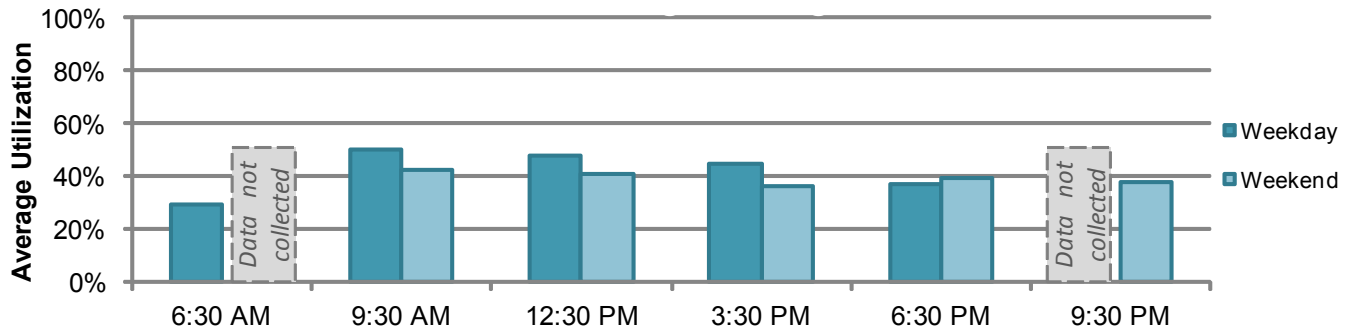
ecoFLATS Apartments Parking Utilization

RLIS Data. 2012. Portland, Oregon.
ESRI, ArcGIS Online, World Imagery. Aerials Express (AEX). 2009. Portland, Oregon.

Shaver Green: Peak Utilization By Block - Weekday 9:30 AM



Shaver Green: Average Utilization



LEGEND

- Shaver Green
- No Parking
- Peak Use / Capacity
- Existing Apt. (No On-Site Parking)
- Existing Apt. (Limited On-Site Parking)
- Existing Business (No On-Site Parking)

Parking Utilization by Block

- < 15%
- 15 - 45%
- 45 - 65%
- 65 - 85%
- 85 - 99%
- 100%

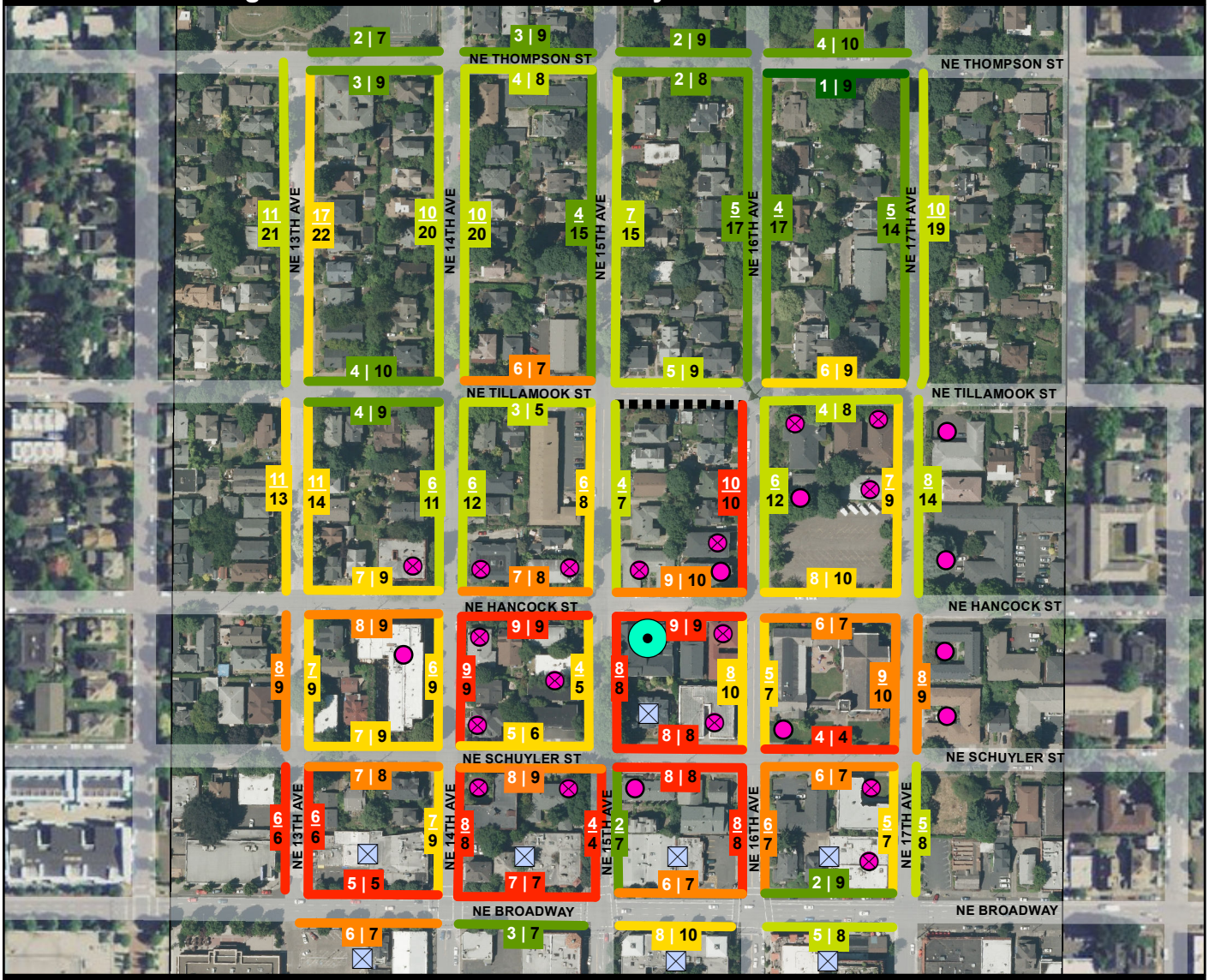
DRAFT Figure 4
Shaver Green
Parking Utilization

N

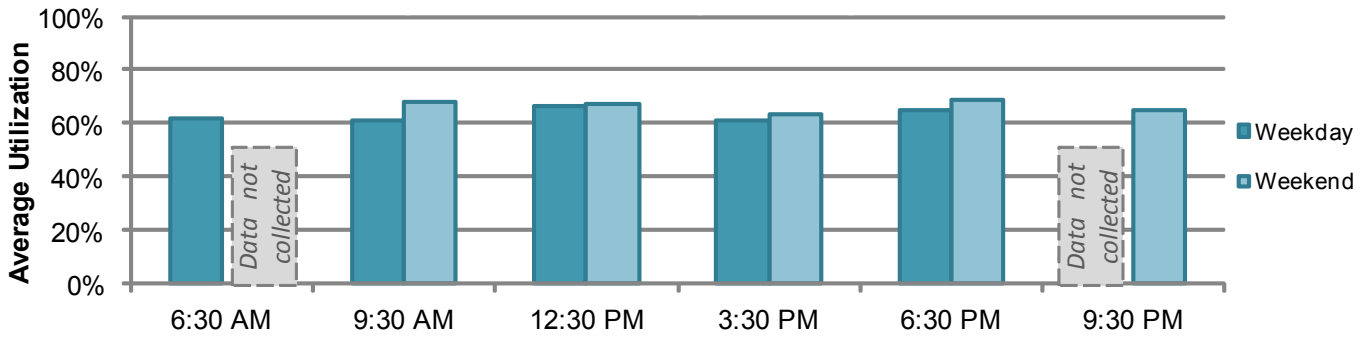
0 400 Feet

RLIS Data. 2012. Portland, Oregon.
ESRI, ArcGIS Online, World Imagery. Aerials Express (AEX). 2009. Portland, Oregon.

Irvington Garden: Peak Utilization By Block - Weekend 6:30 PM



Irvington Garden: Average Utilization



LEGEND

- Irvington Garden
- No Parking
- Peak Use / Capacity
- Existing Apt. (No On-Site Parking)
- Existing Apt. (Limited On-Site Parking)
- Existing Business (No On-Site Parking)

Parking Utilization by Block

- < 15%
- 15 - 45%
- 45 65%
- 65 - 85%
- 85 - 99%
- 100%

DRAFT Figure 5
Irvington Garden
Parking Utilization

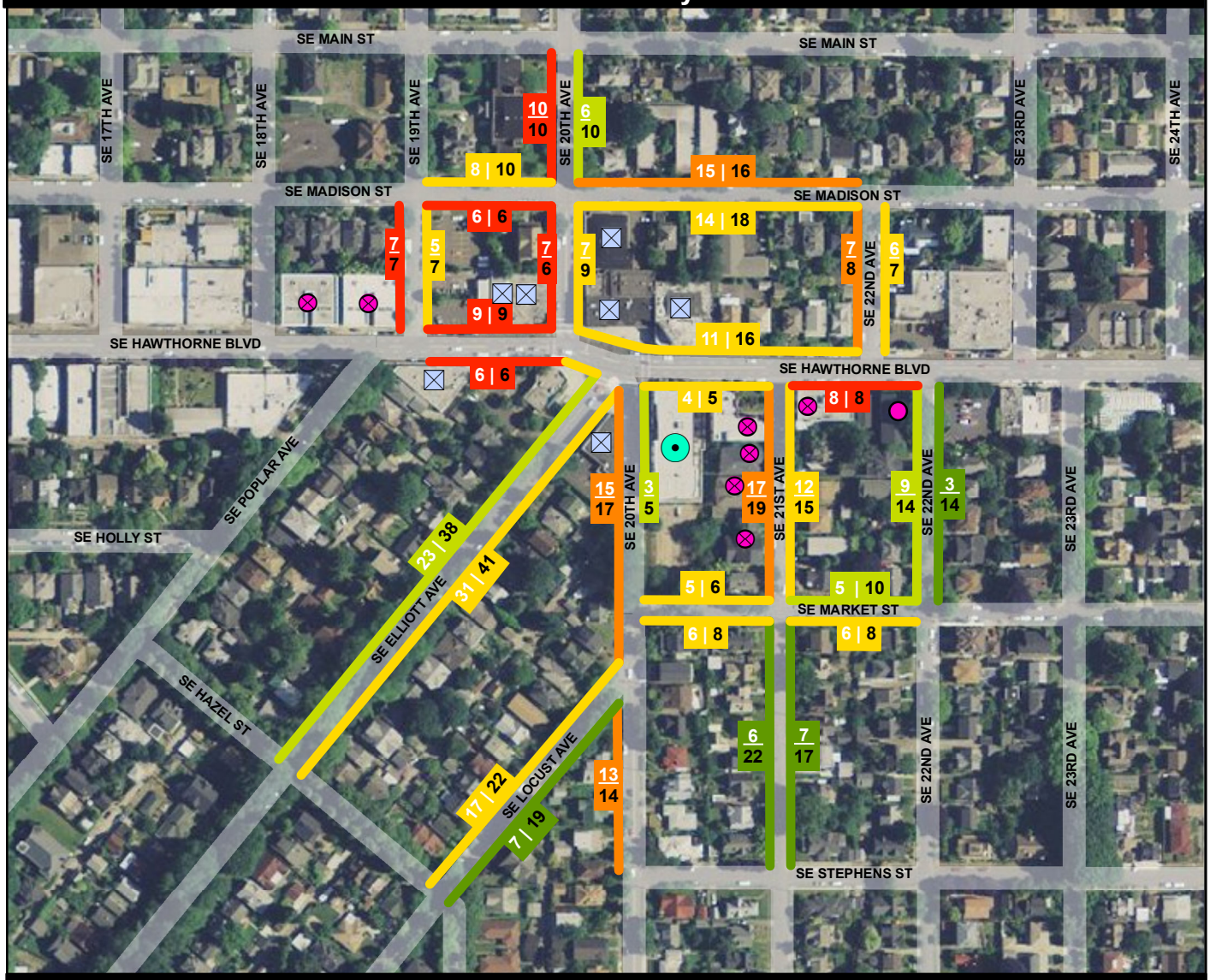
N

0 400 Feet

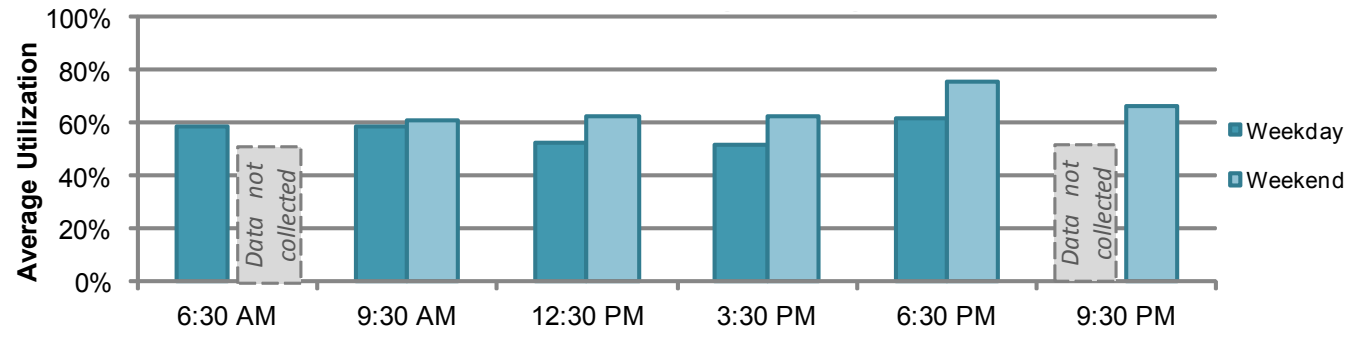
RLIS Data. 2012. Portland, Oregon.
Aerial Imagery: City of Portland, 2012.

Document Path: P:\P\PDXX00000192\0600INFO\GS\arcmap\Utilization with Chart\Parking_Utilization_Weekend_IrvingtonGarden_PEAK_630PM.mxd

The 20 on Hawthorne: Peak Utilization By Block - Weekend 6:30 PM



The 20 on Hawthorne: Average Utilization



LEGEND

- The 20 on Hawthorne
- Peak Use / Capacity
- Existing Apt. (No On-Site Parking)
- Existing Apt. (Limited On-Site Parking)
- Existing Business (No On-Site Parking)

Parking Utilization by Block

- < 15%
- 15 - 45%
- 45 -65%
- 65 - 85%
- 85 - 99%
- 100%

N

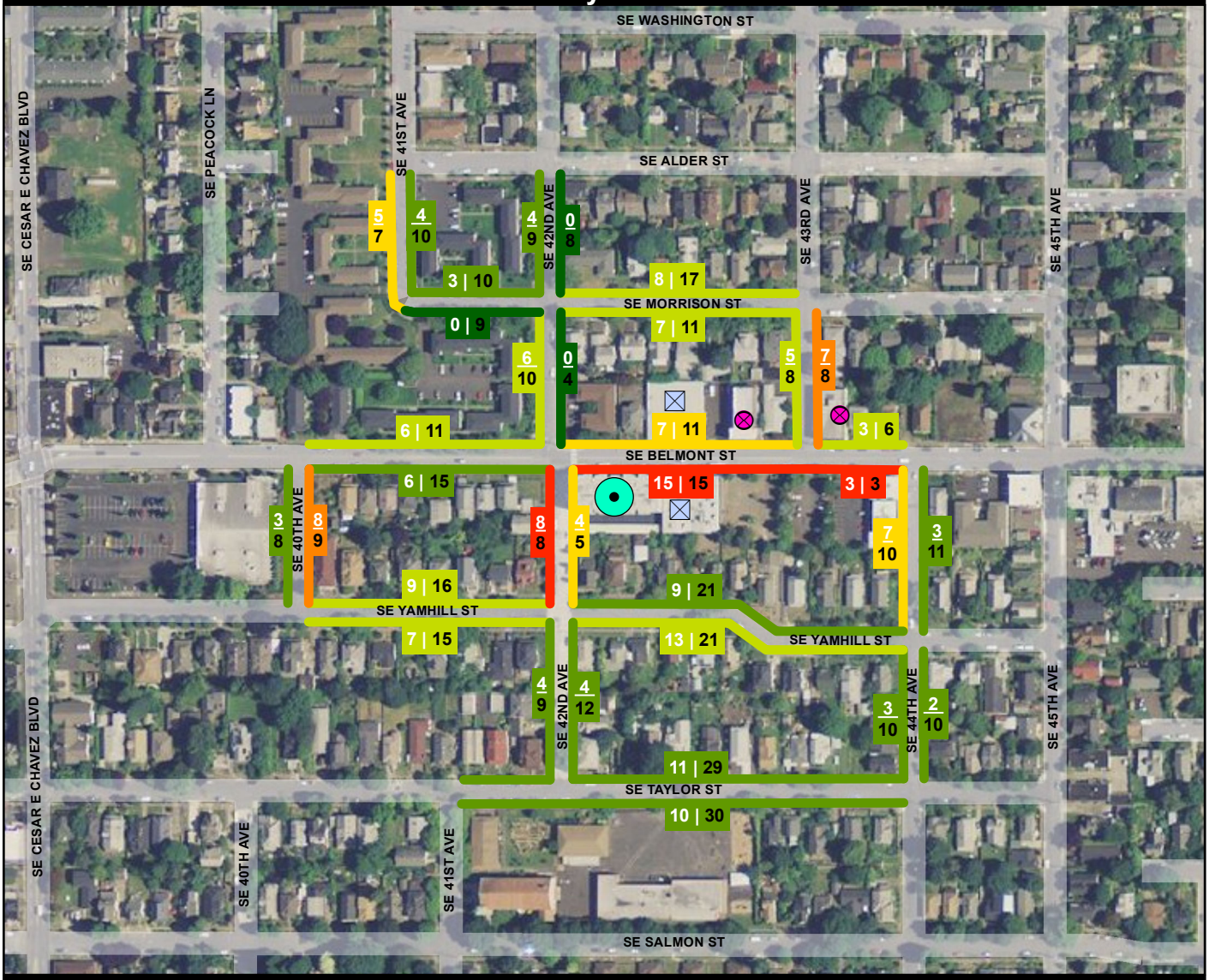
0 400 Feet

DRAFT Figure 6
The 20 on Hawthorne
Parking Utilization

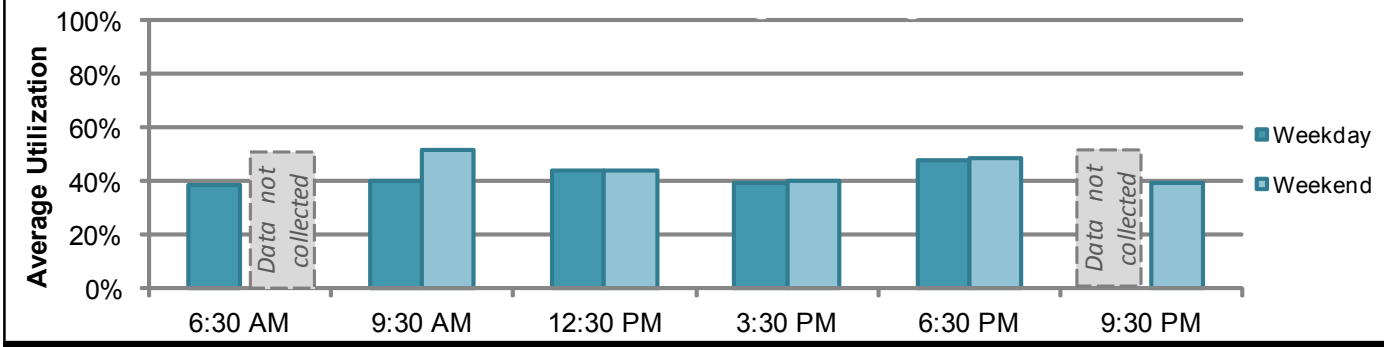
RLIS Data. 2012. Portland, Oregon.
ESRI, ArcGIS Online, World Imagery. Aerials Express (AEX). 2009. Portland, Oregon.

Document Path: P:\P\PDXX00000192\0600INFO\GS\arcmap\Utilization with Chart\Parking_Utilization_Weekend_Hawthorne_PEAK_630PM.mxd
Date: 11/6/2012 Time: 10:40:39 AM User Name: axjb

Andria: Peak Utilization By Block - Weekend 9:30 AM



Andria: Average Utilization



LEGEND

Andria

Peak Use / Capacity

Existing Apt. (No On-Site Parking)

Existing Business (No On-Site Parking)

Parking Utilization by Block

- > 15%
- 15 - 45%
- 45 - 65%
- 65 - 85%
- 85 - 99%
- 100%

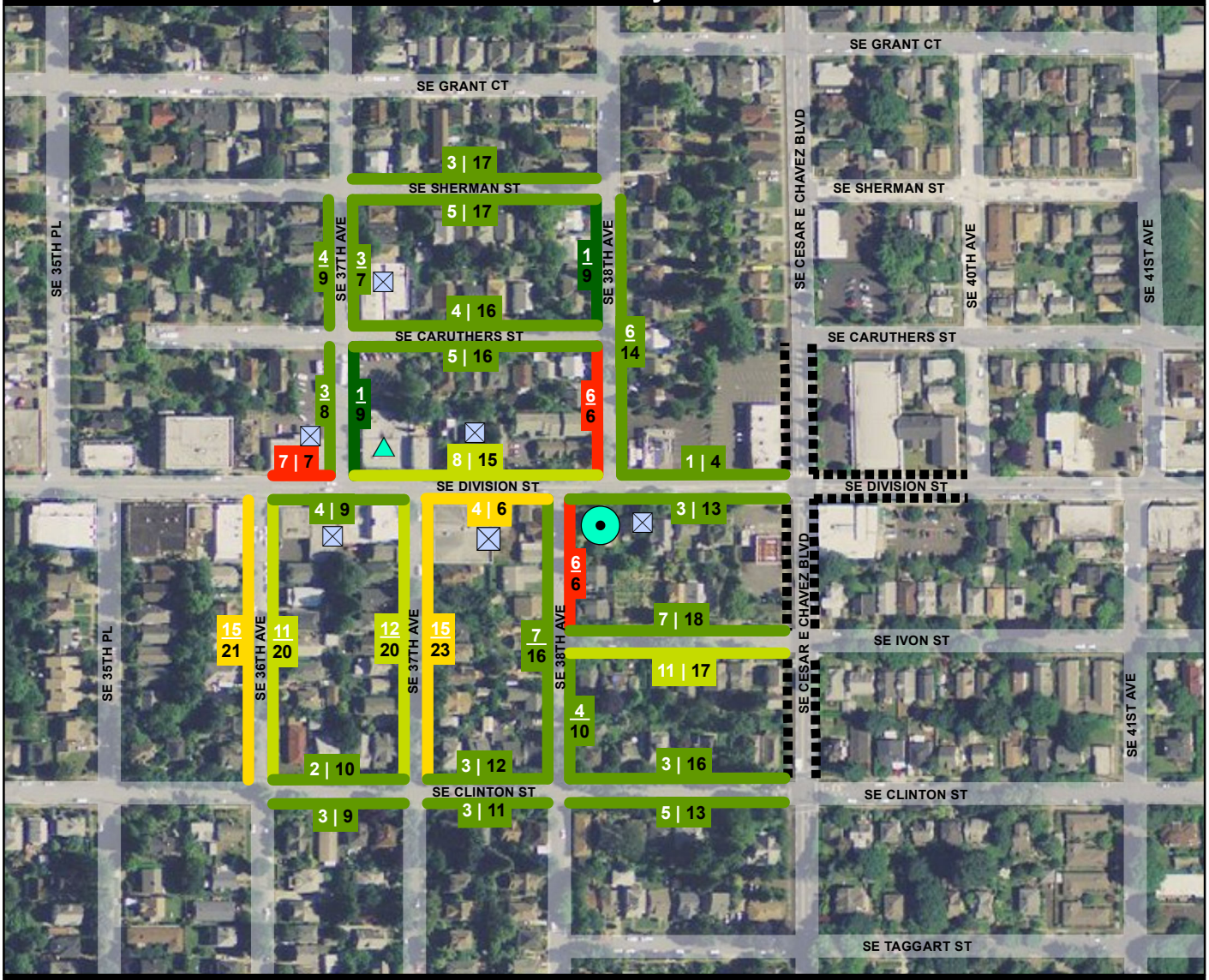
DRAFT Figure 7
Andria Condominiums
Parking Utilization

N

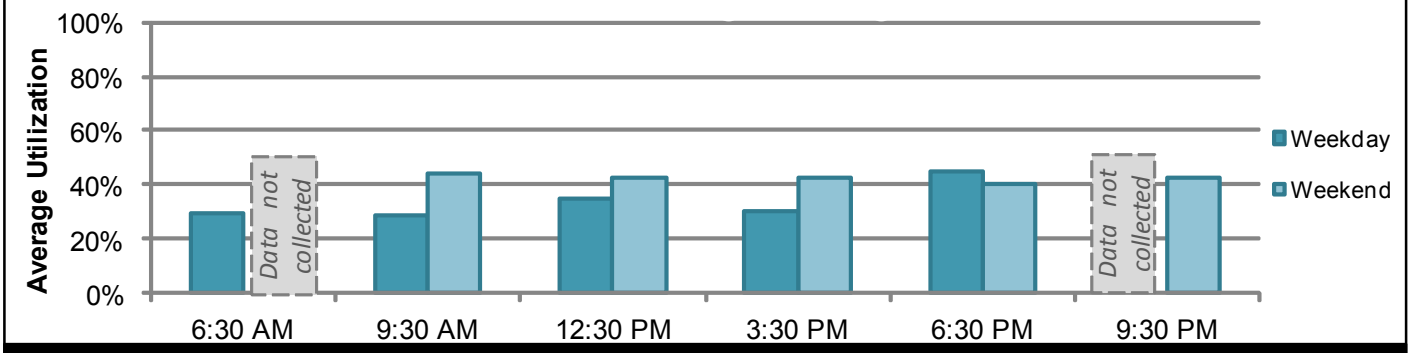
0 400 Feet

RLIS Data. 2012. Portland, Oregon.
ESRI, ArcGIS Online, World Imagery. Aerials Express (AEX). 2009. Portland, Oregon.

3810 SE Division: Peak Utilization By Block - Weekend 9:30 AM



3810 SE Division: Average Utilization



LEGEND

- 3810 Division St
- Future Planned Apartments
- No Parking
- Existing Business (No On-Site Parking)
- Peak Use / Capacity

Parking Utilization by Block

- < 15%
- 15 - 45%
- 45 -65%
- 65 - 85%
- 85 - 99%
- 100%

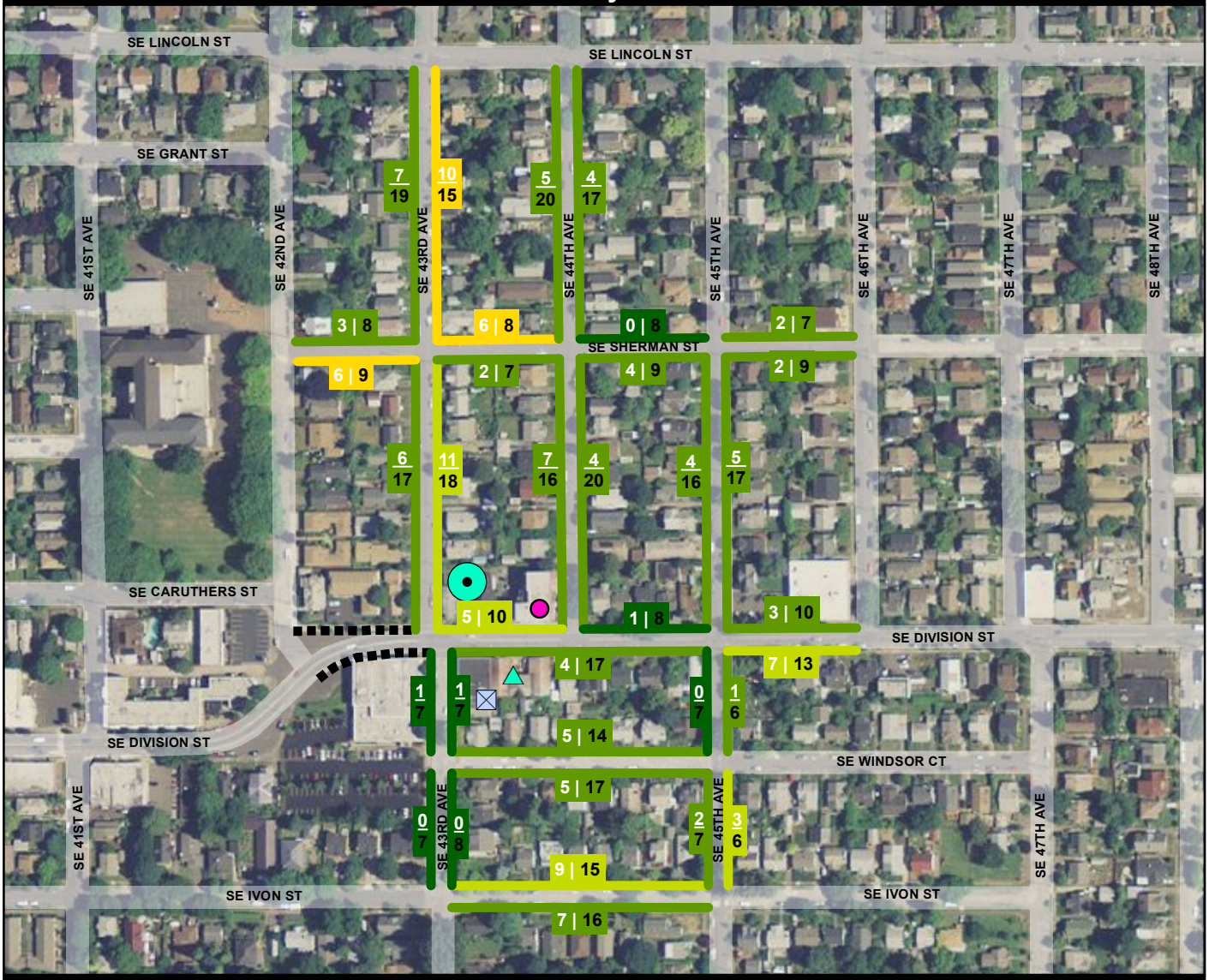
DRAFT Figure 8
3810 SE Division Apartments
Parking Utilization

N

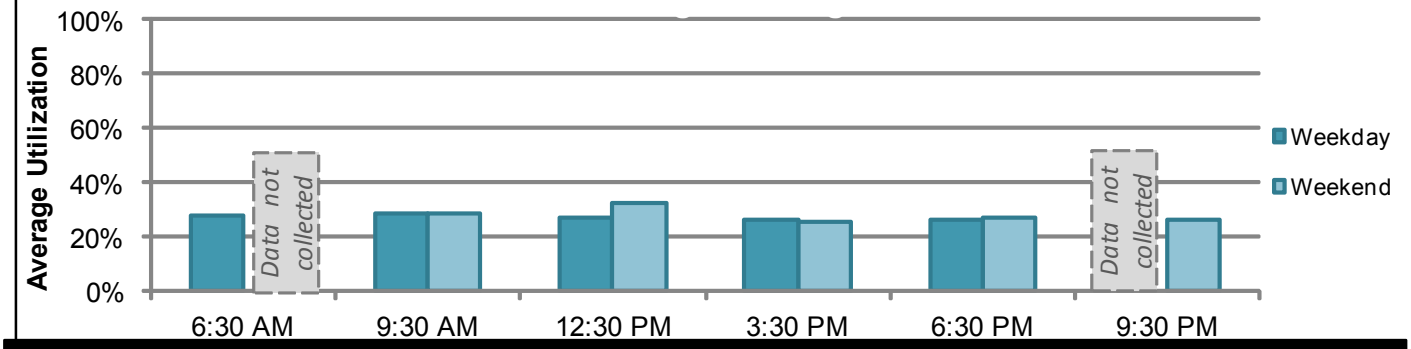
0 400 Feet

RLIS Data. 2012. Portland, Oregon.
ESRI, ArcGIS Online, World Imagery. Aerials Express (AEX). 2009. Portland, Oregon.

43 Division: Peak Utilization By Block - Weekend 12:30 PM



43 Division: Average Utilization



LEGEND

- 43 Division
- No Parking
- Peak Use / Capacity
- Future Planned Apartments
- Existing Apt. (Limited On-Site Parking)
- Existing Business
- Existing Business (No On-Site Parking)

Parking Utilization by Block

- < 15%
- 15 - 45%
- 45 -65%
- 65 - 85%
- 85 - 99%
- 100%

N

0 400 Feet

DRAFT Figure 9
43 Division Micro-Units
Parking Utilization

RLIS Data. 2012. Portland, Oregon.
ESRI, ArcGIS Online, World Imagery. Aerials Express (AEX). 2009. Portland, Oregon.

MAILER AND ON-LINE SURVEY RESULTS

The survey results provide a good understanding of motorized vehicle ownership, parking behavior, and commuting trends for the eight Project Locations. Though many of the buildings aim to reduce the need for a vehicle, the bottom line is that people still want the safety net of having a car, even if they rarely drive it. Even if parking is available on-site, the general trend is that residents will not use on-site parking if they have to pay extra for it, since parking on the street is free and one rarely has to park more than a block away. Results of the survey are summarized below, and answers to each survey question may be found in **Appendix B.**

Based on the 116 responses to the questions asking about primary modes of transportation, the top three modes of commute travel are as follows:

1. Motor vehicle (single occupant) – 36 percent
2. Public transit – 23 percent
3. Bicycle – 20 percent

Based on data provided by the City of Portland Bureau of Transportation the average mode split in Portland is 59 percent motor vehicle (single occupant) which is notably higher than the 36 percent single occupant motor vehicle mode split for the eight project locations. Transit and bicycle use at the project locations are also higher than the Portland average.

An important point to draw from these results is that 64 percent of residents are getting to work via a non-single-occupant vehicle. Almost a third (28 percent) of those surveyed belong to car-free households. This is notable higher than the 12 percent car-free average in Portland. Even though there is a higher than average percentage of households that are car-free, cars are still the preferred mode of travel for many of the survey respondents. Most of the vehicle owners (67 percent) park on the street without a permit and have to walk less than two minutes to reach their place of residence, and they spend only five minutes or less searching for a parking spot. Though some time periods are more congested than others (4 p.m. to 7 p.m., for example), the results varied by location, with people rarely having to park more than a couple blocks from their house.

A common trend in this study is that people are reluctant to get rid of their vehicles. One of the questions the survey asked was what amenities would reduce the respondent's need for motorized vehicle ownership. Many people stated that there were no amenities that would reduce their need for a vehicle. Of those who would consider a car-free life, the most commonly needed amenities were easy access to transit and services such as stores and restaurants; however, the following responses were also given:

- Transit that travels to my place of work/school
- More carsharing options
- Affordable, high quality daycare in the area

To better understand what the concerns about parking were truly based on, many of the survey questions were specific to those who owned vehicles. Responses to these questions varied from concerns about convenience, to safety concerns, to a few responses that indicated that the person did not feel parking was a problem now, but they were concerned it would be in the future. Many of the responses were concerned with neighborhood character and amenities, rather than about the amount of available parking. The most common concerns with parking, as listed in the survey responses, are as follows:

- Theft and damage to car parked on the street
- Winter parking/inconvenience of parking more than one block away
- Running out of parking in the future with increased population and more development
- Cost of secure parking, especially for income-restricted residences
- Additional developments being built in the area without parking
- Crowded on-street parking making streets narrow and hard to navigate
- Cars staying parked in the neighborhood for long periods of time

Some respondents had no concerns about parking.

STATISTICAL ANALYSIS OF SURVEY RESULTS

To develop an estimate of the vehicles generated per unit by the developments studied, survey data has been compiled and summarized using a basic statistical analysis. For this analysis, it was assumed that each survey response represents one unit of the building, the responses provide a representative sample of the tenants at each Project Location, and that the responses for the number of vehicles for each household follows a two-tailed t-distribution. An estimate for the number of cars parking on the surrounding streets at each Project Location assumed that any provided off-street parking is fully utilized.

Question 7 of the survey asked residents how many cars are owned or leased by the people living in their household. The numbers generated from this question were separated by Project Location and compiled to show the total number of cars owned by the residents surveyed in each location. From the total cars per Project Location and the number of survey responses, a car per unit average was found.

To determine a range of vehicles generated per unit with a 95 percent degree of confidence, the sample size (number of survey responses), population size (number of units in each Project Location), and the vehicle per unit average for each Project Location can be used. Further calculations can be found in **Appendix A.**

TABLE 7. VEHICLES PER LIVING UNIT

Project Location	Number of Residential Units	On-Site Parking Spaces	Survey Responses from Project Location	Average Cars per Unit	Cars per Unit (95% Confidence Interval)
Patton Park Apartments	54	33	13	0.8	0.3 – 1.2
ecoFLATS Apartments	18	None	6	1.2	0.4 – 2.0
Shaver Green Apartments	85	32	26	0.5	0.3 – 0.7
Irvington Garden Apartments	50	None	12	0.9	0.6 – 1.2
The 20 on Hawthorne	51	34	15	1.0	0.6 – 1.4
Andria Condominiums	27	15	10	1.2	0.9 – 1.5
3810 SE Division Apartments	23	None	23	1.1	0.8 – 1.4
43 Division Micro-Units	29	None	10	0.6	0.2 – 1.0

In general, the survey results do not imply a relationship between whether or not provided parking at a building actually attracts car-owners or vice versa. Survey responses indicate that residents at both types of buildings (those with on-site parking and those without on-site parking) have similar trends in motorized vehicle ownership. The range of vehicles per unit determined in the statistical analysis varies from a low of 0.2 vehicles to a high of 2.0 vehicles per unit (see **Table 7** for a more detailed breakdown). Since motorized vehicle ownership appears to be consistent, it is likely that provided parking and the location of a building to nearby amenities and transit has more influence on whether or not residents actually use their cars.

RESIDENT AND STAKEHOLDER INTERVIEWS

A wealth of information was gathered from the resident and stakeholder interviews. Though opinions varied between residents and stakeholders, some commonalities emerged. Few interviewees are concerned with the current availability of parking, but most worry what the compound effect of multiple developments in an area would be. The following section details the interview responses from each Project Location. For the individual survey responses, see **Appendix C.**

RESIDENT INTERVIEWS

The responses varied by Project Location and by the resident's lifestyle. Most residents do not feel there is a significant problem with parking, but in some locations the residents do not feel secure when parking their vehicle in the surrounding neighborhoods, and would prefer to have accessible parking close by. In other buildings, however, the residents do not have a problem finding parking at all. For bicyclists, secure indoor parking is a very desirable amenity. Most residents will store their bike in their apartment rather than in the less secure parking provided by their building. Several times, interviewees raised the point that, for the income-restricted buildings, they feel that the cost for parking is far too high for the many families that live there and own a vehicle.

PATTON PARK APARTMENTS

Patton Park residents interviewed feel that on-street parking in the area is ample for their apartments. While Patton Park Apartments does provide off-street parking for an additional fee, the lot is rarely full, and most residents are able to find on-street parking on the two adjacent streets. Typically, weekdays after 5 to 6 p.m. are the worst times to park because of the traffic generated by businesses and restaurants in the area.

Secure bike storage is an amenity that the Patton Park Apartments needs to address. The two residents surveyed keep their bikes in their units, because they do not feel comfortable leaving their bikes in the outside storage area. One of the residents has had two bikes stolen from the outdoor parking, and both residents have heard of neighbors' bikes being stolen from the on-site bike parking.

ECOFLATS APARTMENTS

The two residents interviewed from the ecoFLATS Apartments are typically able to find on-street parking within one block of the apartments. One resident parks in a small lot behind the apartments that has unofficially become a parking lot for ecoFLATS residents. The on-street parking is located in the surrounding neighborhoods, and one resident feels that it is not secure. Several break-ins have been reported, and one resident's partner's car has been broken into in the past. Although there is no off-street parking provided at the ecoFLATS Apartments, one interviewee would be willing to pay up to $100 per month for a secure parking spot, whereas the other is considering getting rid of her car.

The bike parking at ecoFLATS is inside the building in the lobby. The bike parking is relatively secure and is usually almost full. Business and restaurant traffic in the evenings causes congestion and can create a parking issue for bikes and cars, especially on Wednesday, Thursday, and Friday nights. One resident would like to see more bike parking and more time-restricted parking spots on Williams Avenue for the restaurant patrons, and both residents would like to see more reliable bus service and would like the city to do a better job encouraging active transportation.

SHAVER GREEN APARTMENTS

From interviews with two residents of Shaver Green Apartments, the on-street parking around the apartments is very difficult. It is always hard to find a parking spot, and usually the only spaces available are two or more blocks away. Residents feel that the neighborhoods around the building are not secure, and many feel uncomfortable parking their car in the neighborhoods due to frequent break-ins and broken glass all over the neighborhood sidewalks. For this income-restricted residence, the off-street parking that is provided is too expensive. Parking is usually the worst on weekday and weekend evenings.

Bike parking at the Shaver Green Apartments is not secure. The provided bike parking is an outdoor bike column, from which bikes have been stolen repeatedly. Most residents have to store their bikes inside their units.

IRVINGTON GARDEN APARTMENTS

All three of the residents interviewed from Irvington Garden Apartments admitted that parking can be inconvenient at times, but they do not see the need for designated off-street parking. Two of the residents do not drive a car every day, and typically leave their cars parked for multiple days at a time. The other resident owned a car but sold it, because parking was inconvenient and driving was unnecessary. The farthest these residents ever have to park away from their building is two blocks away, after circling the block for five minutes looking for a spot. They feel that the large number of apartment complexes located close to Irvington Garden Apartments is creating the parking issue on Hancock between 15th and 16th Avenues, and it is not the businesses on Broadway. One resident wishes the developers would have considered providing parking for the sake of the neighborhood, but from her perspective the parking is not bad enough to require off-street spaces. Generally, evenings between 4:30 and 6 p.m. and after 7 p.m. are the worst for parking.

The secure bike parking at Irvington Garden Apartments is adequate, and most residents utilize the vertical hanging spaces on each floor, though one resident would like to see more bike parking on the lower floors.

THE 20 ON HAWTHORNE

Both residents of The 20 on Hawthorne who were interviewed own cars, though only one resident has purchased a spot in the building's parking structure. On-street parking seems to be busiest in the evenings when people are home from work.

According to one resident who owns two bikes, the bike parking provided is too small and crowded, which makes it too hard to use. She would like to see improvements to the provided bike parking. Both residents use transit, though they would like to see more robust and frequent service. Neither resident uses carsharing services, although they are aware of them. One resident mentioned that "parking" works as a way for people to fight the development of large apartment buildings. If they do not like big buildings or density, then the issue of parking is one way to make a case against it.

ANDRIA CONDOMINIUMS

The two residents interviewed at the Andria Condominiums own cars and park them in the lot next to the building. Their parking spots were included with the purchase/rental price of their apartment units. While neither resident parks on the street, they say that parking during the days and on Saturdays seem to be the busiest.

The bike parking at the Andria Condominiums is just a single room without racks or hooks, and it is inadequate and insecure. Neither resident had used a carsharing service, because they own cars and have good parking spots. One resident mentioned concern with the future vitality of carsharing services if on-street parking is so hard to find. For example, if all on-street parking is already taken, how will drivers be able to find good, accessible parking? The other resident mentioned the difficulty that on-street parking poses for visibility when drivers are turning onto Belmont. With cyclists and cars sharing such a small space, Belmont tends to feel congested.

3810 SE DIVISION APARTMENTS

All three residents interviewed from the 3810 SE Division Project Location indicated that parking in the area has not been an issue. One resident has noticed that parking around their apartments has gotten progressively worse over the past several months, but that it still isn't hard to find a spot. In general, it takes the residents no more than five minutes to find a parking spot in the surrounding neighborhoods. Evening parking after around 6 p.m. can be difficult because of all the restaurant traffic, but by the morning, most of the evening cars are gone.

The bike storage room in the building provides adequate capacity and security for most residents. To reduce the need for a car, these residents would like to see a carsharing option located on-site, as well as more frequent and reliable bus service in the area.

43 DIVISION MICRO-UNITS

According to the three residents interviewed for 43 Division, on-street parking around the Project Location is not hard to find. The two residents who own cars are able to find a spot within one block away on one of the neighborhood streets. One resident feels slightly uneasy about parking on narrow streets such as 43rd Avenue, where he has heard of neighbors getting side-swiped, but other than that issue, the neighborhood parking is fairly secure. Parking in the evenings around 6 p.m. can be difficult because of the restaurants in the area. Parking along Division Street between 43rd and 44th Avenues seems to be the worst.

The secure bike room provided has plenty of room for all of the bikes and has adequate capacity for the development. One resident suggested that a dedicated carsharing parking spot located closer to the building would be advantageous. A resident of the 43 Division building has used Zipcar before and plans to sign up for Getaround (a peer-to-peer carsharing service). The closest designated Zipcar spot is on 39th Avenue, several blocks from 43 Division. If he could access a carsharing service more easily, this resident might use the services more frequently (though he does not own a car at all).

In regard to the new developments planned for Division Street, two of the residents interviewed are not concerned about the parking situation around the building as it is now, but worry that this may change if more of these developments are built close by. One resident cited concern about the new 81-unit development on 37th Avenue and Division, and feels that a development this size is unreasonable for the area.

STAKEHOLDER INTERVIEWS

DEVELOPERS

The developers interviewed shared similar views regarding these properties. In general, the developers do not provide parking because their target market does not feel the need for it and tenants do not want the additional cost of parking rolled into their rent or added as a monthly expense. Providing parking at a building raises the cost of each unit, especially when underground parking is built. The majority of the tenants at these properties like them because they can live in the city along transit and bike corridors, with many different resources within walking distance without having to pay rent that are as high as at traditional developments with off street parking. Before purchasing a piece of land for construction of buildings with little to no on-site parking, developers do studies focused on determining the walk-ability of the neighborhood, including the proximity to transit lines, grocery stores, restaurants, etc. Developers usually look at the existing neighborhoods beforehand to try to get a feeling for the number of available on-street spots. In locations that have the potential to lease parking from a nearby business, many developers will pursue leasing unused parking for their residents. The developers and tenants agreed that there is never enough bike parking. Tenants want safe, indoor, and convenient bike parking.

According to the developer interviews, changing parking requirements for this type of development would ultimately drive developers away from building highly dense residences in the area, depending on what the requirement was. Generally, developers expressed that a parking requirement of 0.5 to 1.0 spaces per unit is just not possible in the areas that the city wants developed. Most developers try to work with the neighborhood associations beforehand, offering to meet and discuss the proposed development, although the level of acceptance by these neighbors can vary greatly. The developers feel that these high-density developments are bringing the neighborhoods the type of business and commercial development that the neighbors want to see.

BUSINESSES

Businesses are primarily concerned with the amount of nearby parking for their patrons. Clinics that have elderly or injured patients, or businesses that sell large items such as furniture are worried that if their patrons cannot park close enough, they won't continue to come. Along commercial districts such as those on Mississippi and Division, the evening hours are usually the busiest because of all of the restaurant traffic. Developments close to these districts that do not provide parking can take close-by, on-street parking away from customers, especially if the building residents' cars do not move for days at a time. Businesses themselves need to do a better job of encouraging their employees to park farther away, leaving the nearby parking for patrons. Several business owners feel that large developments should be required to provide off-street parking to accommodate their residents. It is not the effect of one building that is of concern; rather, it is the effect of many of these developments being built in the same area.

NEIGHBORHOOD ASSOCIATION

From the perspective of an Overlook Neighborhood representative, the Patton Park Apartments development does not significantly impact the Patton Park Neighborhood. The representative of the neighborhood association stated that these types of developments are good for the area when they are built in the locations that can support it. A primary concern is the cumulative effect of many of these developments causing a real parking issue. The proposed development north of the Overlook Park MAX station is an example of a location where this type of development is very concerning. Limited access into the neighborhood and narrow streets create a safety concern for the neighborhood. Additionally, the issue of "curb-to-curb" access for disabled residents who rely on para-transit options is a much-understated concern. He feels that some sort of zoning or process of review for these developments is necessary.

SUMMARY OF KEY FINDINGS

The literature review suggests that the unbundling of parking and rent lowers rental costs. The literature also suggests that density and carsharing reduce personal motorized vehicle ownership rates, and dense neighborhoods with strong transit and active transportation options reduce driving. Twenty eight percent of all the households surveyed as part of this project study do not own or lease a car. The remaining 72 percent do own or lease at least one car, and two-thirds (67 percent) of them indicated that they park on the street. This shows that while the target demographic is largely multi-modal, they also own cars for occasional use. Survey responses indicate that the primary mode of transportation for commuter trips is spread between 20 percent of people biking to work, 9 percent walking, 23 percent riding public transit, 3 percent carpooling, and 36 percent driving a vehicle alone. For non-work travel, 16 percent ride their bikes, while 20 percent walk, 3 percent use a carsharing service, 6 percent carpool, 4 percent ride public transit, and 44 percent drive their vehicles. So, though many of the responders bike, walk, take transit, and use carsharing services for many of their daily trips (to commute, run errands, etc.), they still need a place to park their car.

According to the Forinash et al. research, carsharing can dramatically decrease the need to own a private vehicle. However, of the eight Project Locations studied, few have designated carsharing parking spots in the immediate vicinity. Developers and the City may consider designating prime parking locations for carsharing vehicles to incentivize their use.

The on-street parking observations found that all eight project locations have peak period parking utilization below 85 percent of the existing capacity, which indicates that there is adequate parking within a two block walking distance of each project location. All locations have areas with high parking demand with one or more blocks at capacity during peak periods. Irvington Gardens is most utilized, but none of the project locations have a clear pattern of high on-street parking demand around the project buildings.

Based on the 116 responses to the survey questions asking about primary modes of transportation, the top three modes of commute travel are as follows:

1. Motor vehicle (single occupant) – 36 percent
2. Public transit – 23 percent
3. Bicycle – 20 percent

An important point to draw from these results is that 64 percent of residents are getting to work via a non-single-occupant vehicle. Almost a third (28 percent) of those surveyed belong to car-free households; however, cars are still the preferred mode of travel for many of the survey respondents. Most of the vehicle owners (67 percent) park on the street without a permit and have to walk less than two minutes to reach their place of residence, and they spend only five minutes or less searching for a parking spot. Though some time periods are more congested than others (4 p.m. to 7 p.m., for example), the results varied by location, with people rarely having to park more than a couple blocks from their house.

A common trend in this study is that people are reluctant to get rid of their vehicles. One of the questions the survey asked was what amenities would reduce the respondent's need for motorized vehicle ownership. Many people stated that there were no amenities that would reduce their need for a vehicle. Of those who would consider a car-free life, the most commonly needed amenities were easy access to transit and services such as stores and restaurants; however, the following responses were also given:

- Transit that travels to my place of work/school
- More carsharing options
- Affordable, high quality daycare in the area

To better understand what the concerns about parking were truly based on, many of the survey questions were specific to those who owned vehicles. Many of the responses were concerned with neighborhood character and amenities, rather than about the amount of available parking.

In general, the survey results do not imply a relationship between whether or not provided parking at a building actually attracts car-owners or vice versa. Survey responses indicate that residents at both types of buildings (those with on-site parking and those without on-site parking) have similar trends in motorized vehicle ownership. The range of vehicles per unit determined in the statistical analysis varies from a low of 0.2 vehicles to a high of 2.0 vehicles per unit

Both residents and developers saw a need for additional bicycle facilities, with residents indicating a need for secure indoor parking as a very desirable amenity. Most residents will store their bike in their apartment rather than in the less secure parking provided by their building. Several times, interviewees raised the point that, for the income-restricted buildings, they feel that the cost for parking is far too high for the many families that live there and own a vehicle.

Both residents and the Overlook Neighborhood Association indicated that are not as concerned with the effect of one building parking impact; rather, it is the effect of many of these developments being built in the same area.